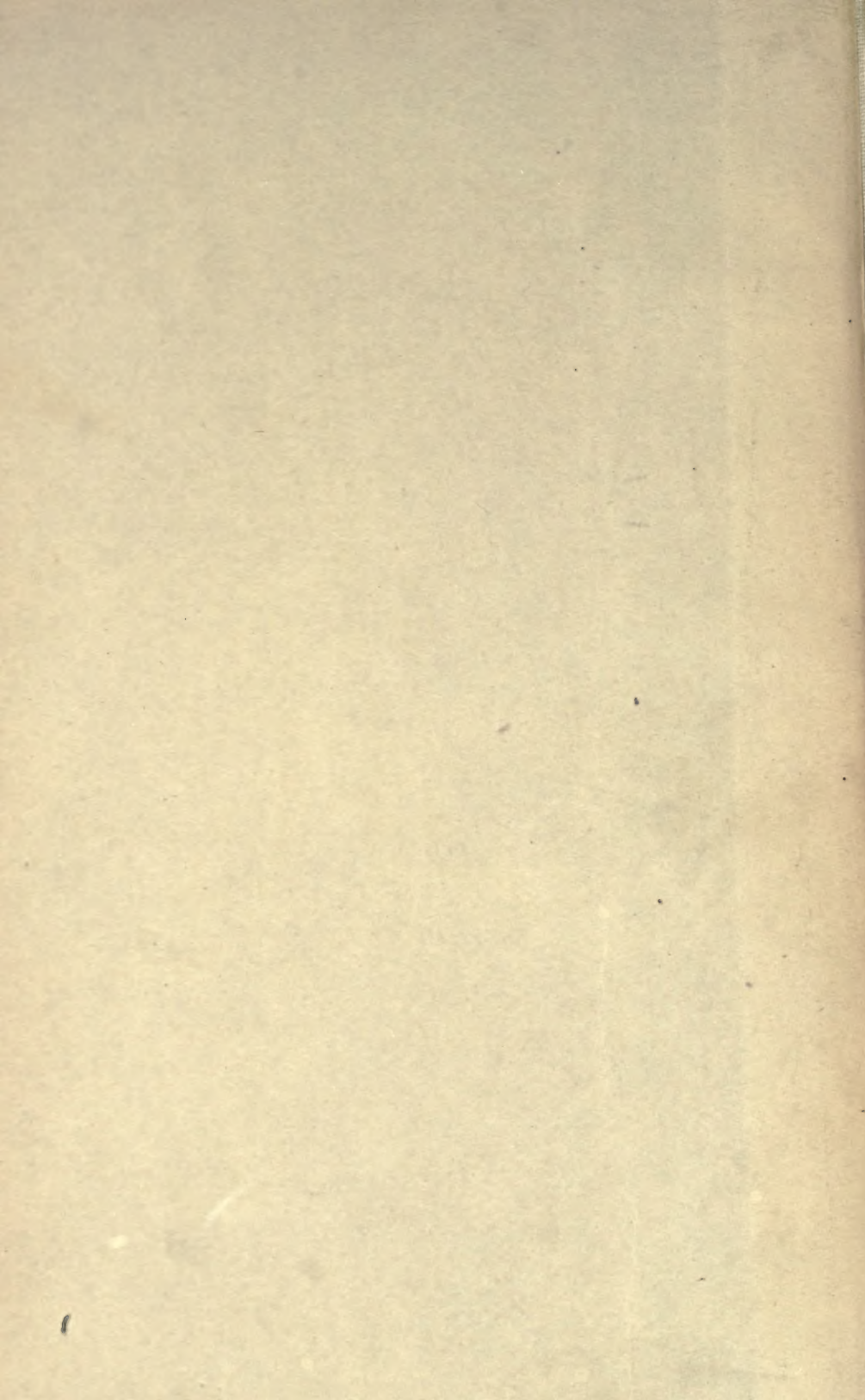



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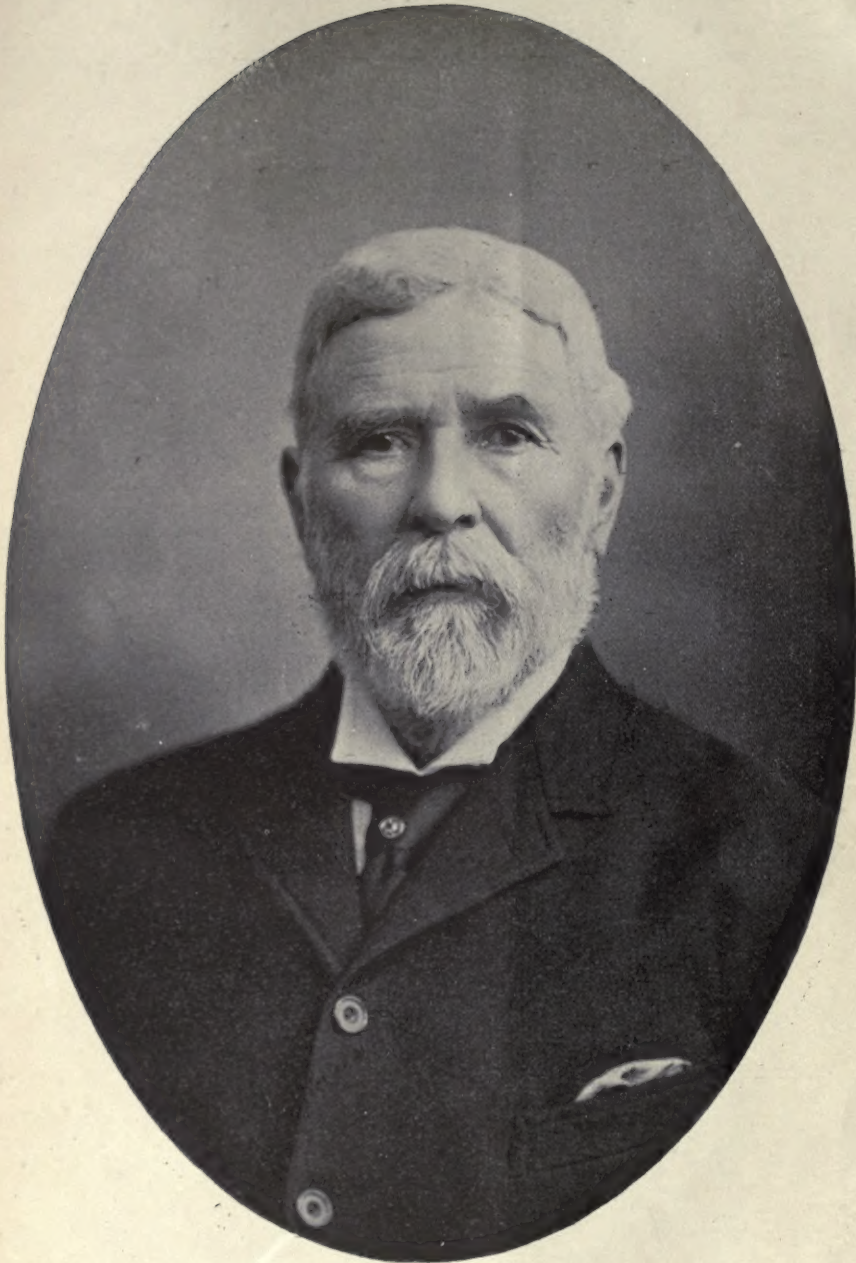
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(Frontispiece.)



HIRAM ROBINSON,
President of the Hawkesbury Lumber Company.
President of the Canadian Forestry Association, 1903.

REPORT

OF THE

FIFTH ANNUAL MEETING

OF THE

~~CANADIAN FORESTRY ASSOCIATION~~ ASSOCIATION

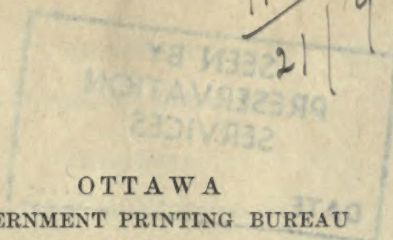
ERRATA.

Page 82, 13th line from bottom read "In Snow Lake we have the large trout (Touladi) (*Salmo namaycush* and possibly "

Page 86, Second last line, for "thirty-five" read "five"

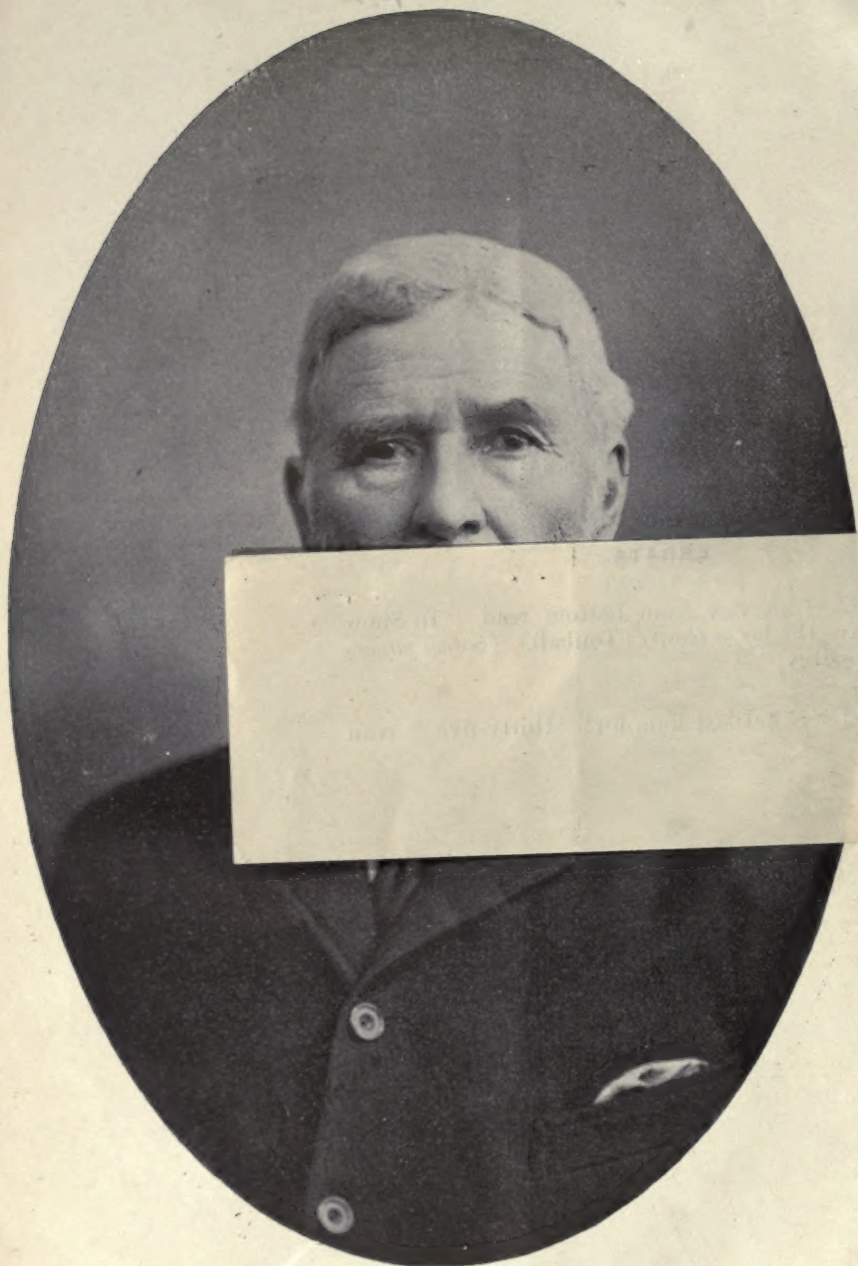
11, 1904

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OTTAWA
GOVERNMENT PRINTING BUREAU
1904

(Frontispiece.)



HIRAM ROBINSON,
President of the Hawkesbury Lumber Company.
President of the Canadian Forestry Association, 1903.

F. D.



REPORT

OF THE

FIFTH ANNUAL MEETING

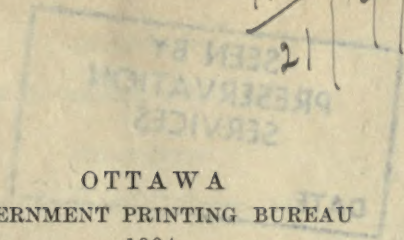
OF THE

CANADIAN FORESTRY ASSOCIATION

HELD AT

TORONTO, MARCH 10 and 11, 1904

118482
21/9/11



OTTAWA
GOVERNMENT PRINTING BUREAU
1904



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DATE

CANADIAN FORESTRY ASSOCIATION.

OFFICERS.

PATRON:

HIS EXCELLENCY THE GOVERNOR GENERAL.

HONORARY PRESIDENT:

William Little, Westmount, Montreal.

PRESIDENT:

Aubrey White, Assistant Commissioner of Crown Lands, Toronto, Ont.

VICE-PRESIDENT:

E. G. Joly de Lotbinière, Quebec.

PROVINCIAL VICE-PRESIDENTS :

Ontario.—Hon. E. J. Davis, Toronto.

Quebec.—Hon. S. N. Parent, Quebec.

New Brunswick.—His Honour J. B. Snowball, Lieut.-Governor, Chatham.

Nova Scotia.—Hon. J. W. Longley, Halifax.

Prince Edward Island.—Rev. A. E. Burke, Alberton.

Manitoba.—Major Stewart Mulvey, Winnipeg.

Assiniboia.—His Honour A. E. Forget, Lieut.-Governor, Regina.

Alberta.—William Pearce, Calgary.

Athabaska.—F. D. Wilson, Fort Vermillion.

British Columbia.—H. Bostock, Monte Creek.

Yukon.—The Commissioner, Dawson.

Keewatin.—The Lieut.-Governor of Manitoba.

BOARD OF DIRECTORS:

Wm. Saunders, LL.D., Ottawa, Ont. J. R. Booth, Ottawa, Ont.

Prof. John Macoun, Ottawa, Ont. John Bertram, Toronto, Ont.

Thos. Southworth, Toronto, Ont. Hiram Robinson, Ottawa, Ont.

E. Stewart, Ottawa, Ont. H. M. Price, Quebec, P.Q.

SECRETARY:

R. H. Campbell, Ottawa, Ont.

TREASURER:

Norman M. Ross, Ottawa, Ont.

NOTICES.

The objects of the Canadian Forestry Association are:

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-afforestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual dues are \$1.00. The Life Membership fee is \$10.00.

Applications for membership should be addressed to the Secretary,

R. H. CAMPBELL,

Ottawa, Ont.

The Sixth Annual Meeting will be held in Quebec, 9th and 10th March, 1905.

FIFTH ANNUAL MEETING

OF THE

CANADIAN FORESTRY ASSOCIATION.

The Fifth Annual Meeting of the Canadian Forestry Association was held in the Reception Room, Legislative Building, Toronto, on Thursday and Friday, March 10 and 11, 1904.

Among those present during the proceedings were: Hiram Robinson, Ottawa; John Bertram, Toronto; E. Stewart, Superintendent of Forestry, Ottawa; T. S. Young, Toronto; Reverend Father A. E. Burke, Alberton, P.E.I.; President James Loudon, University of Toronto; Aubrey White, Assistant Commissioner of Crown Lands, Toronto; Professor W. L. Goodwin, Kingston; Thomas Southworth, Director of Forestry, Toronto; William Little, Westmount, Que.; Professor Filibert Roth, College of Forestry, University of Michigan, Ann Arbor, Mich.; J. W. Wardrope, Ottawa; F. G. Todd, Montreal; W. C. J. Hall, Montreal; E. G. Joly de Lotbinière, Quebec; D. James, Thornhill, Ont.; James Gillies, Carleton Place, Ont.; N. Silverthorne, Summerville, Ont.; Norman M. Ross, Ottawa; E. J. Zavitz, New Haven, Conn.; Hon. F. E. A. Evanturel, Alfred, Ont., ex-Speaker Ontario Legislature; J. M. Macoun, Ottawa; George Y. Chown, Kingston; J. J. Bell, editor Pulp and Paper Magazine, Toronto; Thomas Conant, Oshawa, Ont.; Marcel Hoehn, Berlin, Ont.; D. J. Cooper, Collingwood, Ont.; Professor H. L. Hutt, Guelph; Professor Reynolds, Guelph; Samuel S. Cann, Toronto; E. B. Biggar, Toronto; H. S. Peart, Guelph; Anson Groh, Preston, Ont.; J. H. Faull, Toronto; Arch. Hislop, M.P.P., Walton, Ont.; W. C. Caldwell, M.P.P., Lanark; Professor Creelman, President Agricultural College, Guelph; Samuel Russell, M.P.P., Deseronto; W. A. Charlton, M.P.P., Speaker, Ontario Legislature; Professor Ramsay Wright, Toronto; Hon. E. J. Davis, Commissioner of Crown Lands, Toronto; William Houston, the *Globe*, Toronto; D. James, Toronto; G. B. Kirkpatrick, Chief of Surveys, Toronto; Professor Squair, University of Toronto; J. C. Shook, Dickson Lumber Co., Peterborough; Hon. John Dryden, Minister of Agriculture; Albert B. Leake, Inspector of Technical Education,

Toronto; Professor Galbraith, Toronto; W. Ryan, Toronto; E. W. Rathbun, Deseronto; T. W. Gibson, Director of the Bureau of Mines, Toronto; A. Mahaffy, M.P.P., Bracebridge; Valentine Stock, M.P.P., Tavistock, Ont.; W. Anderson, M.P.P., Peterborough; Mr. Nash Macpherson, Longford Mills; R. H. Campbell, Ottawa.

ROUTINE PROCEEDINGS.

The President, Mr. Hiram Robinson, took the chain at 10.30 on Thursday morning and said: Gentlemen, I have now to state that the general meeting of the association is open for business. The secretary will read the several communications which we have in our possession.

Mr. STEWART.—We have here a number of letters from persons whom we would like to have seen present. We will not read all of them, but there are a few who have taken a great interest in our association, and have been with us before, from the United States, and from different parts of Canada.

Letters of regret were read from Gifford Pinchot, Chief Forester of the United States; Col. W. F. Fox, Chairman of the New York Forest Commission; J. T. Rothrock, Superintendent of Forestry for Pennsylvania; Dr. B. E. Fernow; Dr. C. A. Schenck, and others.

The minutes of the previous annual meeting were read and adopted.

Mr. E. Stewart then read the report of the Board of Directors, which was as follows:—

REPORT OF THE BOARD OF DIRECTORS.

The Board of Directors of the Canadian Forestry Association beg to submit their report for the past year. Subsequent to the last annual meeting the following were appointed as vice-presidents for the provinces and districts, viz: Ontario, J. B. McWilliams, Peterborough; Quebec, Hon. S. N. Parent, Quebec; New Brunswick, His Honour J. B. Snowball, Lieutenant-Governor, Chatham; Nova Scotia, A. H. MacKay, LL.D., Superintendent of Education, Halifax; Prince Edward Island, Rev. A. E. Burke, Alberton; Manitoba, Major Stewart Mulvey, Winnipeg; Assiniboia, J. S. Dennis, Calgary; Saskatchewan, P. G. Laurie, Battleford; Alberta, William Pearce, Calgary; Athabaska, F. D. Wilson, Fort Vermilion; British Columbia, H. Eostock, Monte Creek; Yukon, the Commissioner, Dawson; Keewatin, the Lieutenant-Governor of Manitoba.

We regret to say, however, that during the year the death occurred of the vice-president for the district of Saskatchewan. He was one of the pioneers of Battleford, and as proprietor of the Battleford *Herald* was in an advantageous position to advance the interests of the forestry movement to which he gave great assistance. The recent death of the late Mr. E. W. Rathbun, of Deseronto, should also be mentioned, as he was for a time a director of this Association, and in this capacity, as well as a member of the Ontario Forestry Commission, did much to bring the investigation of improved methods of forest management to the prominent position which it holds in public estimation at the present time.

MEMBERSHIP GROWING.

We are pleased to be able to report that the membership of the association maintains a steady growth as shown by the following comparative statement:—

	1903.	1904.
Nova Scotia..	10	14
New Brunswick..	10	14
Prince Edward Island..	1	1
Quebec..	†54	98
Ontario..	128	134
Manitoba..	78	80
Assiniboia..	15	23
Saskatchewan..	4	3
Alberta..	†61	60
British Columbia..	17	25
United States..	17	24
England..	3	2
Germany..	1	1
	<hr/>	<hr/>
Total..	400	479
	<hr/>	<hr/>
Life members..	9	33

(†An error occurred in printing the number of members in Alberta and Quebec, respectively, in the report for 1903.)

The receipts for last year were \$1,117.96, and the expenditure \$395.80, leaving a balance on December 31 last of \$722.16. The account for subscriptions to *Rod and Gun* for 1903, about \$200, which is one of the liabilities for the year, was not received in time to be paid before the books were closed, and the balance is, therefore, less favourable by this amount. The receipts were largely augmented by a grant of \$300 from the Government of the province of Ontario, and of \$200 from the Government of the province of British Columbia, and more recently of \$200 from the Government of the province of Quebec, for which kind assistance your board has taken the opportunity of returning the grateful thanks of the association.

RE OFFICIAL ORGAN.

Your board have given careful consideration to the policy to be adopted in regard to the official organ of the Association which matter was left in their hands by the Association at the last annual meeting. With the object of ascertaining the opinions of the members of the Association on the question, a slip of paper was sent out with the circular calling this meeting, requesting replies to the following questions:—

1. Do you favour a continuance of the present arrangements with *Rod and Gun*?
2. Would you prefer that the Association should issue a paper specially devoted to its interests?
3. If so, would a paper issued quarterly be sufficient?

The number of replies received was 62, of which 23 replied in the affirmative to the first question, eight to the second, and 31 to the third. The replies came from all parts of Canada, and probably fairly represent the opinions of the members of the Association generally. It would appear that a large percentage of the membership of the Association would prefer to continue the present arrangement, although the larger proportion consider that a change would be advisable. If the financial support to the Association from the governments of the provinces is continued and becomes more general, its financial condition may warrant undertaking the publication of a forestry paper, but the scientific study of forestry is not yet far advanced in

Canada, and the securing of suitable material for a monthly publication on this subject would be a task of considerable difficulty, so that if any change is made it would hardly be possible to attempt more than a quarterly issue at the beginning. The matter is submitted to the Association for consideration and decision.

DANGER FROM FIRES AND RAILWAY CONSTRUCTION.

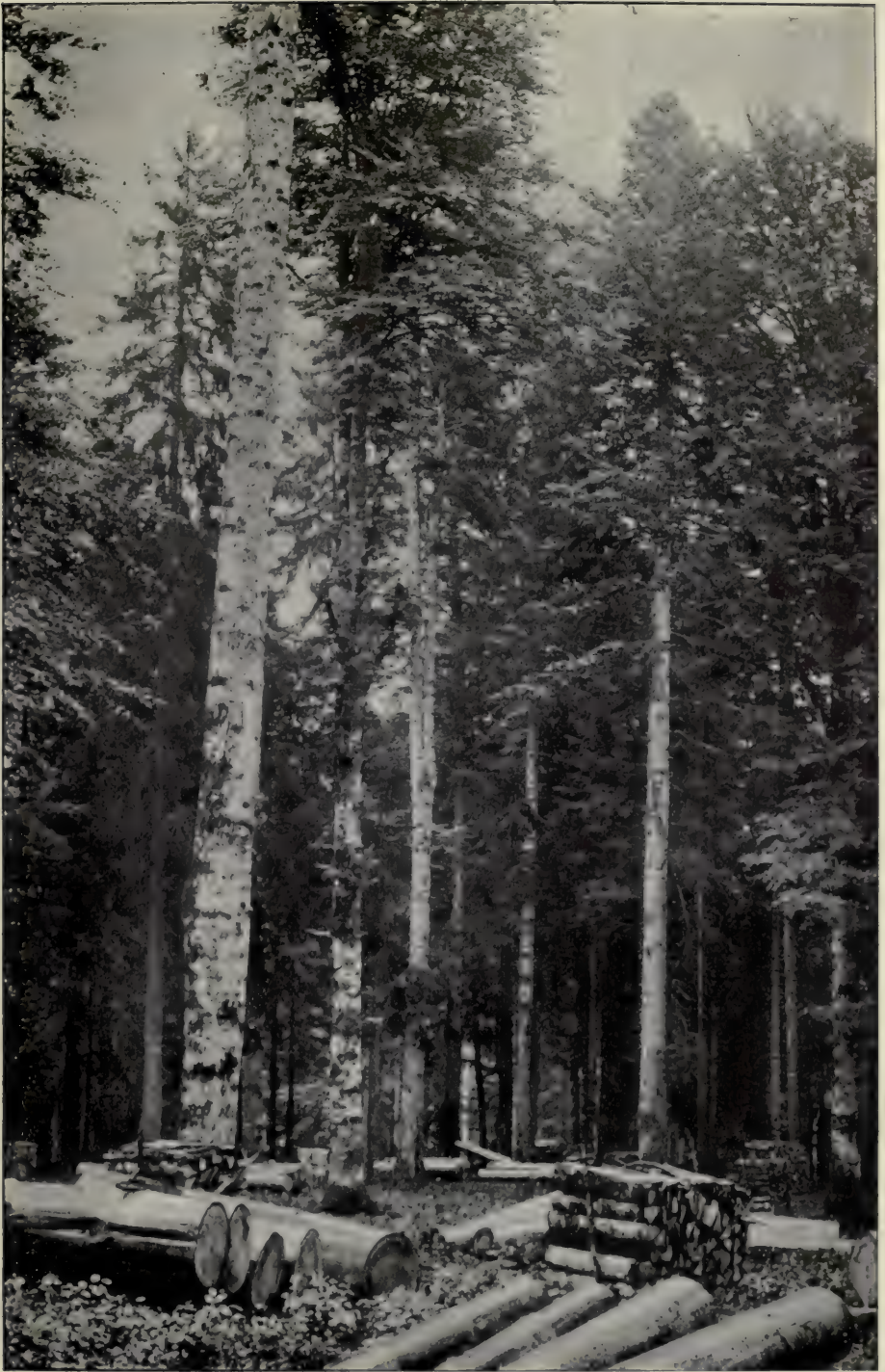
The unusually extended period of dry weather during the early part of the past summer caused a great deal of anxiety on account of the danger from forest fires. Fires were numerous and in places resulted in considerable loss not only to timber, but to the homes and property of settlers, and in some cases even villages were destroyed. The smoke invaded the cities and interfered seriously with navigation. All parts of the Dominion suffered to a greater or less extent. The exceptionally early beginning and duration of the drought made this result almost inevitable under present conditions, and emphasizes yet again the necessity for continued care and vigilance on the part of the public and officials. It may be stated, however, without fear of serious contradiction, that the fact that the loss during this trying time was not much greater may be fairly attributed to the work of the fire ranging staff, the effectiveness of which has been clearly demonstrated in spite of the fact that the numbers employed are quite inadequate for the large areas to be protected.

The proposed construction of a transcontinental railway through the forested districts of the northern part of Canada and the projection of other lines, brings into prominence the possibilities of danger to the forests consequent on the construction and operation of such lines. The establishment of a railway line through timbered land has usually resulted in disastrous consequences to the forest, largely owing to want of care on the part of the contractors and others in charge of the work of construction, as well as to lack of sufficient supervision by the companies operating the roads for the protection of this valuable national asset. This, therefore, seems an opportune time for the association to consider the question of the relation of the railways to the forest, and to give an expression of its views in such way as to influence the authorities, both governmental and railway, to take such action as may prevent the development and extension of the Canadian railway system which is now taking place from becoming an agent in hastening needlessly the destruction of what is one of the largest sources of revenue of the provinces and the basis of one of the greatest industries of the Dominion.

ADVANCES IN FORESTRY LEGISLATION.

The most important advances in forestry legislation during the past year in Ontario have been the addition to the Temagami reserve of a tract of 3,700 square miles to the north and west of the reserve as formerly established, making a total area of 5,900 square miles, or 3,774,000 acres, and the creation of a new reservation to be known as the Mississauga reserve to the north of Lake Huron, comprising an area estimated at 3,000 square miles, or 1,920,000 acres. The policy of the Government in regard to the administration of these reserves, as declared by the Commissioner of Crown Lands, is that the timber should be disposed of by the thousand on the stump and cut under the supervision of officers of the Government.

A notable event in the province of Ontario was the sale of timber limits held in December last, and the returns therefrom show the value which pine lands have reached. The pine on an area of 826 square miles was sold and realized in bonuses the sum of \$3,677,337.50, a general price of \$7 per acre, while in one special case the price reached the sum of \$50 per acre. This is clear evidence of the rapidly increasing value of timber lands, a movement which is general throughout the Dominion, and is a strong justification for urging the utmost energy and vigilance in protecting this valuable asset of the nation.



SILVER FIR—MATURE FOREST IN BAVARIAN ALPS.



In the province of Nova Scotia a Bill has been introduced into the legislature providing for the establishment of a fire ranging system. As in this province the forest lands have largely passed into private hands, the suggested system is based on the appointment of fire wardens for the counties, the larger forest areas in such divisions to assist in the payment of the service by means of a special tax. The interesting of the municipal authorities in forested districts in the prevention of fires is a desirable object for which as yet no fully satisfactory solution has been worked out in Canada, and it is one deserving attention and which might very well be made a subject of special study by the association.

Your directors desire to draw the attention of the members of this association, as well as that of the public in general, to the fact that a commission was appointed by the Government of the province of Quebec, in March, 1902, to :

1st. Make a critical study of the law and regulations respecting public lands, roads and forests, colonization societies, works and roads, and the protection of settlers, as well as the carrying out of such laws and regulations;

2nd. To inquire into the number and causes of the difficulties between settlers and holders of timber licenses, and to advise upon methods for their prevention and removal;

3rd. To find out what are the sections of the country most suitable for colonization;

4th. To ascertain whether the present colonization roads are sufficient to give access to the good farming lands, whether the extent of surveyed land is large enough, and if the work performed by colonization societies deserves encouragement;

5th. To inquire whether in the interests of the colonization of the province it is expedient to contribute towards the building of certain bridges, and to grant subsidies in lands to certain railway companies;

6th. To study the new proposals or systems which may be submitted to it, and, whilst taking into account the financial resources of the province, to recommend those which tend to amend the laws and regulations so as to foster colonization and the development of forest industries.

The scope of the commission being a very wide one and the subjects to be investigated of vital interest to the province of Quebec in particular, and of interest to all the other provinces of the Dominion, the report of this commission will be looked forward to with great interest.

The province of Prince Edward Island has also appointed a commission whose duties are similar to those of the province of Quebec.

TREE PLANTING AND FOREST RESERVATION.

The operations of the Dominion Forestry Branch in connection with the tree planting scheme have shown steady expansion. This is clearly evidenced by the figures of the distribution of plant material. In 1901, the first year of operation, eighteen settlers were supplied with 63,780 trees, and for the present year, 1904, 1,030 settlers will be supplied, 1,700,000 trees having been provided for this purpose. The total distribution, including 1904, will be 3,210,467 trees and 1,518 lbs. of seed to 2,064 settlers. It is estimated that the applications for the year 1905 will reach the number of 2,300.

A recent estimate of the area of timber reserves under control of the Dominion places the figure at 15,135½ square miles, or 9,686,880 acres, 3,449,600 acres being in Manitoba, 5,612,800 in the North-West Territories and 624,480 acres in British Columbia. A decision has been reached to open the Rocky Mountains Foothills Timber Reserve to disposal under license. As this reserve controls the water supply of a large part of southern Alberta where irrigation is necessary for successful agriculture, the conditions are unique and the administration of this reserve should not be carried out on the same principles as are adopted in connection with other tracts.

Licenses should certainly not be granted without an inspection of the limits, and there should be such supervision of the operations as to prevent injury to the water supply, whether through increasing the danger from fire or otherwise.

GRATIFYING GROWTH OF PUBLIC OPINION.

During the month of February the secretary and assistant secretary of the association visited the maritime provinces with the object of bringing the work of the Forestry Association before the people there. At Halifax the delegates were given an opportunity of addressing the legislature, and in the evening, through the courtesy of the Legislative Council, a meeting was held in the historic chamber in which that body carries on its deliberations, and was largely attended by members of the legislature and by the general public. Meetings were also held at Mount Allison University, Sackville, and at St. John, New Brunswick, and a visit was paid to Fredericton. The reception given to the representatives of the association was everywhere most kindly and courteous, but it may perhaps be allowable to make special mention of the kindness of Hon. J. W. Longley, Commissioner of Crown Lands for Nova Scotia, to whose energetic and enthusiastic assistance the success of the efforts of Dr. A. H. MacKay, the vice-president of the association, to organize the meeting at Halifax was largely due. From reports since received, the meetings have resulted in a much greater and more widespread interest in the forestry movement and the Forestry Association.

The time seems to have arrived for a more systematic and scientific study in Canada of the conditions of reproduction and development of the forest, so that the data may be available on which to base plans of management. The public interest in the subject is growing in a gratifying manner, but in order that wise action may be taken in silvicultural operations the information at the disposal of the authorities should be much more exact and definite than such as is now available. The association might very well bring this matter specially to the notice of the governments, so that steps towards this end may be taken with as little delay as possible.

The beautifying of our cities and towns by the planting of trees in the streets and parks, and the care of such trees when planted, is one of the objects which by its constitution this association wishes to forward, and, with the purpose of bringing it more prominently before the association and the public, a paper dealing with this subject has been included in the programme of the annual meeting. Municipal authorities display a great deal of laxity in this direction, and the efforts made by them to improve the trees are sometimes woefully and ignorantly misdirected, if not positively harmful. This Association should co-operate heartily with the Civic Improvement Leagues and such other organizations as are making efforts to have better management provided for.

The thanks of the association are due to the railway companies of the Dominion, who have kindly again granted single fare rates for the annual meeting, this privilege being extended to Manitoba and the North-west Territories, in addition to eastern Canada; to the press, which has shown great courtesy to any request from the officers of the association, and has assisted materially in placing its work before the public, and to kindred societies from whom assistance has been received in many directions.

DISCUSSION OF DIRECTORS' REPORT.

Mr. STEWART.—I beg to move the adoption of the report.

Mr. WHITE.—I second the motion.

The CHAIRMAN.—Mr. Stewart moves the adoption of the report and Mr. White seconds. Is it the pleasure of the association to adopt the report?

FATHER BURKE.—I would move that the report be received and discussed clause by clause.

Mr. WHITE.—On a motion to adopt the report it can be discussed as widely as it is desirable to discuss it.

The CHAIRMAN.—The report is now open for discussion. I notice by the programme that the president is expected to make an address. However, I have not been very well, and I feel that the report covers pretty much anything that I could say. Therefore, I think the association will excuse me from making a lengthened address, further than to say that last year, at the annual meeting it was decided to hold the present annual meeting in the city of Toronto, the capital of Ontario, and we were all pleased to be able to fall in with that view, and very highly pleased to see how well the association has been received in the city of Toronto.

It is a most important matter, this matter of forestry. I am not going to make a speech about it, but I do not think there is anything that the people in Canada should think more of than presenting their views and securing for themselves that great heritage which is given to us in this great Canada of ours. And the object of the association is not only reforestry, but that greater question, perhaps, the taking care of the forests we now have, and assisting nature in her work; allowing the seedlings to come up and take the place of the older trees, and using every care possible in that respect.

But then again the greatest danger which appears to our common country is that from fire. It is started in various ways, some of them, it would seem, perhaps, for the time, legitimate, in the matter of clearing land—which cannot be helped. But that could be done at the proper time. But the great danger is from pot-hunters, and persons under the name of settlers, who go in and start fires with the view of making little homes in places where they never should go, thus burning over areas of country which are lost to the people of Canada.

And another great danger we find is that from railways. It will surprise some here, perhaps, for me to tell them that last year on a certain railway in the Ottawa valley a fire, and a very bad one, started on the line of railway, and that that fire was started, not by lumbermen, not by pot-hunters, not by settlers, but by the railway men themselves. They did this, of course, from their point of view, in a way which was right; that is, to take out the old ties and place them in piles along the lines of railway and, at any time that suits the section master, to burn them. Now, they started fires in this way on the line of railway, and rangers were immediately sent to put out the fire. And while they were engaged on the upper end of the line the section men were starting other fires at the lower end. To my mind this is most criminal, and a great danger to the forests is in that regard. The general manager of the railway knew nothing about that, and the moment it was brought to his notice the company gave it strict attention, and very promptly discontinued the practice. But the very fact that these men had not been warned shows that there was something wrong. Now, the construction of railways, the clearing of land, under-brushing, the smudges made by the men during fly-time, and smokers—all these are great dangers to our forests, and, indeed, some lumbermen who have bought very largely

in timber berths in the past year, have, if I may use the term, taken their business lives almost in their hands, and are at the mercy of such men as I speak of. Now, I cannot do more than to impress this upon every one, because I feel that the Government officials are doing their best, and they are united with the lumbermen and with others, to prevent these fires, but in spite of all we can do we require public attention to go with them, because they require help in this matter of fire protection. I did not intend to say much at this juncture. Perhaps at some other time during the meeting I shall make some further remarks. The association may now discuss the matter of the report of the board of directors.

FATHER BURKE.—Mr. Secretary, I think it would be advisable to take up the report clause by clause. There are a great many matters referred to; they are distinctly divided; and there are clauses which the association might possibly like to say something upon.

Mr. STEWART.—Which do you refer to?

FATHER BURKE.—There are the deaths which have occurred.

Mr. WHITE.—I should think, Mr. President, that there is no objection to disposing of this report clause by clause, if it is considered necessary.

The CHAIRMAN.—With regard to the deaths which have occurred, the report says: 'We regret to say, however, that during the year the death occurred of the vice-president of the district of Saskatchewan. He was one of the pioneers of Battleford, and as proprietor of the Battleford *Herald*, was in an advantageous position to advance the interests of the forestry movement to which he gave great assistance. The recent death of the late Mr. E. W. Rathbun, of Deseronto, should also be mentioned, as he was for a time a director of this association, and in this capacity, as well as a member of the Ontario Forestry Commission, did much to bring the investigation of improved methods of forest management to the prominent position which it holds in public estimation at the present time.'

FATHER BURKE.—I might say, Mr. President, that I think it necessary that the Association should put itself on record as to these deaths, and I would, therefore, move that a committee be appointed to draft resolutions to cover that matter.

The motion was agreed to and the chairman nominated Father Burke and the secretary to form the committee.

The CHAIRMAN.—With regard to the paragraph touching the membership of the Association, I can only say that, to my mind, the membership ought to be multiplied by ten, or even by a hundred, and in due time I think we will get that number, because people are coming alive to the necessity of forestry work and planting wherever they can plant.

FATHER BURKE.—I would like to say, so far as Prince Edward Island is concerned, that we have only one member. At the same time I may say that we have not increased our membership, principally because we have not many advantages to offer people until we can get the Association to come down and look us up. I just wish to

make that explanation so that Prince Edward Island will not be regarded as a one horse affair.

Mr. LITTLE.—There is one thing I can say. That is, that I find people are a little more inclined to become members of the Association. When I first tried to get people to take an interest in forestry, the first gentleman I spoke to said, 'Mr. Little, to be candid with you, I do not care a rap if every tree in Canada was cut down to-night and burned up to-morrow morning.' Now, that was a few years ago. Shortly after our meeting in Ottawa last year, I called upon a bank manager there and asked him if he would not become a life member to help us along. He replied, certainly, I will do so with much pleasure, at the same time remarking that we were doing a good work; he also said that not feeling very well one day he remained at home, and happening to see a copy of our forestry report on the table, took it up and did not lay it aside till he had read every word of it. With others, however, I was not so successful, for on applying to an Ontario member of parliament, he said he had no use for forestry; he had to devote his thoughts to politics. Another from the east said he knew all about it. No one could teach him anything about forestry. On my return to Montreal I wanted a member of the Quebec legislature to interest himself in the subject, when he exclaimed, 'Have I not enough to think about without troubling about the timber!' But as a fact there is now beginning to be an interest taken in the work, and it is less difficult to get people to become members of the Association. I have been endeavouring to get as many as possible to become life members in order to increase our funds—we can get ordinary members without much trouble.

The CHAIRMAN.—I may say that Mr. Little has done very well in regard to life members. He has added very largely to our list, and that means a great deal.

FATHER BURKE.—The membership from Prince Edward Island is entirely of the life class. (Laughter.)

Mr. WHITE.—Of course we have two objects in connection with membership. The one is to get sufficient funds to enable us to carry on the work of the Association, and the other is to induce people to become life members to take an interest in the work of the Association. I think the latter class is the more important of the two, because I fancy we shall be able to get enough money to run the Association, if I may put it that way, but I think if we sent out a circular to all the members of the local legislatures and the Dominion parliament, and to the men who are interested in the lumber business directly and indirectly—that is, the bankers, whom Mr. Little has referred to, and others—that we could very largely increase our membership. And I think it is desirable that we should increase, not so much from a monetary point of view, as to the fact that, if we had these members, they would take an interest in the work of the Association.

Mr. LITTLE.—With regard to what Mr. White says it is perfectly correct, now that the governments have come forward and given us enough money to get along on. What I wish to do in connection with the banks is to get life members from a number of their managers. The general manager and the assistant manager of the Bank of Commerce here both became life members, and sent in the first annual fees for ten

local managers for ordinary membership, and I am endeavouring to get other banks to do the same. (Applause.)

The clause of the report dealing with the receipts and expenditure was adopted without discussion.

THE OFFICIAL ORGAN.

On the reading of the next clause, dealing with the establishment of an official organ,

Mr. LITTLE said: I think it would be well to continue the arrangement with *Rod and Gun* until such time as we come to a thorough understanding as to what we should do in the future.

FATHER BURKE.—As far as that is concerned, Mr. President, speaking for myself personally, I cannot see that the present publication is of very much value at all to the spread of forestry about the country. I have received the publication, and occasionally a special paper on forestry appears, spread here and there throughout the publication without any regard to the interests of the Association. Besides that the vital work which the Association is doing, that which would bring it into complete contact with the people, is not brought out, and, so far as forestry is concerned, I think the Association might just as well be without an organ at all as such an organ as that. I think there is a good deal of information which ought to be spread throughout the country by bulletins from this department. I receive bulletins of the department of forestry from the United States, and I think, with very little trouble a great many of these things could be brought down and adapted to our circumstances, at very little cost, and I think if the Association would take a broad view of this thing and get money enough to get an organ of their own and put things before the country it would increase forestry interest all through the land.

Mr. JOLY DE LOTBINÈRE.—I do not think I can entirely agree with the last speaker as far as *Rod and Gun* and its usefulness to the question of forestry are concerned. We all know perfectly well, I think, and will admit it, that if we issue a quarterly, monthly, or a weekly dealing simply with forestry matters, it will not reach the public in a general way. It will interest a certain number of gentlemen who are actively and sincerely interested in forestry. They take that up and study it with care. But we want a medium to bring the matter before the public, and I think an attractive paper or periodical such as *Rod and Gun*, if we elaborate it a little further, is exactly the medium to popularize the question and bring it before the people. *Rod and Gun* has a large circulation, is widely disseminated, and its sphere of influence can be largely increased. Now, we are getting into fairly good financial position at the present moment, and I think perhaps our contribution to *Rod and Gun* can be largely increased another year, and a large portion of *Rod and Gun* devoted to forestry and so on, in which everybody takes a certain amount of interest, they will also pay more attention to those questions which are connected with forestry, and I think a publication of that kind is a proper medium to bring the matter before the people. I am in favour of *Rod and Gun* or any similar publication which will help to popularize forestry.

Mr. CHOWN.—I would like to suggest that we have what we might call an editorial secretary, whose duty it would be to prepare and collect the material for publication. In connection with that we might also include Father Burke's suggestion, that it would be his duty to issue bulletins and have them sent out. We might be able to arrange with some of the departments to have them franked for circulation. That is the next step. I understand our officers are going to make an attempt to largely increase our membership next year. That is a good thing, and then, if we had someone to help as a writer, to undertake the editorial work and popularize *Rod and Gun* we will be taking a long step forward.

FATHER BURKE.—I would like to ask what the circulation of *Rod and Gun* is, where it goes, and to whom?

The CHAIRMAN.—Perhaps the treasurer could give you some information, or Mr. White.

Mr. WHITE.—I was going to say, in connection with this matter, that the arrangement which we made with *Rod and Gun* seemed to be the only arrangement that could be made at the time it was made, because we could not at that time establish anything in the nature of an organ of this Association. I am not able to say just what the circulation of *Rod and Gun* is, but, at all events, its subscription price, I think, is a dollar per annum, and a copy of that paper is sent to every member of the Association, and, as we have heard to-day, there are over four hundred members of the Association. Now, the amount we pay *Rod and Gun* to be our organ is, I think, not at all extravagant, having regard to the fact that \$400 worth of the paper is sent broadcast throughout this Dominion to different people. I have always thought that it might be made an admirable medium for disseminating knowledge in connection with forestry matters, because in the first place the men who buy it, sporting men, a good many of them, are constantly in the forest and take an interest in forestry matters, and could contribute material which would be of interest, and in the second place, they could assist us in everything pertaining to forestry. I do not think, sir, that we have arrived at that position where we are able to maintain an organ of our own, because gentlemen must remember that it entails a good deal of labour to get up a magazine or a paper once a month, or even quarterly, and we could not attempt to do anything of that kind unless we were to appoint somebody to do the work. Now, if this Association is in a position to pay a gentleman who shall devote his entire time to writing matter for a monthly or quarterly magazine, then I say let us do that. But, I do not think we are able to pay a salary sufficient to secure the right man, and, therefore, I think what we ought to do is to continue the present arrangement endeavouring to get more forestry matter into *Rod and Gun*. As it is at present, we see an article one month and there is none the next. What we ought to do is to endeavour to get some interesting articles into every issue of the paper. I think we cannot, at the present time, attempt to establish an organ of our own.

Professor GOODWIN.—Would it be possible to induce the proprietors of *Rod and Gun* to modify the title to indicate that it is the organ of the Association. *Rod and Gun and Forestry*, for instance. Some such title would indicate the interests of forestry. That might answer a very good purpose. The difficulty I find with *Rod and*

Gun is somewhat the same difficulty that has been suggested here, that is that it is more rod and gun than the forest. If the title were modified, and if the part devoted to forestry interests were given, as has been suggested, a distinct heading, and if the readers could always count upon having something interesting under that heading, I think the present arrangement would work out very well.

Mr. LITTLE.—I think we should endeavour to get along for the present year. We may stand better another year, but for the present I think we should go on just as we are.

Mr. CAMPBELL.—Mr. Chairman, we are travelling over the same old ground in the matters we are bringing up in connection with the arrangement with *Rod and Gun*. It was arranged that there should be a special department of that publication devoted to forestry and the interests of the Association, for which we were to pay them at the rate of 50 cents a year for each member. That arrangement existed for a short time, and then, without consulting us, the articles were all mixed up in the paper without regard to the special department. I wrote to the editor of the paper drawing attention to the violation of the agreement, but he said it was impossible to carry out the first arrangement. As I could not make any other agreement, I insisted that there should be some way of bringing the Forestry Association prominently to the front in the magazine, and the arrangement made then was that all articles on forestry should be credited to the Association specially, and that they should give us a full page advertisement of the Association in each paper. That we are getting. In regard to the change of title of the paper, we spoke of that too, but it was pointed out that *Rod and Gun in Canada* was the title under which the paper had been established and which proved most attractive to those it wished to reach, and that no change could be made. In fact, I have tried all the points mentioned this morning, and it has been impossible to work them out. In regard to a publication of our own, I do not think we are in a position to undertake it. I think we ought to make a strong effort to increase the membership and place ourselves in a better financial position. Then we might possibly be in a position to consider the proposition. Publishing a paper in connection with forestry would entail a great deal of work for some person, and, as far as I am concerned, I would not like to undertake it, whether asked to or not. As far as I have been able, with the time at my disposal, I have endeavoured to edit the matter for *Rod and Gun*, but I am not a member of the forestry branch, nor can I devote my entire time to the work of the Association. I have to do it largely in addition to and outside of other official duties, and acting as secretary and treasurer and editor, I have not been able to give very much time to the different duties. It is not easy, at the present time, to get articles on forestry. I have communicated with different persons and tried to get such articles, and find it an exceedingly difficult thing to do. It means, generally, that I have to write as many letters and do as much work as if I had written the articles myself, and in some cases, I have not got them at all. It would not be a very easy matter to conduct a paper of that kind, and I hardly think the Association is in a position at the present time to do it. Increase the membership of the Association; get it in a stronger financial position, and then we will be able to do something.

FATHER BURKE.—Can you tell us the circulation of *Rod and Gun*?



BEECH—NATURAL REPRODUCTION BY GROUPS FROM MATURE TREES, GERMANY. [p. 16]



Mr. CAMPBELL.—The circulation is about 5,000. I think the subscription circulation would be probably between 1,500 and 2,000.

Mr. BERTRAM.—What about getting additional matter ?

Mr. CAMPBELL.—Well, that is largely a question of supply. The demand is there all right, but the supply is not there to meet it.

FATHER BURKE.—If you have no time to do that, you cannot get time for it, and probably cannot get the money from the Department to help you.

Mr. CAMPBELL.—Not just at present.

Mr. MACOUN.—Mr. Chairman, we should consider some of our duties. One of our duties is to spend the money we get. I think in an organization of this kind there is every excuse for living up to the last dollar, and, if necessary, going into debt in order that it may ask for more money. If ever an organization had an excuse for doing this, I think this is the one organization. We find that our subscriptions from membership—which we hope to largely increase during the year—is ample to run our affairs. Now, with what face can we go to any Government, either Provincial or Dominion, and ask them for money ? If we spend our money, and then go to the representatives of either the Dominion or Provincial Government and say, 'During the year we have had a thousand dollars; this is what we have done with it. In order to continue that work and enlarge on it in certain directions'—which you could point out—'we need more money.' In that way I think we would not only get the grant which we have received, but would get larger grants from those who give us nothing. If you went to the governments of Quebec, British Columbia, Ontario or any of the provincial governments, and I were in authority, I would ask, 'What did you do with the money we gave you last year ?' Pile up a balance of \$900 ! Now, I am not saying whether we should continue with *Rod and Gun*, or establish a paper of our own. I am editor of a publication which publishes monthly, of 20 or 30 pages, and costs \$250 a year. Now, we have \$700 of a balance no matter what form our publication would take. Whether we increase space with *Rod and Gun*, or publish quarterly or monthly, \$500 would be ample, not only to publish as much matter as we would have, certainly three or four hundred pages—300 pages at least and, if necessary, pay an editor. Now and to-day is the time to settle what we are to do. If we put it off for another year, we must consider definitely that we have lost one year more. Whether we issue bulletins, as Father Burke has suggested, or get more matter into *Rod and Gun*, I think it is a shame that an association organized for the purposes that this is organized for, should carry over from year to year a balance; the little sum of \$300 expended in the necessary running expenses of an organization which meets once a year. Of course, we have our annual report, which shows nothing but the proceedings of the Association and the papers read before it, but the time has come for a more general dissemination of knowledge than we could possibly get now from Government sources, and I think every one of the provinces would be delighted to give this organization a large sum, provided at the beginning of the fiscal year we could go to the different departments and show each what has been done. I think we can do that, but I cannot see with what face the Association can do this now. We are a self-sustaining organization, and I do not see why we should put this matter off for another year.

Mr. LITTLE.—The only object in putting it off for another year is to see what we can do.

Mr. MACOUN.—We have all had notice of it, and I do not see why we cannot settle the matter now. The \$700 balance is ample to publish a paper of our own. This could be done for \$1.25 a page. Why should we wait longer?

Mr. LITTLE.—I think the position taken by the Association is the right one.

Mr. MACOUN.—One of the troubles we have is a very important one—the difficulty of getting matter. If we start a publication of any kind, or enlarge the scope of *Rod and Gun* we should do it gradually. We can do it nicely for \$500 a year. That is ample to pay for not only all the printing, but also an editor—if it is necessary to have an editor—and we could not have a better one than our secretary, Mr. Campbell. Why should we wait if we have \$500? We would have the same difficulty at any time in getting matter. If we start a publication of our own, or ask *Rod and Gun* to give us 10 or 12 pages a month—I do not care what form it takes—we have something to grow on, and it would give us a good leverage. The articles going into *Rod and Gun* are not reaching the people interested in forestry, unless they are members of the Association. Who subscribes for *Rod and Gun* for forestry articles? I dare say no one person other than the members who want to know something about forestry, and what is being done about forestry in Canada, would subscribe for *Rod and Gun* for that purpose.

Captain SMITH.—It seems to me that what the Association wishes to do is to reach people who have never heard of the work of forestry. The means of reaching these people you will find in the ordinary newspaper press of the country. You should have some means of preparing this matter for the newspapers. This is a public matter, not a personal affair at all, and I think you could very well go to the Government and ask them to appoint a special officer in connection with one of their departments to prepare this matter for you under your direction, and have it sent broadcast to the press of the country. In addition to that you could issue bulletins and send them to the farmers. The bulletins issued by the Department of Agriculture reach 25,000 of the best farmers in Ontario, and are read by these men. In addition to that I think you should have somebody go on the staff of Farmers' Institute lecturers to preach this gospel all over Ontario.

FATHER BURKE.—Do not confine yourself to Ontario, for gracious sakes.

Captain SMITH.—I am speaking of the Dominion as a whole, because you have the means to do that work all over the country. I was speaking to the president of the Farmers' Institutes yesterday, and he said he would be glad to make some arrangement of that kind. The institute has done wonderful work in these days. It has changed the whole face of the country. You can bring the matter before the farmers in this way.

Mr. STEWART.—I think this is perhaps one of the most important matters that will come before this meeting. It is one that has been considered at different times and referred to committees and referred back to the general meeting, and we have now

the opinion of a number—not by any means the majority of the members—some sixty or seventy, out of four or five hundred, that have expressed an opinion. Now, we must consider in the first place that this is a Canadian Forestry Association. It does not belong to any one province. When forming this Association a few years ago, the founders took that view in the first place, that it would be impossible to have a successful provincial forestry association, and we formed one for the whole Dominion, and having officers in every part thereof. Now, if it were either Ontario, or Prince Edward Island, or the North-west Territories, it would not be so difficult to have an organ. The North-west Territories and Manitoba would say to publish in an agricultural paper. The lumbermen would probably prefer to have the *Canadian Lumberman*. The scientific men would probably prefer to have some of the scientific journals. You, therefore, see the difficulties arising from the different classes, and we have to arrive at a medium that will please the great majority of our people. Now, with reference to bulletins being sent out, which the last speaker referred to. We are sending out bulletins; the Ontario Government are sending out bulletins through the Department of Agriculture. Mr. Southworth is sending out matter regarding forestry all the time. But this is an organ of the Association, to give the views of the Association and educate the people along forestry lines. We started with *Rod and Gun* a few years ago. They gave us a portion of their paper and afterwards changed the arrangement and dispose of our matter anywhere throughout the publication. There is a little of something every month, and if we are to continue with *Rod and Gun* they must give us a number of pages devoted wholly to that object. That which we have is lost at present in it. If we can afford it I think we should have at least a quarterly publication of our own. My reason for that is this: We would receive more attention from the press if we had a distinctive paper of our own. One of the objections to having an organ of our own was that we would not get readers outside of our own organization, but if we had an organ of our own devoted entirely to forestry, I think you would find the press of the country would take that up and in that way the objects of the Association and the work we are doing will receive greater notice than in any other organ. Now, I know Mr. Campbell has had a very onerous task indeed in preparing the matter for *Rod and Gun*. It does take a great deal of time. I am not perhaps well enough versed in those matters to speak on the subject, but it does strike me that there would not be more work in preparing a quarterly than there would be in doing what he does at present for *Rod and Gun*. The question then is, would a quarterly be sufficient for our purpose? I am inclined to think that we could not, at present, publish a monthly. Now, there is just one other subject for our notice. There is in the United States a paper, formerly the forestry organ, now forestry and irrigation. It is a question whether irrigation is of sufficient general interest in Canada to warrant our joining with them in the publication of such a paper. I do not know whether it would be wise to do so in view of the fact that irrigation in Canada is not at present a matter of general interest. The lumbermen have an excellent medium covering a large portion of the country. It is just a question whether an arrangement with the *Canadian Lumberman* would not be better than *Rod and Gun*. It would not be one which would commend itself to the farmers, and people planting trees on the farm would not care for the *Lumberman* at all. So you see the difficulty in getting any one organ devoted to any particular

purpose that would be received by every part of the country. I just want to say that if we are to continue we must have a distinct portion of *Rod and Gun* set aside and distinguished as a forestry department. I do not know whether I would favour a quarterly, but it is for the Association to decide it, or refer it to a committee to act. I would, therefore, suggest to Father Burke, that the rest of this report might be left to a committee on resolutions. I have a committee named here, which I will move later, and Father Burke is among them. They can take up the report and report back again to the meeting.

Mr. LITTLE.—I think Mr. Stewart is right, and that we should have a committee appointed. If you have means enough to print a quarterly, do it. I would like to see the name 'Forestry' going around. Heretofore, people have seemed to think the idea of growing forests visionary.

FATHER BURKE.—Mr. Secretary, when does your contract with *Rod and Gun* end?

Mr. SOUTHWORTH.—Mr. President, if I am in order I would move that the present arrangement with *Rod and Gun* be terminated, and that a special committee be appointed to report at a subsequent meeting of the Association at this session as to the method to be adopted in the matter of a publication of the aims and objects of the Association, the committee to report to-morrow morning at the morning session, or this afternoon.

Mr. STEWART.—The way I understand Mr. Southworth's motion is that the present arrangement with *Rod and Gun* be terminated. If we carry that, that ends the present arrangement with *Rod and Gun*.

Mr. SOUTHWORTH.—Yes, that the present arrangement be broken.

Mr. JOLY DE LOTBINIÈRE—This motion will practically terminate all our arrangements with *Rod and Gun*. Don't you think it would be just as well to leave to the committee the advisability of terminating the arrangement?

Mr. SOUTHWORTH.—Terminate them if you wish. I am anxious to get something done.

FATHER BURKE.—I second that motion for a committee.

Mr. STEWART.—I want to know what Mr. Southworth means by the motion. Does he mean that this committee would not be allowed to deal with *Rod and Gun* at all?

Mr. SOUTHWORTH.—It means that the present arrangement is unsatisfactory and ought to be terminated. If we like to renew it that is another matter.

Mr. JOLY DE LOTBINIÈRE.—I withdraw my opposition. I understand Mr. Southworth's position.

The CHAIRMAN.—Is it the pleasure of the Association that this motion of Mr. Southworth's be carried?

Motion agreed to.

The CHAIRMAN then named Messrs. Southworth, Mr. Joly de Lotbinière, Rev. Father Burke, Mr. Campbell, and Mr. Macoun, as the committee to deal with the publication question.

Mr. STEWART.—Mr. President, I beg to move that Mr. Aubrey White, the president, Mr. John Bertram, Mr. Joly de Lotbinière, Mr. R. H. Campbell, Rev. Father Burke, and myself, be a committee on resolutions, to report at a later date.

Mr. LITTLE.—I second that motion.

Motion agreed to.

OUR NATIVE FOREST TREES AND THEIR USE IN ORNAMENTAL PLANTING.

Mr. F. G. Todd, landscape architect, Montreal, contributed the first paper to the proceedings of the Association, on the above topic.

When Mr. Campbell first asked me to say a few words regarding the use of our native forest trees in connection with the planting of parks and private grounds, I was a little undecided how to treat the subject, for the reason that the planting of trees for ornamental effect is rather different from the planting of trees for commercial purposes, or for wind breaks and that sort of planting, as is so largely carried on in the west. However, I think we all realize the importance of planting trees in our cities and in our towns, along the streets and in the parks, which so many of our towns and cities have recently acquired. The use of native trees and shrubs has not been given the prominence that it should have received in the past. There has been a general impression that trees which come from foreign countries, and which possibly cost a little more, are more suited to planting out. But I think as a rule this is not the case, and the object of this paper is to urge the use of the native trees of Canada in the ornamental planting of our large parks.

The general effect and character of the park is too often lost sight of in a continual striving after striking details. Instead of considering broad effects and extended landscape views and dealing with broad masses of woods, with meadows and groups of trees placed so that their form and shadow produce a pleasant landscape, our parks are too often turned into a museum for different kinds of foreign trees and shrubs. Parks generally have a character of their own, some special feature, which, if properly treated, may be accentuated and give us a park which will express its dignity and character in such a manner that we will feel at once that here is a park, not simply a repetition, but which was designed to suit its peculiar location. Whether the special character of the park is due to some magnificent wood or whether it is due to extended views and broken topography, the future character of the park depends very largely upon the treatment which the existing woods receive and upon the trees which are planted from time to time to form new woods and replace the old and decaying ones. We are so accustomed to associating certain trees with particular scenes that when we find them under different conditions, or with different surroundings which do not seem appropriate, they do not give us the same degree of pleasure. The American elm, one of the grandest of our native trees, is almost always associated with pastoral scenes, standing singly or in stately groups in a meadow or overarching some farm house. To plant these elms as a forest, or on a steep and rocky hillside, will be to destroy their beauty and mar the whole character of the park.

The oak is one of the best trees for park planting: the red, the scarlet and the pin oak being the best. The white oak is slow of growth and difficult to transplant.

The maples, the beech, the American linden, and the black walnut are all beautiful in characteristic ways. The white willow is an artistic tree along water courses. Coniferous trees should be used only in masses. Street trees should be able to stand smoke and gas. The elm, the maple, the linden and the oak are useful for this purpose.

The CHAIRMAN.—We have heard the paper, and a very interesting paper it is, one which we may all profit by. I am not sure at what hour we should adjourn, and I am afraid that we may have to adjourn now. Some of the members of the committees are out at present and there is not the full attendance there might be for the discussion of this matter of tree planting for cities.

Mr. TODD.—If there is any question the members would like to ask me, I would be glad to answer as far as I am able.

Professor ROTH.—I would like to ask Mr. Todd what he has found to be the best method of planting out oak trees?

Mr. TODD.—The best effects are usually obtained from nursery grown trees, which can be planted up to 20 feet, when carefully done. The best effect is usually obtained from eight to ten-foot trees.

The morning session was adjourned at 12.30.

THURSDAY AFTERNOON.

The first business of the afternoon session, which convened at 2 o'clock, was the presentation, by Rev. Father Burke, of the report of the Committee on Resolutions, as follows:—

'Resolved, that this Association express its deep regret at the death of Vice-President Laurie, for the Saskatchewan district, and, also, that of Mr. Rathbun, of Deseronto, an ex-director of the association, whose best interests they have at all times so well and unselfishly served; and, further,

'Resolved, that a copy of this resolution be spread on the records of the Association and forwarded to the sorrowing relatives of our late lamented associates.'

Father Burke moved the adoption of the resolution and Mr. Stewart seconded. Resolution adopted.

PROPOSED OFFICIAL ORGAN.

Father Burke also presented the report of the committee having in hand the matter of the official organ, as follows:—

'Resolved, that we establish an official organ entirely devoted to forestry; and further

'Resolved, that the executive be and is hereby empowered to bring this about as early as possible, and make such publication as practical and universal as circumstances will permit.'

Father Burke moved the adoption, and Mr. Stewart seconded.

The CHAIRMAN.—The matter is now open for discussion.

Mr. BERTRAM.—One of the questions that came into my mind while thinking of the difficulties that exist in connection with a publication of that kind was this: Of course we want to get at the public as much as possible and if you adopt that resolution—which I do not get up for the purpose of objecting to, but of offering some suggestions to the Association—I do not very well see how you can get forestry literature brought together without hiring an editor. You would require to have an editor for the publication. Then there are two classes of people the Forestry Association would like to send the publication to, the lumbermen and the farmers. Now we have two organs that, if we could get the information in good shape, would be very glad to make arrangements for the publication of such matter. One of them is the *Canadian Lumberman*, and the other is the *Farmers' Advocate*. And they would reach just the class of readers we want to reach. Now, speaking of the *Canadian Lumberman*, I want to say that, in Ontario especially—I do not know what they are doing in Quebec—but in Ontario we have adopted the system of having libraries in our camps, and we want to send a good class of publication to the libraries. Speaking for myself, for instance, I send three daily papers to each of my camps during every winter. I send the *Canadian Lumberman* to the foreman, but we want to send a couple of copies anyway to each camp. In that way they would reach just the proper class of people. One of the greatest difficulties we have is the utter carelessness of the men themselves. We preach to them about it, but they will slash down the young trees in spite of all we can do, and we are only now getting them educated to spare them. A publication of that kind would be of very great value to men of this kind. And then the farmers have, no doubt, great need to be awakened to the necessity of planting on the rough spots on their farms, which are of a great deal more value for the growth of forest trees than they are for cultivation. If you had a series of articles on forestry in those papers you would get them into the hands of people who are really in need of education in that way. There is an awakening interest among the farmers in that direction. If we had such articles in these papers—the *Canadian Lumberman* and an agricultural paper—I think they would do much good. The articles would be of very great interest and would be published in the daily newspapers also, as these papers are looking for just such interesting articles as those. While I do not propose to make any motion against this, if it could be recognized by the committee and a way brought about whereby special publications of this kind, which really reach the people, could be utilized, I think it would be a great step forward.

FATHER BURKE.—I might say, as Chairman of that committee, that we considered every phase of the question which Mr. Bertram has so well put before this Association, and came to the conclusion that it was absolutely necessary that we should have an official organ. And this committee that has been constituted to carry out our object in that regard would develop the work of the Association on broad lines by communicating with those special organs which Mr. Bertram speaks of, matter from our publication and then getting it sent broadcast throughout the country; and that we would, as years went by and circumstances permitted, so extend and develop the arrangements for publication that it would meet all requirements. But for the present we thought that the only thing to do was that which we have done, and that is the reason we recommended that resolution in the terms in which it now stands.

Mr. STEWART.—Mr. Bertram has referred to one matter that I would just like to speak of. He states, for instance, that if we could have the forestry articles published in the *Farmers' Advocate* they would reach the agricultural class, and in the *Lumberman* it would reach the lumbering class. These are both large and very desirable classes to reach. Now, the difficulty in trying to publish in the *Farmers' Advocate* is this: it is only one of the agricultural papers in this country. In the North-west the *North-west Farmer* has a very large circulation and if you singled out the *Farmers' Advocate* there would, no doubt, be jealousy and a very great deal of criticism of the action of the Association in choosing one particular publication. That is the difficulty we have to contend with in the whole Dominion. If we publish in any one publication read in one province alone, it is read in that province, but outside of that members would get no benefit of it. It might be sent to them, of course, and the forestry matter would be of interest to them, while the balance would not. The idea is to have one publication devoted entirely to forestry, and we would certainly be able to publish enough extra numbers to distribute, I hope, to others than subscribers to a certain extent, and with certain articles marked, especially to the press in all the provinces. If Mr. Bertram had seen the difficulties that we had in that regard he would say that it is very difficult indeed to take up any one paper. I would be delighted to take the *Canadian Lumberman* for one section. It is an excellent medium for reaching the lumbermen, but I cannot see how, with one editor, we could look after publishing in different papers.

Mr. BERTRAM.—I should probably have elaborated my remarks a little more; I was rather hurried about it. It was by no means the intention to confine the publications to Ontario, or Ontario papers. The same thing can be done in Manitoba and the North-west and the Maritime provinces. They would be very glad to get the articles, and might pay for it, for that matter. Simply being acquainted with these two papers in Ontario I instanced them as being the two papers for this province. There would be no objection whatever to taking in any paper in the North-west, or other provinces.

Mr. STEWART.—Do you think it practicable for us to undertake arrangements with so many papers? We have had a great deal of difficulty in making arrangements even with *Rod and Gun*. Mr. Campbell is circumscribed with *Rod and Gun*. He is not the editor, and if they object to setting aside certain columns for our use he can do nothing. They also take the liberty of saying what articles they shall publish and what they shall not.

The CHAIRMAN.—Is there any further discussion on this important subject? I know it is the desire of most of us to reach the most suitable form of publication, and if there is nothing further to be said, I wish to put the resolution. Is it the pleasure of the Association that this resolution be adopted?

Resolution adopted.

THE TREASURER'S REPORT.

Mr. CAMPBELL.—Mr. Chairman, the report of the Treasurer was not laid before the meeting this morning in any formal way. If you will permit me, I will just read

the report, and it can be referred to the auditors by the meeting. It will only take a moment. This report, I may say, is for the calendar year 1903. Our financial year ends with the calendar year.

(Mr. Campbell reads report.)

Mr. CAMPBELL.—I may say that the amount now standing at the credit of the Association, after adding the grant of \$200 from the Quebec Government, which was handed me this morning, is \$744.44. Will somebody move that the report be referred to the auditors, and name the auditors ?

Mr. GILLIES.—I move that the report be referred to the auditors.

Mr. CAMPBELL.—That would mean the same auditors as last year.

Mr. JOLY DE LOTBINIÈRE seconded.

The CHAIRMAN.—Well, I suppose that is all right. I have now to call upon Mr. Ross to read Dr. Unwin's paper on Forest Reproduction in Germany.

Mr. STEWART.—I might say that Dr. Unwin is a graduate of the School of Forestry of Tharandt, Germany, and came out and joined the Forestry department of the Dominion about a year ago. He agreed to read this paper, but within the last month he has received an appointment under the Imperial Government in Nigeria, which was so tempting an offer that, though I was very anxious for him to remain with us, I could not help advising him to accept the other position. Therefore his paper will be read by the Assistant Superintendent of Forestry for the Dominion, Mr. Ross.

Mr. Ross.—Dr. Unwin was several years in Germany, where he took up the study of forestry, and he had special advantages for observing the methods of management and reproduction in practice in that country.

FOREST REPRODUCTION IN GERMANY.

A. Harold Unwin, D. Oec. Publ. Munich, Dominion Forestry Branch.

In being asked by the secretary to give an address on this subject at the meeting of the Canadian Forestry Association, I have found some difficulty in condensing the subject matter, which is necessarily very comprehensive.

To begin with, the forests of Germany, which occupy 25 per cent of the total area of land (Sweden has 48 per cent and Finland 62 per cent), are composed of trees belonging to the same genera as our own, only represented by different individual species. The chief of these are spruce (*Picea excelsa*), the Scotch pine (*Pinus sylvestris*), the fir (*Abies pectinata*) like our balsam but growing much larger (up to 150 feet in height and 6 feet in diameter), the larch, or tamarack as it is termed here. Then of the wood-leaved trees, the beech (*Fagus sylvatica*), the oak (*Quercus pedunculata* and *sessiliflora*), corresponding to white and burr oak here (*Quercus alba* and *macrocarpa*), great maple and Norway maple (*Acer pseudo-platanus* and *platanoides*) corresponding to the hard maple and soft maple here, ash (*Fraxinus excelsior*) like white ash (*Fraxinus americana*), elm (*Ulmus montana*) like white elm (*Ulmus*

americana), silver birch (*Betula alba*) corresponding to white birch (*Betula papyrifera*). One important tree, especially here, which has not an exact counterpart in Europe, is the yellow birch (*Betula lutea*).

*Of these trees the Scots pine occupies 41 per cent of the total forest area, the Norway spruce 22.5 per cent, the larch 0.3 per cent, making a total of 66 per cent of coniferous forest and a total of 33.3 per cent of broad-leaved trees.

Of this latter the beech with 14.6 per cent comprises the greatest proportion, oak forming only 3.6 per cent of the whole.

Originally the composition was somewhat different, the pine and beech and other hardwoods occupying a greater and the spruce a comparatively smaller area. Although the original growth determined to a great extent the system of forest exploitation and reproduction, this was modified by a very creditable far-sighted commercial policy of selecting those trees for special care and reproduction, the price of whose timber was rising most in value.

An early indication of this was shown, as the following table will illustrate.

*Per cental rise in price (large timber), (1875=100).

Following is a table giving the rise in prices from 1745 to 1890. Values are calculated both ways from 1875; in this year values are considered as 100.

	1745.	1761.	1797.	1867.	1875.	1882.	1890.
Beech, maple and oak.....	14.67	26.67	36.00	64.00	100.00	100.00	120.00
Birch.....					100.00	100.00	116.67
Spruce.....	7.14	31.43	48.56	68.57	100.00	100.00	135.71

That is to say, in 1745 beech was double the value of spruce. Forty years later that was almost reversed. Then the two rose in value in similar proportion, but the spruce being the quicker growing tree was planted more extensively. In 1867 they both rise but the spruce has a tendency to increase in price quicker. Then in 1875 they are equal, and finally in 1882 and 1890 and at the present time the price of spruce at \$28 per thousand in the wood and beech \$18 clearly shows the difference. Beside that, as soon as public men realized this, and guided by the advice of the then half-foresters and half-huntsmen of the nobles, rational, conservative commercial forestry was inaugurated.

Previous to that, that is in the 18th century, cutting had been quite haphazard. Definite plans were now made showing exactly what could be cut on certain areas permanently without endangering the existence of the forest. Diameter limits were at first used, or rather trees of a certain size.

Now, this manner of using the virgin forest or growing timber trees is not only German but is also germane to all countries where forestry is practised. It is in fact the essence of forestry, as with a moderate climate such as ours a forest will reproduce itself, and better still and more quickly if slightly assisted with the help of a few seed trees left on each acre.

This principle of cutting a forest with regard to getting a regular and annual yield has been kept up from the start, both where planting had to be done to restock the cut areas and also where the forest could be left unassisted to re-seed itself.

And it is to this that the splendid financial results are due which each state in that country now shows.

Calling the growing trees in a forest the forest capital what they took and take was and is only the interest or what actually grows each year in wood, and with in-

* Percentages taken from lectures in Europe.

creased care and better management that capital has been increased from 26,040 feet b. m. to 31,800 feet b. m. per acre, and the interest taken greater still in proportion as timber prices have risen. At the present time spruce pays at about 4 per cent on the capital represented when grown pure under a rotation of 90 years. This is on medium mountain soil in the Bavarian Alps. Fifty years ago these forests were just being used to their fullest capacity ; before that they had scarcely been touched, as being inaccessible.

As is natural, the forests of Germany are situated, at least in the largest compact areas, in the mountains of that country, where 70 to 80 per cent of the land is under forest. Besides this the largest areas are the sandy heaths in Hanover and East and West Prussia, so that really only about 10 per cent of the forests are growing on good agricultural land. These for the most part are situated in river valleys where the land is subject to floods. A gradual process is, however, taking place whereby the Prussian state especially is buying up poor, sandy land which is going out of cultivation and planting it with pine. On the other hand, certain tracts of really good land have been sold and denuded of trees. During the last twenty years \$500,000 has been spent annually for this purpose and enormous areas productively stocked with Scots pine.

Turning to the reproduction of the tree which interests us most, white pine (*Pinus strobus*). This though at present growing only on small areas, in the aggregate about 5,000 acres in Germany, shows that it can be profitably grown or reproduced either by self-sown seeds or planting with three year old trees. In the former method the old and original crop is gradually removed, leaving spaces sometimes as much as half an acre between the trees where the young trees come up in large quantities. When the area is seemingly well stocked more of the old trees are taken, still leaving a few so as to ensure all spaces being filled in.

In this way it has been found that from the first cutting of the old stand to the complete clearance of the same and restocking of the area by self-sowing seed, it takes seven to ten years.

This being done without any cost for seed or preparation of the soil. The old stand is of a dense nature and so the forest soil is covered with needles and twigs which rapidly decay when exposed to the atmospheric agencies. This leaves the soil in a receptive condition for the seed. Most of the branches and tops of the trees cut down are either used as faggot wood or burnt.

The spruce, the next most important tree to us, is largely reproduced by planting, or about 90 per cent of all areas. Only in the Bavarian Alps and a few other localities is it left to reseed itself. This is done by cutting the forest by strips up the mountain side, moving in opposite direction to the prevalent wind. When a strip is first cut it is three-quarters to a tree's length in width. This gradually widens as the first area becomes reseeded. Finally the first reseeded area has become old enough to cut again. A rotation of 85 to 90 years is adopted and yields timber of 16 to 18 inches square on medium soil. This size pays best, as if left to get larger the increase in price does not more than pay for the interest on the money represented by the original trees.

The Scots pine, another very important tree, and its counterpart, the Norway or red pine here, is one which must have a good future. This is usually planted as one or two years old untransplanted seedlings. In a few districts natural seeding takes place when the old crop can be removed in three successive cuts with two years between each ; the first being made previous to a seed year, the second after a good seed year, and the third about two years after the young seedlings have got started. Even then a few trees are left to stand over to reseed blank spaces until the end of the rotation, and produce very large timber.

Two very important trees, the beech and silver fir (balsam), do not interest us so much here but afford good examples in methods of reproduction suitable for the treatment of hemlock and Douglas fir and perhaps the hard maple.

The oak, ash and maple, also tamarack, are of minor importance, and hence can be left out of the discussion at present. A good number of Canadian trees have been successfully introduced into Germany, notably the Douglas fir, which has proved the quickest growing tree, and the locust which yields admirable pit timber and has proved a profitable tree to grow. Others, such as cedar and yellow birch, have not been fully tested. Altogether planting experiments with 56 species are under way.

From this it will be seen that not only is the forest in Germany thoroughly replanted or reseeded when cut, but also new species are being added to make it constantly more useful and valuable to the community.

The CHAIRMAN.—It has been suggested that, instead of taking these three papers up together, Mr. Bertram might follow now and the discussion of both papers be taken up before Professor Loudon reads his paper. Taking that suggestion I would call upon Mr. Bertram, if it is the wish of the Association, as I think it is.

Mr. BERTRAM was loudly applauded on rising. He said: Mr. President and gentlemen, the paper which I propose to read before the Association this afternoon is on some phases of Forest Management in Ontario. About two or three weeks ago I wrote this paper as I did not at that time expect to be present here to-day but to be out of the city for some time, and it is rather a curious fact that during this time this paper has had the singular felicity of having had some of its recommendations adopted by the provincial authorities—a rather odd circumstance. I do not know whether to compliment the writer of the paper or the provincial authorities.

A member—Why not both? (Laughter).

Mr. BERTRAM.—The department of forestry and the department of agriculture have each adopted one of the recommendations made in this paper, and which I was very glad to see, you may be sure. Now, I will confine myself to the simple question of what should be done, without touching on any scientific significance. I will confine myself to the question of practical forestry.

FOREST MANAGEMENT IN ONTARIO.

JOHN BERTRAM, *{President Collins Inlet Lumber Co.,*
{Chairman of the Dominion Transportation Commission.

The most important feature within recent years of forest management in Ontario has been the setting apart of certain areas of suitable territory as 'Forest Reserves.'

The first, though not spoken of strictly as a forest reserve, was created in 1893 as the Algonquin Park with an area of 1,109,383 acres, situated on the height of land between the Ottawa River and its tributaries and the Georgian Bay waters. Then followed, under the Forest Reserve Act in 1899, the Eastern Forest Reserve, being part of townships north of the city of Kingston, containing about 80,000 acres of land that had been lumbered over and was afterwards burned, but now carrying a heavy crop of young pine. In 1900 by Order in Council the Sibley Reserve was set apart, being a portion of the township of Sibley and including Thunder Cape, 45,000 acres, more or less. On January 11, 1901, there was created the Temagami Reserve, comprising 1,408,000 acres, within which is the beautiful lake of the same name. Most of the territory in this reserve is still covered with virgin pine and is of great value. An extension to this reserve west and north was made on December 16, 1903, adding 2,368,000 acres, so that now the area of the Temagami Reserve is 3,776,000 acres. The total area so set apart in the province of Ontario being 5,010,383 acres.

Nothing but words of commendation can be used in speaking of the wise and far-sighted policy of the Ontario government in having inaugurated this policy, and it should be followed up by a still greater extension of the system, as fast as exact information is acquired by the Bureau of Forestry.

There is still a very large area of country extending to the west and north from the last-named reserve, along both sides of the watershed between the Georgian Bay and James Bay waters, quite unfit, in a general way, for grain growing, but well suited for the growth of conifers, by which it is at present largely covered. The land is in the possession of the Provincial Government and only a small portion of it is under license. Within the area stands a large proportion of the white and red pine not yet sold, and how to deal with this remnant of what was once a mighty forest in Ontario, is the pressing question. It would be quite superfluous to offer any argument before the Dominion Forestry Association about the value of white pine, or the necessity of strictly caring for its future growth in all localities where it at present exists; the extension therefore of the present reserves to cover the pine-bearing territory north and south of the watershed is self-evident. The height of land runs in an uneven line in a westerly direction from the sources of the Montreal River to the source of the Mississaga River, which flows to the Georgian Bay, and within this area, north and south of the line, is the as yet unsold pine. The general character of this great territory makes it far more valuable for a forest reserve than it can ever be for agricultural purposes, and there should be no hesitation in placing it in the proper place. The policy pursued by the Department of Crown Lands in selling only the white and red pine on licensed lands is open to question. It is very desirable that on all berths the growth of pine, as the most valuable wood, should be facilitated and encouraged; this can hardly be done by cutting down all the merchantable pine and leaving its place to be taken up by balsam, hemlock, spruce or any other wood covering the ground. Good forestry requires that the merchantable trees of these varieties should also be cut down to allow the seed of the pine to germinate, which it will not do under the close shade of other trees. Hitherto it would not pay lumbermen in many places to cut either hemlock, spruce, or balsam, but now that the price has increased they should be cut down and not allowed to usurp the place of more valuable timber; and the same may be said of localities where hardwood predominates. If the pine is cut down and the crown of the forest left intact then pine will not come up again under its shade, or if it does, will be under stunted conditions.

Looking, therefore, to the re-growth of pine, a different policy will have to be devised than what amounts to extermination of the pine and the encouragement of the growth of inferior and less valuable varieties. It is manifest that if the red and white pine only on a berth are sold and the term of fifteen years retained, when the berth at the end of the time comes back into the hands of the Government it will be covered only by inferior varieties, growing with accelerated speed, having been freed from the overshadowing influence of the pine. No special formula of treatment can be given, as each berth will present a different problem, but any intelligent forester can work towards the desired end, and it is for the department to see that in their selling policy this is kept steadily in mind.

There is another view with reference to forest reserves, that although occasionally spoken of has not been seriously discussed: that is the desirability of extending the reserves to land now under license to lumbermen; the preservation of young growing pine is attracting year by year more of the thoughtful lumbermen's attention, the old notion of pine not succeeding pine is passing away, and a keen sense of the value of young pine trees coming up again after the original forest has been cut down, is now prevalent. There can be no question of selling land to settlers that is fit for cultivation; but because a license has been sold covering a district which is more fit for forest growth than farming is an additional reason why it should be retained for that purpose, and placed in the forest reserve permanently. No question can then come up between the lumbermen and the settler which hitherto has led to so much bad feeling.

Any lands so reserved can remain in the hands of the licensee subject to any reasonable change in the regulations the department may deem it wise to impose. Good judgment and a close examination of the districts would be necessary together with a general policy governing large areas. A patch of reserve here and there taken out of licensed lands is not what is thought of, but when the general character of a district is found suitable then this phase of forest management may come up for consideration.

Speaking of reservations so far, it has been looking to the propagation of white and red pine, but there is another question of great interest to the province. The height of land between Georgian Bay and the great Northern Basin, and which is the backbone of Ontario, extends from the sources of the rivers running into Georgian Bay and Lake Huron around the north end of Lake Nipigon and westward; the prevailing timber being spruce. This region has been ravaged by fire from time to time, the prevailing timber is small, the land utterly unfit for cultivation, and it has been looked upon as a wilderness, under no kind of surveillance, and liable to be set on fire by any wandering intruder. Is it not time that this vast territory should be brought under an efficient system of fire protection? Let alone, it will only go from bad to worse, and probably, in time, from recurring fires, become a veritable wilderness. There is at present supposed to be a large quantity of merchantable timber and pulpwood growing on it, and pending the question of making it a vast forest reserve, which does not require an immediate decision, it would surely be in the interests of the province to find out what timber is on it and to take immediate steps to have it brought under the system of provincial fire protection.

The only other question to be touched on in this paper is one that has been dimly in the minds of many people in this province and probably also in other provinces; and that is, what should be done with a very considerable area of land in the Dominion suitable for both farming and forestry, of which the district of Muskoka may be taken as a type. Muskoka is a beautiful and healthy country, with a bracing and invigorating climate, mostly hilly, with innumerable streams and lakes of clear water abounding with fish and game, an excellent example of the features of the country found within the Laurentian range, the hills, as a rule, not rising more than a few hundred feet and covered with trees. Between thirty and forty years back, while large lumbering operations were being carried on, this district was opened to settlers, and while it cannot be denied that many of them have done well, still a number of abandoned farms can be seen by any one driving through the district, and many settlers, while remaining there and being averse to giving up their holdings are fighting an uphill battle on account of the character of the soil on which they are located. The district being of Laurentian rock, has all the characteristics of the formation; the rocks having been subject to attrition for untold ages, have given a constitution to the soil very different from the limestone series or from the ordinary alluvial deposits. In many circumscribed spots of greater or less extent as good soil can be found as anywhere, but they are limited in extent, the general character of the country being better fitted for tree growth than for agriculture. The good soil is splendidly adapted for the growth of clover and timothy, potatoes and roots of all kinds; grass will produce the very best cheese and butter, the milk being rich and delicious.

It is manifest that a country of this kind, which has a population of thrifty farmers, cannot be depopulated even if it could be shown that better financial results would accrue to the holder if it were all kept under forest; the conditions point rather to mixed holdings of greater extent than at present prevail. Instead of trying to make a living as a farmer only, the proprietor should be encouraged to acquire larger acreage and become a forester as well as a farmer. An ideal condition for the district would be for the proprietor to own say 1,000 or 1,200 acres; cultivate the really good part wherever found within his boundaries, and keep the rest of it in forest. A knowledge of forestry could be acquired by reading, or it could be imparted by professors or

students giving lectures and lessons on best methods. What a wonderful change would be brought about in the productiveness of the forest, if this were carried out. Trees could be planted where needed, poor varieties cut out, thick patches thinned, and the product utilized in many ways, merchantable logs or trees sold from time to time, and the whole forest looked upon as the most valuable crop the nature of the soil could produce. Authentic statistics can be obtained, particularly in Germany, of the net value of forest product extending over long periods. The writer will give an instance which came under his own observation in 1902, when visiting Scotland. A patch of spruce forest containing eleven acres had just been cut down and sold en bloc to the owner of a portable saw-mill, the timber was fifty years old, and so from the amount received the proceeds were easily calculated and it was found, taking the opinion of the agent of the estate as to the rental value of that particular land, that the timber had given three times as much rent per annum than if the land had been rented for agricultural purposes. Of course it was not good land for cropping, but well suited for young spruce, as an examination of the yearly growth fully testified and by which the age of the trees was tested.

The occupation of forester and farmer would appeal to many people, and with personal care and attention would become a profitable pursuit, pleasant and agreeable, away from the hurly-burly of city life. Personal attention to this style of forest would give a much larger growth of feet per acre than in a forest reserve which could not possibly receive the same care. In a minor degree there are many farmers in old settlements who would find it more profitable to devote a part of their farms to tree growth. All uneven or hilly land should be planted, the main business being farming, tree growth secondary, just as in the northern districts sylviculture should be the main business and farming subsidiary. There is another feature of forest management in townships partly settled which should be considered. Very often abandoned farms are sold or offered for sale by the municipality for taxes, and also denuded lands on which there is no clearing. It would be well to give the township power to acquire these lands and hold them as a municipal property; in time they would become valuable and a source of income. Let them be held as township forest reserves, and to show how the idea is growing of the value of young trees, Mr. Thos. Southworth, of the Forestry Bureau, has had application already from some townships seeking to acquire this very power; give it to them by all means, it would help to increase the value of all timbered lands and give a new view of the worth of our rocky back country and help to transform what is in many cases looked upon as a worthless wilderness into one of the most beautiful of all nature's scenes, a country covered with forest.

The incidental but very real value of keeping a considerable area in every district under forest cover has not been touched upon as it does not come within the scope of this paper.

The CHAIRMAN.—I am sure we have been very much interested and delighted with the paper just read by Mr. Bertram, and it is a paper which will merit a good deal of thought and discussion. He has brought out some very important points which are worthy of our deepest consideration, and the matter will be now open for discussion.

Mr. SILVERTHORNE.—Mr. Chairman, I have been amused, at some statements made on this subject years ago, and one is that the same timber would not follow the same timber. I thought it was a very discouraging thing, for we have great areas of pine land, and it would be very unfortunate indeed if some similar timber to it would not follow. Now, I do not know how that idea originated, but it was contrary to any experience that we have had in our locality. And by that, I mean in this locality. I can show you within ten or twelve miles of Toronto as nice a growth of pine as ever

grew, and it grew right on, among, and in the original stumps, which have gradually disappeared, and which were forty and fifty years old. I am glad to see that the fallacy about the same kind of forest not succeeding has been exploded.

Mr. CONANT.—In the first paper read, the professor spoke of forests in Germany, and the reproduction of different kinds of trees. Suppose you want to reproduce trees in Canada, with all the trees we have, did it ever occur to you that it is a very difficult matter to get a real seed? We can get small trees, but the real seed is a very difficult thing to get. I myself have found it best to go to Germany to get seed to plant, notwithstanding all the trees we have in this country of ours. Now another idea which occurred to me was that the forest trees of Germany are not usually as hardy as ours, although I think those grown in the neighbourhood of the Black Forest, in Germany, grow. Now, to show you how cheaply the Germans will produce these seeds, I may mention that for a kilogramme—three and a quarter lbs.—two shillings would be the average ordinary price of most all forest trees, which shows that the purchase of seeds in this way is not such an expensive matter after all. My reason for mentioning this is this: It is difficult to reproduce trees, as a great many of them die, and I find if I plant the seeds and let them grow, I get much better results. I may say that I have planted 10,000 black walnuts, and the squirrels came and took all the nuts away. Out of 30 bushels of nuts, not more than 500 trees grew. Then I got the small trees. I could not get them in this country, and so I got them in the United States, four and a half feet high. It seems to me I had fairly good luck with the black walnut, and out of 10,000 planted, 7,000 are growing very nicely. But had I known of this way of getting black walnut seed (the little sprouts) from Germany, at the time, I certainly could have saved a great deal of expense in experimenting in that matter.

Professor HURT.—We have had most valuable papers and I have been very much interested in them. One of the most prominent things that struck me in these papers was the definiteness of the former, such definite figures in every case as to the percentage of area under forest, definite figures each time as to the different species of trees in the forest, and I thought the chief characteristic of that paper was the definiteness of information given. Now, in the second paper, the valuable paper by Mr. Bertram, we have much indefiniteness about our forests. We have a good general idea what they are and what they require, but in Germany, where they have been giving attention to this matter so long, and give a great deal of study and attention to it, they know definitely just what the forests are like and what they require. Now, I think the secret of the whole thing was given by Dr. Unwin. The German Government spends \$500,000 annually in the advancement of forestry. I think that is a thing we as members of the Association should press home upon the people everywhere, and strengthen the hands of our Government in supporting forestry education more liberally. What we need in this country is men who are educated along this line. We all have a general idea, but the Germans have given special study and thus they have definite figures to offer each time, and definite information to give as to forests and what they require. That was one of the most striking things. What this country needs is more liberal support to forestry education. We will have a little more of that later on, we hope. Now, the subject referred to by Mr. Conant, the importing of European or German seed, is, I think, just another point along that line.



WHITE PINE.—NATURAL REPRODUCTION IN GROUPS FROM NEIGHBOURING TREES, 120 YEARS OLD, GERMANY.



In this country we have given little or no attention to it, and while we could be growing our own seed, we have to import foreign seed because we can get it cheaper. Last week I learned that very little of the seed in this country had been saved last year, and the only seed that could be obtained was seed from Germany. Why cannot we in this country, with our vast forests, save the seeds of our own trees as cheaply and to better advantage than having to import German seed? What we should do is to train our young men—and there are hundreds of young men in this country who are anxious for this work. We have some of them here and they have either to go to Germany for it, or to some American institution where forestry is being taught. We want more liberal support for forest education in Ontario. Then we will have the men to give us definite information as to what the forest requires. What we should do is strengthen the hands of our legislators in a more liberal support of forestry education.

Mr. ANSON GROH—Mr. Chairman, with regard to sustaining the Government in the work undertaken in promoting the planting of trees, I will make these remarks. For the last two or three years, locally and on institute work, I have been requested to do a little talking along the farmers' wood lot line, and I find there is no question we can bring up that will arouse so much enthusiasm as that idea. It is only necessary to point to what they can accomplish. Right in my own section we have some fine cases of pine following pine. My own father-in-law has pointed to his pinery and told me that those trees had all grown up since he was a little boy, and that he had been accustomed to follow the cows through those very fields when it was a small brush. In that way we estimate that the trees are eighty years old. We examined those trees last week and found some of them three feet in diameter. The old gentleman had been raised on a farm north of us, and he said he remembered well a forest fire which occurred when he was a boy four years old. In great excitement his parents gathered all the water tubs on the roof to be ready for emergencies, the sky darkened with the smoke and soon everything was down and the ground quite clear. I said, 'You do not mean to say that those big pine trees have grown since that time?' 'Every one of them,' he said. I have cut trees over 28 inches in diameter from the scene of that burn. In fact I have counted the rings and find his words are true, that the pine dates from about the beginning of the century. There is, therefore, no difficulty along the line of pine following pine. As soon as the enthusiasm and interest of the people is raised, I believe the Government will be supported in anything judicious that is done, and we trust it will do nothing else, as we have every reason to believe. But education is required. An old gentleman over 70 years old showed me some ridges he intended to re-forest. Even the old men are interested, but the young men are particularly so. In regard to the matter of seeds, would say that I have been hunting seeds myself but cannot get them. I do not think pine produces seed every year but about every three years, so that we shall have to seek them when they are to be found.

Mr. CANN.—I must be one of the old men that this gentleman referred to, and was born in the forest of Ontario seventy years ago. You were kind enough to say this morning, sir, that the audience, as well as the members of your Association, would be allowed to speak. I wish to take advantage of that privilege, although not a member of your Association.

A voice.—Hope you will be.

Mr. CANN.—I will not make a speech but just say a few words, as I do not want to interfere with the time of experts, gentlemen who have, perhaps, a great deal more experience than I have had. I can agree fully with the sentiments expressed this afternoon, that we may congratulate ourselves and the country generally on account of the wise and far-reaching policy of reservation of our forests. It is one great feature, and a very important feature, but you say in your report, I think, that the time has come when the re-forestry of older Canada should be considered. That has not been emphasized very much to-day, but I would just like to say a word or two along that line. Now, I hold in my hand here the *Journal of Education*, a copy published in January, 1873, 31 years ago. At that time, nearly a third of a century ago, I took a little interest in forestry and advocate certain features, so perhaps I am entitled to say just a few words. The circumstances were these: The Chief Superintendent of Education, who represented the Government, offered a number of cash prizes to the inspectors, teachers and trustees of Ontario for the best plan for school architecture, and block plans for school sites. I was eligible, entered the competition and was successful enough to win two first prizes, amounting together to \$25. My name is here, with all particulars about it. And we notice here the name of a gentleman who to-day is a member of our ministry, who won five dollars along the same line.

A voice.—What name?

Mr. CANN.—Richard Harcourt. To-day he is a member of parliament. I am in parliament, too, not as a member, however, merely in the Parliament Buildings. (Laughter). Pardon this personal allusion, gentlemen; the reason I referred to it is that I sent in plans and specifications on the block system for school houses, and recommended, as strongly as I was able, the idea of using our schools for the raising of trees and the distribution of trees in sections. That is, I advocated the teaching of forestry to the children of our schools and making use of our schools in the promotion of general forestry throughout the country. Now, the late Dr. Sangster was a prominent man in the educational world at that time, and he congratulated me personally on the idea. Since that time I have written to several papers advocating the same idea, and I suppose, gentlemen, that you know better than I do that France is a country that is noted for economy, and science, and advanced thought. France to-day is using her thousands of schools and, I believe, other European countries, in the same way that I proposed over 30 years ago. Now, I just bring this matter before you and I would like the Association to consider the question and the importance and propriety of using our schools as centres for the promotion of this great question.

Mr. JOLY DE LOTBINIÈRE.—Allusion has been made here to-day by different speakers about the difficulty of obtaining the seeds of our coniferous trees. Last year those who were at our meeting may perhaps remember that we had a gentleman from the New York Forest Commission, Mr. Knechtel, who came here and made some most interesting remarks about the work being done in the Adirondacks, and in the propagation of coniferous trees from seed. Among the interesting things he told us was the way in which he obtained these seeds by sending out boys and girls, and young men and women at the time they are cutting trees, say spruce, although, unfortunately,

the cones are not fertilized every year. After they are gathered the little cones are piled close together and properly dried. They are then placed in bags together and violently agitated—hit up against a tree or anything else, and all the little seeds in the cones are loosened and fall to the bottom of the bag.

Mr. CONANT.—Can you give us some idea of the cost of seed in the United States ?

Mr. JOLY DE LOTBINIÈRE.—I will just tell you about this process first. After this process has been gone through, you eliminate the little chaff and dirt that remains with the seed by means of a fanning apparatus. There then remains the clean seed, of which Mr. Knetchel was kind enough to send me several samples, and very nice seed it was. I thought last spring I would try and procure some white spruce and hemlock seeds. It happened to be a good year. The hemlock trees were full of seed, as also were the white spruce. I went through sections where they had been cut and selected about a barrelful of likely looking cones. I spread them over a dry attic and heated them properly, and when I found the propitious moment had come I followed Mr. Knetchel's plan of throwing them around in a bag.

Mr. BERTRAM.—What time did you gather the cones, Mr. Joly ?

Mr. JOLY DE LOTBINIÈRE.—I gathered them in the month of March. The spruce and hemlock seed is right for taking in the month of March. Until that time the cones are closed. In April and May the cones open naturally and the seed is blown away, but in March the seed is there.

FATHER BURKE.—I find on that point that Dr. Fernow says that in spruce and all other trees except pine, the period for the collection of seed is from September to November.

Mr. JOLY DE LOTBINIÈRE.—Well, I would like to know what possible objection there can be to collection in the spring, for the seed is just as good as it is later on in the season. It may be more convenient in the autumn when there is no snow on the ground, than in the spring.

FATHER BURKE.—Would not the spruce seed fall before March ?

Mr. JOLY DE LOTBINIÈRE.—Not in Quebec. In the spruce growing district you will find seeds in the cone even in March.

FATHER BURKE.—The seed of pine falls.

Mr. JOLY DE LOTBINIÈRE.—You will not find any seed in the pine cone in the spring but you will find seed of the hemlock and spruce at that time. I thought by giving this little experience that if it was well known by our prominent seedsmen here how easy it was to collect seed, both pine and hemlock, and other coniferous seeds, it would be very easy for them to send out men or boys where the felling is going on and make the necessary collection of cones, treat them as they are treated by the State Forester of New York, and then we will all have an abundant supply of seed and would not have to send to Germany or anywhere else, but get them in Canada. Where

the seed grows in Ontario and Quebec the thing can be done with very little expense, and if it could be done by people who would make a business of it, I think it would be a paying business. I think it well to give you my experience. It is a very small one, but shows that if the matter is taken up in a thorough business way it can be done and done successfully, all who use the seed can get it, and whoever takes it up can make money out of it.

The CHAIRMAN.—It will be noticed that the Commissioner of Crown Lands, Hon. Mr. Davis, has done us the honour of being present this afternoon, and we would like to hear a few words from him.

Mr. DAVIS.—Mr. President and gentlemen, I am exceedingly glad to have the opportunity of being present with you this morning and this afternoon for a short time to show that I appreciate the excellent work which is being done by the Forestry Association of the Dominion of Canada. I am glad also to be here to listen to the excellent papers that have been read to-day, so full of interest and practical suggestions which cannot help aiding very much in advancing the work which you are specially interested in, and which I think I may say every citizen of this Province and this Dominion ought to be exceedingly interested in. (Hear, hear). Perhaps in the position which I hold for the time being I have some responsibility, as far as the Province of Ontario is concerned, in dealing with the forest reserve matters in the larger sphere. Mr. Bertram, who gave us such an excellent paper, was good enough to make a slight reference to what has been done in the way of setting apart permanent forest reserves. I think that most of us do not appreciate what that work will mean in years to come. In a comparatively short time, within two or three years, there have been set apart of virgin area unsuitable for agricultural purposes in this Province, 9,000 square miles of territory for the purpose of permanent crown reserves, to be used in the interests of the people and for the production of valuable timber for all time to come. (Applause). We have been engaged for some little time in preparing regulations for handling the timber of these reserves. I need not say to practical men that this is a question that requires a good deal of careful consideration and due deliberation, that when we arrive at a conclusion, it will be one that will be practical and useful, and from which the people of this Province will derive the best results. I hope that, ere long, we will have these regulations completed and in shape to put into operation. Of course there is no great hurry as we are not thinking of disposing in the immediate future of additional timber.

Then, there are many features in connection with forestry outside of the permanent forest reserves which I have referred to. We are trying to do a little in another way. That is re-foresting reserves that have been cut over in the past, and which have fallen back into the hands of the Crown, and I am endeavouring to make special inquiry through our proper officers in order that a thorough examination may be made in various parts of the Province of areas of this description. Wherever we find such areas suitably large enough to be worth while, and which are not suitable for agricultural purposes, these will be set apart as reserves for the purpose of re-forestry, and, in that way, will be of great advantage in years to come. (Applause). I would like to ask a question or two of Mr. Bertram with reference to his paper. There are many

things that occur to one, but I will take up your time only to speak of two which impressed me when he read his paper. Perhaps I am a little selfish in asking for his views, because they are more matters of public policy and legislation, perhaps, than the forest reserve work in general. One is his reference to timber berths which have been sold, as I take it, by public competition to certain persons who are now the licensees, and where the pine timber only was sold. I infer from his observations that he thinks there might be, in certain limits of that description, which have passed from the Crown in the way I have indicated, some policy introduced whereby the licensee could reforest that particular berth. A policy of that kind could only be worked out on non-agricultural lands, as agricultural lands are required for settlement. Of course I would like to know what his view is as to what payment the Crown should obtain to allow a licensee to continue almost in perpetuity. Forest reserve areas belong to the Crown. When the timber is sold by public sale the bonus derived is supposed to be the value on the stump of the pine timber that is standing at that time. And then dues are paid on timber when cut. Now, suppose the licensee is allowed the pine on that area for the next 40 or 50 years, what position, in his opinion, should the Crown take in order to get proper revenue from a licensee under that policy, because as administrators of the people's business it is our duty to see that the Crown gets all it is entitled to from the people's domain.

We are endeavouring to see whether some legislation can be introduced to cover the case of townships in Muskoka, such as mentioned by Mr. Bertram, where we have had several petitions from councils of townships asking that land sold at tax sales might be bought in by the township, and some of these areas set apart as forest reserves by the municipalities. I would like to ask Mr. Bertram, who has large experience in this matter, what he would suggest as to the management of these reserves. Should they be absolutely under the control of the council of the municipality? Would they have sufficient experience to handle these to advantage? Or should we have a general policy directed through the Bureau of Forestry in this Province, having a certain control over all such reserves, and giving suggestions as to how they should be managed in the most up-to-date manner? Then as to revenue to be derived from them. What would he suggest as to the utilization of that revenue? How much expenditure should be placed upon the municipality? Or whether it should be managed by our Provincial Bureau, or entirely left with the municipality?

I am glad to be with you and am sure you will have a useful and prosperous afternoon, and if I can manage to steal away from my departmental and legislative duties to-morrow I will be glad to come in again and gain further information from you.

Mr. BERTRAM.—Mr. President, the Commissioner of Crown Lands has done me the honour to ask me to advise the Government. Of course, advice is very often cheap, and it may be very easily given, but I would like to say to the Hon. Mr. Davis that he has put his finger on two of the most difficult questions he could ask one, and as I am an exceedingly slow man, and never dare make up my mind in a hurry, I have to think it over. These two very points have been in my mind a great many times. I may say that, some 22 or 23 years ago, after retiring as I thought, from business, I by a mere chance got into the lumber business, and I never was in any business before

that I cared anything about. I think I must have been born a lumberman, because I then entered into all the joys and delights of being in a business that I like, and I hope I will die a lumberman. I went to that beautiful north country—Algoma—22 or 23 years ago, from Peterborough, where I then lived. I had gone to the shanties and woods and had a great deal of so-called information about the lumber business. I was there told a great many things—and every one of them, without exception, was wrong. I was told that pine would not succeed pine, and a great many other things of the old lumberman's lore, and walking around in the woods of Algoma I saw a great many things that did not altogether agree with the things I had heard. I then started to study myself, and so little did I know that I did not know then that there were seeds within the cone. I refrained from reading books on forestry, so that I could make my own individual observations.

Mr. DAVIS.—Gentlemen, I am sorry to say that I am just informed that I am wanted in the House, and must leave.

Mr. BERTRAM.—I may say, Mr. Davis, that I will think that over and possibly write you. I will have to do that, because I must think the matter out. The old formula of the lumberman was to cut down your timber as quickly as you can and get your money out of it and save interest. All the old lumbermen had that idea, and I was wondering if there was not a better plan than that, and while we were on our forestry inquiry I found no better place than on my own limits to take the members of the Commission. To make a long story short, and not to detain you, I may say that in place of adopting that policy, I adopted the very opposite policy, and if the grace of the Ontario Government would allow me to keep it, and I would live forever, I would lumber forever, because I cut no more each year than the accretion of timber. On the other side they are sending experts from the school of forestry down to the southern states and they are not cutting any more than the annual growth. And that is the true system for cutting on this continent. By chance Mr. Southworth and I came together at the Canadian Institute, and we found out that there were some things on which different people thought alike. Canadian lumbermen indulged in a great deal of hilarity at my expense when I advocated this policy and they thought I was a very good, first-class specimen of a maniac. Now, I am very glad to see that a large number of our lumbermen are alive to the value of the young pine, and if you will take the preliminary report of the Forestry Commission,—the late Mr. Rathbun and myself, the two lumbermen on it, and Mr. Southworth and some other gentlemen—you will see the exact facts, and if any of you have a pine tree eight or ten inches, not fit for cutting, I say keep it and it will pay you double the interest of any bank or loaning institution in the world. It is for the interests of the country, and I certainly think it is for the interests of ourselves, as well. I will look into the questions asked by Mr. Davis, who is trying to get all the money he can for the Province. The Provincial authorities never sell their hen on a rainy day, and if the Government could see a chance whereby they are likely to get some advantage of us they will get it and I will not commit myself. I can assure them that if I care for lumber under license to me for 15 or 20 years I am quite entitled to some interest in it. I shall try and give the Government some discreet reply. It is quite a difficult matter.

Mr. STEWART.—I just want to congratulate the members of the Canadian Forestry Association who advocated our coming to Toronto. I think the success of this meeting shows the wisdom of coming here to-day. We have entirely different men here from what we had at Ottawa, and that is the result of moving from one part to another. In past meetings we have been favoured, I think, with very eminent foresters from the United States. Dr. Fernow has been with us, and also Dr. Schenk, and others, unfortunately they have not been able to come to-day. But fortunately we have a gentleman here whom many of you will know from his writings, and who is now a professor in the University of Michigan. He has been kind enough to come here to-day. He is experienced in forestry in Germany, as well as in the United States. Mr. President, I just wish to call your attention to the fact that Professor Filibert Roth is here, and I have no doubt you will give him an opportunity to address the meeting.

The CHAIRMAN.—It gives me great pleasure to call upon Professor Roth, of the University of Michigan, and before he takes his stand, I would just like to say that here is a sample of pine growth that I gave to Mr. Southworth last year. The piece of pine I got myself, I have retained one piece and gave the other to Mr. Southworth. The rings on this piece show the age of the tree to have been 37 years, and the timber is 22 inches in diameter.

Mr. LITTLE.—How high was the growth taken?

The CHAIRMAN.—I cannot answer you that.

Mr. BERTRAM.—Where did it grow, Mr. President?

The CHAIRMAN.—It grew on the Ottawa river, opposite Jocko river, on the Quebec side.

Mr. BERTRAM.—It was not in any Crown territory?

The CHAIRMAN.—It was grown on the bank of the river, and I think the country had been burnt over a few years ago. It now gives me pleasure to call upon Professor Roth.

Professor ROTH.—Mr. President, members of the association, gentlemen. It certainly gives me great pleasure to be here with you to-day. It is not only a pleasure, it is fairly an inspiration to be with you. I do not exaggerate, and I say it not to flatter you, but I doubt if I have attended any forestry meeting in the United States that has come up, in the practicalness of the discussions, or in the enthusiasm or general depth of thought and feeling to this meeting here to-day. I fear that by taking up your time in this way I am interrupting the good work that is going on. I think the papers are of such an important nature and that there have been subjects put before you of an importance that very few people in the world can realize, and I fear that I am cutting short the discussion and the consequent good that should follow these discussions. I do not wish to interrupt, therefore, and will merely say a few words concerning our work in the States, believing that perhaps some of the things I shall mention reflect on affairs here in Canada and may thus prove perhaps helpful in these valuable and important discussions. You all know that we are moving.

Our national Government has set aside upward of sixty million acres of land as forest reserves. These reserves stretch from Arizona to Alaska and represent a variety of conditions of climate, ground and forest. They contain the stately red fir in Washington and are covered by a mere chaparral in Southern California, where the tree is the exception and the brush cover takes the place of the forest. We owe these reserves to the efforts of the American Forestry Association, one of whose founders, Mr. Wm. Little, of Montreal, we have the pleasure of having with us here to-day. The Forest Reserve policy was opposed at first, the people were being misled by demagogues. Their representatives in Congress thought it a policy of obstruction which would hinder the rapid development of the west. Ten years of trial have demonstrated that the policy is correct and the most ardent friends of the reserves are the people of the districts where the reserves are located. To be sure, we have a champion who is perhaps less strongly represented in your land than in ours. It is the irrigator, the conqueror of the arid west. He is an intelligent farmer who, in spite of all the sophism of snowdrift theories which have been preached to him by pseudo-scientists and others, knows perfectly well that his case can be summed up in four words: 'No forest, no water.' And this farmer has expressed himself intelligently and strongly, and to-day there is no better friend of forest reserves than the irrigator of our arid west, from California and Arizona clear to Montana and Washington. On these reserves the Government keeps things in its own hands. The mine owner or lumberman can buy a million or ten million feet of timber, but the trees he cuts are marked for him, he must get through his work in a stipulated time, and he must take care of all debris left in cutting. There was opposition; we were told, 'We cannot afford to do these things, they are impracticable.' But they were done, and they have proven feasible and the woods and the country have been the better for them.

The work is progressing in other directions. With Secretary Wilson as its able head, the Department of Agriculture is doing excellent work in forestry. Under Professor Pinchot its Bureau of Forestry is advising and assisting the people to a better care of the forests. Farmers and lumbermen alike are availing themselves of its assistance. We have one of its men to-day in Michigan visiting different farmers who have applied for this assistance, and telling them what to do, where and what to cut, what and how to plant.

Besides the National Government, the States themselves are moving in forestry matters. You all know of the good work in the State of New York, with its fine Adirondack park or reserve. You know of its school, which was closed on account of some personal squabbles, but which is soon to be re-established, for it was a good thing, and a good thing always outlives all kinds of criticism. The State of New York has realized at last one of the greatest principles in human welfare, and that is that it is not a good thing to put a poor man on a poor acre. If you want to put a poor man somewhere, put him on good land. Give away your good land if you want to be liberal, but keep poor non-agricultural lands in the hands of the State. The Eastern United States have at last realized that the people of Europe, with two thousand years' experience probably know something, and that if the progressive people of Europe have come to the conclusion that it is unsafe to place poor lands into

poor hands, and let them deteriorate into waste land and desert, that the same principle is probably true with us. At any rate, New York is buying Adirondack lands, even though she pays \$3.60 per acre for lands which she sold at five cents per acre in the days when the policy was: 'Get rid of the land.' The State of Pennsylvania is following New York. She has a good code of laws, a good Forest Commission, nearly a million acres of forest reserves, and is buying lands at a price not to exceed \$5 per acre. Wisconsin passed an Act last year declaring all its lands forest reserve. These lands are in scattered bodies and the case resembles your Muskoka problem. Yet Wisconsin preferred to declare and hold them as forest reserve. There is wisdom in this, for it is an experience of centuries, that while the private man makes the best farmer, the State makes the better forester, and in most cases has made the only safe and good forester. As an illustration I might mention my birth place, the little State of Wurtemberg, just north of the Alps. It has been conservative in its forestry matters for centuries. When the French Revolution inspired the sense of liberty, some of the other German States, notably Prussia and Austria, felt called upon to modify their forest laws and sell the lands to private people, Wurtemberg clung to its gains. The wisdom of this policy has been demonstrated by a century of experience, and the other States are gradually returning to the point where they left off a century ago. Wurtemberg as a State holds all it can, and whenever poor, dilapidated farm lands are offered for sale, they are bought for forestry purposes. What the land can do as forest may be inferred from the fact that as high as \$40 per acre are paid for such lands, and that in a country nearly one-third in forest (not waste and such lands) with wood nearly as cheap as in parts of our States.

To return, I wish to call your attention to the work of a few others of our States. California is spending \$15,000 in co-operation with the National Bureau of Forestry, to find out what it has and what it ought to do. Several other States are becoming active. The States of Montana, Wyoming and Washington have quit throwing away lands and hold all State lands at no less than \$10 per acre. Minnesota has a Forest Commission, good fire laws and a machinery to enforce them, and is beginning to set aside forest reserves. Connecticut has its forest school and a state forester empowered to buy lands, and similar activity is shown throughout the New England States.

We in Michigan have a problem similar to yours. We have the old pinery lands converted into burned-over wastes, just as you see them in parts of this province. Much of this land has become delinquent for taxes, about one-sixth of the area of the State was reported 'in soak' in this way. For years the State has followed a liberal policy and disposed of these lands at prices from ten cents up, in order to get them settled up. This has not met with the success it deserved. The State's liberality was misused and we have learned that a good farmer, the kind we want and need, does not take land simply because it is cheap. Michigan has adopted a new policy, it has set aside a small portion of these lands as forest reserve. We hope to set out 50,000 trees, and start a forest nursery this spring, and in time we hope to cover a part of these lands with growing timber. We hope that the State will continue this good work and keep the lands which good farmers evidently are not anxious to undertake. Michigan has progressed otherwise. The University and also the Agricultural

College are teaching forestry and we hope soon to have a competent set of men to wrestle with our problem.

Here, then, we have a few signs of activity which may interest you by reason of their similarity to your conditions. There is just one thing I would emphasize, and this is: If the private man makes the good farmer and the State the better forester, I hope you will see your way clear to holding on to your lands. I confidently hope that you will, for you have made a good start and a timely start, better and sooner than we, and I hope that you will hold and hold tight every acre of land which is not actual farm land. Do not turn it over to the town or county, to the mercy of the peanut politician, where a personal greed will always put foremost that dangerous phrase and motto of the short-sighted and greedy: 'Posterity has done nothing for me, I need the money, need it badly and need it now.' Gentlemen I thank you.

EDUCATION IN FORESTRY.

PROFESSOR JAMES LOUDON, M.A., LL.D., PRESIDENT OF THE UNIVERSITY OF TORONTO.

Mr. President and gentlemen. This is the first occasion on which I have had the pleasure of attending a meeting of the Canadian Forestry Association. Distance from the place of meeting and the pressure of other duties has caused my absence, not any want of sympathy with the aims of the Association, or interest in its proceedings. I consider that the Association has achieved a great deal during the five years of its existence; in awakening a widespread interest in forestry; in assembling together from all parts of Canada representative men to discuss the many problems which present themselves; and in issuing the valuable reports which, I may say, I have read as they appeared with interest and profit. For, Mr. President, I need hardly tell you that I am not a forester, nor the son of a forester, but I have for some years back realized the importance of the subject in Canada, and I have been trying to get light on it from available sources, and among these sources I value your reports very highly.

The object of this paper is to introduce a discussion on Education in Forestry, the necessity for it, ways and means for its practical realization. Now, although education in forestry was, in my opinion, a necessity years ago, I feel that the chances of success have been greatly increased through the preliminary work done by your Association. Information on the subject has been thus diffused, public interest has been aroused; in short you have contributed largely to provide that basis of public opinion which is necessary for any important movement.

It is instructive to look for a moment at the rapid progress of the movement in the United States. There we see that within a very few years a preliminary campaign, such as is now being waged here, has resulted in the organization of several important schools of forestry, a lively interest among leading men of business and politicians (including President Roosevelt), the establishment of a central Bureau of Forestry at Washington, of Departments of Forestry in several of the States, and the widespread application of systematic forestry. It is, in short, regarded as a business proposition, and a practical matter. This is, I imagine, what we wish to bring about here, and as speedily as possible.

Forestry, like technical education in general, suffers from popular misconceptions. I do not, of course, need to clear up these misconceptions as far as this Association is concerned, but it may not be amiss to state, for the benefit of the ordinary layman, that a fire-ranger is not a forester—no more a forester than a navy is an engineer—that a forester's business is not to prevent the cutting down of trees, but to

see them cut down to the best advantage, that he is not a botanist let loose to air his fads at the expense of others. What a training in forestry really implies may perhaps be best seen by examining the course of study in an institution like that of the Yale School of Forestry, which represents about the highest type of forest school as yet evolved on this side of the Atlantic. Presupposing a good general preliminary education, somewhat higher than our university matriculation, let us look at the curriculum of the Yale School, particularly as regards the relative importance attached to the various subjects. This course is of two years' duration, with a session of 36 weeks each year. The courses of the first year include a thorough training in the sciences that are fundamental for the profession, and a preliminary training in forestry. The second year is mainly devoted to technical forestry. Looking at the course as a whole (including the two years) we arrive at the following proportions:—

Out of a total of 2,280 hours of class-work and field-work together, we have 1,602 hours for technical forestry proper, and 678 hours for the remaining subjects, divided up as follows: botany, 420; mineralogy, geology and meteorology, 114; engineering, 108, and zoology, 36. These latter subjects require no remark. Under the head of technical forestry we have, after a general introduction to forestry, such subjects as silviculture, forest mensuration, forest management, forest technology (including nature and uses of woods), lumbering, forest protection and administration. An entire term of 12 weeks is devoted to practical forestry in the woods, besides some practical work in previous terms in forests adjoining New Haven.

I have referred to the Yale curriculum somewhat in detail because it served in a general way as a model for the course of study laid down by the Senate of the Provincial University in the curriculum adopted in November, 1902. (I should state here, parenthetically, that the Senate statute embodying this curriculum still awaits the sanction of the Government). Our course extends over three winter and two summer sessions. The standard for entrance is that of junior matriculation, or of third year's standing in the Ontario Agricultural College. The work of the first year is largely scientific—biology, chemistry, physics, geology—and includes English, mathematics, French and German. The second and third years include further instruction in the sciences and in their application to forestry, together with a treatment of the various subdivisions of forestry proper. The two summer sessions are devoted to practical work in the forest.

Now, I do not wish you to understand me as saying that the graduates who have completed such a curriculum as either of the above are fully trained foresters. It might not be expedient to put these young men at once in charge of important forest interests, any more than it would be safe to put a newly-fledged young doctor in charge of a case of serious illness, or a young engineer in charge of a transcontinental railway. But in the one case as in the other, the young professional man has laid down the scientific basis, has received his special technical training, and has faced the various typical problems which will present themselves in his future career. Like the other professional men referred to, he lacks experience, and the development of his powers to face new problems. This he will get in time, just as it is acquired in other professions. But we cannot have the thoroughly qualified expert without special training in his profession, and this it is the function of the forestry school to provide.

An important practical question arises at this point. What do we propose to do with our trained forester when we have produced him? I have been told more than once that to create a supply of trained foresters for Canada would amount to spoiling so many young men for some other useful career, only to leave them stranded at the end of their course, without the hope of employment. I remember to have heard a similar objection urged about thirty years ago with regard to the engineering profession in Ontario, when I advocated the establishment of an engineering school. Nobody raises that objection now with reference to engineering, and I venture to predict that nobody will raise it with regard to forestry even ten years after the establishment of a school.

Let me say that if our trained foresters are not employed it will not be for the want of important interests in which the special knowledge of the forester would be of the very greatest profit. Who will assert that the administration of the Crown forest lands of Ontario has hitherto been ideally perfect, or that lumbering has always been conducted with due regard to ultimate economy, or that the farmer has managed his woodlands to his own best advantage and that of the country as a whole? And what is true of the past will be true of the future, unless some systematic policy involving the utilization of expert direction is adopted. If such a policy is not adopted, it will only be because of the apathy or the want of intelligence of the people of this country. I have more faith in the intelligence and business foresight of Canada than to suppose that this is possible.

We may, I think, infer what will happen here by what is happening in the United States. The circumstances of the two countries are closely parallel—vast tracts of forests, once thought inexhaustible, have disappeared, and a pressing necessity arises for economy of the remnant and the production of new forests for future needs. So far, the parallel holds good, but, as usual, the people of the United States are a step in advance of us. They have already begun to utilize the forester in a profitable way; we have not. They have felt the necessity of the forester, they have imported him from abroad, they have founded schools of forestry, and they have established a great national bureau of forestry at Washington, supported at great expense by the State, and of itself requiring the services of more trained foresters than the schools can supply.

The Washington bureau may serve as an example of scientific forestry organized by the Government. Some idea of the magnitude of its work may be obtained by referring to a few examples taken from its report of 1902. (1.) Applications for expert advice as to the forest management of private lands covering an aggregate of 4,709,120 acres had been received, and of these applications the bureau was able to deal with only 84, owing to the lack of men and money. The work of the bureau in preparing working plans for economic lumbering in five of the national forest reserves was continued. These reserves comprise a total of 58,850,925 acres. More important still in their ultimate results are the forest investigations carried on by the bureau, investigations which concern not only the private owner, but the nation at large, covering such subjects as commercial woods, studies of forest conditions in various States, fires and grazing, turpentine orcharding, the production of timber for railway necessities, &c. The work also covered the superintendence of tree-planting plans in 29 States and Territories and 172 different localities.

A notable example of the investigations mentioned above is the inquiry of Dr. Hermann von Schrenk into the timber rot in the forest reserves of South Dakota. In this reserve he found on the stump about 600,000,000 feet of dead and dying timber. The death and subsequent decay of the trees, Dr. Schrenk has shown to be caused by a pine-destroying beetle and certain fungi, and he makes a series of recommendations, which, if followed, will result in saving a very large part of the dead wood.

The Biltmore estate will show what scientific forestry is doing for the private owner. Before its purchase by G. W. Vanderbilt, this estate was a desert, all the marketable timber having been removed and the land devastated by fire, drought and the pasturing of cattle. Under working plans prepared by Mr. Gifford Pinchot, and afterwards carried out by Dr. Schenck, it has become a valuable property, on which the returns, though remote, are assured, a 'gilt-edged' investment, as it is termed by the *Scientific American*.

As to forestry methods practised by corporations, I may say that several railway companies in the United States (amongst them the Pennsylvania Railroad) have planted forests of their own for the production of ties. This venture is proving most successful. This work also demands the supervision of the expert forester, and is not undertaken, you may be sure, for sentimental reasons. It is a matter of dollars and cents.

But you will ask how can the forester be usefully employed here? There are, I imagine, three spheres of usefulness open to him:—

- (1.) As superintendent of Crown forest lands;
- (2.) As an adviser of the lumberman;
- (3.) As a guide to the farmer.

I do not need to elaborate the first of these heads very much. The field is almost unlimited. Mr. Southworth, Director of Forestry for Ontario, tells us on this point that there are in the province some 40,000,000 acres of lands suitable only for forest reserves, with an estimated annual yield of some 6,000,000,000 feet in perpetuity, if properly managed, I may add. Here is ample scope for the best energies of a large number of trained foresters in perpetuity also.

If the lumberman here will take example by his far-sighted colleague of the United States, who now begins to look forward to a second crop, he also will have need of the forester, and if he is not disposed to assume this attitude, it is the duty of the Government to see that he conducts his operations in such a manner that there may be a second crop for future generations. The case of the farmer is simple. What he needs is knowledge, and this it is the function of the forester to impart. In order to achieve any particular result in re-forestry, the farmer must be instructed in the subject, and his work superintended and directed at least at the outset, just as it has proved necessary and useful to instruct him in the art of dairying or the breeding of stock. He will not acquire this knowledge by his own initiative, and it will be necessary for the Government to encourage his efforts by providing expert advice and superintendence, just as it has proved necessary in other branches of agriculture.

The first practical step in the direction of securing a supply of home-bred Canadian foresters has not yet been taken by the Government. It means the establishment of a Provincial School of Forestry, and the cost need not exceed at the outset more than a few thousand dollars annually. Having regard to the vast interests involved, to the certainty of profitable results, and the future prosperity of our country, I can imagine no safer investment.

The CHAIRMAN.—Gentlemen, the whole question is open for discussion and we will be glad to hear any remarks that members may make.

Mr. BERTRAM.—I would like to ask Mr. Roth whether they are buying these lands in Michigan from private parties altogether, and whether there are any wild lands in Michigan belonging to the General Government.

Mr. ROTH.—In the first place the State of Michigan is not buying lands. The State of Pennsylvania and the State of New York are to-day the only two states of the Union that are buying lands. Michigan is establishing its forest reserves merely out of taxes on title lands; that is to say, a portion of the six million acres, of which I spoke as being 'in soak' for taxes.

Mr. BERTRAM.—Bought by the State?

Mr. ROTH.—They are not bought by the State, exactly. An acre of land in Michigan becomes delinquent for taxes. It is offered for sale by the tax officers. If it is not bought by anyone the State buys it in as it were. It may re-advertise and sell them over again in five years. The acre of land so bought or redeemed is deeded to the State of Michigan, not to the county, as is done in some states, and we have in this way a large number of tracts, a great deal of land which is tax title land, and it is from these tax title lands that the State has reserved now the forest reserves.

FATHER BURKE.—Have you no other Forest reserve beside that ?

Mr. ROTH.—No, we have no federal reserves. To be sure there are wild lands in our State, some belonging to the lumber firms of former days, some belonging to the speculators who have bought them with a view of making grazing tracts of them; and we have a small amount of federal government land in the State yet, but the great mass of real State land, I venture to say, is delinquent tax title land.

Mr. BERTRAM.—The reason I ask is, I have had some communication with the President of the Bureau in Michigan, asking information as to how those lands could be re-forested, and one of the greatest difficulties they had was the getting of sufficient quantities of land together in one place. For instance, I have been in Michigan where the forest has burnt over hundreds of acres and where there was hardly a tree on it. I do not very well see or understand how in Michigan you can get a proper forest reserve in an area more suitable for agriculture. Have you gone to private individuals and bought it ? Have you gone that length ?

Mr. ROTH.—No, the land has reverted to the State, and the State claims to be the owner of the area from the day the man ceases to pay taxes. The State says, 'I am part owner of that land, according to the amount of taxes that are due upon it.' After a certain number of years which the man has to redeem that land, the title is in the State. The title has been disputed and some of the lower courts have stated that the title is not a good one. New York State, it is true, has decreed that a tax title is as good a title as one can have to the land. We have a great deal of land there in tracts of one section or more, and I would say here that it is a question altogether of forest management whether it is not better to have a whole lot of people scattered through your forest reserve than to have a stretch 40 miles in extent without a man to help you in case of fire. We have found our ranger has had to ride a day's ride to get help, and then he could not do anything with the fire when he did get help. What we would like to have in Michigan—at least that is my own personal opinion—is to have the lands in this way : that we take the poor land and the agriculturist may have the good land and make farms of it in order that he may help us and we may help him.

Mr. BERTRAM.—That is very good so far, but that was not the idea in my mind when I asked you the question. Take an area of, say 100,000 acres, altogether unfit for farm land, or nearly so, and one part of it comes into your possession in the way you say, by tax sale, and you get possession of it. But here is another part of the very same kind of land, utterly unfit, and no means of getting possession of it. It seems to me that if you are going to be successful in the establishment of a forest reserve you should have some means of getting possession of this land. Whether you have succeeded in getting possession of it I do not know.

Mr. ROTH.—I agree with you most heartily. Our State of Michigan could do nothing better than pass a law right away which would enable the State Land Commissioner to buy every acre of waste land. More, it ought to enable him to say to a man, 'Very well, you keep it, and you see to it that a fire does not start on your land and we will see that a fire does not start on our side.' In other words, we should quit

looking upon a man's land property as though it belonged to him absolutely and unconditionally and without any reference to other people's welfare.

Mr. STEWART.—I am glad this discussion came up with regard to these reserves. I am just going to Winnipeg next week to make a report on certain reserves in the province of Manitoba, in the Riding Mountains. There is one township that has been partly taken up and I believe the land is fairly good, at least. There is one point, however, that has not been touched upon. Although that land is good there it is on a watershed, and even though the land is good to produce crops it is necessary to preserve the timber on that watershed for the benefit of the surrounding territory. If we destroy the Riding Mountains, some 45 townships, we simply destroy a large and most fertile portion of that province. Now, it may generally be right enough to simply reserve land which may be useless for agriculture, and here is a case where may be found land already fitted for agriculture reserved simply for the benefit, it is as the basis of the reservoir that supplies a large area that is dependent on it. This setting aside of reserves is a matter that has engaged my attention ever since I undertook the management of the forestry of the Dominion. If there is any part of the Dominion where forest reserves need attention it is in the sparsely-timbered districts of the west, because if we destroy, as I said before, the timber in certain localities there, the headwaters of these streams, we simply destroy the land adjoining the headwaters. It is well known that the husbandman of the plains does not now fear the summer frost half as much as he does the summer drouth, and it is necessary, and will be found necessary there at least, I think, to set aside land for forestry purposes for the benefit it is for supplying an even run-off for the water. There is one point connected with these reserves, that in Ontario and Quebec, and in this northern country, deserve consideration. You have perhaps the greatest water power anywhere to be found in the world in Canada, in this northern country, but what benefit will these water powers be if the source of supply from which the water is derived, that is the timber, is taken away. There would simply be torrents in the spring and drouths in the summer. I have told the people dependent for power on the Chaudière Falls that the immense water power in all that region depends on leaving a very large supply of timber on the head waters of those streams. Now, how are we going to know where we are going to set aside these reserves unless we have the country explored? I do not think the Dominion, or any of the provinces, can expend money better than in having a thorough exploration as far as possible made of those northern districts.

This matter of exploration is valuable not only for that. For many years, when practising as a land surveyor, I used to notice that we were surveying township after township not valuable for agriculture. The result of this division was that settlers would go in and, as every person who knows anything of it in this northern country knows, many of these townships would have been far more valuable if left in timber not only for the economic reasons which I have mentioned, but actually for the cash value of the timber.

There exists, therefore, the necessity in certain cases of retaining the forest even where the land is good, where there is danger of impairing the source of water supply by its removal.

FATHER BURKE.—This discussion as to the water sources, and also the idea of re-forestation by seeds are very practical, and we should have time to discuss them and come to some conclusion, but just at present we have the very valuable paper of Professor Loudon, the Principal of the University, before us, and some action ought to be taken on that point with a view to having a properly equipped forestry department in connection with some University of Canada. The country requires it. It is a big and growing country and we cannot do better than provide for the exigencies of that growth.

At this point Mr. Marcel Hoehn, of Berlin, exhibited to those present two seedling pines grown from seed planted in April, 1903. The display aroused much interest and favourable comment.

The CHAIRMAN.—Professor Goodwin, of Queen's University, is here. We would like to hear from him, if he would kindly favour us.

Dr. GOODWIN.—Mr. Chairman and gentlemen: My interest in this subject is very keen. I was just saying to a friend I met to-day in going away from the meeting, that it seemed to me in looking back over my life I had been born in the woods, and brought up in the woods, so that I may be pardoned if, although not a forester in any sense, I may profess and show some considerable interest in this subject which is occupying us to-day. I think, Mr. Chairman, that the proposal to discuss the three papers just read was a very wise one, and it struck me, as the papers were read one after the other, and as the discussion of the first two came on, that the problems of reforestation, of the establishment of forest reserves, and of forestry education were so intimately connected that you could not prevent the three papers from being discussed together, and after President Loudon's admirable résumé was given to us it seemed as if we already had a great deal of discussion which might have arisen from the reading of that paper. I think that the points that have been emphasized with regard to the setting aside of forest reserves and reforestation are exceedingly important ones, and I was especially struck with what has been called to my attention before, with the emphasis that has been laid upon the state as the best and the only forester. This is a point which has given rise to a great deal of discussion. It has been discussed several times to my knowledge as to whether it would be advisable to introduce the system of scientific forestry into the practice of our lumbermen who have bought their limits from the government and who are realizing as best they can on these limits. Now, one cannot blame the lumbermen for wishing to realize, because, as has often been pointed out, the risks which they run are very great and if they do not realize on their limits as quickly as possible they are constantly running the risk of losing a very large part of their profits. But Mr. Bertram has shown us by his able paper, and by his answers to questions, that it is possible for a private owner to introduce the principles of scientific forestry into his handling of his property, and to introduce them in such a way as to be perfectly satisfactory to his own interests, and I am sure that many of us who listened to Mr. Bertram's paper wished that we could just turn from our occupations and follow his lead, and go into the woods and be practical foresters, as he has become, greatly to his delight. I do not wish, Mr. Chairman, to occupy your time. I have had opportunities of giving my views on forestry educa-



HAULING HEAVY TIMBER—J. R. BOOTH'S TIMBER LIMIT, MADAWASKA. [p. 48]

tion before this Association before. You are well acquainted with them, and it would be really trespassing too much on your time for me to repeat what I have said on former occasions. Of course one is always getting new light on such subjects, but I may sum up by saying that I heartily agree with what has been said as to the prime necessity of the different governments looking into this subject and putting our people into the position to get the advice and assistance of Canadians who have been given the proper training to give such advice and assistance. The situation cannot be exaggerated in that respect, and I am sure that what has been said on that subject will receive the endorsement of every broad-minded Canadian and every man in the country who looks forward, instead of looking merely at the present.

Thanking you for your courtesies.

Mr. GILLIES.—Has anything been done at Queen's University towards the establishment of a School of Forestry ?

Professor GOODWIN.—In answer to Mr. Gillies' question I might just state the situation shortly. Queen's University began to consider this subject in 1894, the session of 1894-5, and a few years afterwards the School of Mining, which is affiliated with Queen's University, instituted lectures on forestry and called together a convention which attracted a good deal of discussion in the newspapers. Two years ago we followed that up with a course of lectures which were published, and I think these lectures must have reached the hands of most of the gentlemen present here to-day. We have even formulated a course in forestry very similar to that which has been mentioned by Professor Loudon, and we are doing everything possible to bring the subject forward in every possible way. There are a number of our young men who are looking forward to forestry as a profession. We are very much in the same position in that respect as I think Professor Loudon suggested they were here in Toronto.

Professor HUTT.—As one of the younger members I would like to say a word about forestry education. I have been interested in this subject longer than any of these older men. For ten years past I have been teaching forestry in the Agricultural College, Guelph. It was not to teach forestry I was appointed there. Ten years ago not nearly so much attention was given to forestry as at the present time. Teaching horticulture was the purpose for which I was appointed at Guelph, but we have finally realized the importance of forestry education and begun in a small way to teach our students along the lines of scientific forestry. That course in forestry has been growing every year, and our students are taking a very great interest in it. The course has been enlarged now so that there is a special course, or at least one of our special subjects, in connection with our fourth year, or degree course, where the students pass an examination in forestry and get their degree in forestry. This course has been growing, and students are coming there now for training in forestry. But what we really need is the paying of more attention to forestry education. What we need is more support. We want specialist support, not the horticulturist, the agriculturist, but the forester,—the specialist. In the meantime we have been creating public sentiment and our students are alive to the importance of forestry. I think it is largely because of public sentiment created by our students and the Experimental Union that attention has been called to the subject of farm forestry which is now looked upon as

one of the prominent branches of forestry. Our students are wide-awake and we have many now who would like to go on and take advanced work in forestry. I hope Queen's and Toronto will get forestry branches—we are going to have one in Guelph, anyhow. (Applause and laughter).

Professor MULDREW.—If I may crave your forbearance for just a few moments, I would like to speak of another aspect of forestry education, which was suggested by our friend, Mr. McCann, here, a few moments ago. Allow me first to explain my own position. Last summer I was called on very suddenly and very unexpectedly to take charge of that magnificent institution—though I say it myself—which was given to this province by Sir William Macdonald, of Montreal. (Applause). Now, I have, at least for many years, given a great deal of attention to forestry problems, and to education along all such lines as are indicated by this term. It had been my lot for nearly nine years to live in Muskoka. I was very much pleased to hear that an interest in forestry was beginning to show itself there, and I had almost the assurance to flatter myself that some of the seed which I had tried to scatter amongst the farmers and settlers in Muskoka had, on this occasion, possibly taken root. However, when I found myself in the position of which I speak, in Guelph, I found that my duties there would be, very largely, to disseminate, by means of the teachers of the public schools, education along the lines which are now commonly described under the heading of nature studies. I could not help noticing a few minutes ago, although we have had many brilliant speeches this afternoon, the gentleman who stepped up to the table with a small pine seedling in his hand created more enthusiasm and received a better hearing, although he said nothing, than those who made speeches. Gentlemen, we are going to see if we can interest children at school in things like this. They will not need such persistent and energetic hammering at them to get simple ideas on such questions of forestry into their heads. Now, as I said before, I am anxious to learn on this question and if any members of the Association can offer any suggestions as to any lines along which the Macdonald Institute, which is built and maintained for that purpose, can assist the cause of forestry at the same time in the nature studies of the public schools, we shall be most happy to give our consideration to the suggestions, and carry them out as far as possible. We are beginning just now to issue a series of bulletins to go to all the teachers of the province, in which we shall do what we can to create an interest in the studies and form a centre where teachers and pupils alike can look for interest and assistance. It is a well-known fact, easy of demonstration, that the intellectual standing of an individual or a nation can be very well measured by the distance ahead which the said individual or nation is able to look. A little child can see nothing but that which appeals to his senses immediately in front of him. As he grows older he deals more with the far-away than with the scene near by. You can see the same between the savages and civilized man. You have often heard about the Indian planting potatoes and digging them up again in two weeks time to see how much they had grown. We are something like the Indian. A year is too long for him to wait; fifty years is too much for us to wait. As the standard of education gets higher we will see that the wisdom of the old world is still far in advance of the wisdom of the new world in some of these fundamental matters.

Now just one more matter. There seems to be a question as to whether a school of forestry is to be established, or two or three of them. Now, I would not bring this

up, Father Burke, except that I happen to be very particularly related to these three bodies. I have the honour to be a graduate of Queen's, of holding a degree from Toronto, and being a professor of the Macdonald Institute, which is affiliated with the Agricultural College. And I might add to this, that I have on several occasions made some reputation as a peacemaker, and it just occurred to me as gentlemen were speaking that if the universities of the province cannot agree as to what ought to be done we have a staff of very able and very, very unassuming and very self-sacrificing men up at Guelph wonderfully well acquainted with the practical side of the science on which forestry is based. I suppose that our professors, through their relations to the agricultural interest, have paid more attention to the practical application of the biological sciences than most professors in merely academic institutions. It just occurred to me that really, if these gentlemen cannot agree, in my capacity as peacemaker I was going to suggest that possibly the professors of the staff, the president, and the Department of Agriculture would agree to settle the question by founding a nice, modest little school of forestry at Guelph in connection with the School of Agriculture. And our friend Professor Roth will remember that beautiful little nursery story that comes down to us from German books, the story of a poor little girl in the home who washed the dishes and swept the floors and got the meals while her two sisters upstairs were quarrelling most thoroughly over the question of frivolities and balls; and would it be stretching the parallel too far by saying that that little institution up at Guelph has been doing a noble work while some of her sisters have been quarrelling a little over this matter, and so perhaps the slipper that would not fit either of those other sisters might fit this little agricultural college at Guelph.

MR. BERTRAM.—I have given a great deal of consideration to the matter of the distribution of white pine seed, and that is one of the questions I would ask the lumbermen present to take up and see if they can see how far the white pine seed blows. I am not speaking about anything else but that. I do not think it was quite correct what was said about the spruce trees, but the white pine only comes to maturity every second year, or every four or five years. In the fall of the year the white pine cone opens and one of the reasons why you get a distribution far and wide over the country, and which enables the white pine to perpetuate itself over wide areas is (this is theoretical, rather, but I do not think there is any other way by which it can be done), that the white pine cone opens in the fall of the year when the storms are on and the seed—two of them together—get blown out of those positions where they are in the cone and are carried away by the winds far and near over the country. That is the only way white pine seed can distribute itself, because I have examined sections of territory showing where it has carried for a mile. That is the only way it can be done, because if it remains in the cone until March, as Mr. Joly said, well then it would not distribute itself at all.

FATHER BURKE.—It does not stay there until that time.

MR. BERTRAM.—What is not blown down by the wind is eaten by the squirrels. You do not get anything at all.

THE CHAIRMAN.—I can vouch for that.

Mr. WHITE.—But here is a gentleman who says he did gather seeds in March.

Mr. BERTRAM.—I do not agree with Principal Loudon in what he says about the American lumbermen. He spoke about our far-sighted colleagues, the United States lumbermen. Now the lumbermen of the United States are a lot of very nice fellows, delightful men to meet. I was going to give them the very best of character, but you can take it all for granted. I was going to say another thing about them. They are the keenest, shrewdest men in the world. I won't say they wanted to play a low-down game on us, but they wanted to take all our logs from Canada and saw them in the United States, but there were some things they did not know about the constitution of Canada, and we turned the game on them. They are the greatest sinners in the country and their whole efforts have been to cut down the forests and turn them into money. We have been great sinners ourselves in that respect, but I think we got light a little quicker than they did. It would be impossible for any institution of this kind, like the Forestry Association, to take any recommendation as to a particular institution. We can go the length of asking the Provincial Government to provide a grant for the establishment of a school or schools, but if I was to single out Toronto University here they would raise the cry 'Oh, he is a Toronto man. Hogtown.' And they would say we wanted to grab everything. I know they have done good work in Kingston, and did it before it was thought of here, and I would not like to move a resolution here which would be a direct slap in the face either to Guelph or Kingston. I therefore move :

Resolved, that the Ontario Government be and is hereby requested to make an appropriate grant for the operation of a Provincial School or Schools of Forestry.

Mr. LITTLE seconded.

Resolution adopted.

Father BURKE.—Mr. President, in connection with the subject that Mr. Stewart so ably referred to, the water sources of Canada, I think it would be well if we should offer a resolution. Therefore, I would move, seconded by Mr. Newman Silverthorne, who understands this question thoroughly also :

Resolved, that this Association urge upon the Federal and Provincial Governments the advisability of a careful examination of the water sources of Canada upon which the supply for agricultural, manufacturing or irrigation enterprises depends, with a view to the adoption of such measures as will assure the proper conservation and maintenance of the forest growth so essential to the continuance of an even flow in the streams during the seasons of the year when it is most required, and to the prevention of destructive floods and erosion of the watersheds such as have occurred in older lands.

Mr. SILVERTHORNE.—In seconding that motion, Mr. President, I may say that I can see the importance of the preservation of the forest and the volume of the streams throughout the agricultural portion of Canada. Now, we have a number of rivers around Toronto, some of which to-day are dry streams. They were milling streams years ago, milling streams throughout the season, and to-day the mills have been abandoned, the ponds have gone into agriculture, the buildings moved away, and the river no longer used for milling purposes. It is high one day and down the next day

and dry a part of the season. Hence we see the importance of retaining the forest to keep up the volume of the stream.

The CHAIRMAN.—Is it the pleasure that this motion should be adopted?

Resolution adopted.

The CHAIRMAN.—I have received a telegram from Mr. George Johnson, of Ottawa: 'Regret I cannot be with you in annual meeting. Hope the Association will produce even better results than ever before in arousing public interest in preserving our great forest asset.'

Mr. JAMES.—I rise to ask if the members of this Association can procure those bulletins of the Agricultural College at Guelph, alluded to by previous speakers. I think we could interest not only members of this Association, but others that we might meet with from time to time. It is a step in the right direction, and if the authorities can see their way clear to do this it would be very beneficial.

Professor MULDREW.—These bulletins will be issued through the Department of Agriculture, so far as this province is concerned. It is to be hoped that they will be extended to other parts of the Dominion afterwards, because it was agreed in the bequest from Mr. MacDonald that students from all provinces should have equal rights. I am sure the Department of Agriculture would be only too pleased to have from the Secretary of this Association a list of the members and to have these publications sent to all such members. I think I may say that much for the Department of Agriculture.

The CHAIRMAN.—The question of seeds that was referred to a short time ago might be discussed now.

Father BURKE.—I might say, with reference to the question of seeds, that I find that the Bureau of Forestry of the United States, have sent out a bulletin which describes accurately the different seeds grown in the United States, so that everybody may be able to find them out. In addition to that it would be well if we were able to give such information to our people. Besides that, they have what they call a co-operative plan. The farmers who grow good seeds in one section, by this plan would exchange them with farmers who grow good seeds in another part. If we could interchange the good forest seeds of Canada I think we would help on reforestry to a very great extent. I do not know whether a resolution is necessary. If the professors who are interested in this business, technically, would say something on that point—the co-operative seed gathering and distribution throughout Canada—I think we might grow something that would be of use.

Professor MULDREW.—We are just beginning, you understand, at Guelph, Mr. President and gentlemen. I will say this much, that within a very few weeks we hope to begin nursery work there, at first by growing deciduous varieties from the seeds and probably just get a supply of coniferous seeds from other districts. The object, as outlined in the House by Mr. Dryden, a few weeks ago, is to provide for the farmers of the province some centre from which they can get seedlings economically, at or near cost price. That is as far as we can go at present.

VALENTINE STOCK, M.P.P.—If you will pardon me for intruding on your attention to-day, I would like to say a very few words upon this discussion. Last year, in seconding the reply to the speech from the Throne, I alluded to forestry. I showed then, or at least tried to show, that we were, here in this Province of Ontario, fast creating the conditions which in many other lands they were trying to overcome. I tried to show that our country needed clothes; that we were depriving it of its clothes very fast, and through that we were changing our climatic conditions, changing the fertility and productiveness of our soil, &c., and creating the conditions which in older countries they were trying to overcome; that we should learn by their experience. India, for instance, which has denuded its hillsides and is doing nothing to replenish her hillsides and watersheds, suffers from dreadful famines caused by drouth, and in Australia they have had several years of drouth, with horses and cattle and sheep dying out. Japan has learned the lesson long ago, and, thanks to reforestry, that country looks like a garden. In the northern part of Africa, which used to be a great waste, a great tract of land has been reclaimed by planting. Now I have hoped, in addressing the House last session, that we should learn by their experience and not wait here until we had the same conditions which brought about the baneful results in these older countries. I asked the question: 'What can we legislators do?' and I pointed out that we must educate the farmer to conserve and make the best economic use of what he already has. Educate the farmer who has cleared off almost all his wood lot, to replant. Now, I went further than that. I made the suggestion to the Hon. the Minister of Agriculture, because I saw what seemed to me to be a feasible scheme of doing that. We had our farmers' institutes here in Ontario. I asked him to send out to these institutes men who could arouse the farmers and awaken sufficient enthusiasm to cause men to replant, at the same time providing the means to reforestry by taking a few acres of good land, and turn them into a nursery for replanting. And the honourable minister made the announcement the other day that that would be done. I am prepared to go a little further, and I submit it to the gentlemen to-day to say if it is possible or not, and that is this: That there will be planted at the Agricultural College several varieties of trees to be handed over to these farmers who wish to replant. Now, I think we can do a great deal of good in this way. There are many farmers to-day who have ten or fifteen acres of wooded land. There are on this ten or fifteen acres of land some large trees, some spreading out like the beech trees, growing in the branches and nothing more, and which prevents the land bringing in the return it ought to. I would advise that every farmer be taught to cut away from one end. Select that part of his farm which he wishes to continue as a forest, and cut away one acre at one end; clear it thoroughly as if he were going to plant corn; apply to the Agricultural College for trees to plant there; plant them as he would corn, so that he can go in between the rows with the horse and scuffler for the first five years, and, in the course of five years he will have a second acre prepared; and the third acre at the end of 15 years. At the end of 10 years he could possibly come along and thin out the first acre, and have a thickness of wood the size of my arm, and in that way by cultivating five acres systematically he will have far more wood than by letting ten or fifteen acres grow as you please. Now, I think in the Agricultural College they should just show in that same way what could be done on every hundred acre farm, one acre cultivated, another acre cultivated,

and so on, and the farmers flocking there from every part of the county would see how it is done and whether it is workable or not. I am quite willing to assist the farmers of this country to do everything they can to reforest their wood lots. Only the short-sighted man, a man of greed, or a victim of need, will dispose of his trees in a haphazard manner. I have seen in some trees one-half inch of growth every year and I am satisfied that this work of re-foresting the wood lots can be much better accomplished if the trees receive systematic treatment and care.

MR. FAULL.—After all, how many scientifically trained foresters have we in the whole country who are able to give advice on the general question? It seems to me, sir, that so far as Canada is concerned, we are simply playing at present. The discussion this afternoon has brought up a number of problems that should be settled to a large extent by a Department of Forestry in connection with the Legislature or Government. I had the pleasure, this summer, of coming in contact with some of the members of the Yale Forest School in a visit to their Summer School in Pennsylvania, and there are two things that struck me very forcibly in connection with that school. In the first place, the school is endowed by the head of the Bureau of Forestry, Mr. Pinchot, and the work is largely controlled or influenced by the United States Government or Bureau of Forestry. There are courses of lectures given in this school, and no fewer than five instructors holding positions and engaged in practical questions along the line of forestry. The question is, that the government and the school cannot be divorced, they must work hand in hand. The question of seed is something that we know very little about. We do not just know the habits of our Canadian trees in seeding times, and the general habits of the trees. That is one of the first questions that a Department of Forestry, I take it, would be able to investigate. Another point that struck me in connection with the school was the practical lumbermen giving lectures. In the case of a school here in this province, it seems to me, sir, that it would be successful only—or at least its success would be greatly increased—if lectures could be given by some men who are in the Government employ now. Say, for instance, by the head of the Bureau of Forestry in Ontario, and the gentlemen who have to do with the questions of fire ranging, and other practical matters. And, in addition to these men, such progressive lumbermen as the ones we have listened to this afternoon. What we need is scientific foresters who will be an aid to the Government in managing this large, permanent forest area which we are setting apart, and which we believe is to be for the benefit of the people, and where we are to have a constant supply of wood in perpetuity.

PROFESSOR SQUAIR.—I think that the people in this country are playing with forestry. I am a farmer, although a member of the staff of the University of Toronto. I have seven acres of wood fifty miles from here, and have been interested in reserving that piece of wood, and also in extending it, and seven years ago I thought I should make an effort to extend it and I bought some seed. Mr. Southworth got it for me, and I got practically no results. I made inquiry of other people and they could not tell me how to do these things. Now, I will admit that that is true, there is not a man in this country who has the information in his head that he ought to have regarding the re-foresting of the country. Now, that is the first thing to realize. You cannot get that information from books. The books of this country do not provide it, and

very little do the books of the United States provide it. I have not got the information yet, and I have made quite a search. You must have scientific training and have men who will make it a business to get this information. One man gets up and tells you this afternoon that you gather your seed in March, another tells us that it is not so. Well, now, we want this information just right. The woods are decreasing in quantity. Here and there you find an odd kind of creature who saves his wood. He does not know how to do it, but he keeps his cattle and fire out and then trees grow inside the limits of the woods and so the woods are preserved. But we are only fooling with the question. The Government of Ontario must tackle this question in a business-like way, provide men who will make a study of it, and gather the knowledge in our country, in Germany, and in other countries. They know what to do and we do not know what to do. I speak in a general kind of a way. There seems to be an odd man here and there who does know. If he does he has not written a great many books and has not delivered a great many lectures. (Applause)

FATHER BURKE.—So that we may have something before the chair for discussion, I would like to move the following resolution :—

Resolved, That the action of the General and Provincial Governments be heartily commended for extending the respective forest reserves of the country, and further

Resolved, That this Association urge upon such Governments the advisability of the country's interest of still further extending this policy of reserves.

Mr. BERTRAM seconded.

Mr. CHOWN.—I should like to say a word on that, Mr. Chairman. It seems to me that our Forestry Association has been moulding Government policy, especially in Ontario. It seems to me that in a report of our Forestry Association we should have taken more notice of the very important steps that have been taken by the Minister of Crown Lands and his assistants, with not only reservation but what, to my mind, is perhaps more important. The system of reservation has been accepted for some time, and the Government has gone and wisely extended it and accepted the principle that where land is not fit for agriculture that land should be set aside for forest reservation. I would like to say a word upon a further step. The Government has gone further. So far this reservation has been a reservoir of water from which nothing has been drawn, and we should highly commend them. They say the trees in reserve after a time reach maturity, stagnate and decay, and there is damage from windfalls, &c. The Government has stated in the House that they are going to provide in Ontario a system by which the timber is to be cut in such a way that there will be continued re-forestation, while the country will receive the income which will result from this method of disposition. It seems to me, therefore, that we should mark this in some fitting way. There is another matter. The Commissioner of Crown Lands has stated, and it seems to me he is altogether too modest,—I am not of his stripe of politics and am therefore not taffying him,—that he has undertaken to provide a system of forestry for waste lands. I come from a portion of the country which unfortunately is cursed from these waste lands. I have driven eleven miles in the northern part of Frontenac without passing an occupied house. These reservations are not only to be left there but a system of re-forestry will be worked out. The waste lands will not be permitted



LOCUST, 8 YEARS PLANTED, GERMANY.

to lie waste. There is another important matter referring to the Department of Agriculture and of Crown Lands, that is the providing of forest trees for the re-foresting of farm lots. It seems to me that we should in some way mark our approval, not only of the setting aside of these reservations by the Government but in undertaking to make available these reservations and to re-forest these waste lands that we have in Ontario. (Applause).

Mr. LITTLE.—I wish to commend in the highest manner possible the action of the Government of this province in the last few years. It seems an entire change has come over us and it is a grand one to look forward to. There is now some effort made of a practical kind towards preserving the timber that we have, and I can say this, that I have read a great deal of forestry literature during the last two or three months during an enforced leisure at home, and of all the forestry literature that I read I do not know anything that equals in value the Reports of the Director of Forestry of the Province of Ontario, Mr. Thomas Southworth. It is practical and the recommendations seem to have been put in such shape that the Government could not do otherwise than carry them out. Not only that, but I am going further, and this is a bigger thing than influencing the Government. He has actually induced the *Toronto Globe* to become a forest protectionist. A gentleman here tells us that in 1871 he took some action on forest protection. In looking over my forestry papers I came across a letter written by my father in 1851, and I remember that the first forestry work I ever undertook was copying that letter for him which was a protest against the views the *Globe* then held with regard to forestry. The other day I read an editorial in the *Globe* and I had to look several times to assure myself that it was the *Globe* I was reading.

Mr. BERTRAM.—Well, you know the old editor is dead. (Laughter).

Mr. LITTLE.—I do believe that the province of Ontario now leads any part of America in measures of forest conservation, and I have the greatest pleasure in getting up and saying something in connection with this resolution before the meeting.

Professor GOODWIN.—Mr. Chairman, as this is the Canadian Forestry Association, I think that any resolution of that sort should embody some notice of the admirable work that has been done by the Dominion. Why, the Dominion Government brought into Canada the first trained forester, and I may say that Mr. Stewart, our very active secretary, is doing a great work to-day over the Dominion of Canada. I know his work because I follow him very closely and he is doing a great work in our North-west.

The CHAIRMAN.—It gives me great pleasure to put this resolution. I am sure it will be adopted unanimously. Is it the pleasure of the meeting that this resolution be adopted?

Mr. RATHBUN.—While I heartily agree with the spirit of the resolution about to be put, I still think that the question of more forest reserves is something that is very, very far in the future. The lumbermen (I am speaking perhaps, personally, but at the same time I think I am voicing the sentiments of the whole lumber trade)—the lumbermen have a grievance from which they are suffering, and it is a serious one. I hesitate about mentioning it because I quite recognize that it is a matter of great delicacy,

that is the question of settlement. All lumbermen to-day hold limits well within the borders of civilization. Some lumbermen have been very careful in preserving the limits that are closed, great care being taken and much money expended in keeping fire out and skill exercised in the cutting. Now, when timber of all kinds is increasing in value, a so-called settler goes through the limits and he finds a particularly choice lot. He promptly makes application to the Department. Reports are called for. In some cases the lot is not settled; in many cases it is settled. In a great percentage of the cases where it is settled, that lot has been taken, not for the purposes of absolute location, but for the purpose of stealing the timber. My own company buys back each year many thousands of dollars worth of timber which are absolutely cut out of our own licensed lands, which have been taken from us on the plea of settlement. And the so-called settler cuts the timber, sells it to us, packs up his turkey and moves over into the next concession and repeats the operation. From the lumberman's point of view that is serious. I recognize, as I said before, the difficulties of the Government in dealing with that question. We want people in the country and it is their bounden duty to encourage settlement to the fullest extent, but I think there should be some continuity of interest between the Forestry Association, the Government, and the lumbermen on this very point. I do not think any lumberman in the country will stand in the light of bona fide settlement, but every lumberman is certainly opposed to timber stealing, such as we are now suffering from. I am not making these remarks from a critical spirit, but it is a matter of importance, and I think of sufficient importance for the Forestry Association to consider, and see if there are any suggestions which can be made to the Department which will aid in dealing with a very delicate matter.

Mr. WHITE.—Mr. Chairman, I have listened with a great deal of interest to the remarks which have fallen from Mr. Rathbun in connection with the interests of settlement and the interests of the lumbermen. I need scarcely say to you, sir, that the Department of Crown Lands is continually in hot water and more or less a subject of criticism for the manner in which it tries to discharge its duty to both these interests. On the one side we are attacked by the lumbermen because we do not keep out the settlers. Upon the other side we are attacked by the settlers and by their friends in Parliament because we do not let them go in as freely as they think they ought to be allowed to go in. Now, it is a most difficult thing, where the two interests are so intimately woven, that you cannot touch one without touching the other, to know just what is the proper course to pursue. Of late years we have endeavoured to pursue what we have believed to be, at any rate, an intelligent course, and have endeavoured to work out to the best of our ability what is in the interests of the province as a whole. In the old days when timber limits were sold all the timber went with the sale, and large tracts of territory have been under license for years, in townships which have been opened for settlement, and into which the settlers had a perfect right to go. It is true that in some cases, perhaps in a good many cases, lands are taken up that ought not to be taken up for settlement; where the settlers would have been better off, from an agricultural point of view at any rate, if they had not selected these lands. Now, of late years we have pursued this course. When an application is made for a location we refer the application to the lumberman in order to know if he has any objection, and if so what his objections are. We usually find that the statements of

the lumberman and the settler as to any particular lot are as wide asunder as the poles and, consequently, what we do is to send our own ranger to inspect the lots. If he finds that a reasonable percentage of the lot is suitable for agricultural purposes, and that all the pine timber has been removed from it, then we locate the land to the settler. But if, on the other hand, we find the lot has a very small percentage of land fit for settlement—fifteen or twenty acres—then we do not locate him, whether the timber is cut away or not. But if the land has a considerable percentage, say thirty or forty acres out of the hundred of good land, and contains a large quantity of hemlock, which is coming into value, we do not locate it. Now, I do not know how we can go any further unless we say to the settlers that they shall not go into any township where there is any kind of timber which the lumbermen may require in the future. Frankly, we are not prepared to go that far. We must deal justly. We are not satisfying either party, and that is a good evidence that we are doing what is right. What we are trying to do is to deal fairly with both parties. That we are trying to do, and I suppose we shall continue to be criticized both by the lumbermen and the settlers.

The resolution was then adopted.

Father BURKE.—I have another resolution to offer :

Resolved, that in view of the proposed construction of a new transcontinental railway and the projection of other lines passing largely through coniferous forests, the attention of the Governments of the Dominion and the provinces and also of the railway companies, be called to the serious danger of loss of valuable timber consequent upon the construction and operation of such lines if all possible precautions to prevent the starting of fires are not taken, and to urge that the question be given full and careful consideration, that to the end sought the party or parties contracting to build the different sections of the said roads be required to enter into an agreement for an efficient equipment and control to prevent fires, that at such seasons as may be necessary an effective patrol be established along all the afforested line of railway and that the officers, both of the governments and the railways, be required to use all possible diligence to prevent the starting or spread of fires through defective equipment or through the carelessness of the operations or negligence of the employees under their control.

Mr. LITTLE seconded.

Mr. STEWART.—Mr. Chairman, there has been a new Railway Act in reference to that. I am not going to criticize the motion at all, but I am going to ask Father Burke if he has looked over it to see whether the contractors are not compelled to take some action ?

Father BURKE.—I have not seen the Act.

The resolution was then adopted, and the first day's proceedings closed at 5.45 p.m.

SECOND DAY'S PROCEEDINGS.

Friday, March 11, 1904.

The meeting was called to order at 10.30 a.m. by the Chairman.

The CHAIRMAN.—Gentlemen, there is no necessity for introducing to you Mr. Aubrey White, who is to read us a paper this morning on the Crown Timber Regulations of the Provinces of Canada.

On rising, Mr. White was loudly applauded.

Mr. WHITE.—Now, gentlemen, this is the history of the regulations, and I want to say that you will have noticed that a great deal is left to regulation. The law provides that every timber license shall expire on the 30th of April in each year absolutely, and there is no provision in the law for a renewal.

Mr. BERTRAM.—Was there not a clause in the Act of 1869, Mr. White, that gave a right to give a renewal of licenses ?

Mr. WHITE.—I have not come across it, Mr. Bertram. All our regulations are made under the Crown Timber Act, and it does not say a single word about renewals. Under regulations, of course, renewals are provided for, and it is a curious thing and illustrates the confidence that people generally have in what is called 'the honour of the Crown' that enormous sums of money, millions of dollars, are paid for these timber limits, the license of which ceases absolutely on the 30th of April in each year, and are renewable by regulation, subject, however, to any restriction or change of regulation or rates that the Crown may see fit to impose. But it is a testimony to British institutions, at any rate, that people have such respect for what is called 'the honour of the Crown.'

SYSTEMS OF ADMINISTRATION OF TIMBER LANDS IN CANADA.

AUBREY WHITE, ASSISTANT COMMISSIONER OF CROWN LANDS FOR ONTARIO.

Having been requested to read a paper at this meeting of the Forestry Association, I have chosen as my subject 'The Systems of Administration of Timber Lands in Canada,' a subject which lies within the scope of our studies and ought to be of importance to any society taking an interest in the preservation of our forest wealth.

I have not confined myself to the provincial systems only, because my paper would not be complete without some reference to the Dominion laws and regulations, and I have strayed a little afield to notice the system prevailing in Newfoundland, which we hope soon to see included in the constellation of nations, if I may so put it, which form this great Dominion. (Applause.)

I suppose I might have contented myself with making a collection of the laws and regulations covered by my field of study, and have read them to you, leaving you to form your own opinions about their efficiency, but I have thought it would be more

interesting, as well as instructive, if I were to take the most important of the systems and trace it from the seed up to the full-grown tree, with its numerous branches of regulations. The most important system is that prevailing in Ontario and Quebec, and I bracket the system of these two provinces together, because they have grown from the same germ, were under one management until the year 1867, the date of Confederation, and since then have differentiated very slightly. The seed of our system was sown in the period known as the 'French Regime,' when, in grants of Crown Lands to the Seigniors, the oak timber, and later on the pine, was reserved to the King, and did not pass with the soil. Some of the principles that govern free grants under our legislation of to-day are found in these grants, and as was to be expected, some of the difficulties which exist to-day were troublesome even in that early period.

As a typical grant, I take that made to Sieur de la Vallier by the Government of Quebec, in 1683. In it we find (1) that settlers are to be put on the land and that they must take possession, make improvements and keep home and home within two years, otherwise the location was to be forfeited; (2) the oak timber was to be reserved to the King, and had to be protected; (3) the necessary roadways and passages had to remain open, and (4) the mines and minerals were reserved to the King. In our free grant there is required (1) actual residence and improvements, (2) the pine timber is reserved to the King, (3) roads and streams are reserved, and (4) the mines and minerals are also reserved to the King. The reservation of the oak timber was not a dead letter. I have read one permit—familiar name—granted by the Governor in 1731, authorizing the holder to enter upon a Seignior and cut and remove the timber required for building a vessel, which timber was to be brought to Quebec and there inspected and received, and a great deal of our square timber is to-day brought there to be inspected and received for shipment. Trespasses were provided against, and the regulations were drastic, which not only include confiscation of the timber, as in our day, but also forfeiture of the horses and plant engaged in taking out the stolen timber. The settlers' grievances were also present, for we find that a settler having cut some oak trees in process of clearing and sold the logs cut from them, the Seignior immediately fined him. The settler appealed his case to the Governor, who in effect said, 'how can he clear the land without cutting down the oak trees, why should he burn them if he can turn them into money? It is in the public interest that trees felled in the course of clearing should be sawn into boards and disposed of in order that the settler may obtain a little money to assist him in making his improvements rather than that he should be obliged to burn them on the land,' and he further confounded the Seignior by calling his attention to the fact that the oak was reserved not to him but to the King. If the settler cut beyond the limits of his clearing, or failed to improve his location, any timber cut by him was held to be a trespass. Here are the very same regulations that prevail to-day under which the settler may cut and sell timber required to be removed in clearing his land, and commits a trespass if he cuts beyond the limits of clearing or before he has become a bona fide settler. The right to take timber free of charge for public works, such as bridges, colonization roads, &c., was reserved in the grant to the Seignior, and the same reservation is found in our timber licenses to-day. After what I have said you will see why it is I go back to the French regime for the beginning of things.

When the British took possession, the Governor's attention was directed to the timber question. Pine, of course, was reserved to the King for naval purposes, but the Governor went a step further and issued instructions that areas containing quantities of pine were to be reserved absolutely, no settlers were to be allowed in them, and—wise precaution—no sawmills were to be erected anywhere near pine reserves, except by his express permission. Now you will note that down to the end of the year 1700, though the pine was reserved to the Crown, and pine areas were to be kept isolated, there is no mention of any authority being given to enter upon the Crown domain to take out timber for ordinary lumbering purposes, and here to dispose of the question of pine reservations, which by the way are now, over 100 years later, be-

ing made for the first time, it will be sufficient to say that none were made, the policy was started but no life given to it. What was done was to insert a reservation of the white pine to the King in all patents issued.

We now come to a period where timber was cut for exportation from Canadian forests. The reservation of the pine, as already stated, was to be for naval purposes. Shortly after 1800 the attention of the contractors to the dockyards in England was called, perhaps by some wide-awake Canadian, to this reservation, and perhaps it was said by some Canadian advocate of 'Preferential Trade within the Empire.' 'Why do you not come to Canada and get some of your timber there instead of getting it all from the Baltic?' Be that as it may, the naval contractors did apply to the Home Government for permission to cut masts, &c., in Canadian forests, and licenses—mark that word—were issued, one of which is now in my possession, dated 7th October, 1807, authorizing Messrs. Scott, Idles & Company to cut timber in the forests of Canada. This license was directed to the Surveyor General of Woods and Forests on the continent of America—fancy that for a jurisdiction. Messrs. Scott, Idles & Co. transferred their rights to Messrs. Muir & Jolliff, of Quebec. The Lieutenant-Governor-in-Council of Canada directed the Deputy Surveyor General of Woods for Canada to mark the trees that might be cut—quite a contract for him, was it not? No attempt seems to have been made to inspect this cutting, much less mark the trees, and cutting was limited only by the ideas of the people who were operating under these licenses. Here we have the first issue of any form of authority, under British rule, to cut timber on the Crown lands, and the name of that authority, viz., license, has been continued ever since. This business of contractors for dockyards cutting by proxy was the genesis of our square timber trade, and it centred in a few Quebec merchants, and these gentlemen were the precursors of those great firms which afterwards made Quebec famous as one of the principal timber markets of the world. It is to be noticed that these licenses did not cover any area. The holders of them went where they pleased, cut the best timber and paid nothing for it. The first of these licenses was issued in 1807, and it was not until 1826 that we find any attempt at regulation or supervision. Such a system as this created discontent, it being in the nature of a monopoly, and at last the people began to take the law into their own hands and go into the forests and cut as they pleased, without any authority.

To bring an end to the discontent, bring order out of chaos, and more important still, to obtain some revenue from the timber cut, Sir Peregrine Maitland, the Lieutenant-Governor, issued a proclamation on the 3rd May, 1826. Under this any person was at liberty to go into the forests, along the Ottawa river and its tributaries, and cut as much timber as they wished subject to paying three cents per cubic foot for oak, two cents per cubic foot for red pine, one cent per cubic foot for white pine, and four cents each for sawlogs suitable for deals. If trees were cut that did not square eight inches, double these rates were exacted.

Under these regulations, bad as they were, we have the first attempt to collect revenue from Crown timber. Under this system disputes as to boundaries took place, and there was no proper supervision of the cutting. The next year Mr. Peter Robinson was appointed Commissioner of Crown Lands and Surveyor-General of Woods and Forests. He had authority to grant license over such territory as the Governor approved of. The licenses were to be limited as to quantities, 2,000 feet was all that could be cut under one. They were to be advertised in the *York Gazette* at an upset price and sold by public auction. Here is the first provision for an auction sale of Crown timber. The licenses ran for one year only, but timber had to be cut within nine months and the dues had to be paid within fifteen months, and the timber was to be measured by a Government measurer. This system never took life—it died still-born. The regulations established by the proclamation of 1826 seem to have been continued in the Ottawa region, at any rate, and not much timber was cut elsewhere for export.

In 1840 the system was described to be as follows: The person desiring to cut applied in the summer or autumn, stating quantity desired to be cut. A license was issued; the licensee paid 25 per cent of the dues on the quantity applied for in advance and entered into a bond to pay the balance when the timber came out. When the timber reached Bytown, the following season, it was measured and went on to Quebec. The parties applied for a license for only a small quantity so as to keep down the advance payment, but in practice they cut as much as they pleased. The dues were finally paid at Quebec on all the timber they took out.

We now come to the period of responsible government, and the union of the Provinces of Upper and Lower Canada, which brought about a closer guardianship of the natural wealth of the country. The union took effect on the 10th February, 1841. A year later instructions were issued by the Hon. John Davidson, Commissioner of Crown Lands. They were intended to secure greater strictness in suppression and to introduce the principle among lumbermen. These instructions are dated the 30th March, 1842. Under them licenses could be issued at the former rates. The licenses were to be for a fixed period, at the expiration of which they were to absolutely cease and determine. The former licensee could get a new license for the same territory provided he came forward and applied before the 1st August. Provision was made for sale by public auction, in cases where there were conflicting applications. No greater extent than ten miles was to be licensed to one person; 5,000 cubic feet of timber per mile had to be made annually.

On the 24th June, 1846, new regulations were made. Under these new limits must not exceed 5 x 5 miles; current licenses to be renewed for three seasons, after which they were to be curtailed to 5 x 5 miles, but existing licensees might select the particular part of their limits they desired to keep. Licenses not applied for before the 15th August were to be put up for sale on the 1st September following, as well as any other berths for which more than one application had been received, and sold to the highest bidder. Here again we have the principle of a public sale, although one would say that fifteen days was a very short period in which to make an examination. The quantity of timber to be taken out in each mile was reduced from 5,000 feet to 1,000 feet, and, after the 1st September, limits were to be granted to the first applicant complying with the conditions of sale. Parties applying for territory or unexplored limits were to furnish a sketch by a sworn surveyor, describing the territory and tying it to some known point. If the sketch was afterwards found to be incorrect the license could be declared null and void. In order to induce the lumbermen to keep a close eye on one another, provision was made that a forfeited limit was to be licensed to the party giving information as to the non-fulfilment of the conditions of the license, and failing the application of the informer, then to the next applicant. These instructions also specifically declared that licenses were not transferable and that any attempt to transfer them would entail forfeiture. Applicants had also to declare who were associated with them in the application.

Two months later, on the 14th August, 1846, other regulations were published. The only important change made by these regulations was that limit-holders might transfer their limits with the sanction of the Department of Crown Lands, a provision that has come down to our own time, and the quantity of timber to be cut each year per mile was reduced from 1,000 feet to 500 feet.

In 1849 a Select Committee of the House was appointed to consider the causes of depression in the lumber trade, and suggest a remedy. This committee made two reports in which they stated that the depression was caused by over-production, which was stimulated by the uncertain tenure of licenses, and the threatened subdivision of the licenses already granted. Also that provisions requiring a certain quantity to be produced, without respect to the state of the markets, had a bad effect, and that the want of any decisive action by the department with respect to disputed boundaries was demoralizing. The uncertainty of the tenure and the disputed boundaries caused great trouble. Wealthy lumbermen who had the advantage of large numbers of men,

would go in where they liked, without respect to other's rights, and rush out all the timber they could manage to cut in one season. As a remedy, positive rights of the renewal of licenses was recommended so as to give certainty of tenure. Surveys of boundaries, and the imposition of ground rent for the areas covered by the license was also suggested, and it was recommended that no distribution of areas should take place. It was further pointed out that under the regulations the practice with respect to the collection of dues was to ascertain the quantity by counting the number of sticks without respect to size and averaging them at a certain number of feet per stick, which average was too high in some cases and too low in others, and with respect to this the suggestion was made that dues should be paid on the actual contents of the timber ascertained by count and measurement.

The result of the report of this committee was the passage of the 'Crown Timber Act,' which, with comparatively little change, is to-day the law under which all the timber licenses are issued in the Provinces of Ontario and Quebec. This Act provided that the Commissioner of Crown Lands might grant licenses for unoccupied territory, at such rates and subject to such conditions, regulations and restrictions as the Lieutenant Governor might establish from time to time. No license was to be granted for a longer period than twelve months and all the licenses expired on the 30th April of each year. The territory licensed was to be described in each license. The licensee was given absolute possession of the territory, so he could prosecute trespassers and seize the timber cut by them. The making of sworn returns of the timber cut year by year was provided for, and there were many other provisions of less importance. The first regulations under this Act are dated 5th September, 1849. Agencies were established—agents might, on application, grant licenses, apparently without referring the applicants to the Commissioner of Crown Lands. Sketches of the territory applied for had to be furnished. The area of timber limits was increased from five miles by five miles to ten miles by five miles. Licenses were to be confined as far as possible to one side of the river. There was no restriction to the number of limits a man might hold. The timber was to be cut and paid for at certain rates. Transfers of limits were to be in writing, and not valid until approved by the Commissioner of Crown Lands. It also provided that settlers or squatters cutting without authority if they cut any timber except for building, fencing, clearing, &c., were to be treated as trespassers. These restrictions contained a distinct provision for renewal of licenses. The proper counting and measuring of timber cut, was also provided for, and a clause was inserted in the regulations that actual settlers were not to be interfered with in the clearing of the land, &c. Here the settler first appears in the regulations. Under these regulations all a person had to do in order to obtain a limit was to make application to the agent, furnish a sketch of the territory he desired to obtain and give security to pay the dues on the timber cut. There was no provision for competition except where adverse applications were received. Generally speaking, the principle of selling limits by public auction appears to have been entirely absent from the regulations.

In 1851 fresh regulations were promulgated. The new provisions were—I call particular attention to this—that sawlogs cut on the public domain, if exported, paid double dues. Ground rent at the rate of fifty cents per mile was imposed. Here we have discrimination against the export of logs and the first imposition of ground rent. The ground rent was to be doubled each year that the limit was worked. Vacant territory was to be granted to the first applicant provided he called and paid the ground rent, in the Bytown agency within three months, elsewhere one month. If adverse applications were made for the same territory then the right to receive the license was decided by lot. Here we notice a gambling spirit in deciding the rights of individuals. Who would toss up for a limit to-day? There was also a provision to sell to the highest bidder in case of clashing of applications. Registers of the licenses issued were to be kept in the agencies and the Crown Lands Department and were to be open for public inspection. Decisions of the Crown Timber Agents as to disputed bound-



STAND OF TIMBER—J. R. BOOTH'S TIMBER LIMIT, MADAWASKA

aries were to be final until reversed by arbitration. If one party failed to appoint his arbitrator then the Crown Timber Agent took the position. Should they not be able to agree on an umpire the Commissioner was to appoint one. Transfers of limits were allowed subject to the approval of the Commissioner of Crown Lands. Parties defying the regulations of the Department or the decision of the arbitrators were to be refused further license and their berths forfeited and disposed of. Security had to be given for the timber dues, &c.

In 1855 an Order in Council was passed dealing with the ground rent question, and fearing apparently that the imposition of ground rent might lead to the idea of rights of ownership, and in order to prevent any misunderstanding, this Order in Council contained a declaration of great importance, to wit, that the changes made are not to imply that the Government cannot increase the ground rent or timber dues at any time in the future as the circumstances of the trade might render it expedient. Previous to the year 1857 no information could be obtained about the transactions of the Crown Lands Department except by special return to the House, but on motion of Mr. A. T. Galt it was, in the session of 1856, ordered that an annual report of the management of the Crown domain should be submitted to the Legislature each session. The first report, and it was one of the best reports that has ever been made by the Department, was made for the year 1857.

In 1857 another change was made in the time for the payment of the ground rent; it was now made due on April 30 in each year, the day on which ground rent becomes payable under the present regulations. The limited number of cases of competition which came up under the regulations forced upon the attention of the Commissioner the principle of selling timber berths by public auction, for in the report of the Commissioner of Crown Lands for the year 1859 it is stated that wherever competition existed or could be excited, recourse had been had to the plan of disposing of the timber by public auction. Between the years of 1856 and 1860, attention was sharply drawn to the practice of people purchasing valuable timber lands under the pretence of settlement, thus depriving the Crown of its revenue and the licensees of what they believed to be their property. Energetic steps were taken by the Department to stop this system of plundering. Numerous sales were cancelled when the lands were found to be valuable for the pine timber. Under the settlement regulations then prevailing, strange to say, the settler could burn whatever timber he cut in the course of clearing his land, but if he cut it into sawlogs and sold them he was guilty of trespass. The good sound position laid down by the Governor during the French regime was departed from with disastrous results. The settlers were very much embittered and a deplorable state of matters came about. Some remedy had to be found, consequently new regulations were passed under which a class of license called a 'settler's license' was issued to all settlers who erected a house 16 x 20, cleared five acres in every hundred and had been six months in residence. A fee of \$4 was charged for these licenses. Timber dues were charged upon the timber cut, and these dues were applied in payment of the purchase money of the land with a refund of any money collected in excess of the purchase money, less 10 per cent for collection. Any person who is familiar with the history of lumbering and settlement in Canada during the period from 1856 to 1866 will know the bitter feelings that existed between the settler and the timber licensee, and how the department was beset with criticism and difficulties in respect to clashing of interests and the providing of a remedy. Settlers' licenses apparently did not meet the difficulty, and the issue of them greatly fell off until they entirely disappeared.

In 1866 new Crown timber regulations were made. Sales by public auction were provided for. These sales were to be held on January 10 and on July 10 in each year, or any other date that the Commissioner might fix. The limits were to be offered at an upset price of \$4 per mile, the highest bidder to have the berth. If there was no bidding the berth was granted to any person paying the upset price. The Commissioner could sell between the dates of auction sales at \$4 per mile to any person who

applied for a berth. One berth only could be sold to each applicant. Timber licenses were to expire on April 30 in each year. Ground rent was continued at 50 cents per mile. No licenses were to issue on a smaller computation than eight square miles. The ground rent was to increase annually on berths not worked until it reached 23s. 4d. (\$4.67) per mile. When occupation took place it reverted to the original rate of 50 cents per mile. Five hundred feet of timber or 20 sawlogs had to be made every year for each mile of the limit; renewals of licenses were provided for if the regulations and payments were complied with. Applications for renewal had to be made in writing every year before July 1. Transfers could not be made if dues were owing.

We have now come to the period of Confederation which was consummated on July 1, 1867. Since then every province has been free to manage its own affairs and enact such laws and regulations as would best carry out the policy suited to its circumstances. It is a great testimony to the wisdom of the legislators of bygone years that the Crown Timber Act of 1849 has remained the charter, so to speak, of the timber licensing systems of Ontario and Quebec, very few amendments having been made to it in either province. The great strength of the Act is that it only lays down broad principles, leaving the management of the Crown domain to be fixed by the regulations as experience teaches or emergency requires. It may be worth while to state the broad principles laid down:—(1) The Commissioner of Crown Lands may issue licenses, which licenses are to cover all kinds of timber during their currency; (2) licenses are to run for one year only and then absolutely determine; (3) proper returns of the cutting of timber are to be made, and (4) timber cut in trespass is liable to seizure and confiscation.

Since Confederation the Act has been amended as follows:—Timber on road allowances is declared to be covered by the timber license; lots which have been sold to actual settlers are to remain in license until proof of settlement duties is filed in the department; the Commissioner of Crown Lands can sell timber on pulp concessions which is not covered by the concessions, and no pulp concession can be granted for a longer period than 21 years, and most recent and most important, pine timber and spruce on lands under license must be manufactured in Canada. It will be seen that the points touched by the Act are not very numerous, but the field left for legislation is enormous—just listen to the language of the Act, ‘the Commissioner of Crown Lands may issue timber licenses subject to such rates and conditions, regulations and restrictions as may from time to time be established by the Lieutenant Governor in Council.’ No attempt is made to define what sort of conditions or restrictions may be imposed, anything that comes within the meaning of these words can be done by regulation. This, with the discretion taken in combination with the absolute termination and legal death of every timber license within one year of its birth, places almost unlimited power in the hands of the Crown. Take one example: When our good friends over the border undertook to treat us, as we thought, unfairly, and the Government of Canada could not act without making matters worse and perhaps ruining the lumber trade, we were able, by passing an Order in Council to attach a condition to all licenses to the effect that timber cut on Crown lands must be manufactured in Canada, thereby transferring a goodly portion of the sawmill business of the State of Michigan to the Province of Ontario and leaving our friends who would not come over to Canada in the position of Lord Ullin when the waters wild went over his child. (Applause). Of course, these regulations being very important, they were afterwards crystallized into an Act of the legislature. Several Acts have been passed by the legislature since Confederation amending the Crown Timber Act and affecting lumbering interests, and I will just mention them. There is an Act affecting the rivers and streams which declares that everyone has the right to use these waterways for floating timber or logs; the Cullers’ Act, which requires that persons desirous of culling logs cut under license shall pass an examination and be licensed by the Commissioner of Crown Lands; the Act for the preservation of the forest from destruction by fire, under authority of which fire rangers are put upon limits at the

joint expense of the Government and the licensee ; the Act affecting liens of employees on sawlogs and timber ; an Act amending the Free Grants Act, which reserves the pine timber on lands located after March 5, 1880, and enables them to be continued in license ; the Act for the driving of sawlogs and timber, which made some needed provisions with respect to parties who might be inclined to shirk their share of the expense and responsibility.

On May 28, 1869, the Crown Timber Regulations of 1866 were abrogated and new regulations were made by the Lieutenant-Governor in Council of the province of Ontario. To a great extent the old regulations were incorporated in the new, of course some new clauses were added at that time, and others have been added since. The most important clause in the new regulations was the requiring of survey, exploration and valuation of the timber limits before they were offered for sale. Then due advertisement of the sale by public auction to the highest bidder. Another important change was the increase of timber dues from 50 cents per thousand to 75 cents per thousand, and of the ground rent from 50 cents per mile to \$2 per mile. Another was the requiring of a more elaborate system of returns, with power to the Commissioner to have an inspection made of the books, records, &c., if fraud in returns were suspected.

In 1887 the regulations were again amended by increasing the timber dues from 75 cents per thousand to \$1 per thousand, and the ground rent from \$2 per mile to \$3 per mile.

In 1890 for the first time the sale held in that year by authority of Order in Council covered only the pine timber, and the dues were again increased for the purposes of that sale to \$1.25 per thousand.

In 1903, for the purposes of the timber sale held in that year, the dues were increased from \$1 per thousand to \$2 per thousand, and on square timber from \$20 to \$50 per thousand feet cubic, and the ground rent from \$3 to \$5 per mile. Regulations affecting the last two sales were passed fixing a time limit beyond which licenses were not to be renewed of from 10 to 15 years. Regulations have also been made to the effect that lands located or sold are to pass automatically out of the timber license for anything but the pine timber on the day of sale. Regulations have also been passed that require licenses to supply sufficient timber for local sawmills upon being paid the fair value of the same. Regulations have also been made requiring that pine and spruce shall be manufactured in Canada, which of course have been crystallized into legislation, and more recently regulations have been passed requiring that hemlock bark shall be used in Canada.

Having traced the history of the license system, and given you the substance of the recent amendments to the Ontario laws and regulations, prevailing in the Dominion and Newfoundland, I shall now proceed to refer to the different laws and regulations. I shall refer to these in a general way and briefly. It is only necessary to call your attention to the principles of the systems and to the wide divergencies of the laws and regulations. The licensing systems prevailing in Ontario and Quebec have, as I have said, a common origin, and have run nearly along parallel lines.

The New Brunswick licensing system dates back to August 26, 1817, when the Lieutenant-Governor in Council framed a set of rules with regard to timber license. One interesting provision in these early regulations was that licenses were to be given only to British subjects. No dues appear to have been charged at that time.

Nova Scotia had no timber licensing system until quite recently, and the British Columbia system is comparatively modern and is based somewhat on our system, diverting very widely, however, in the matter of tenure and the rates of ground rent and dues. The Dominion system is also based largely on the Ontario system with such modifications as different circumstances have called for. I have not succeeded in tracing the Newfoundland system back to its origin.

In Ontario the Commissioner may issue licenses after sale by public auction, a reserve bid being fixed but not made public. The licenses are annual and terminate

on April 30 in each year, but by regulations are renewable. Ground rent runs from \$3 to \$5 per mile and is subject to increase or decrease. Dues on pine timber run from \$1 to \$2 per thousand feet, and are subject to increase or decrease. Pine logs, pulpwood and hemlock bark are required to be manufactured in Canada. Fire rangers are placed upon all licensed lands, one-half of the expense being paid by the licensee and the other half by the Government. These rangers are selected by the licensee. One dollar per mile is charged for transfer bonus on limits that are transferred.

In Quebec the Commissioner may issue licenses after sale by public auction. Limits have to be advertised for thirty days if of an extensive character, and small limits for fifteen days only. There is an upset price made public at the date of sale. The licenses terminate on April 30 each year and are renewable by regulation. Ground rent is \$3 per mile, and is subject to increase or decrease. Dues on pine run from 80 cents to \$1.30 per thousand, subject to increase or decrease. There is no restriction as to the exportation of logs except that pulpwood must pay 25 cents per cord additional if exported. Fire rangers are appointed by the Government upon the recommendation of the licensee and a tax called a fire tax is charged upon the limit to pay the expenses of the fire ranging.

In New Brunswick the Commissioner may issue licenses. The mode of disposal is that applicants are required to petition for the limit they wish to obtain and to deposit in the department \$20 per mile. The limit is then advertised in the *Royal Gazette* for 14 days, after which it is put up at public auction, and if the applicant is the highest bidder he gets the limit. If somebody else bids more and gets the limit, the applicant gets back his money. Limits are not to exceed 10 miles in area. The ground rent is \$8 per mile and subject to increase. Dues on saw-logs are \$1.25 per thousand, subject to increase. There does not appear to be any fire ranging system. The measurement of logs is made by Government cullers. There does not appear to be any restriction as to exportation.

In Nova Scotia there is no provision for sale by auction. The Governor in Council may issue leases to cut timber, which leases are to be for a period of 20 years, renewable for another 20 years if conditions are complied with. The price is to be 40 cents an acre—not annual—if timber below the diameter of 10 inches is not cut. If timber is cut below 10 inches down to 5 inches the price is 50 cents per acre*. The only provision for public auction is where there are adverse applications for the same territory. If lands are not suitable for agricultural purposes they may be leased for pulp purposes as arrangements are made with the Government.

In British Columbia limits may be sold by public tender and are to go to the highest bidder. Annual ground rent, \$160 per mile; dues, 50 cents per thousand feet, b. m. If a mill of certain capacity is erected on a limit the ground rent is reduced to \$96 per mile. Dues are abated by one-half on lumber or timber that is exported from the province. The license or lease runs for a period of 21 years, and as this provision is statutory it is presumed that dues cannot be changed during that period. There is another class of licenses called 'Special License,' which cover only an area of 640 acres. These are issued at the discretion of the Commissioner, for a period not exceeding 5 years, and may be renewed at the discretion of the Commissioner. Annual ground rent on these licenses run from \$115 to \$140. There is another system of licensing called 'Hand Licenses,' which are given without competition and it is presumed are intended to cover only small quantities. They run only for one year. Timber must be manufactured in the province. There is no provision for fire ranging on British Columbia lands.

In the Dominion of Canada lands may be put up for competition by tender and go to the highest bidder. Annual ground rent \$5 per mile; west of Yale, \$32 per mile. Dues 50 cents per thousand. Licenses are annual and expire on April 30 in

*At last session of the legislature these rates were increased to 80c. and \$1.00 respectively.—Ed.

each year, and are subject to renewal. There is a fire ranging system on Government lands paid for entirely by the Crown.

In Newfoundland there is no provision for public sale. Limits are granted by authority of Order in Council, at a bonus price fixed by the Governor in Council which varies according to the situation of the limit, and not to be less than \$2 per mile. In any case notice is to be given in the *Gazette* for one month. There is an annual ground rent of \$2 per mile. Dues on timber are 50 cents per thousand in Newfoundland, and in Labrador 25 cents per thousand feet b. m. Licenses may be granted for fifty years or such further period as may be deemed necessary. Licensees must erect a sawmill and work the limit; sawmill to be capable of cutting 1,000 feet every twenty-four hours. No person having a limit can buy logs from another licensee or cut them by agreement on any other limit than his own. Pulp limits may be granted by the Lieutenant-Governor in Council; not more than 150 miles to any individual or company. The license may run for 99 years or longer. There is a bonus of \$5 per mile and ground rent of \$2 per mile, and the timber is subject to 50 cents per thousand feet b. m. Pulp concessionaires have to expend \$20,000 in plant. All kinds of timber, pulpwood, &c., must be manufactured in the colony.

The CHAIRMAN.—Gentlemen, you have heard the paper just read by Mr. White, which is filled with information and is a very valuable paper. There are many points in it I am sure that the members of the Association would like to have some further discussion upon. I am sure Mr. White would be glad to have a full discussion on the points of this paper. The matter of licensing and granting licenses to individuals by the Crown for the purpose of cutting timber, and for the larger purpose of commerce is a very important thing, and we will be glad to hear any gentleman speak on this subject. It is going to be followed by another paper by Mr. Hall from the province of Quebec, I do not know upon what lines exactly, but after discussing this paper, which I think deserves our attention for a little while. Mr. Hall will take that paper up. There is one point within my own experience that I would like to ask Mr. White if he remembers anything about. I can remember a time when an applicant for a license was required to state whether he would build a sawmill for the purpose of cutting, and unless he did that he was refused his application.

Mr. WHITE.—I did not find anything to that effect.

The CHAIRMAN.—There was something in that. I can remember perfectly well of Orders in Councils being passed by the old Government of Canada—(it may be in part of the regulations)—that the applicant build a sawmill to manufacture the lumber. I have in my mind's eye an application and Order in Council passed by the Government of Canada with that provision.

Mr. WHITE.—Of course, sir, you will understand that there may have been Orders in Council passed that were merely local in their application which have not come down to us because a great deal of the records and authorities for things that took place before Confederation are some of them in Ottawa and some of them in Quebec, and this may have been a minor regulation, because it is not referred to in any of the broad regulations, it may have been a local regulation and we have no trace of it.

Mr. LITTLE.—Some years ago there was some difficulty between the Government of Quebec and the limit holders. I remember the late Judge Church, before his ascent to the Bench, was employed by the limit holders to take up the position held by them;

that is, that they were entitled to the renewal of their licenses from year to year so long as they conformed to the regulations. I would like to ask you whether that was decided legally or was it a compromise—that the licenses were to be extended for a term of years.

Mr. WHITE.—Now, I do not know what took place in the province of Quebec but I will tell you what took place in the province of Ontario. When we had this little difficulty with our American friends about the imposition of regulations requiring them to manufacture in Canada, they carried it to the courts, claiming that they had a right under our regulations to a renewal without this new condition, but the courts held, just as I have said, that the licenses terminated absolutely on April 30, and there was no right to renewal except as given to them by the regulations, and the regulations provided for restrictive conditions and all that sort of thing ; so that the province owning timber could at the time of giving a new license—and a renewal is a new license—attach any condition that it chose.

Mr. BERTRAM.—There is no doubt whatever, I think, that what Mr. White states is perfectly correct. The contention of the lumbermen themselves was sustained by the Superior Court, and I think it a great compliment to the lumbermen that all the claims made by them in the matter of restricting the output of logs to the United States and every contention was sustained by the courts, and it put us in the position that we think the Government have a right to listen to our opinions. I would say while my view is that the Forestry Association is certainly indebted to Mr. White for the very able paper which he has presented to us, I think further that one of the great benefits of having a paper presented here is that it will go on our records and be with us continually. We will be able to turn back in time and see just what the regulations are and all about them. I certainly wish to express my own individual thanks, and I have the idea that the Forestry Association will say that we are greatly indebted to Mr. White for the paper. There are one or two points, hardly subjects for discussion, but rather consideration. The Forestry Commission of 1897 gave a great deal of consideration to the preliminary report particularly, and one of the things we had under consideration was as to a time limit for license. We found a large area of licensed land where the timber was cut off and abandoned so that there was nobody there, and no attention was paid by the lumbermen in the way of having fire rangers looking over it. These had no timber on them and were only a danger and detriment to the limit holders alongside of them. We thought it necessary for the Government by some means to take possession of those limits again. That was the idea in our minds in making a recommendation to the Government that they should limit the time so that they could again take possession. And I believe they have done so, although I am not very sure of the area. I believe they have got possession of those cut-over limits which were a danger to the rest of the timber. Now, while after a few years they acceded to that recommendation to limit to ten years, I think, sir, the time is rather short. But I think the principle was right, without any question, although the time is rather short; for this reason: As every lumberman knows, there comes a time in the history of the trade when it is really a detriment to be obliged to cut timber, while they do not want to lose it. This period may extend over a term of years. Take away back in the nineties; every one of us lost money during those

years, unless particularly well situated, and it took some considerable time afterwards to make it up. Therefore, I think the ten year limit is rather short. They have adopted fifteen years, but I would like to have an expression of opinion here if it would not be better to have the term twenty years. That would give the licensees sufficient time to take off what they have really bought—the merchantable timber. They have not paid for the saplings, but only the merchantable pine, and I think if the Commissioner of Crown Lands, who I am glad to see here this morning again, would take it into his consideration, with his officers, and extend that time to say, twenty years, I have no doubt whatever that if sufficient reasons could be shown the term could be extended to twenty or twenty-five years, if necessary. As Mr. White stated, we are really and absolutely in the hands of the Crown, but we have never found the Crown taking advantage of us. I offer that only as a personal opinion of my own.

The only other point I wish to speak on, and to me is an exceedingly important one, so important that I have applied for information from Germany and England to see if it is possible to get a plant that we can take into a limit away from the railways, where we cannot draw hemlock bark to a railway. I think one of the things that the government ought to take into consideration would be a new regulation about cutting. In my paper yesterday I spoke of the pine timber being legislated, as it were, out of existence, and the balsam and hemlock and other trees being left to grow. I have in my mind considerable districts of country that are now covered with these trees, and white pine will not germinate under shade of that kind. When you see a white pine growing under another tree you find it stunted and looking like a young fellow that did not get enough to live upon, and within perhaps a yard or so you will see one of the most beautiful objects in nature, a white pine tree growing in perfectly luxurious magnificence, with an annual growth of from a foot and a half to two feet. I almost feel like standing and worshipping a tree of that sort.

The CHAIRMAN.—Sometimes we do. (Laughter.)

Mr. BERTRAM.—Now I speak of that to show that the hemlock and spruce and balsam that have grown up in the shade will germinate in the shade and grow up better than the pine. Some of you who have seen large pine trees a hundred and fifty years old have noticed, after they were taken away and the sun had got down into the forest, a whole brood of trees coming up right in that very spot. But if the shade is kept up over them the seeds will not germinate. I take it it would be better to see how these cheaper woods could be cut out and give the white pine a chance to grow. That is one of the most important things the department can give consideration to, and I have applied to the best scientific authorities in Germany and England to see how small a plant we could get that would be capable of producing the extract of hemlock in the forest where it is not possible to take the hemlock bark and draw it a long distance, on account of its bulk. I think the department would be really serving a good purpose if it could put us in the way of getting a plant with which we could obtain the extract without much trouble. There is an enormous quantity of wood so situated that there is no means of getting it down to the market, there are no streams to float it down, and if we could also get a small plant to produce

mechanical pulp it would be of enormous benefit, as it would enable us to utilize something that we cannot now do anything with. I would very much like to hear an expression of opinion from some of the lumbermen present who have no doubt been troubled with the same feelings that I have had in the matter.

Mr. STEWART.—I just wish to make one or two remarks upon this paper. Mr. White has certainly given us a most excellent résumé of the rules and regulations regarding the cutting of timber in different provinces. Now, this is something, I dare say, that Mr. Southworth has noticed,—and I have noticed it—that applications come to me from different parts of the world asking for the regulations concerning the cutting of timber in Canada. They know nothing of the regulations of the different provinces of the Dominion, and I just wish to say this, that I think that paper, if it were put in bulletin form would be a benefit to each province of the Dominion, and would be most convenient to send out in response to applications in general terms for the regulations for cutting timber in Canada. To give it to the applicant in complete form I had to get the regulations from British Columbia, from Ontario and from the other provinces, and our own regulations. Here we have it all epitomized in one report, and we should join together and have that published in bulletin form. Now there is just one thing regarding British Columbia. Generally we speak of the timber regulations of British Columbia, but there are two different sets of regulations applying to that province. There is in British Columbia the portion along the Canadian Pacific Railway that is under Dominion regulations. This territory, five hundred miles in length and forty in width, extends all across the province along the railway. This district was given, the land and timber thereon, as a contribution from the province of British Columbia to the Dominion government for the building of the Canadian Pacific Railway through there. Therefore, when you speak of the timber regulations of British Columbia, you must remember that they do not apply to this railway belt, but that the regulations of the Dominion, of which Mr. White spoke, do apply to this belt, the same as they do over the rest of the Dominion territory.

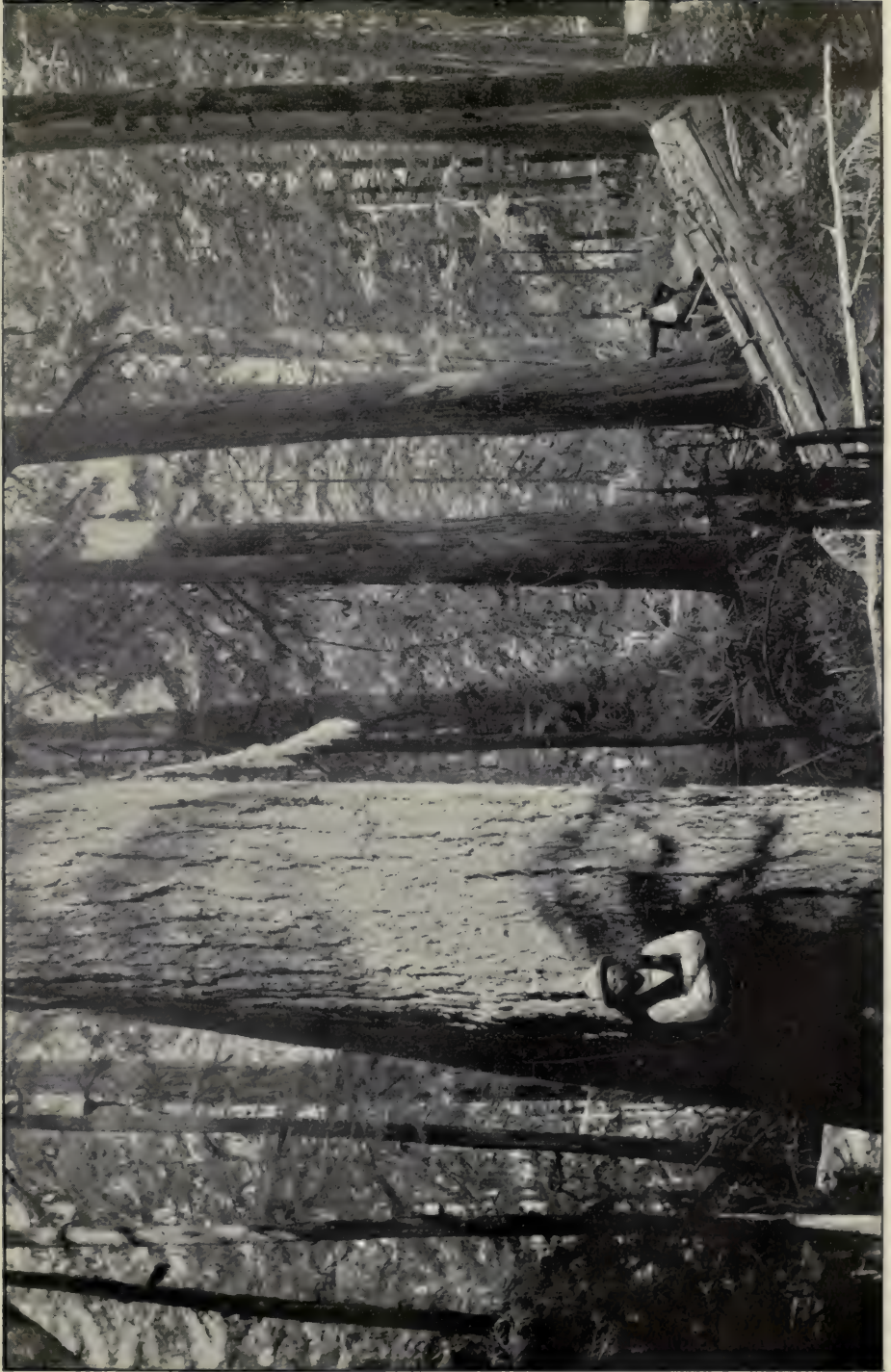
There is one thing that Mr. Bertram brought up here about the tenure of a license. It seems to me that the Crown really, through practice, has become almost in duty bound to renew these licenses, but there is a doubt about whether they will do so or not. Now, does it not operate in this way at these sales: Would not the bonus often be greater than it is if parties from outside knew they would be allowed twenty years to take off that timber, instead of being subjected to not knowing whether they would be allowed more than one year—

Mr. BERTRAM.—The bonus is too high now.

Mr. STEWART.—Very well, perhaps it is.

Mr. BERTRAM.—No question about it.

Mr. STEWART.—Mr. Bertram speaks of working his limit in a conservative way and cutting on scientific methods, and he has spoken of those trees that will grow under the shade and the difficulty of growing small pine trees under cover where there are other trees growing over that shut out the light. Every one knows that. I would like to ask Mr. Bertram if he has taken any steps to cut down the maple? I find the



FOREST OF FIR, CEDAR AND WESTERN HEMLOCK ON THE WEST SIDE OF PITT LAKE, B.C.

maples in the north country, from their broad leaves do cast a shade under which the pine has very great difficulty in growing. Where it can be done it is always considered necessary to take out those large deciduous trees if you wish the pine to grow. Again I say I think the different departments should take some means of having Mr. White's paper published in bulletin form.

Mr. WHITE.—I just want to say a word in answer to what Mr. Stewart said about making the renewals of licenses statutory for twenty years, or something of that kind. If that had been the law when we had the difficulty with our American friends we would not have been able to overtake them. It was because the licenses terminated absolutely on the 30th of April, and we could attach conditions to the renewal of the license, that we were able to checkmate them.

Mr. STEWART.—I admit that, but could not the license be renewable subject to any regulations that may be made?

Mr. MAHAFFY, M.P.P.—I am not a member of this Association, but I happen to represent a riding that is a very important lumber district, and in which there is always more or less friction between the settler and the lumberman. I was struck, sir, by one thing in Mr. White's admirable paper and that is the striking difference between the ground rent charged in British Columbia and in all the other provinces—\$160 per mile. And in the other provinces it ranged from \$2 or \$3 to \$8. Now there must be some reason for that, some basic principle upon which it is worked out, and I would like to ask what is the guiding principle in regard to the fixing of this ground rent? It seems to me that there is a great deal to be said in favour of a higher ground rent than perhaps is being charged in other provinces outside of British Columbia. For this reason, sir, I am not an old man, but I have lived long enough to see licensees hold limits on which at the time they were bought the merchantable timber was all that was actually paid for, although the license covered all the timber, and then by holding this for a prolonged and indefinite period for a small sum, an annual fee of ground rent, the other timber not computed at all at the time of purchase grows into enormous value, and practically becomes a bonus to the licensee. Now, I do not know whether that is the object of the British Columbia legislation fixing the ground rent, or not, but I think the point is worth consideration.

Mr. WHITE.—I would like to say in connection with that, that you will observe by the British Columbia laws licensees pay only 50 cents per thousand for their timber as Crown dues. Here they pay from \$1 to \$2 per thousand. Now, the ground rent is, after all, a very small thing as compared with the dues, and we prefer the system of putting limits up by auction and getting their full value in the shape of bonus, subject, of course, to a substantial payment as dues for each thousand feet when cut, and subject to a moderate ground rent. We do not think it would be fair to increase the ground rent to anything like that charged by the British Columbia Government, because their system is entirely different from ours and they do not begin to get anything like the proportion of the value of the timber that we do. Mr. Mahaffy of course is a lawyer, but he said some things that did not appeal to my reason, just now. When he referred to those limits that were sold some years ago, he said they were sold, but at the time they were sold the timber other than pine was not valued by the men

who bought them. But, sir, the Crown sold all the timber on the lands. It is not proper to tell a man after he buys a property that he did not consider it of value when he bought it. He bought it and paid for it, and anything growing there is his. It is not as though they were getting something they had not bought. The Sandfield-Macdonald Government was the Government that sold the timber in Muskoka, and it sold everything on the ground, not the pine only, as we are doing to-day.

Mr. STEWART.—With reference to what was said by Mr. Mahaffy regarding the difference of ground rent here and in British Columbia, I think the basis is the greater quantity of timber grown in British Columbia, the larger trees, and the greater amount on an acre. For instance, under our regulations west of Yale the charge is five cents an acre, and east of that \$5 a square mile. You can easily understand that, even though it might be \$160 an acre, it would be perhaps cheap compared with the quantity.

Mr. WHITE.—They have a regulation in British Columbia which says that land with less than 8,000 feet b. m. to the acre upon it shall not be considered timber land.

Mr. BERTRAM.—In answer to Mr. Stewart's statement about the term of a license, I would say that it was not my intention at all to ask for an Act to continue them in force for twenty years. I think it much better as it is. We are quite willing to trust the Crown, but the object in having the license so that it terminates in that time is this : What you purchase now is your year's license to cut. That is quite right ; that is the law. You get in addition to that what the regulations give you, that is a renewal, if you comply with the regulations for the year. But even that must cease at the end of twenty years and it reverts back to the Crown, and that is all that the regulation calls for. That is right, Mr. White ?

Mr. WHITE.—Yes, sir.

Mr. BERTRAM.—Now, as to the other matter, about the hardwood, I should have spoken about that while on my feet. That is one of the things we have to call attention to. The hardwood, with the exception of birch, is not of very good quality in our north country. The soil is not sufficient to give you a good hardwood, and it will be necessary, it seems to me, to establish some cheaply contrived alcohol plant in the Algonquin Park for the utilization of this class of wood. I am not troubled very much with the wood, but have a large number of inferior conifers where we could place a plant for making hemlock extract. If the Government could get a plant on the Algonquin reserve that would utilize the hardwood, it would allow the pine to come up, as pine will not germinate under a canopy of hardwood. I would like very much to hear from Professor Roth about that plan of utilizing this wood and what they are doing in the States. I know that they are doing this in the States but would like to do it here on a smaller scale so that the machinery would not be so expensive. I would like to get Mr. Roth's opinion about it.

Professor ROTH.—I feel perfectly certain that the statements of Mr. Bertram are right, with regard to the relation of pine and the other timbers. It is precisely the same as having a cornfield and weeds. You can pluck the corn and you are going to have a field of weeds. That is precisely the case in the forest if we keep on

plucking the good timber instead of plucking the poor and giving the good timber a chance to reproduce itself. There is a danger of going too fast in either direction. It was only a short time ago that we thought we ought to get rid of these cheaper timbers at all hazards, but the experience of the last few years has shown us that it was a good thing that we had not the chance to destroy them in such haste. We could not get 50 cents stumpage ten years ago for elm, and to-day we can hardly get elm at and pays continuously. To be sure small concerns have paid now and then, \$10 a thousand. As regards the utilization of these other timbers I would say this : That our experience in the States has not been vast. To be sure we have carried the tanneries into the hemlock forest. The tanneries have left New York State and Pennsylvania and gone to Wisconsin, for instance, rather than ship the hemlock bark, or even attempt the matter of extracting it. As regards alcohol, from hardwood, our experience across the way seems to be that it requires quite an outlay before it pays and pays continuously. To be sure small concerns have paid now and then, but the latest efforts are in the direction of concentration. We have in Cadillac, Michigan, what we call a mill acid plant. The Cumber people have there a sawmill, and in connection with the sawmill an acid plant. That thing is really a paying institution and it is doing beautifully, and anyone interested in an establishment of that kind could hardly do better than go there. They have all modern appliances, use gas and tar for fuel right under the retort. As I say, our experience has not been vast. Of course we have the ordinary charcoal oven, and have a little deviation from that, including the charcoal oven and pipes for converting the vapours into acids. But I notice that the small concerns have to shut down whenever there happens to be a little fluctuation in the price of their output. While I believe myself a great deal can be done in the direction of carrying small plants to the forest, I cannot say that we in the States have been especially successful in that direction. In general, I would say this : Do not be hasty in trying to get rid of timbers that simply seem to be useless at the present day. To-morrow may tell us that they are valuable. On the other hand Mr. Bertram is right. If you want a pine forest you must give the pine a chance to grow.

Mr. JOLY DE LOTBINIÈRE.—I would like to know how that part of your Act which prohibits the exportation of logs from Canada is working. It seems to me that there is a door open for an evasion of that provision. You do not prohibit the export of your logs to the province of Quebec, and does not that leave the door open to get rid of the staff to the States, which you are trying to avoid here? What if they shipped pulpwood, for instance, to the province of Quebec, and then shipped it from there? Have you any control over that? Can you stop them from doing it that way? If it were not—I do not say it is possible—but could they not drive your logs into the province of Quebec, and from there export them to the States? I would like, if possible, to have some information on that subject, whether that has been contemplated, and if evasions have been indulged in by lumbermen and pulp manufacturers, &c., to get rid of this material in this way.

Mr. WHITE.—I was going to say, Mr. Joly, that the only place where anything of that kind could occur would be in the way you mention, through the province of Quebec. But as a matter of fact, we know they do not export any saw-logs that go

down the Ottawa river. It is simply an impossibility. Then, as to pulpwood : So far as pulpwood has gone off Crown lands into the province of Quebec. When it does we will make inquiry about it. The Government of the province of Quebec, having that idea in mind, did at one time pass a regulation requiring timber cut under their license to be manufactured in the province of Quebec. We said that would be altogether too narrow and that in the Dominion we must have freer inter-provincial trade. We asked them to withdraw it and they did so.

Hon. Mr. DAVIS, Commissioner of Crown Lands.—Mr. President, I do not care to be taking up your time improperly, but wish, before Mr. Bertram leaves, to say a word or two with reference to one or two matters. I am responsible for the first public sale of pine by the province having a time limit within which the pine must be cut. The first time it occurred was the first sale that took place after I entered upon the position which I hold now. The question as to time is one that is open to debate and open to information. The object of the Crown is to fix such a time as may be in the best interests of the lumbermen and settlers, in order that we may arrive at a plan which will produce the best results generally. Now, the first two sales were small sales, and the time limit fixed was ten years. There was no objection to it, because the areas were somewhat scattered and limited, and it seemed quite sufficient to get the pine off. When the question of the last sale came up some of our lumbermen friends thought, perhaps properly, that ten years was too short a time, and after consideration, I suggested fifteen years, and that seemed to meet with the approval of those who mentioned the matter to me, and was fixed as the limit. Now, the other side of the question is this : Take the last sale ; we are constructing a railway through a portion of the country in which many of these timber limits are situated which were sold in December last. We now have applications for land along the line of that railway. Experienced men know it is utterly impossible for us to allow settlers to go into an area that has been sold for pine during the currency of that license, unless it is shown clearly that the pine has been cut off. Therefore, with the fifteen-year limit it might be nearly fifteen years, if not quite, before we could allow settlement into that country. This seemed to me a very serious situation, and where settlement is likely to come in you will see that aspect of the case has to be considered, and especially where limits have been sold, as these are, in a section where a railway is going through, and where we expect progress and development will take place. Our only object is to fix a limit that will give the best results generally. Areas sold years ago have been cut over, and Mr. Bertram has referred to these coming back to the Crown. Now, the policy I have adopted is this : When the payments have not been made for three years for ground rent, which means a forfeiture, I have refused to allow them, as sometimes has been done in the past, to pay up back dues and resume the license. I think in all cases I have declined to do that, and these areas come back to the Crown thus giving us absolute control over reforestation, &c.

The question of timber other than pine is a very difficult one. Where the land is agricultural I suppose no better plan could be pursued than the one we are now following. That is, that the settler should get the advantage of the timber other than pine. Where it is not agricultural land (as I took the opportunity to say in the House the

other day, in an address), we are considering some method by which this timber may be available for the manufacture of hardwood products and products made from timber other than pine. We hope before long to have some regulations prepared that will meet with the approval of the House and the country.

Now as to hemlock extract and the introduction of a plant, I do not know whether I understood Mr. Bertram's idea or not, but the notion I got was that he thought perhaps in some way Government assistance could be given to some plant as an experiment to introduce it in some hemlock area and see how it would work out. Whether the government ought to be at the expense of doing this is a question. However, I would be open to any suggestions that would be in the public interest. I visited British Columbia last summer, where I met two of the ministers of the Crown, one of whom had charge of the timber of the province. I discussed their situation with them very closely, and also visited and looked over some timber areas. Now, it is quite true that the ground rent per acre is higher than here, but as has already been said, the charge of fifty cents dues we would consider a mere nothing, as the dues for pine at our last sale in Ontario were fixed at two dollars per thousand. Then we have the bonus, amounting to very large sums, which they do not get at all.

It is suggested if the ground rent were increased lumbermen would abandon their limits earlier than they do, and there would be less difficulty between the lumbermen and the settler, and this is a proper question for consideration. But, strange to say, the British Columbia timber areas I visited were not suitable for settlement, so the Government could not have had settlement in mind when they imposed the higher ground rent. I am only too glad to obtain suggestions from this Association or any member thereof, from lumbermen or settlers, in order that, with a general collection of information and suggestions, we may from time to time improve our regulations, and so act that we will be up-to-date in every way that will advance the interest of the settler, the lumberman, and the people of the province generally.

Mr. BERTRAM.—When I spoke of that hemlock matter it was not with any intention of asking the Government to take it up. I only spoke of it as being a question that I was concerned about myself, having a considerable quantity of hemlock on hand that I could not possibly use, and I am exceedingly glad, sir, to have an expression of opinion from Mr. Davis, and the statement that he has the disposition of hardwood now under consideration by his department. Whether the departments should sell it to lumbermen along with pine, or in some other way, I am not prepared to say, in that we will be assisted by discussion, but I am very glad to find that Mr. Roth supported me in the contention that if it was pine you wanted to grow you had to utilize in some way the other conifers that were growing upon the area. And now that his attention has been called to it, I think it is one of the benefits that our Forestry Association will confer upon the general public that this has been brought to the Commissioner's attention, and I am very glad to think that he will now give consideration, not only to the spruce and hemlock alone, but to the hardwoods as well.

SETTLERS' FIRES IN QUEBEC.

Mr. JOLY DE LOTBINIÈRE.—I would like to say a few words about fires and fire protection. I was in that portion of Quebec west of the Saguenay river, where there is

a provision for a Fire Act which is far from filling the requirements which are necessary to give sufficient attention to fires now occurring. I cannot imagine how experienced men could have put a provision in the law that permits the burning of brushwood and debris during all the months of the year, excepting from July 1 to September 1. Now I can vouch for it that in our part of the country, it is a part of the country covered with spruce, and covered in some sections with hardwood. The safest time of the year to burn is that period when the forest floor is covered with ferns and grasses. In the months of April and May, just after the snow leaves, the moisture is less than during the whole summer, and everything is like tinder and powder in our part of the country, and again in the month of September. Now, strange to say, by clause 1345 of our Act you are allowed to burn in these very months, and during the months when you could burn safely by taking ordinary care you are not allowed to. Now I would like to get an expression of opinion from the members of this Association as to whether it would not be advisable to try and have this changed for the province of Quebec. I know a great many gentlemen here are not interested in the province of Quebec, but a few of us here are interested in it, and we would like the support of the Forestry Association in having this much-needed reform made to our laws. I am sure if the matter was brought by the Association to the attention of the Government the Government would take action on it almost immediately.

The CHAIRMAN.—I quite agree with the remarks of Mr. Joly. We own a very large number of miles in the province of Quebec and the matter that he has brought before us has engaged our attention very frequently. It is quite right, as he says, that the spring of the year and the month of September—that is April and May and part of June, especially April and May,—are the very worst months for fire. And as he very truly states, everybody who is permitted at all is permitted to start a fire in these months. The other two months, I think, are the better months, the safe months for starting a fire, and I think if Mr. Joly wrote out a resolution this Association would fairly discuss and consider it.

Mr. ROTH.—It does seem to me that Mr. Joly is entirely right, and I want to say most emphatically we are just neglecting what seem to be trivial measures. To most men it would seem most trivial to bother about one month or the other, but it is a most essential point, and so far as we are concerned, in the preservation and extension of forests in general, it seems to me that everyone should put forth every effort to save millions of acres of timber in such a simple way, simply a misunderstanding on the part of legislators who had the good in mind but forgot the details. This is a most important measure and could not be brought before the public or the legislature too strongly.

Mr. LITTLE.—I think the spring months are the months of the year when fires burn most disastrously.

Mr. Joly then moved—

That the subject of protecting the forests from fire having had careful consideration at the hands of this meeting, it would recommend that settlers' fires in the province of Quebec be permitted only from June 15 to August 31 of each year.

Mr. Little seconded.

Mr. SOUTHWORTH.—Is it quite in order for this Association to pass special resolutions regarding particular provinces? Or is it in good taste for us to do so? Would it not be better to make the resolution a little more general in its character and to apply to provinces that have not adopted regulations governing settlers' fires than to specify the province of Quebec? It is just a question to me whether it is quite the proper thing to do, or if this Association should do that.

The CHAIRMAN.—I think it is quite a proper thing to do if it covers all the provinces. Are there any other provinces that do establish a different time?

Mr. SOUTHWORTH.—I do not know that any province has proper regulations.

Mr. STEWART.—You could not pass any regulations regarding fire that would apply to the whole Dominion. If you do anything at all you will have to restrict it.

Mr. SOUTHWORTH.—That is quite true, but that is not my point, Mr. Stewart. We are practically asking the province of Quebec to pass a law and not saying anything about other provinces doing the same thing at all, and it might be just as necessary in other provinces. I can understand Mr. Joly wanting it done in his province, but whether the Association ought to single out one province and ask them to do it is a question. Personally, I am of opinion that fixing a time limit is not the proper way to go about it. I do not think that either the province of Quebec or of Ontario can regulate this thing properly by the almanac at all.

Mr. STEWART.—Hear, hear, that is right.

Mr. SOUTHWORTH.—We ought to go further and adopt some systematic method of controlling settlers' fires. It is a matter for the Association to take up. I am merely expressing my own opinion in the matter, but it does seem to me a little invidious to pass a resolution concerning the province of Quebec unless we take a similar position for other provinces.

Mr. LITTLE.—That invidious distinction might be removed by drawing the attention of the other provinces to the fact that Quebec has adopted this law.

Mr. WHITE.—Mr. Chairman, it is hardly the right thing for us in this Association here to undertake to specifically instruct the province of Quebec upon any particular date as to when fires should be allowed, and when they should not be allowed. I would rather see a resolution calling the attention of all the Governments to the necessity of taking such steps either by legislation or regulation to fix the period best calculated to bring about the results that we have in view. Make it broad and general and applying to all the provinces, not to the province of Quebec alone.

Mr. JOLY.—Well, Sir, I came before the Association in this matter as a sick man going before a doctor and asking for specific assistance for a specific disease. I am the only one here that has a specific and formal complaint upon this question. I know that this thing needs remedying and that the attention of the Government of the province of Quebec must be very strongly aroused to consider this matter, and I think possibly my resolution can be made in a more general manner, respectfully drawing their attention, after discussion, to the fact that it would be well, possibly,

to change this Act and give a more efficient fire protection, &c. Make it of a more general character, if you will, but I would like to draw attention to the fact that that is not the right time of the year to burn. It may be, they will not do it, but it will be a suggestion from practical men who know something about it. We can frame a resolution in a courteous manner, and in such a way that it will not offend the Government at all; in fact, it is quite possible they will be very glad to do it.

Mr. HALL.—A commission is sitting in Quebec now with this matter under consideration. I think we are pretty well agreed that when the forest is in full bloom is the time of the year when there is least danger of having a spreading forest fire. I wish we could get it into the heads of our settlers that it is not necessary to burn at all. However, at the present time things are on that basis. I think it only fair to the meeting to state that the next clause of the Act stipulates that in the event of continued drouth between those dates, June 15 to August 31, the Commissioner is empowered to prohibit the setting of fires for the purpose of clearing during said drouths.

Mr. LITTLE.—Something similar to this occurred last year. The premier of the province brought forward a resolution sent to him by this Association to enable him to go before the House asking for changes. This will go down there and enable the Commissioner to state that this change is necessary because of the attention being drawn to it.

THE LAURENTIDES NATIONAL PARK.

(By W. C. J. Hall, Department of Lands, Forest and Fisheries, Quebec.)

This extensive reservation consists of a territory situated partly in Charlevoix, Montmorency and Quebec counties, to the north of the city of Quebec, comprising 2,650 square miles, or say nearly 1,700,000 acres, and was created a park by Act of legislature on January 12, 1895.

In brief the boundaries are as follows :—On the north the 48th parallel; on the east the St. Urbain road; on the south and southeast the rear line of the Seigniorship of Beaupré and the XII. and XIII. ranges of Stoneham and Tewkesbury; and on the west by the Fief Hubert and an imaginary line running to a point west of Grand Lake Batiscan, thence skirting the Quebec and Lake St. John Railway to the intersection of the 48th parallel.

The objects of the park, as cited in the preamble of the Act, are as follows : The protection of the forests, fish and game; the maintenance of the water supply, and the encouragement of the study and culture of forest trees. An appropriate selection of territory was made for the furtherance of these objects. Over a dozen large rivers take their rise in the interior of the park, which is remote from the lines of colonization and which has always been celebrated as a hunting and fishing ground.

Touching upon the forests of the park and their protection, it is well to make clear the point that the cutting of timber within its boundaries is not prohibited. On the contrary, a large area is under license, and some of these limits are being operated upon at the present time, *e.g.*, in the valley of the Batiscan.

So far, the limit-holders have removed only mature growth, which system of cutting, when properly controlled, eventually improves the forests and induces a faster and healthier growth of the residue.

Again, these operations are now, and for a great length of time will be, confined to the cutting of spruce, fir and pine, leaving the hardwoods intact. But should at



CAMPING SCENE, LAURENTIDES PARK, QUEBEC.

any time the nucleus of forest growth in the park be threatened with extinction, legislation of a special nature could be enacted to modify the rights of licensees, and thus preserve the territory for all time in forest. However, the topography is of such a character that the contingency above cited is unlikely to occur.

Altogether we have under license to cut timber in the park some 2,300 square miles, and it is quite possible that the whole area will eventually be taken up.

I am prepared to admit that the carrying on of lumbering operations on a tract is not conducive to improvement in the fishing and hunting thereon, but take this ground that as timber is the staple product of the country, it would be unwise to throw any obstacles in the way, particularly as the fish and game under such conditions reassert themselves after a reasonable lapse of time, when the cut-over areas are left unmolested.

Thus it is contended that although the cutting of timber is allowed, the forest is yet preserved, even if certain varieties are lessened in quantity.

Protection as regards fire is perhaps more easily accomplished in the park than elsewhere. The park and club guardians exercise a judicious patrol, lumbermen are possibly more careful, and members of clubs see to it that their guides and other men employed take proper precautions. At all events it is gratifying to be able to state that no forest fires of any consequences have occurred in the park since its creation, and any burning that has taken place did not start within its boundaries. Perhaps the fact that the whole area is withdrawn from sale, and the consequent total absence of settlers, can be attributed as a reason for immunity from the fiery element. Moreover, as there is no line of railway closer at any point than, say five miles, the park is thus relieved of this fruitful source of forest fires as well. We may safely conclude, therefore, that proper steps have been taken for the protection of the forest growth in the park, and that the results so far have been reassuring.

MAINTENANCE OF WATER SUPPLY.

The authorities, as will be seen by a glance at the map, made a judicious selection of territory in order to furnish an example to the rest of the province of the good results attendant upon preserving in forest the sources and valleys of rivers.

From the interior of the park streams radiate to all points of the compass: The Metabetchouan, Upika, Pikauba, Cyriac, à Mars to the north and north-east; the Murray to the eastward; the Ste. Anne de Beaupré and Montmorenci to the south; the Ste. Anne de la Pérade and Jacques Cartier to the south-west; the Batiscan inclining still more to the west, and the Bostonnais waters running nearly due west to the St. Maurice.

The year 1903 is a period of time which affords students of forestry an opportunity of testing the claims made that the preservation of forest at the sources of rivers and along their banks results in a comparatively well sustained and even water supply, and this on account of the general drought which occurred last year.

Let us sum up results. On inquiry we find that the drives on the rivers of the north shore of the St. Lawrence all came out. It is necessary to remark here that, except in cases of some small streams, the headwaters of rivers on the north are all wooded. South of the St. Lawrence, in Quebec province, the sources of rivers are of course to the south, but many rivers take their rise in settled districts, or very near thereto, and are to a greater or lesser extent settled along their banks. The drives on the rivers of the south shore in a great many instances were either only partially successful, or even less, except in the Gaspé peninsula on the southern watershed.

Naturally a thickly settled country and forests are not found occupying the same area; the latter must recede and disappear upon the advance of the former. Would it not, however, be possible under such circumstances to maintain a timber belt at least along the water courses?

Some years ago a disastrous landslide, accompanied by loss of life, took place at St. Albans, on the River Ste. Anne. A large area became loosened by copious rain,

and slid right into the river, practically changing its course. Investigation showed that the surface soil was underlaid by a bed of blue clay, that, there being no forest growth, the rain had permeated the surface, lubricated, as it were, the sub-stratum, and thus released and set in motion the whole mass, causing devastation and worse.

Now, had there been a narrow belt of timber along the banks it is questionable if such a disaster would have occurred. I think that the trees, firmly gripping the surface, and their roots forming a network reaching deep down into the soil, would have prevented the banks from giving way under the pressure.

Can any of us cite instances of landslides, on anything like a scale such as this, occurring in wooded districts ?

At all events, here is a river partly in the park, partly outside; on that portion situated within you may look in vain for evidences of extensive landslides, whereas on the part outside, being destitute of forest, this eminently disastrous one occurred.

The park, whilst not being selected for the wealth of its forests, carries a fair stand of timber, the predominating varieties being three in number, viz., the spruces, fir and birches. A partial list of trees indigenous to the territory would comprise alder, basswood, birch (white, yellow and black) cedar, beech, cherry, ash, maple, spruce, white pine, red pine, cypress, poplar, butternut, elm, tamarack, fir and willow, but doubtless on closer investigation a number of others could be found.

A conservative estimate, making allowance for water, old burnings, barren ground &c., would give 1,000,000 acres of timbered territory, and upon this one could safely figure on 3,000 feet board measure to the acre, giving a total of three billion feet consisting mainly of timber which could be operated under the existing regime. No means have as yet been employed for exploiting the deciduous growth.

It must be admitted that the park is a well watered area, and it is graphically described by one person as 'peppered' with lakes. Within its boundaries there are some large and noble sheets of water, e.g., Grand Lake Batiscan, Grand Lake Jacques Cartier, Lake Jacques Cartier West, Lake Croche, Lake Moise, Grand Lake Malbaie, Snow Lake, Lake aux Ecorces, Netascouac, des Passes and others.

FISH.

The rivers and lakes of the park may truly be described as teeming with fish. Every one of its rivers abounds in brook trout (*Salmo fontinalis*), and with a few exceptions the same can be said of the lakes.

In the Ste. Anne la Péraie basin two or three lakes have been found without any fish in them, but trout were taken from the neighbouring ponds and liberated therein. The results were astonishing, as in five years' time trout were captured there of three to five pounds' weight, and there appeared to be plenty of them at that.

Coarse fish, such as gudgeon, perch, carp, &c., are to be found in certain waters, but the first sharp fall of prominence precludes their ascending any further, so by far the major portion of the territory is free of them.

Every one of its rivers abounds in brook trout (*Salmo fontinalis*), and with a few they exist in one other sheet of water. These fish take the spoon or troll readily, and specimens have been taken of over 20 lbs. in weight.

There are several lakes and rivers in the park where the true brook trout attains to a weight of from 7 to 10 lbs., e.g., Grand Lake Batiscan, Grand Lake Jacques Cartier, Rivers Murray, Montmorenci, Ste. Anne, aux Ecorces, Metabetchouan.

This statement may appear to some present as difficult of belief, but I would have no trouble whatever in dispelling their doubts, since it would only be necessary for me to ask certain Torontonians to detail their experiences in the park.

I am positive that in Grand Lake Jacques Cartier and Grand Lake Batiscan there exist brook trout of 10 lbs., some having been captured of nearly that weight. In the former they take the fly in the discharge of the lake from the 15th of August to the end of the season; in the latter trolling has to be resorted to to get them up, but in the

rivers above mentioned they take the fly when dexterously presented. Therefore, until the contrary is proved, I claim that, owing to the quantity of large fish obtainable by fair casting, the Laurentides Park affords as fine brook trout fishing as any known region.

The Canadian brook trout is classed as a charr by the best authorities on the subject, and is a more elegantly moulded fish than the brown trout of Europe, but we have the genuine Alpine charr in the park; this fish (*sal. mars.*) having been found in two or three small lakes in the river Ste. Anne la Pérade basin.

The *sal. mars.* is a more beautiful fish than even our ordinary brook trout, having a smaller head and finer lines. The tail is slightly forked, there is no silver rim encircling the "speckles," but the belly and fins are bright scarlet in colour. In the lakes lying east of Lake Temiscouata this species attains a size of $3\frac{1}{2}$ to 4 lbs., and affords magnificent sport. Strange to say, although both varieties exist in these waters, they appear to maintain their respective characteristics and do not breed promiscuously, as far as can be ascertained.

GAME.

The park, at present, can be claimed to possess game in abundance, owing to the protection afforded. Moose are now plentiful, and as for caribou, the famous "Barrens" in Charlevoix county have a world wide reputation. A few red deer have found their way in and will be a feature later on, as in the park they will be protected for a time all the year round.

In feathered game we have the willow grouse—of course an occasional visitor only and not indigenous—the ruffed grouse in large quantities, and the migratory species of water fowl, such as ducks, geese, and the plover family. Some of the duck tribe, such as the black duck, wood duck and the sheldrake, breed in the park.

The fur-bearing animals are well represented and are plentiful, the beaver particularly having felt the benefit of protection, so much so that lessees of territory have complained that their caribou hunting has been affected. These industrious animals have, by the erection of dams, caused the flooding of grassy borders of many lakes where the caribou were wont to feed.

Black bear are plentiful, also otter, and there are plenty of mink, marten, fisher, and all the rest of the small fur-bearing animals. Fortunately we are as yet unmolested by wolves. They appear to confine their operations to territory west of the St. Maurice and remote from the park.

CLUBS.

Large portions of the park, particularly those lands bordering the outskirts, are under lease to various clubs, each lease stipulating for the employment, the year round, of a guardian satisfactory to the Government. We find that clubs are protectors of forest, fish and game, their interests being identical with those of the Government. The actual quantity of fish and game taken is, in the main, of no account whatever, the members observe the law and regulations to the letter, and the result is invariably gratifying.

The River Jacques Cartier basin, however, is withheld from lease and reserved for transient sportsmen wishing to have a few days' fishing or hunting under permit. This stream is navigable for canoes up to the Forks, and affords excellent fishing, whilst the scenery is very beautiful and shooting the rapids on the way down is exciting. A five-hour drive over good roads from Quebec lands the angler at the starting point—River Caché—where Government canoes and camping outfits are kept in readiness, and good river men are procurable at very reasonable prices.

The caribou barrens, casually referred to a moment ago, deserve special mention. From all I can learn, there has never been any forest growth on this area, which comprises between 150 and 200 square miles. True, little clumps of stunted

spruces and cypress exist here and there, but they never attain to any size from the commercial point of view. The extensive barren patches are covered with what I believe to be *Lichen rangiferina*, and in the summer the surface is fairly hard, crunching under one's feet like snow. Immediately underneath the surface there is an excessive amount of moisture, even in a drought.

Lying to the west of these barrens is a large area, which many years ago was completely burnt over, the forest being absolutely exterminated. In summer the caribou resort to this tract, presumably to feed on herbs, &c., along the water courses and around the lakes, but the moment winter comes on and there is snow in the barrens they flock to this latter place and feed upon this moss, or lichen, apparently finding no difficulty in pawing away the snow covering even when the same is very deep. Therefore, there must be something peculiar in the formation to cause the animals to frequent this area at certain seasons only.

During the winter of 1902-3 a herd of over 100 head was seen and counted, whilst bands of over ten and up to fifty animals are now a fairly common sight.

A hunting lodge, 20 feet by 40, has been erected in a convenient place on the banks of the River Murray, furnished with spring cots, blankets, heating and cooking stoves, and utensils, so that the sportsman has only to bring his provisions and rifle. For hunting in the barrens and use of hunting lodge a fee of \$2 per day is charged. With good travelling conditions the barrens can be reached in a day and a half's drive from Quebec; under favourable conditions, in two days, but then one is repaid by the certainty of sport. Only a limited number of sportsmen are allowed in at the same time, consequently every one gets his deer and comes back satisfied.

Convinced that clubs are genuine protectors the department has leased, in sections, a narrow strip along the St. Urbain road, a guardian being placed on each section. As a result the barrens lying immediately westward are adequately protected, and the caribou have increased wonderfully in numbers.

There are at present only five Government guardians, but with the club guardians this number is swelled to twenty. It cannot be claimed that there is a sufficient number of Government guardians to patrol efficiently such an extensive area, particularly when the boundaries are not sharply defined topographically or otherwise.

To demonstrate the utility and expediency generally of creating fish and game preserves, it may be mentioned that when the park was first erected by Act of legislature a general outcry was made by hunters who looked upon this territory as in a measure belonging to them for trapping, and a good deal of feeling was displayed. Ten years have not yet elapsed since the creation of the park, and yet some of those who decried most warmly its creation are now content to say that they have actually been benefited thereby. The small fur-bearing animals increase so rapidly in the park as to favourably affect the trapping on its outskirts, owing to the natural increase finding its way there as a consequence in the course of time.

Government guardians act as, and are vested with all powers of, firerangers, in addition to their powers as fishery wardens and game overseers.

The plan of destroying, on the spot, any traps, nets or tackle of any description found set in the park has been adopted, and proved to be satisfactory. The mutilation or destruction of any standing growing timber is prohibited beyond what is necessary for camping purposes. Special permission is granted to lessees of territory to cut out trails, or to cut timber for erecting necessary buildings.

The regulations read that the only manner of fishing permitted in the park is with the fly, but the department has seen fit to modify this in the case of Grand Lake Batiscan and Snow Lake, and would do the same for other waters should it be found necessary.

No licenses for the sale of liquor in the park are permitted. The Government guardians, or other park employees, are not entitled to any share of fines or penalties collected. Any person violating any of the provisions of the Park Act or regulations is liable to a fine of not less than five dollars and not more than fifty, with costs; and

in default of payment to imprisonment for not less than one month and not more than three, with or without hard labour.

It is not claimed that the park is free of trespassers. Unfortunately, as we are aware, there are and have been violations, but this much at least can be asserted, viz., that the creation of the park has been in a great measure a success. that it has benefited the majority, afforded employment to a large number of people, and will continue to do so, whilst at the same time none can dispute the fact that the fish and game have materially increased, the forests have had a fair measure of protection afforded them, and their value has rather increased than otherwise.

In view of the permanently increased value of timber and the ever-swelling ranks of sportsmen, it would appear prudent and judicious to foster both, and this can be done easily and inexpensively by the erection of parks. The direct revenue therefrom may not appear sufficient perhaps to justify such procedure, unless the parks were credited with the ground rent, when the revenue would at once be enough to cover the cost of their maintenance. But even leaving the above item out, the indirect benefit derived from judicious cutting, protection from fire, and the immense amount of money left in the country by tourists is more than sufficient to warrant any Government in extending the system to all sections unfit for profitable agriculture, and would ensure the question of water supply, to say nothing of the perpetuating of all varieties of fish and game indigenous to the country.

Professor ROTH.—Mr. Chairman, I cannot resist the temptation to express my appreciation of this last paper. I would rather have missed anything else in the whole proceedings. We have stuck to timber, and right here I believe it true to the nature of our profession that the man of game and fish has as much a right in the forest as the man of the log. I believe that it is an important part of our forestry, and especially so in your territory here where you have immense expanses—in fact where you have the grandest game and fish parks on earth. I believe that right here you have one of the finest beginnings that can possibly be imagined, and I want especially to thank this gentleman for the paper.

Mr. WHITE.—I may say, Mr. Chairman, that I have been very much interested in hearing about the Laurentides Park. We in Ontario have known that the Government of Quebec had set aside such a park, but we did not know the rules and regulations and laws that affect it. Now, I find that some of the regulations are different from the regulations that we have in Ontario in what we call the Algonquin National Park. It is, like this park, on the heads of several important rivers. The territory is under license, just as it is in Quebec, but part of it for pine only, the rest for all kinds of timber. But we exclude hunters from that park absolutely. We do not allow any man to carry a gun in the park. When we took it over game was very scarce. However, under our protection the game has multiplied and the park is now becoming full of moose, red deer and beaver, indeed all kinds of fur-bearing animals. These have multiplied until they have spread into other portions of the country. We give permission to fish and there have been no serious results from that, but so far we have not seen fit to allow anyone to go into that country with a gun because you know what the temptation is sometimes when moose or a deer is in front of a person, and people might be overcome by temptation and violate the law. I may say further, Mr. Roth, we have another park upon the shore of Lake Erie known as the Rondeau Park, and it is there as a sort of recreation ground for the people of that vicinity. Some ancient forest is to be found on that park and the ranger now assures

me that he could sell timber which would bring us a very large amount of money, and which ought fairly in justice to other parts of the forest to be cut away, but so far we have not done that. However, in a short time we will receive as much revenue from these parks as will entirely wipe out all the expenditure in taking care of them, &c., and leave a balance besides. At the same time they are affording a recreation ground for the people who want to go there during the summer months. I think these parks are most valuable things, I am not now speaking of forest reserves, but parks set apart for recreation purposes. With all due appreciation of the park in Quebec I think we have in Algonquin Park in Ontario an ideal recreation ground, and that until we have it so full of game that they are crowding each other out, we should not allow hunters to go in.

The CHAIRMAN.—I can testify to what Mr. White says, that we have an exceptional park in the Algonquin Park. The game there is wonderful. It is overflowing. Indeed the province of Quebec profits by that park for the animals cross the river into that province, and it certainly has been one of the finest things for the province of Ontario. I think the prohibition of firearms in that park is a very wise provision, and I hope Mr. White, and the department over which he has control, will continue that regulation. It is a most important one, and I can speak of that park because we own timber in it, and the regulation is working admirably. The timber owner is glad to see that the animals and the fish are protected in the way they are.

Mr. ROTH.—I have said I feel that the man of the gun has as much right in the woods as the man of the log. I would like to modify that by saying that what I meant was simply the proper regulation and protection and care of game, and the proper care of game is important and necessary in the forest, and a proper part of forestry. I am not a believer in the indiscriminate shotgun man. If I were, I would be a renegade to my profession.

Mr. WHITE.—Of course, it is better to leave a sort of reservoir there to feed the surrounding country where hunters can go to shoot from year to year.

Mr. ROTH.—By proper regulations the game alone can be made a source of great pleasure, and also a truly useful part of your forest management. Dr. Schenk, of the Biltmore estate, is renting the shooting privileges for an amount which I believe is sufficient to protect that forest from fire.

Mr. BELL.—Is the soil withdrawn from sale ?

Mr. HALL.—Yes, it is absolutely withdrawn from sale; there is no settlement within thirty-five miles of the park.

At 12.30 noon, the meeting adjourned until two o'clock.

FRIDAY AFTERNOON.

At two o'clock the Chairman called the meeting to order and announced that Mr. Campbell would read Mr. J. S. Dennis' paper on 'Forestry in relation to Irrigation.'

FORESTRY IN RELATION TO IRRIGATION.

J. S. DENNIS, *Irrigation Commissioner for the Canadian Pacific Railway Company, Calgary, Alberta.*

Forestry in Southern Alberta and Western Assiniboia has an aspect not met with elsewhere in Canada. The districts referred to contain vast areas of prairie now recognized as being semi-arid in the sense that during recurring long cycles of years the rainfall is insufficient for the successful production of grain or fodder crops, and irrigation has to be adopted to correct nature's shortcomings. During these dry years many of the smaller drainage channels and most of the surface supplies of water in swamps and small lakes dry up, and stock-watering on the open range becomes a serious matter.

The semi-aridity of the districts referred to constitute, however, a strong feature in their value, and combined with the celebrated "chinook" winds, has proved the region the "ranchman's home." These districts produce practically every year a good crop of grass, the melting snows and spring rains being sufficient to advance the growth to a healthy condition before the hot and dry summer months. The aridity of these months cures the grass grown in the earlier part of the year in such a manner that its nutritive qualities are retained, and cattle ranged at large will keep fat and are fit for beef direct from the range even in winter.

The soil of this vast district is first-class, and where irrigation is introduced will produce bountiful crops, but if the total available water supply of the region is utilized for that purpose not more than 15 per cent of the area can be irrigated, and the remainder must for all time be devoted to ranching and pastoral pursuits.

Water, it will therefore be seen, plays a more than usually important part in the development of this part of the "Great West," and its conservation is a matter of vital interest. In that conservation forestry takes first place.

The eastern slopes of the Rocky Mountains and the foothills adjoining, which bound on the west the district under discussion, constitute the great watershed of the region, and all the large streams and main drainage channels of the district head in, or obtain their water from this great run-off area. This watershed is useless for agricultural or grazing purposes, and aside from a small amount of second-class merchantable timber, its great value is as a catchment area to furnish water to the thirsty plains lying to the east. It would, therefore, seem unnecessary to have to advance arguments to support the claim that this watershed should be preserved in a condition best calculated to maintain and improve its usefulness as a catchment area. Unfortunately, however, both official and public opinion and knowledge on the subject are very much in need of education, and the Forestry Association is certainly the proper medium for instilling this required knowledge.

The watershed in question was originally well covered with timber, and in spite of devastating fires and lumbering operations, is still fairly well forested. However, each year sees its timber disappearing, and the restraining influence of the reservation of the area as a forest reserve, instituted some years ago, has unfortunately now also been removed. That the removal of the timber means diminished water supply

for irrigation and the allied industry of stock-raising should be self evident. Timber on any watershed is the most satisfactory method of storage of water supply. Its removal is always followed by violent freshets, followed by periods of extreme low water in the drainage channels.

It is certain that if the watershed of our great western plains region is denuded of timber, vast sums of money will ultimately have to be expended in providing, artificially, the storage facilities now provided by the timber, and in addition we will have the usual experience of loss from floods in the streams carrying the run-off from that watershed, because that run-off will increase in rapidity in almost direct proportion to the removal of the timber and undergrowth, which now exercise such a restraining influence on flood conditions.

The success of irrigation in any country is dependent on the regularity and permanence of the water supply, and when that supply is dependent upon the precipitation in the way of rain and snow upon any watershed, the conservation of such precipitation, and its even discharge through the drainage channels is of vital importance. Here the preservation of existing forests, or the reforesting of areas denuded of timber, brings forestry into close alliance with irrigation. To advance arguments that water poured upon the side of a mountain containing nothing but a rocky surface will run off more rapidly than if the same surface is covered with timber, brush, moss and roots would seem superfluous, and yet such arguments have to be advanced in advocating the establishment and maintenance of forest reserves on watersheds providing water for irrigation.

In western Assiniboia the Cypress Hills constitute the local watershed, from which all the local drainage channels receive their water supply. The timber on this watershed is sparse except on the western end of the hills, and what there is there is rapidly disappearing owing to cutting by settlers and the ever-recurring fires. The water supply in the plains areas adjacent to the Cypress Hills is limited at best, and any steps taken to preserve the present forested areas or to reforest those denuded of timber must be followed by beneficial results.

Irrigation has now passed beyond the experimental stage in the west. At present there are one hundred and sixty-three irrigation ditches and canals constructed in southern Alberta and western Assiniboia, comprising a total length of about four hundred and seventy-five miles, and capable of irrigating 625,000 acres. With the completion of the large undertaking which the Canadian Pacific Railway Company have now in hand, the mileage of canals will be increased to at least seven hundred miles, the irrigable area to two million acres, and the capital invested in irrigation undertakings will reach the large total of at least seven million dollars.

This large amount of itself would justify some attention being paid to the preservation of the forests upon the watershed upon which the whole investment rests, but its importance is dwarfed beside the interests which will ultimately be dependent upon a reliable and steady flow of water through these irrigation canals and ditches.

Certainly there is no phase of the subject of forestry which at the present time is of greater interest to the people of southern Alberta and western Assiniboia, and realizing its importance, it is to be hoped that this Association will place itself upon record regarding the desirability of preserving the timber on the watersheds, from which the supply of water for irrigation must come.

The introduction of irrigation on the great plains of the west will, as it has in the states and territories to the south of us, be followed by tree planting in a very general manner, and in a short time each main canal and ditch will mark a line of thriving timber across areas now producing nothing but grass.

Forestry and irrigation are, therefore, closely allied, not only in the matter of the preservation or removal of the timber on the area from which the water for irrigation must come, but in the introduction and encouragement of tree culture in the area actually under irrigation.



LOWER FALLS AND CAVE ON ELBOW RIVER, DISTRICT OF ALBERTA, N.W.T.

Mr. CAMPBELL.—I do not think that any person has a better grasp of the subject of irrigation in relation to forestry or of irrigation generally in our west, than Mr. Dennis. He has been connected with that work since its very inception in Canada. In fact he may be considered as one of the originators of the irrigation scheme. When the irrigation survey of Southern Alberta and Western Assiniboia was inaugurated Mr. Dennis had charge of that work and now he has been taken into the service of the Canadian Pacific Railway to superintend the large irrigation works which they are going to undertake, stretching from Calgary almost to Medicine Hat, a very extensive operation. There is one point in his paper that demands a little bit of explanation, and those of you who were watching closely Mr. White's paper this morning will understand the point. You will remember, perhaps, that Mr. White in speaking of the evolution of timber regulations, said that timber limits under the Dominion regulations were granted without any previous inspection or valuation of any kind. Mr. Dennis makes the statement that the reservation which existed on the watershed he describes, has to a large extent been removed. I might explain that a reserve was established along the foothills of the Rocky Mountains, covering an uncertain belt from the foothills to the summit of the mountains, from the international boundary to the Bow river. Part of this is now covered by the Rocky Mountains park, which when it was first established, was a small park twenty-six miles long by ten wide, but has been recently extended, to take in an area of something like 2,800,000 acres. But the southern part still remains as what we call the Foothills Reserve. Up to just recently no timber licenses were granted in that district, nor were settlers allowed in. The regulations still remain the same in so far that settlers are not allowed in the reserve, but the point referred to by Mr. Dennis is that the prohibition of the granting of timber licenses has been withdrawn, and any piece of property there might be put up upon the application of any person and the timber on it sold. But you will see that in that reserve the great matter to be considered is not the production of timber, but its use as a watershed, and it is quite possible, under the regulations as they stand at present, that the timber might be put up and sold at auction and the right to remove that timber given without special consideration or investigation of the effect of such action on the water supply. Mr. Dennis is suggesting that this association might record itself in favour of the proper supervision and the proper care of the timber on these watersheds.

Professor REYNOLDS.—Mr. President, I suppose this question is open for discussion. I have given some attention lately to the question of climatic influence and the forest, and this question is one of the largest and most difficult to deal with in connection with forestry—the extent of climatic influences exercised by the forest. But the paper that we have just heard comes under that head and it appears to me that, while irrigation is not an absorbing problem in Ontario, and I dare say never will be, because our rainfall is generally sufficient for agricultural purposes, yet the influence of the forest is far wider than its mere application to irrigation. I may just mention briefly the reasons why the forests conserve this rainfall from the watersheds. As a matter of fact, the amount of rainfall which reaches the forest floor is less than that which reaches the bare ground in the open. About eighty-three per cent only of the rainfall reaches the ground in the forest, so that less water really penetrates the ground covered by the forest than in the open, and yet the forest is a tremendous

conservator of the water supply. For these reasons: the forest litter, as it is called, the covering of the ground, moss, vegetable matter, &c., which has decayed through a long course of years, acts as a sponge retaining the water and preventing its run-off, and allowing a very much slower sinkage of water to the soil underneath the trees. Then I think a more important influence of the forest in conserving the water supply is its behaviour towards the snowfall. It prevents its flowing away; holds it there in all the quantity that falls. And not only that, the effect of the forest on the temperature generally in the spring is very marked, lowering it very considerably, the tree crowns preventing a rapid melting of the snow, and therefore keeping the snowfall in the forest several weeks longer than in the open. There is, therefore, maintained a constant melting of snow throughout the spring months which, as we see at once, affords the supply for the plains below. Now we have seen, in the paper which we have just heard, the influence of the forest on irrigation, but I want to point out the importance of this for the eastern part of Canada as well, so that we may see that it is of Canadian significance. The forest situated on these watersheds is essential to the maintenance of springs and wells. The destruction of the forests means the destruction, or at any rate, the lowering of the spring water, and the ground water level, and the lowering of the whole surface, and increases the difficulty of maintaining a water supply on the farm. Then, too, up in the newer parts of Ontario, more particularly this applies. It is important that we recommend the maintenance of the forests on the watersheds, the high lands. In order that the great reserves of water power there, the tremendous waterfalls, shall retain their value we need to apprehend that they depend for their continuation upon the perpetuation of the forest on the watershed. Therefore it seems to me that this Association should recommend two things as covering the whole of Canada—the preservation of the forest on the head of waters, at watersheds, and secondly the reforestation of hillsides all over the country, because that reforestation will undoubtedly mean, if it is extended far enough, the restoration to some extent at least, of our perennial streams and of our springs, and the prevention of destructive floods in the springtime. These two points, then, it seems to me, come within this general question, the preservation of the forest on watersheds, and, second, the reforestation of hillsides over the whole of the Dominion.

Mr. BELL.—Mr. President, I am very sorry indeed that Mr. Dennis is not here to take part in the discussion that must arise over such a very important and valuable paper. It seems to me that the paper is one of the most important that has come before the Association at this meeting. It is a subject in which I have taken considerable interest and have had occasion to give attention to as editor of the *Canadian Engineer*, more particularly the engineering features of it. However, I am tolerably familiar with a good deal of the ground that is referred to by Mr. Dennis in connection with his paper. Some years ago I was connected with the surveys for the Canadian Pacific Railway, and I can remember having to send long distances, sometimes ten miles, in order to get a supply of wood for our camps. I used to wonder how the settlers that it was expected would flock into that country would get their wood. I think the question is pretty well settled. This is impressed upon anyone who visits the Brandon Experimental Farm and sees the work going on there, as will be shown by photographs on exhibition here. Very considerable forests have grown up in the course of ten or twelve years, and I think the introduction of scientific forestry is gradually solving

the problem, and it is quite evident that crops of wood can be raised on the prairie quite sufficient to meet the requirements of the settlers. The reports of Mr. Dennis and Mr. Saunders, who recently resigned the position, I believe, as Deputy Minister of Public Works, and who is to be associated with Mr. Dennis in this irrigation work, are extremely interesting, and if by this means of irrigation they can bring under cultivation large tracts of country that are new, and have been considered in the past, semi-arid—if these tracts can be brought under cultivation for grain crops, and also for the propagation of trees, a very important economic purpose will be served. And I think it might be well to have this paper of Mr. Dennis's published in bulletin form, such as Mr. Stewart suggested should be done this morning in reference to another paper, in order that the information contained in it may reach a wider circle of readers than can be reached in the ordinary publication of it in the transactions of the Association.

Mr. A. H. D. Ross.—Mr. President, I might say that I am a new member of this association. The paper prepared by Mr. Dennis strikes me as being a first-class one. I am familiar with Southern Alberta, having spent a summer there with a Dominion survey party, and I can see quite clearly that to maintain these irrigation works the thing is not so much a question of reforestation as the preservation of the forest there. Now, I think the main point may be summed up in that. The real point is to preserve the forest there now, to make the irrigation works of use in the future.

Mr. CHAIRMAN.—If there is no further discussion on this paper, I will call upon Professor Hutt, of Guelph, for his paper on 'Some Ontario Forest Problems.'

SOME ONTARIO FOREST PROBLEMS.

PROFESSOR H. L. HUTT, ONTARIO AGRICULTURAL COLLEGE

Professor HUTT.—It may seem rather late in the day for me to bring on a paper of this kind, on some of the forestry problems in Ontario, when we have been discussing these for the last two days, and I think by this time we have some of them pretty well threshed out. However, it is not my fault that I am last on the programme, and if I should happen to sum up some of these problems and put them in a different light than they have been presented, I may not be out of place after all.

Ontario is a large province, presenting a great variety of conditions with regard to its forests and farms. We sometimes hear its parts spoken of as newer and older Ontario. For the purpose of our discussion, I want to make a little different distinction and speak of its settled and unsettled portions. In the settled parts the land is owned by the settlers—private individuals—who have purchased it, either directly or indirectly, from the Crown. In the unsettled part the land is still held by the Crown. This difference in the ownership of the land gives us two more or less distinct types of forestry problems with which we have to deal. They might be called Crown lands forestry problems, and farm forestry problems.

On the greater part of the Crown lands nature has left us a rich heritage in the form of valuable forests. The sale of timber from these forests affords the government its chief source of revenue. Whether we are making the best use of this heritage or whether we are wasting it, is a much discussed question by the two great political parties. And it is well it is discussed, for it is a very important matter to us that these forests be not wasted, and such that a profitable source of revenue be maintained, for all time to come. I do not intend to enter upon a discussion of this phase of the

question, for I feel confident that the government will do its best to make this revenue a permanent one, and the opposition is alert enough to bring the government to task if such a duty to the people be neglected.

But we in Ontario have much yet to learn about the management of forests, and the importance of the subject demands the very best thought that can be given to it both by the government and the opposition. Some of the chief problems with which those in charge of the Crown lands forests have to deal might be summed up in these few questions: How can the most money be made out of these forests? How is this source of revenue to be permanently maintained? How can these valuable forests best be protected from devastating fires? How can the forests be most economically regenerated on areas which have already been denuded by fires or by the lumbermen?

As to how these problems are being worked out by annual timber sales, by more stringent regulations regarding the cutting of timber, by increased forest reservations, by fire-ranging systems, &c., I shall not take your time to discuss. What, in my opinion, is most needed at the present time is a larger staff of experienced foresters—men skilled in the scientific management of forests, who can have a personal oversight of these forests, and not only keep the Government posted as to their condition, but see that the regulations regarding the forests are faithfully carried out.

With reference to forestry in the settled and older parts of Ontario, we have quite different conditions, and a different set of forestry problems present themselves. The forests which once covered the land have been gradually cut away year by year till all that remains now are the isolated patches here and there known as the farmers' wood lots. In many counties in Southern Ontario the proportion of woodland to cleared land is not more than 8 or 9 per cent, which is only about one-third of what it should be to maintain the most favourable climatic conditions.

The disastrous effect of this undue removal of the forests is becoming more and more apparent. The snows, which in a well-wooded country melt away gradually in the spring and soak into the soil to support vegetation through the summer, now go off rapidly in the spring, washing over the land and carrying much of the fertility into the streams; while these streams in many sections of the country become swollen to such an extent that the spring floods are becoming more and more every year a menace to life and property.

I need not go on to explain the ill effects of the removal of the forests upon the climate of the country: How it renders the country more subject to extremes of heat and cold; more exposed to sweeping winds, cyclones and tornados; more subject to protracted droughts in summer. These effects are becoming more noticeable year by year, and at the present session of the legislature we find provision being made for insurance against losses from such causes. Would it not have been wiser if we had taken action years ago to prevent the excessive removal of the forests, which has brought about such conditions?

One of the first problems we have to deal with is to rouse a more or less indifferent public to the necessity of taking immediate action to check any further removal of the forests. And to encourage them to reforest those areas which should never have been cleared of trees.

How can we best make the public see the importance of this is one of the problems we have to meet. As lecturer in forestry at the Ontario Agricultural College, I have, for the past ten years, been trying to impress this as forcibly as I can upon the students in attendance at the college. Mr. Southworth, in his excellent reports as clerk of forestry, has for years been educating the reading public. This association also for a shorter time, but over a much wider field, has been helping to educate public sentiment in favour of scientific forestry. At times we may have felt somewhat discouraged because our efforts apparently have borne so little fruit, but nevertheless the leaven has been working, and I, for one, feel greatly encouraged and hope for much more rapid progress in the future.

As an example of how public sentiment is growing, I would call your attention to the action taken by the Ontario Experimental Union in this matter. For the past

three years the members of the union have been discussing this forestry question, and at the last annual meeting the following resolutions were unanimously adopted and forwarded to the Government:—

‘Whereas, in many sections of settled Ontario the process of deforestation has been carried on far beyond the proportion between woodland and cleared land shown by the experience of other countries to be necessary to the best maintenance of agricultural conditions of climate and water supply;

‘And whereas, a very considerable proportion of lands thus deforested are totally unfit for agriculture, and, in consequence, are at present unproductive;

‘And whereas, the feasibility of profitably maintaining such area of forest lands has been demonstrated in this province;

‘And whereas, the present method of taxing farm woodland discourages their preservation:

‘And whereas, the supply of wood products necessary for the general interests of the province is rapidly diminishing;

‘Therefore, the Ontario Agricultural and Experimental Union would strongly urge upon the Government the necessity,

‘(1.) For establishing at the earliest possible date a School of Forestry, where instruction will be given in practical methods of dealing with forestry problems;

‘(2.) For collecting accurate information from the municipal authorities as to the amount of lands unfit for agriculture in the settled townships of Ontario;

‘(3.) For undertaking the practical re-forestation of areas sufficiently large to afford forest conditions, as a demonstration of the utility of the work on these lands, which, from their surroundings, enjoy practical immunity from fire;

‘(4.) For considering some means of adjusting taxation so as to encourage rather than to discourage the preservation of farmers’ wood lots.’

This from an organization as progressive and as far-reaching in its work as the Experimental Union, is, I think, very encouraging. Public sentiment on this question is growing and as a result of the sentiment already evident the Government has felt warranted in taking some decidedly progressive steps at its present session. It has seen wise, while establishing larger permanent forest reservations and improving the regulations regarding the cutting of timber on the Crown lands, to also emphasize the importance of farm forestry and to bring this branch of forestry under the fostering care of the Department of Agriculture. So that both the Department of Crown Lands and the Department of Agriculture will now be working to put forestry in Ontario on a better basis.

Organization, education, and co-operation have been the watchwords of the Department of Agriculture in developing the agricultural resources of the province, and these we expect will be the watchwords in promoting farm forestry.

As the Minister of Agriculture has already announced, an educational campaign will be commenced among the farmers to place the matter before them in its proper light. The Farmers’ Institutes have been the schools through which the farming public has been effectually reached in the past and will be utilized in this case.

Some of the prominent points to be emphasized in this educational campaign will be the economic value of the wood lot as a source of supplies for fuel and for manufacturing purposes; the proper management of the wood lot so as to get the greatest possible growth of the most valuable species adapted to the soil and surrounding conditions; the rational harvesting of the wood crop, the same as any other crop, when it has reached maturity; the best means of securing natural regeneration and continuous cropping; and in this connection the reckless waste caused by allowing the cattle to browse at will in the wood lot, which is indeed more wasteful than allowing them to pasture at will in the cornfield.

A forest nursery is to be established at the college this spring from which we hope soon to be able to send out thousands of young forest trees to assist the farmers in tree planting and reforestation. Complete details for the management of this work are being worked out as rapidly as possible, but in brief they will be based on the

same plan of co-operation and education which has already proved so successful in the co-operative experiments in agriculture and horticulture carried on by the Experimental Union.

Farmers who wish to improve their wood lots, to establish shelter belts, or to start forest plantations will be given an opportunity to co-operate with us at the college, and young trees suitable for the purpose will be furnished from the college nursery to give them a start. As with the co-operative agricultural and horticultural experiments which we are now carrying on all over the country, this material will not be given away indiscriminately, but will be furnished on condition that the recipient agrees to follow the printed directions furnished with it; will properly care for it; and will report the results at the end of each season as long as may be required.

The trees selected for this work will be some of the most valuable forest species of the conifers and deciduous trees, and they will be sent out when quite small, so that they may be sent cheaply in large quantities, and can be grown for another year or more if necessary in nursery rows by the experimenter who receives them.

In this way we hope to encourage the establishment of little private nurseries all over the country where the farmers may raise their own forest seedlings. With many species such as the oaks, hickories, walnuts, which naturally have very strong tap roots and are better of being grown from seed without transplanting, it will no doubt be an advantage to furnish the seed rather than the seedlings.

In conclusion I may say that by agitation, co-operation, and education we hope to be actively engaged in solving some of the forest problems which are facing us in Ontario to-day, and whether or not we succeed in solving them all, posterity will profit by our efforts.

Mr. LITTLE.—As I happened to be born in the southern part of Ontario, in Caledonia, township of Seneca, county of Haldimand, I can corroborate everything Mr. Hutt has said on this subject. To show you the importance of this, I might say that fifty-one years ago my father purchased for one hundred dollars four million feet of pine timber within a mile of where I was born, and this small grove of pine of about fifty acres would be worth, if standing to-day, over \$100,000. Now, that was not a place to grow cabbage and corn; it was a first-class place to grow timber. It was just a sand knoll of little value for agriculture. When I was born that section of the country was nearly all a natural growth of timber and some of the timber of an enormous size. To-day I am told by the agricultural report that there is only five or six per cent of timber in the township of Seneca or Oneida. In this section of the country my father lumbered for about thirty-five years, and we sometimes talk about pine timber getting scarce. Well, pine timber does not seem to be getting scarce. I find they cut even now about four million pine logs in the Province of Quebec, and I do not know but Mr. White will tell you that they cut pretty close on that number in the Province of Ontario.

Mr. WHITE.—How many, Mr. Little?

Mr. LITTLE.—Four million pieces.

Mr. WHITE.—Oh, yes; seven hundred millions of feet or over last year.

Mr. LITTLE.—Well, now, that does not show that pine timber is getting very scarce, but there is some difference between quantity and quality, and I want to tell you this: My father cut more clear lumber in one year from this section of Canada than was sawn in the whole province of Quebec last year. And I say, further, that ten

years after that I got out more and better square timber than was made in the province of Quebec two or three years ago.

Mr. Little pointed to one of the illustrations in the Fourth Annual Report of the Association, that of a group of white pine, and said: I would rather have a lot of first quality spruce trees than any in that little patch of white pine timber. The mighty monarch there is simply a fire-scarred shell. When it is cut down, it will fall to pieces, being filled with punk and rottenness. There are, you will see, some rampikes running from the root to the crown of every tree, and you could not get a clear board from the whole dozen. (Pointing to map again.) All through this section of the province there was really the finest timber in eastern Canada. I have myself cut masts for the British government one hundred and twenty-eight feet long and eighteen inches at the top end, many of the trees being six and a half feet on the stump. I hear the lumbermen now speaking about timber of forty-five and fifty feet average. I have taken rafts to Quebec of one hundred and fifty feet average. I say, gentlemen, there is one class of timber that is getting very, very scarce, and that is good white pine timber; we will not have it very long. Mr. White told us that we had ten billion feet of pine in the province of Ontario.

Mr. WHITE.—More than that; we know where we have that much.

Mr. LITTLE.—I am very glad to know there is that much, and I hope it is of a better quality than shown in the illustration. It is not a great deal from a national point of view. I would like to have the pleasure of seconding any resolution passed by our Forestry Association, if you will draw it up.

Mr. WHITE.—I just wanted to say a few words, sir, in connection with the very able paper which we have had from Professor Hutt, and also just a word or two in connection with what has fallen from Mr. Little. Now, it is true that, in the opinion of some people, we have not done everything that we should have done for the preservation of the forests. That is the opinion that some people have, but people must remember that in this country of ours we have what are considered practically illimitable forests, and where we had such an enormous wealth of timber, nobody seemed to think there was any possibility of its coming to an end within two or three lives at any rate, and where you have an enormous supply of any material, very much interest is not taken in its preservation. It is when you begin to get short of it, or see an end of it, as it were, that interest is aroused and people begin to protect and conserve and husband in every way possible. Now, gentlemen who talk about the Government looking closely after the timber in this enormous province must bear in mind the great extent of the country. Mr. Southworth said, only the other day, in a lecture, that we had some forty million of acres of land in this province that was not fitted for anything but growing timber. It is all nonsense for gentlemen to talk to us about what is done in Germany, or small European states, in connection with the study of forestry, and expect us to apply the rules and inspection and study observed there to the whole of our immense forest territory. We have not got the money or the men, and I doubt if the legislature would vote us sufficient money to enable us to place men in every hole and corner of this province to study the trees, and how they grow, and all that sort of thing. It is true that at the Agricultural College at Guelph an

effort is to be made to grow seedlings, and to educate people in the older parts of the province to grow trees and restore portions of the forest, but to talk about our having this close European system of care and study over this province is nonsense; it is not possible for us to do, and it is not necessary for us to do it at the present time. It must not be imagined that the Government is careless, or that the Government does not make every possible effort to conserve the wealth that we have. Last year we spent (the Crown and the licensees) some eighty thousand dollars in fire-ranging alone on lands under license in this province. In addition to that protection from fire, we have established five large forest reserves, which we propose to keep in forest in perpetuity. Also, we have established a large park up in the Nipissing district, the Algonquin Park, and we have another park at Kondeau. Therefore, I say the Government is doing its duty to the utmost of its ability. Now, what I think is the first duty of the Government, and what I think is the common-sense duty, is to protect the timber that we have. That is the first thing. Now, how are we doing that? As I say, we are placing forest rangers upon every limit under license. What Mr. Bertram said this morning was very true, that not a long time ago some men would not put firerangers upon their limits, and the other contiguous limits were exposed to danger that arose from the carelessness of these men. Well, we have legislated on this matter, and the House has given the Commissioner power to place rangers upon a man's limits, where he is too careless to look after them, and wherever there is danger we undertake to do that. But, as I say, all over the licensed territory we have placed firerangers on every limit, and we have got the sympathy and assistance of the timber licensees to enable us to keep a close watch, and after all, fire is the greatest enemy we have to contend with. Now, Mr. Hutt said, and he said it, I know, without thinking, that we have annual timber sales. We do not have annual timber sales in this province. There are three great principles, I take it, that guide the Government in holding timber sales. One is, that if the territory is capable of settlement, the timber ought to be cut away and the licensee given a reasonable time to do that before people are put into that district. The other is, if, through railway construction or mining development, timber areas are exposed to danger of being burnt up, then it is proper to dispose of that timber in order to get the most that we can for the province. And the other, and perhaps not the least of the three, is the necessities of the lumber trade for a supply of raw material. It is all very well for you to say that we should not sell any more timber, but if you have a gigantic industry with hundreds of millions of dollars invested in it, is it fair to say to these people: You may dispose of your property, if you like, but at any rate we will not sell you any more timber? So it comes about that whenever land suited for settlement is required, or when timber is liable to be burnt on lands suited for mining, or anything of that kind, then we have a timber sale. Incidentally, we derive revenue from that sale, but we do not sell merely for the purpose of getting revenue. I want that distinctly understood. Now, sir, in addition to these firerangers supervising limits, we have another staff of rangers on land not under license. We have had two or three men on the Missinabie river and on waterways where people travel, and have had them post up notices on portages, &c., so that travellers may know what the law is and be taught to observe it. We have enlisted the sympathies of the Hudson's Bay Company people, and have got their men to post notices up everywhere, and they have inculcated a spirit of care upon



BRIDGE AND BARREL FLUME ACROSS BOW RIVER, CALGARY HYDRAULIC CO'S CANAL.

everybody they have come in contact with. And so we are doing an educative work, as well as a most practical work, in this direction.

Mr. HUTT.—So you are.

Mr. WHITE.—Then we have set apart enormous forest reserves, and I said last night, and I repeat it now, that the policy of the Government of Ontario, or any other Government that has large timber areas, ought to be to absolutely exclude settlement from territory that is not capable of supporting an agricultural population. In the past too little attention has been paid to that, as you know, in the Muskoka district for instance, the Government of Ontario sold the timber in 1871 and immediately opened the whole country for settlement and allowed settlers to flow in, and the lumber men had to take that timber off inside of five years or else they lost their title. Let us see for a moment what took place there.

Mr. BERTRAM.—Was that a five-year limit in 1871?

Mr. WHITE.—No, we opened the district for settlement and the settler could get his patent in five years, therefore the lumberman had to take his timber off or he might lose it.

Mr. BERTRAM.—But you continued it afterwards?

Mr. WHITE.—I am just going to tell you what took place. Before the five years were up the lumbermen went to the settler and said, 'you are going to get your patent in April or May,' and the settler would say, 'yes,' then the lumberman would say, 'I can go on and cut your lumber this winter, and I will do so unless you sell it to me.' The alternative for the settler was taking something for it, or getting nothing, and he took what was offered, but the province lost seventy-five cents a thousand dues. I took the opportunity of writing the then Commissioner, Mr. Pardee, and saying to him that unless some plan could be devised whereby that sort of thing could be put an end to we would very soon lose most of our revenue from that country. The House did pass an Act reserving the pine timber from the settler for all time, not only until the issue of the patent, but for all time, and in that way we stopped that leak. When selling under pressure in the way spoken of, the settler did not, as a matter of fact, get more than five or ten cents a thousand for his timber, and the province lost seventy-five. It was therefore provided in the amendment to the Free Grants Act to give the settler a refund of one-third of the dues on his timber land after being patented, which meant a great deal more than he had been getting. We now give the settler thirty-three cents on every thousand feet cut on his land after the land is patented, and so the time is pushed further back in which the lumberman has to cut the timber, and the interests of the Crown and the settler are protected. Now, I have told you what we are doing in the direction of conserving pine timber, and I think you are advised that the Government is not only alive to what is its duty in the premises but is anxious enough to be informed by anybody who has got an opinion worth listening to as to what is the best course to pursue in the future.

Mr. Hutt divided his subject into two heads, one dealing with the forest wealth where the country was unsettled, and the other with the older and more settled parts

of Ontario where the farmers have cut away all the timber on their holdings and have done their neighbourhood, themselves and the country great injury. Well, now I do not want to say much on that part of the subject, because the only way that that can be cured is just by the means it is now proposed to adopt, and that is that the Department of Agriculture shall take hold of it and that the farmers throughout the country shall be educated as to the desirability and importance of reforesting part of their farms. I have no doubt that Mr. Dryden, who is nothing if not an intelligent administrator, will do all in his power to disseminate information, and by lectures delivered at Farmer's Institutes, &c., I hope we shall get the farmers educated up to the point where they will try to grow trees on part of their farms at least.

Then Mr. Little referred to the class of timber that his father owned upon some lands in western Canada and said that we had nothing to-day in either Ontario or Quebec that is at all equal to what they had in those days.

Mr. LITTLE.—I beg pardon, I said this. I did not say anything about Ontario, but in the province of Quebec my father in one year, when I was a boy, cut more clear lumber in that section of the country than was cut in Quebec in a year.

Mr. WHITE.—Well, I thought you applied it to Ontario.

Mr. LITTLE.—Oh no, not at all.

Mr. WHITE.—Because I want to say that we got out last year in the province of Ontario a million feet cubic of waney, board and square timber. I do not know what the extent of Mr. Little's operations were, but I do not apprehend he took out a million feet of timber in any one year. This we are getting out is of fair quality and sells at fifty or sixty cents a cubic foot in Quebec. And I do not want you to think that we have no square timber. I am not fighting the battles of Quebec. Somebody else will have to do that.

Mr. LITTLE.—Mr. Edwards said that for every large tree taken out ten were burned.

Mr. WHITE.—We know a considerable quantity of timber has been burned in Ontario, but nothing that would justify us in saying that there were ten trees burned for every tree taken out.

Mr. LITTLE.—I have read your reports for years past, and I do not see that you have lost much timber.

Mr. WHITE.—No, and that is just the point I was going to make. Ever since we have had an intelligent system of fire-ranging, we have asked the lumbermen and rangers to report to us every fire, the cause of that fire, and how much timber was damaged, and the reports which we have had from year to year have justified us in the opinion that the loss by fire, comparatively speaking, has been very small. Another benefit in having rangers on these limits is this: If fire does occur, the lumber foreman is there as a fireranger. He knows the limit, and if a fire occurs, he advises his principal that a fire occurred on this limit, and when, and how much timber they will have to get out, and so they are able to make provision for taking out damaged

timber that winter without loss. And so I do think that, having regard to the timber at our disposal and the enormous extent of the territory, speaking for the province of Ontario—I am not speaking of either one side of the house or the other, but for the whole province—I think we are doing everything that we can do to tighten our grip upon the conservation of the forest wealth of this province, and I think you can rely upon it that, whichever party is in power in this province, even greater efforts will be made in the future than in the past to conserve and protect the forest interests of the province.

The CHAIRMAN.—I can thoroughly corroborate what Mr. White has stated with regard to the fire protection they are giving the licensed timber-holders of the province. I can speak from personal knowledge with regard to our own, and I have no doubt it is the same all over the province. The great destruction by fire was before the days that Mr. White speaks of, it was in the days of the free grant system. On the River Madawaska, and in the neighbourhood of Pembroke especially, there was a free grant of land given to settlers, some from Germany and other parts of Europe, and even from Canada. These literally destroyed the pine forest there, and you can to-day see their operations. Mr. White spoke of the settlers' license system. That in Quebec had exactly the same effect. The settlers—not settlers, but land pirates—got the license, and they were obliged to make improvements before they could get a patent, and I have in my mind's eye an immense district destroyed by these so-called settlers or land sharks. I just wish to corroborate what Mr. White has said, that the Ontario Government, with its capable officers, is giving this matter their personal attention, and if a fire occurs, it will not be for the want of thorough looking after. Mr. Joly could give you some information about the land pirates on their side, but we have not time to discuss that very much.

Mr. LITTLE.—I hope that Mr. White, in anything I have said, has not thought that I have in any way wished to censure the action of the Government. My idea was the very reverse of that.

Mr. WHITE.—I was not quite clear that you had confined your remarks to the province of Quebec.

Mr. BERTRAM.—I only want to say a word. We have no quarrel or fault to find in any way whatever with the work of the Crown Lands department. The only opinion that we have about that is, that they are too conservative. I do not know what they call themselves in public, but they are a lot of Tories in a good many things. I do not know that that is a very bad thing for the province, because in one aspect of the word I am very conservative myself, and we require sometimes to give them a little push on. But the work they are doing is not only in very good taste, but a good thing for the province. I want them to go a little further and give us a little more fire protection. As to the Agricultural College, there is nothing that gives us more pleasure than to think that the Ontario Government is taking that matter up. I have spoken of the broken land that the farmers have. Going from here to Peterborough, you will see a rocky ridge that the pine should never have been cut off, and for some years I have been looking and thinking of a way to get something like this. I have some hills on my own farm down in Peterborough, and will wait now until I can get a few trees from the college.

Mr. SOUTHWORTH.—I do not want to take up any time at this late stage, neither do I desire to differ in any way from my superior officer, Mr. White, but while it is quite true and conceded by every one, that the trend of events in connection with rational forestry by the legislature of the province of Ontario has been in the right direction, and wise and progressive, at the same time I do not like to think that we have reached a finality by any means. As Mr. White pointed out, we do not have a timber sale every year, although we receive about a million dollars every year from the receipts of previous sales. We do not sell timber for revenue purposes only, but from emergencies, pressure of settlement, building of railways, &c., but may we not hope, may we not look forward to the time when the timber will be sold for revenue purposes and because it is ripe to be sold? It is true, we are protecting the timber we have now sold or partly sold, but the forty millions of acres, more or less, of timber lands referred to by Mr. White is largely unprotected. Mr. White succeeds in getting a little larger appropriation every year to expend for surveys, but as Mr. Bertram pointed out, there is still a very large proportion of the province unprotected. I do not think, as Mr. Bertram says, that offence will be taken by the Government if the Association helps the department in getting from the legislature the aid required for the proper conduct of this work.

Mr. MACOUN.—About the matter of posting notices, I might state that this last season was my twenty-fourth season in travelling what we may call the sub-arctic forest. With the exception of the James' Bay district of the province of Ontario the country is *brulé*. In the whole districts of Alberta and Athabaska there is practically no green timber, except in the river valleys and some isolated spots that have not been reached by the fires. But as to the point Mr. White has mentioned about posting notices regarding fire, as one who has travelled for so many years as an explorer, I would say that if we do not learn to put out our fires through seeing those notices, you cannot expect a stray person going through the country to do so. Year after year I have found myself—and I am as careful as most people are—going away from camp and leaving fires burning. Sometimes I have gone back half a day's travel to put out a camp fire. If those notices that Mr. White speaks of cost a man's wages for a whole season to put up one of them it would be worth the money to the Government. I did not camp over five times last summer that I did not see a notice signed 'E. Stewart,' and we never left one of those camps with fire dry. Whoever posted Mr. Stewart's notices—and it could not have been one person, because they were up the whole length of the Peace river—made a very thorough job of it. The notice recites the penalties, but I do not think it is the penalty that people think of. They are apt to forget. But no man who eats his dinner with a notice up before him on a tree will go away and leave a fire burning. On every portage on these regularly travelled routes between Keewatin and the Georgian bay these notices should be posted in French and English, because there are very few people, perhaps none at all, who will wilfully start a fire, but many, many people, experienced travellers at that, who will go away and leave a fire burning. In 1886 I went through Lake Winnipeg to Hudson bay and one of our men went ashore for a moment or two and lit his pipe. For six weeks after that we saw the smoke from that fire, and there must have been millions of acres burned through the carelessness of one man. I am willing at any time publicly to say that if it costs a man's wages for a whole season to put up one notice on each portage it pays the provincial government to have this notice put up.

Mr. STEWART.—The subject of forest fires seems a very popular one. This meeting, as I said last night, being held in the city of Toronto, the discussions have necessarily largely had reference to this province. I therefore feel it a duty to those who will read this report that they should have some record placed there regarding the work that is being done outside of the province; in the North-west Territories, British Columbia and Manitoba. When I undertook the work there were two distinct propositions that seemed to demand attention. One was with reference to existing forests, and the other with reference to tree planting on the bare plains where there were no trees whatever. Mr. Dennis and Mr. Hutt have spoken on subjects that I am tolerably familiar with, particularly in the case of Mr. Dennis's paper, where he deals with the conditions in the foothills of the Rocky Mountains south of the Bow river and the necessity of preserving that forest intact. The reason for this is apparent. It is the source of the South Saskatchewan river. The numerous streams that flow therefrom have their rise in this great range of mountains, and along the eastern foothills we have set aside a reserve, and I am sorry we have not a coloured map here to show it properly. That reserve set apart is one of the most important for another reason. As you are aware they are doing large irrigation works along the plains region there east of the mountains, and it is essential to the success of irrigation that the source of water supply be kept intact. I have here, and I trust it will not weary you at all, a list of the timber reserves that have been set aside by the Dominion Government, and it will only take a few moments for me to read them. I do not know that the areas were referred to as fully in the report as they are here. We have first in Manitoba the Riding Mountain Timber Reserve at the headwaters of the Assiniboine river, and several other streams flowing north from that mountain. The Riding Mountain reserve contains 1,098,240 acres, embracing between 45 and 50 townships. The Duck Mountain reserve, north of that, has an area of 709,760 acres, and the reserve in the Porcupine Mountains, just northward from the latter has an area of 1,382,400 acres. The two latter have been set aside within the last two or three years. The object of withdrawing them from settlement is this: They occupy a well-timbered area. They will probably not be permanent timber reserves, because the land in many cases there is productive. But it has excellent spruce growing on it, and at present, at all events, it is as well to keep it reserved, especially as the land is wet and not as well fitted for agriculture as the other parts. It is therefore as well not to settle this district when there is so much good land on the plains adjoining, and besides the timber is required for use on the plains. The Turtle Mountain Reserve has an area of 69,120 acres. The above named reserves are all in Manitoba and the total area of timber reserves in this province is 3,449,600 acres. Now, it is generally supposed that Manitoba is a prairie province, but the fact is that fully one-half of Manitoba is more or less timbered. I do not mean to say that it is timbered as Ontario is, but there is only perhaps about one-half of it that might be termed open prairie.

Then, take the North-west Territory. We have in the Moose Mountain Reserve 103,040 acres; in the Beaver Hills Reserve, 170,880 acres; Cooking Lake Reserve, 108,300 acres; Rocky Mountain Park, 2,880,000 acres. Formerly the park was comparatively small, but within the last two years it has been added to, making an area as I said before, of about 2,880,000 acres. In the foothills, which I mentioned a little

while ago, and to which Mr. Dennis alludes in his paper, there are 2,350,000 acres, making a total in the North-west Territories of 5,612,800 acres.

Then, we take the Railway Belt of British Columbia, owned and controlled, as I said this morning, by the Dominion Government, a tract 40 miles in width, running along the Canadian Pacific Railway from Alberta to the Pacific Coast. We have the Yoho Park, with 530,340 acres; Mountain Park Reserve, near Glacier, with 18,720 acres; Long Lake Timber Reserve, south-west of Kamloops, 75,520 acres. This last-named reserve is in the semi-arid district known as the dry belt. The land is good, but requires irrigation, and this reserve, the Long Lake Reserve, is at the head waters of several streams that will be required for irrigation in that part of British Columbia. So we have a total in British Columbia of 624,480 acres, and the total area of the timber reserves in the Dominion approximates 9,686,480 acres.

Now, we are attempting not only to guard this timber on these reserves from fire, but, as far as we can, the other timber on Dominion lands outside of these reserves, which I need not say is of vastly greater extent than that on the reserves. Now Mr. White very truly said, with reference to Ontario, that it was not necessary and also impossible to send rangers all through the timber in the northern country. It is not necessary, because people do not usually travel except on certain routes, and if we keep the notices up there, and perhaps guard as well as we can along those routes, that is all we can hope to do. Now, what is true with reference to Ontario is much more so with reference to an immense district of the Dominion stretching right across the continent, because this is largely a timbered territory. Except a small proportion of the country, it is more or less a wooded country. Now, Mr. Macoun has very kindly alluded to the notices which he saw in going through the Athabaska and Peace river country, and I want to tell you how we got those notices posted up throughout that vast extent of country. I took advantage of every means available for the purpose. In the first place, through the plains region, the two railway companies, the Canadian Pacific Railway and the Canadian Northern, were kind enough to say that they would post up notices all along the railway lines, if we would furnish them. So I had them sent up to Winnipeg, and they were distributed to probably every section foreman all through the country along the railway lines; in the case of the Canadian Pacific Railway right through to the coast and to the extreme limits of the railway territory, and similarly with the Canadian Northern. Then, the North-west Mounted Police also did their part, but those that Mr. Macoun refers to more particularly were posted through the kindness of the officers of the Hudson's Bay Company. Mr. Chapman, the Commissioner, whom I met at Winnipeg and laid the case before him, said they would be very glad to have their servants throughout the whole north country post them up, if we would furnish them the notices at a certain time, and we did, and I have been informed that as far up as the Arctic Circle you will find those notices. That is how these notices, warning the public against the careless use of fire in the far north have been posted up. I travelled last season all along Lake Winnipeg and up along the mouth of the Saskatchewan river, west of Grand Rapids, and I found those notices wherever I went, and I also had an opportunity of observing how the instructions contained in them were carried out. I had half-breeds for three or four days, when travelling

up there, and although it was a wet season and I never said a word to these men, they never left a camp without dousing their fire with water. The Hudson's Bay people say that whenever a notice arrives, the Indians and half-breeds want to know all about it, and the agents have instructions to explain it to those who cannot read what the provisions are, and the penalties attached.

Now, with reference to another branch, that is tree planting on the plains, I think it should go on record what we are attempting to do in that regard. Mr. Hutt has mentioned that the Ontario government are about to start in the distribution of plant material for afforestation. When I undertook the work for the Dominion, I looked over the forest systems followed by other countries, but I do not suppose you will find the system of any country entirely applicable and beneficial for any other particular district. Certainly what would be applicable here in Ontario would not be conducive to good results in the plains region. Heretofore the Experimental Farms at Brandon and Indian Head have been sending out trees here and there, a few trees to settlers asking for them. Those were sent out without supervision. People did not know what kind of trees they should have, so I made up my mind that the only way to be successful would be to co-operate with the settlers and to have inspection. So our system—I do not think I need go over it because probably many of you have read it—was adopted. But briefly, our system is this: Any person wishing to avail himself of the co-operation of the Government in planting out shelters, forest plantation, or wind breaks, makes application to the Superintendent of Forestry at Ottawa. These applications are filed. There is a certain time—the time is up now for this season—for receiving them. The application of every man is tabulated and next season the inspectors will go out and visit those farms. They examine the soil and give instructions. But before doing that there is sent out a circular showing how they should prepare their soil. Then, as I say, in the summer, early next season, the inspectors will commence and visit all of those farms. We will have a great many to visit. We had to have four or five inspectors last year, and probably will have more this year. They do not go over the ground more than once. They see what has been done in former years and they see what is the character of the soil, and what kind of trees are suitable, and they instruct the men where and how to plant. Then they make out a little sketch from which a working plan is made, and the trees are furnished the farmers the following year. That is the new applicants this season will receive a visit next summer and will be furnished with trees in the spring of 1905. The American Government do something similar to this, but do not furnish the plant material. I do not think our plan would be successful if we did not furnish the young trees. Suppose we sent those men out to inspect this land and then let the settlers furnish the trees themselves. Do you suppose that during the busy season, when they should be planted, one single man would be able to go off to the woods and get the trees? So we are forced to supply the trees, and we have used a portion of the land at the Experimental Farms at Brandon and Indian Head on which to raise them, and we are sending them from there out to the farmers. These trees will be inspected the following year. They are all sent out at the proper time; they are well packed and each man gets on an average about 2,000 each year. We are sending out this year 1,700,000 trees. Now, the result of this planting is shown in these photographs. I will just pass them around. Here is a farm, all prairie. Here is another picture of the same

farm taken two years after, when the trees that were planted have grown as shown in the photograph. Here are some of the nurseries at Indian Head, where they raise the trees, and you will see there the length of time that they have been planted.

A voice: What area have you?

Mr. STEWART.—We have fifteen acres at Indian Head and something like ten acres at Brandon. There are two principal trees, the Manitoba maple and the green ash, that we send out, besides these we distribute certain quantities of elm and cottonwood. They are small and are sent by express and the parties are notified when to expect their trees. They are well packed and all in the same neighbourhood are arranged to be sent at the same time, so that if a farmer is in the neighbourhood and cannot go in himself to the station to get his trees, perhaps his neighbour will be going in and he will get them for him. He has full instructions how to plant them.

And now as to the result. In certain areas when there is a great deal of moisture in the ground we lose scarcely any trees. I think I am safe in saying that out of all we have planted during the last three years 85 per cent are now growing, and this is very largely from the care taken in planting and looking after the seedlings. Since the year 1901 we will have sent, when this spring's shipments are made out, 3,120,473 trees. In the year 1901 we had just started and only sent out 63,786. The next year we sent out 456,687 trees and 738 lbs. of seed. In 1903 we sent out 900,000 trees and 750 lbs. of seed. This year, as I have said, we will distribute 1,700,000 and thirty lbs. of seed. We cannot always depend on having large quantities of seed. The total number of trees planted, including those which will be put in this coming spring, will be, as I have said, 3,120,473, and we are having applications this year from about 2,300 farmers who wish to plant in the spring of 1905.

Now, there are two objects in this work. One is educative, and the other is to give practical benefit to the settler. If you have a plantation and it does well, it is an object lesson to the neighbour and he becomes interested. It is an education on these lines and though we have furnished those trees so far free, it will scarcely be possible for us to continue always to do so to the full extent that we are now doing if the farmers take hold of it to the extent that we hope. However, the cost of raising seedlings in large quantities is very small. Heretofore we have used the two experimental farms, but we had to keep two sets of farm hands and two foremen, one at Brandon and one at Indian Head. We recently took a quarter-section of our own and we are now putting up buildings there and are making it a forest nursery station. We hope to have there a model forest nursery plantation. We will have a foreman there and be able to do certain experimental work that is quite necessary in addition to growing the seedlings. I may say that we have been able to do this work, both the protection and what little exploration we do in this tree planting with a very small grant. We started with \$10,000 first. Afterwards it was increased to \$15,000, but I am glad to say that last year we got the appropriation increased to \$40,000. And this year we hope it will not be less.

Mr. SOUTHWORTH.—We have with us one of the staff of the Farmers' Institutes of the province. He has already devoted considerable attention to this phase of forestry, and I would like to ask Mr. Nash to speak for a moment.



CULTIVATING SEEDLING TREES AT FOREST NURSERY, INDIAN HEAD EXPERIMENTAL FARM.



HOING SEEDLINGS, INDIAN HEAD EXPERIMENTAL FARM.



Mr. NASH.—Mr. Chairman and gentlemen, if I understand aright there are two sides to Mr. Hutt's paper. One of these is commercial forestry. So far as that goes if I am a judge of experience I think the people of the country understand pretty well that the Government and the lumbermen are pretty well capable of taking care of that side, and that we do not need to. Wherever the interests of the lumbermen are concerned I have always found the lumberman abundantly able to take care of himself. But with regard to the other side, I do not find that the farmers have the amount of technical knowledge necessary to enable them to reforest the lands that are being depleted of their timber. But I am very happy to be able to tell you this: During the last six or seven years, while speaking of the advantage that would accrue to the farmers if they would reforest their waste lands, I find they are keenly anxious to do this and perfectly understand the advantages that would be derived from it. There are certain practical difficulties in the way. They have tried in many cases to reforest their waste land, but they did not succeed, and the reason is simply this: That on the rocky ridges where the roots never should have been all cut off at one time, after the trees were cut off the action of the elements simply took away all the vegetable matter on these rocks and seedlings cannot start now. When the hot sun of summer beats down on these rocks the little seedlings are burnt up. They have asked me how they can get over that difficulty. There is a way, of course, and I have explained it as best I can. There is another difficulty along the banks of streams and spring holes where trees flourish luxuriantly. Now they are swamped and flooded every spring. They plant after the floods of one spring and before the seedlings can get a good hold on the soil the floods of the following spring erode the surface and carry away the seeds. They have not yet got into their heads the advantage of planting willows to bind the surface of the soil. I believe that, through the efforts of the Agricultural College and the Forestry Association these little practical difficulties will be overcome, and I am glad to tell you you will find no people more ready to cooperate with you and undo the mischief that has been done as far as they possibly can do, than our Canadian farmers.

Mr. GROH.—I was exceedingly pleased when I heard Mr. Hutt's paper. I live in the southern part of Ontario. There are two sides to this question and I feel a good deal better since Mr. Nash spoke, because I find there are more of our people who are interested in the re-stocking of our farms than I had imagined. It is an important matter. We have heard that there is five per cent of forest on our farms, but a great percentage of that is down in the valleys and hollows where it is too wet. These swamps hold a large percentage of this wood and when the floods come down the waters would go there anyway. If you discuss it from the economic or scientific side it is quite plain that it is on the heights that we want our wood. I am situated where the people have found the storms somewhat serious. Two years ago a storm came through there that tore the fences, &c., rather badly and people began to wonder if we were going to get cyclones. And only a year later another storm struck through and tore a barn to pieces, and pieces of that barn were found on the fourth farm away. Timbers were torn away and driven right through and into a house endways. This was rather an eye-opener and the co-relation of these incidents were sufficient to convince the farmers that the denudation of the hill-sides is perhaps responsible for this. I am pleased to know there are men here to-day who know something about and are

interested in this important subject that was especially dealt with by Mr. Hutt. I think it would be possible for the farmer to set out these seedlings which may be secured from the Agricultural College in nursery rows on the farm and then when he gets an hour or two to spare he could set them out. It might be a year before he could get them all planted, but they would still be growing, and when he had time he could put it to profitable use. As for educating the farmer, I might say that the editor of the local paper pesters me for articles of a local nature. Our home paper is pleased to receive articles if they are not too long, and I think that this demand could be turned to advantage by writing about forestry as related to the farm. I know the local papers will do all that they can for us. It is only for us to take hold and supply them with the articles.

The CHAIRMAN.—I think that the meeting proper of the Association or the work of the Association is almost completed. There remains the election of officers. Last year, when it was proposed to hold the annual meeting in Toronto, I was one of those who were very cordial towards Toronto as a place of meeting. I think we made no mistake in coming to this city. Toronto has done us honour in the splendid meetings we have had here, and I would like to say that not only has Toronto done us honour, but Mr. White and Mr. Southworth have been the means of making the meeting the success it is. I have to thank them on behalf of the Association for what they have done and in giving us such a nice time as we had last night. There were very able speeches last night, and it was a very enjoyable session. I think it will tend, above all, to spread abroad the work that this Association is endeavouring to perform. We have a great work before us. I am a pretty old man, but the young men should take the place of the older men. Here are Mr. Little and Mr. Bertram, who have been in the past in the old Forestry Association, sticking to it yet, and it is due to Mr. Stewart and Mr. Campbell that the Association so far has been successful to such a large extent. Now, we must decide where our next annual meeting is to be. We must also select our president and our vice-president and directors. I believe in rotation of office, and I am quite in favour of a change. I have decided to drop out, even if I were asked to be president for the coming year. I have decided not to accept the position, although I deem it one of the greatest honours of my life to have been president of the Association. I think that I should be succeeded by rotation by the vice-president; but this matter is left for the Association to decide. One thing I have decided upon is, that I retire from the presidency; but it is with great pleasure at having held the office, and I have to thank the Association for the great courtesy which they have extended to me in endeavouring to carry out the work for this year. As you know, the directors meet in Ottawa frequently. It is not possible to have the meetings of the directors through the different provinces, but there are so many of them who live there, that they meet more frequently than it would be possible for them to do, were the directors' meetings held in different cities and towns. While saying that I would wish to drop out from the presidency, I have no desire, and will not, unless I am voted out, drop out of the work. I wish to remain as a director simply, if the Association will allow. The Association will now decide where and when we will have the annual meeting next year.

Mr. STAIRS.—As an humble newspaper man from the Maritime Provinces, I wish to state that I would have liked very much to have had Dr. MacKay, the Superin-

ent of Education, who is very much interested, or the Premier, or Dr. Longley with us at this meeting, or Mr. Dickie and other practical lumbermen. As I have said, I am not a lumberman and not a forester, but I hope some time to have a bigger representation of Nova Scotia men at the meeting.

Mr. SOUTHWORTH.—I might say, Mr. President, that we had letters of regret from both Dr. MacKay and Dr. Longley, and Dr. Longley said he had thought of coming to the Association meeting, but legislative matters made it impossible to attend.

Mr. JOLY DE LOTBINIÈRE.—I would like to suggest Quebec as the place where we might have our next annual general meeting. Quebec and Ontario, as we know, are two of the great timber-producing provinces in this part of the world, and I think we could have a most interesting meeting in the city of Quebec, because it is a city of lumbering interests, and most of our large lumbermen are resident there, and I am positive that these gentlemen will all take a real active interest in the matter and help make it a great success. And further than that, I think it will have no difficulty in enlisting the Government's sympathy in this meeting. I am sure the Government will act in the same generous way that the Government of Ontario have acted this time; that they will put at our disposal whatever rooms and space we need in the Government buildings, and, apart from these considerations, I think that if you will agree to come to Quebec, you will find a very, very warm and enthusiastic welcome there.

Mr. SOUTHWORTH.—I would just like the honour of moving that the invitation extended on behalf of the Province of Quebec, by Mr. Joly, be accepted by the Association, and that the next annual meeting be held in the city of Quebec.

Mr. MACOUN.—I have the honour of seconding the motion.

Motion agreed to.

The CHAIRMAN.—Then as to the dates.

Mr. CAMPBELL.—The date is fixed for the second Thursday in March. I might say in connection with the resolution we have here in regard to railways—we have quite a general resolution—that the Ontario Government have been building a railway through forest land and are doing it without any danger to the forests. I was going to ask if Mr. White would give us some information as to how they are proceeding.

Mr. WHITE.—I will not take two minutes to tell you. Of course when the Government undertook to construct the railway the first thing that occurred to us, it being through a forest country, was that we should protect the forest wealth. When the contract was let we called upon the Timiscaming and Northern Ontario Railway Commission and we suggested to them that we should put a staff of fire-rangers upon that road and that they should bear half the expense, and that it should be well understood that if a fire broke out, or the forest seemed to be in danger, the whole staff of the railway and all the employees and contractors, and everybody that had to do with the railway should be at the disposal of the fire-rangers in charge, so that every effort might be made to suppress a fire if it occurred. Then we placed two rangers six miles

apart all along the line. One of these walks six miles south each day, and the other six miles north until they meet, returning the same day. The rangers on either side of them are thus in constant touch every day, and there is the closest supervision. I will not undertake to say there were no fires there, but I will say this: that every fire that occurred was suppressed, and we did not lose five cents worth of timber.

The election of officers resulted as follows:—

Patron, His Excellency the Governor General; Honorary President, Wm. Little; President, Aubrey White; Vice-President, E. G. Joly de Lotbinière; Secretary, R. H. Campbell; Treasurer, Norman M. Ross; Board of Directors, J. R. Booth, John Bertram, Dr. Wm. Saunders, Prof. John Macoun, Hiram Robinson, Thos. Southworth, E. Stewart, H. M. Price.

In making the nomination of the Secretary, Mr. Stewart went on to make the following interesting statement: I have taken the greatest interest in this Association and, without any egotism at all, I think I know something about its birth. I was coming up from Washington after attending one of the meetings of the American Association, and I think the idea, as far as I was concerned, originated in smoke. I was having a smoke in the smoking compartment of the car and thinking of what we had done and the advantages of the American Association, and it dawned on me all at once that the time was ripe for a Canadian Forestry Association. And when I came back to Ottawa I called a few gentlemen together and His Honour the present Lieutenant Governor of British Columbia (Sir Henri Joly) was one of the foremost, and Mr. Little came up from Montreal, and Mr. Bertram, if he was not at the first meeting, came up shortly after, and as soon as I saw this I was confident that the formation of the Association was timely, and the success of the Association shows that we probably chose the right time to inaugurate it.

Mr. CAMPBELL.—Before closing, we ought to express in some formal way our thanks to those who have been so kind in assisting us in the meeting. And I think that one class of people who have helped both in the past and at the present time to make the meeting a success and to bring the work before the public have been the members of the press. We have always received great courtesy from them and they have always reported our meetings well. We are greatly indebted to them and I would therefore move that the thanks of the meeting be tendered the press for their efforts in this way.

Mr. LITTLE seconded.

Motion agreed to.

Mr. BERTRAM.—Not only is that so, but we have been met with the greatest courtesy by every member of the press. Some years ago, when the matter was newer than it is now, and I had leisure time, I occasionally wrote different newspaper articles on forestry, and I never in my life had one refused. They were always freely taken, and the editors seemed to want that kind of literature. And I would only say, that if those interested in forestry would only take the trouble to write out anything that struck them that would be of interest to the press, the press would publish the articles,

I am sure. I do not say this in a perfunctory way at all. I feel very strongly in the matter, and certainly the press is entitled to our very best thanks for their courtesy.

Mr. STEWART.—Mr. President, I have very great pleasure in moving another vote of thanks, and that is to the railway companies of the country for their very great kindness in granting us what, I think, are exceptional privileges. Shortly after this Association was formed, I took occasion to go to Montreal and saw some of the leading railway men and told them we were expecting to get a good meeting at Ottawa, and would expect them to do something for us. They asked me what I wanted. I said: You might cut your rates in two. They said all right. I said: I cannot guarantee you that any certain number will be present. Will you give us free return, irrespective of numbers? This they did. This year, the Canadian Pacific and the Canadian Northern, both, have not only given us this rate in the Eastern Provinces, but as far west as the Rocky Mountains and the Territories. So I have very great pleasure indeed in moving a vote of thanks to the railway companies of Canada who have favoured us in this regard.

Mr. BERTRAM seconded.

Motion agreed to.

Mr. MACOUN.—Mr. President, I think we must not separate without thanking the proper official of the Ontario Government for the not only very comfortable, but bright and cheerful, room in which we have had the pleasure of holding our meetings. It is one thing to give us the use of a room, but it is another thing to give us the use of a room like this.

Mr. BERTRAM.—Don't you rather think that virtue is its own reward in that case? (Laughter.)

Mr. STEWART seconded.

Motion agreed to.

Mr. BERTRAM.—I want to propose a vote of thanks to our retiring President. (Hear, hear, and applause.) I do not think that anybody could have more genially and ably and affably filled the chair than has Mr. Hiram Robinson, our President. I am certainly a believer in the offices in an institution of this kind going around. I do not believe in having the same man year after year, and I think the same with the directors. I would have insisted on going off the Board, owing to the difficulty in getting down to meetings, but I look forward with pleasure to the meeting next year in Quebec and to see our fellow-lumbermen there. Mr. Robinson has been an exceptionally affable President, and we have enjoyed ourselves in this meeting largely, I think, on account of his able presidency, and I would ask you all to join me unanimously in giving a vote of thanks to our President, Mr. Robinson.

At this juncture Mr. White, the newly-elected President took the chair.

Mr. WHITE.—Has the resolution been seconded?

Mr. LITTLE.—I have great pleasure in seconding the motion.

Mr. WHITE.—It has been moved by Mr. Bertram and seconded by Mr. Little, that the thanks of this Association be tendered to Mr. Hiram Robinson for the able and courteous manner in which he has presided over this Association during the past year. I need not add anything to what Mr. Bertram has said. We have all found Mr. Robinson to be kind and courteous and genial, and withal having a thorough grasp of the business with which we are connected. I, therefore, put the resolution.

Resolution adopted.

Mr. WHITE.—I have very much pleasure, sir, in tendering you the thanks of the Association for your ability and courtesy in the discharge of your duties as President.

Mr. ROBINSON.—I thank the mover and seconder and the Association for this vote. I am sure I appreciate it with all my heart. It has given me the greatest pleasure perhaps of my life to preside over this Association for one year, and while, as I said before retiring, I do it with the greatest pleasure, because I believe in rotation of office (and I have no doubt but that position will be very ably filled by Mr. White), and while I retire from the presidency quite willingly, I do not retire from the work. My heart is in the work; my heart is in forestry, and I shall, as far as I can, even if I were not a member or a director, do all I can to forward the interest of this great Association in connection with our great country. For we have a great country, a country that abounds not only in timber, but in minerals, and fisheries, and furs, and lands—a country that, to my mind, will become one of the greatest countries in North America, if not in all the world. And I wish I could live long enough to see more of it. It is just beginning to develop, and I am sure our Association will do its part in helping it to go forward, not only to increase the number of trees and reforest, but to protect and give a chance to the trees that we have. That is, I consider, a most important thing. Allow nature to help it along as far as we can. Allow nature to do its work. While we are asleep, the trees are growing, and in the growth of trees there is money. I feel very much gratified at the result of this meeting in Toronto, and I have no doubt we will have a similar meeting, or as good a one, in Quebec. If we do not, it will not be for want of trying on the part of Mr. Joly. I thank you, gentlemen, for this very kind vote of thanks.

Mr. CAMPBELL.—I think we ought to thank the gentlemen who very kindly prepared papers for presentation at this meeting. They have given a great deal of time and thought to the preparation of papers, and the success of our meeting has largely depended on this work. I move that the thanks of this Association be tendered those who prepared papers to be read at this meeting.

Mr. STEWART seconded.

Motion agreed to.

Mr. LITTLE.—Those who have been members and officers in the Association feel, as I would do or any one else who has been here, very reluctant not to be able to attend the meetings of the directors, and it occurred to me that something might be done to enable them to fall gracefully into a position in which they might be able to render some service, and that a change in our constitution that would allow all who have

been members of the Association, *ipso facto* to be directors. These people know the movements that have gone on, and the fact of being elected to the position would show that they have the good-will of the Association.

Mr. WHITE.—Mr. Little, I do not think that it is competent for us to do that at this meeting. It would be competent for us to take the matter up and deal with it at the next meeting of the Association, but we cannot do it now. I think it would be a good idea to have all those who have acted as officers remain directors.

Mr. STEWART.—Mr. President, that is an excellent suggestion, and I think it can be done next year.

Mr. BERTRAM.—I am sorry to disagree with my eminent friends here. I do not think it would work at all. I am a strong believer in young men, and if we are to be overloaded—and I say it with all respect—with us old folks, I think it would be rather a detriment. We want the young fellows to push the work on, and I hope they will be encouraged.

Mr. WHITE.—I hope Mr. Bertram will speak for himself, when he speaks of old folks. I profess to be just as much a boy as ever I was. (Laughter.) We cannot deal with the matter at present, anyhow. If there is no further business before the meeting, I declare it adjourned, to meet at Quebec next year.

At a subsequent meeting of the Board of Directors, the following Vice-Presidents were elected:—Prince Edward Island, Rev. A. E. Burke; Nova Scotia, Hon. J. W. Longley; New Brunswick, His Honour J. B. Snowball, Lieutenant-Governor; Quebec, Hon. S. N. Parent; Ontario, Hon. E. J. Davis; Manitoba, Major Stewart Mulvey; Keewatin, His Honour the Lieutenant-Governor of Manitoba; Assiniboia, His Honour A. E. Forget, Lieutenant-Governor; Alberta, Wm. Pearce; Athabasca, F. D. Wilson; British Columbia, Hewitt Bostock.

THE BANQUET.

A pleasant feature of the meeting of the Association in Toronto was the entertainment of the visitors to dinner at the King Edward Hotel on the evening of Thursday, March 10, by the local members. At the request of the President, who, though present, was slightly indisposed, Mr. Aubrey White assumed the duties of Chairman and discharged the same in a manner that added greatly to the evening's enjoyment.

The toast list included the following:—

THE KING.

“Canada”—J. W. St. John, M.P.P.

“Our Legislators”—Valentine Stock, M.P.P., Joseph T. Clark, the “Star,” Toronto.

“Our Pioneers; the Lumberman and the Settler”—John Bertram, Hon. John Dryden.

“The Forester; the Farmer whose Crops are Trees”—Professor Roth, Ann Arbor, Mich.

“Our Education Institutions”—G. Y. Chown, Queen's University; Professor Ramsay Wright, Toronto University.

“The Press”—Mr. William Houston, the “Globe,” and Mr. John A. Cooper, “Canadian Magazine.”

In response to the toast of "Canada," Mr. St. John, M.P.P., said there were three possibilities ahead of Canada—annexation, independence, and unity with the Empire—but only one probability, which was that so long as the Union Jack floated over the Empire, Canada would be a part of that Empire, and no inconsiderable part either. As years rolled on they would, heart to heart and man to man, be knitted closer and closer together by that Imperial tie. He referred to the statement of the possibilities of timber production in Ontario as recently made by Mr. Southworth, and advocated the cutting of only the increment of growth and the saving of the wood capital.

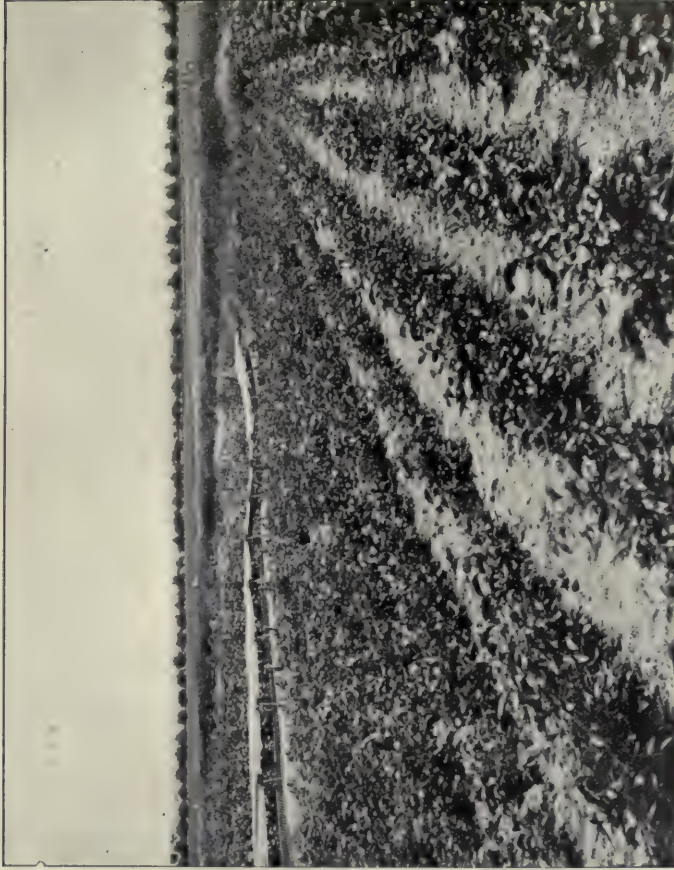
Mr. Stock, M.P.P., in replying to the toast of "Our Legislators," paid tribute to those leaders of thought and research who were just a little in advance of the masses of the people, those who pointed the way and educated their fellows, finally earning their gratitude. In that class he placed the foresters assembled around the table. Their greater foresight warned them that the denudation of forest areas that had taken place in Ontario contained a great element of injury to the country and they should strongly impress their views upon the legislators who have it in their power to pass laws which would aid the work both educationally and financially and help spread the knowledge so essential to the conservation of the forests of the land.

Mr. Bertram, in speaking to the toast, "Our Pioneers; the Lumberman and the Settler," said that last century was for the United States; this century was for Canada, and forward they would go. They could grow grain; they had immense natural advantages in manufacturing and shipping; and they had unlimited forests. He was proud to say that in his own occupation he was a forester, not a lumberman, because he proposed only to cut from year to year the accretion to the forest over which he had the right to cut. He urged that it was the first duty of the lumberman to save his small timber, to hold on to it as if it were gold itself—and it was more than gold.

Hon. John Dryden, Minister of Agriculture, in responding to the same toast, dealt more particularly with the settlers' point of view. Speaking nationally he said we were just in the beginning of things in Canada, and it would be better for Canadians if they had a little more of the spirit of the early pioneers who worked not for themselves, but for their children. With a little of that spirit the Forestry Association would move along very rapidly indeed. With reference to the Agricultural College at Guelph, he said his ambition was not alone to have a farm at the college, but to do something in various parts of the province, so that the lessons to be learned would be before the people all the time. He would not have the Government do everything, but would try to induce the people to do things for themselves.

Professor Roth, in a most interesting address, sketched the history of the development of Forestry in Germany from the beginnings in the hunting forest to the highly specialized and scientific methods of the present day.

The speeches of the evening were all in the happiest vein and the function was most enjoyable.



FOREST_NURSERY AT INDIAN HEAD EXPERIMENTAL FARM, SHOWING PROTECTION
TO BEDS OF CONIFERS. [p. 112]

FOREST FIRES OF 1903.

(Prepared by instruction of the Canadian Forestry Association.)

The year 1903 was remarkable for the long dry period of the spring and early summer and as a consequence the forest fires were numerous. This condition prevailed to a greater or less extent over the whole of Canada and a large part of the United States, and timber lands suffered severely on both sides of the international boundary. In Canada the smoke became so dense as to invade the cities and at times to interfere with navigation on the St. Lawrence river and the lower lakes. The destruction of timber was considerable though where a properly organized staff of forest rangers were employed it is remarkable that the loss was so small in view of the great number of fires that took place. Fires occurred most frequently and persistently in settled districts and the losses to farmers were in many cases severe. It would seem that experiences of this nature have little effect on the actions of the general community, and more energetic steps should be taken to educate the public to a proper sense of the dangers which such periods of drought occasion. If public opinion were properly aroused in such districts and an effective plan of organization worked out through the municipalities or otherwise the careless man would not be allowed the opportunity of endangering his own property and that of others at seasons when, as was the case last spring, the placing out of fires was simply an invitation to destruction. The fire-ranging system for the timber districts is a success, but for the debatable land where settlements and the woods come into contact there is yet room both for legislative and educational effort before the situation is adequately dealt with, and the question is deserving of serious study.

NOVA SCOTIA.

The Province of Nova Scotia suffered severely during the year 1903, and it is not to be wondered at that the movement for an organized system of protection grew so strong that it could not be satisfied until definite action was taken. The fires occurred mainly during the dry spell in the spring and early summer. The reports as to the extent and amount of the damage done vary greatly, owing to the fact that in most cases only a cursory survey of the burned areas was made. After considering all reports and making necessary allowances, a general estimate is reached that at least 200,000 acres of forest land have been more or less injured by forest fires during the year 1903, the total value of the present loss being placed at \$2,000,000, with the prospective loss incapable of estimation. This estimate as to area is certainly conservative, and it might perhaps be placed at a figure nearer 300,000 acres, but after making such deductions as may be necessary for lands that did not carry timber of value, the amount stated as the loss in value may be taken as approximately correct.

The western part of the province had many severe fires. In the county of Yarmouth 50,000 acres is estimated for the burned area, in Shelburne 15,000 acres, in Digby and Annapolis 50,000 acres, in Queen's and West Lunenburg 30,000 acres, in East Lunenburg 12,000 acres, and in King's 25,000 acres. This constitutes one of the chief lumbering districts of Nova Scotia and the loss to the lumbermen has been serious. At a meeting of the lumbermen of this district held at Annapolis Royal on December 3, 1903, the question was thoroughly discussed, and it was decided that legislative action to combat the serious situation that threatened the lumber industry should be asked. The causes of fire were given as the burning of blueberry lands, meadows and cattle ranges, fires of river drivers and hunters. One person gave the loss in Digby and Annapolis counties as \$100,000, and went on to say:—

'The prospective loss can scarcely be estimated as much of the land over which his fire travelled was burned so deeply as to destroy all the seeds that were in the soil; indeed in many places the soil itself was burned so that nothing is left to support vegetation until a new soil has been formed. This will take many years.'

Other statements are as follows:—

'The loss to Western Nova Scotia will, I think, reach over one million dollars, and the loss will be doubled every twenty years for the next hundred years, when the country may recover a new forest, if it has not been burned again in all that time. The origin of most of the fires of the district are attributable to the railway engineers, as they are certain to burn forest country in a dry season, as can be seen on any road in British America, where nine-tenths of the bordering lands are burned if timbered with spruce or fir wood.'

'The fire destroyed to a certain extent all kinds of game and killed large numbers of small trout. Our fish and game will likely become a thing of the past if the fires continue as they have done in 1902-1903.'

'Every log that comes down the river in the spring will be burnt timber. The loss in dollars is too much for me to estimate.'

In Hants and Halifax counties the losses are smaller, but for Colchester, Pictou and Guysborough an estimate of 20,000 acres is given, with a value, present and prospective, of \$250,000. Cumberland county was one of the greatest sufferers, the burned area being estimated by different persons at from 50,000 to 100,000 acres, with a loss of half a million or more.

Here are a few samples of the statements in the reports from the latter county:—

'Last spring we experienced the most disastrous year for forest fires that the writer in his whole lifetime has ever experienced. Millions of dollars worth of property in our forest has been destroyed and legislation to prevent such another disaster is surely now in order.'

'We have had in Cumberland county during the present year more forest fires than in any previous year that I can remember. * * * The worst of these fires were started from portable mills, in most cases though gross carelessness of parties operating the same.'

The excitement of the occasion may be sufficient excuse for the somewhat Hibernian statement made by one person that no person living on earth to-day will have an opportunity to cut a green tree on this territory for 75 or even 100 years.

The seriousness of the situation led to the introduction of a measure in the Legislature by the Government to provide an organization by means of a staff of county fire wardens for enforcing the provisions of the Fire Act. This Act improves in some respects the restrictions of the Fire Act, but its chief feature is the provision that the Governor in Council may appoint a chief forest-ranger for any municipality in the province, whose duty it shall be to take all suitable measures for carrying into effect the provisions of the Act. The duties of the office are further enumerated as to periodically travel over all woodlands in the municipality, whether belonging to the Crown or private owners or under lease from the Crown, to appoint other persons to act as rangers under his direction, to institute proceedings against offenders, to trace the origin of every woods fire, to post fire notices, and to make a full annual report on fires. Holders of one thousand acres or more of timber or uncultivated land in any municipality where a ranger has been appointed may be assessed for an additional amount equal to three-eighths of one cent per acre, thus providing a revenue to be applied towards defraying the expenses of the service.

This is an important forward step and the basis of future development for as one Nova Scotia lumberman stated 'After fires are stopped forestry (i.e., reforestation) will be a live subject and after having given considerable thought and study to it I have no hesitation in saying that I think it can easily be made successful and profitable. But fires must be stopped first.'

NEW BRUNSWICK.

In New Brunswick the counties of Madawaska, Victoria and Carleton on the upper St. John escaped fairly well, there being some comparatively small fires without destruction of property. The two former counties are large producers of lumber and the latter mainly an agricultural country. The Tobique river, the cut on which is 25,000,000 feet per annum, lies mainly in Victoria county. For the northern county of Restigouche no fires were reported. In the counties on the St. Lawrence gulf, namely, Gloucester, Northumberland, Kent and Westmoreland, considerable damage was done, the loss in the first and third of these being placed at 2,000,000 feet respectively. In Kent there were extensive fires, but as they were generally where fire had swept the country before the loss was potential rather than present, and therefore could not be estimated. On the Bay of Fundy, in the county of Albert and the eastern part of St. John the estimate of the timber destroyed is 80,000,000 feet, two-thirds of which would be from private lands. The western part of St. John county suffered seriously, particularly in the vicinity of the village of Musquash, which was literally destroyed causing a loss which was estimated at \$100,000. In this and the neighbouring county of Charlotte, although fires covered a considerable area, there is no means of making an estimate. Of the counties on the lower St. John, King's reported no fires of any great extent, but in Queen's and Sunbury large fires occurred. There is little doubt that in these two counties the loss of timber would reach over 100,000,000 feet, 30 or 35 millions being on Crown lands. Large fires also occurred in York county, but nearly all on private lands. Heavy losses occurred in lumber, fences and buildings, but the reports received do not give sufficient data for an estimate. To summarize, 184,000,000 feet of timber were destroyed, one village was wiped out of existence and large losses in private property occurred, besides the potential value of the lands which, already a brulé, have been put still further away from the possibility of productivity.

ONTARIO.

In the province of Ontario similar conditions prevailed in the early summer, and numerous fires were started some of which were not extinguished until the rains came. The largest area reported by the rangers for any one fire was ten square miles, but it was apparently not in good timber, and the largest number of pine trees mentioned as destroyed was 3,000 to 4,000. Nearly one hundred fires were reported by the fire-rangers, but most were extinguished before reaching valuable timber or were not in its vicinity. There were some destructive fires in the more settled districts. In the counties of Prescott and Russell, particularly in the vicinity of Casselman, the loss in farm buildings and wood was estimated at \$10,000. In the northern part of the county of Frontenac fires, reported to be started by farmers clearing land, got beyond control and destroyed some cordwood and lumber, several farms with their buildings, two large bridges, and the village of Vennochar in the county of Addington adjoining was almost completely wiped out of existence. This fire began on April 30, and ran as a ground fire into the Eastern Timber Reserve, but owing to previous fires before the present crop of timber started to grow there was very little debris on the ground and the fire consequently did very little damage to the growing timber. It is expected that most of the trees in the section where it ran along will survive.

Two hundred and seventy fire rangers were employed during the year, twenty-six of whom were on Crown lands, and the cost of the service was \$31,237. The report of the Crown Lands Department states that the most exposed area of Crown lands was along the line of the construction of the Temiskaming Railway and there the supervision was very close and every possible precaution was taken. The department entered into arrangements with the Temiskaming Railway Commission by which it was agreed that in the event of fire occurring all the employees of the commission and the contractors, sub-contractors and others were bound to turn out and assist the fire-

rangers in suppressing it. The Railway Commission agreed to bear half the wages and expenses of the rangers, cost of suppressing fire, &c. Some fires occurred along the line of construction, but owing to the close supervision which existed assistance was called out and they were extinguished without doing any serious damage. As a result of the active assistance rendered by the Railway Commission and the careful supervision of the fire-rangers on duty no damage worth mentioning occurred although the railway was being actively constructed during the whole of the summer.

QUEBEC.

In Fire District No. 1, including the tract lying west of the Gatineau river, there was no rain up to June 20 in the eastern part, and little elsewhere although in the far northern part of the district there were occasional showers before that date. In spite of these serious conditions there was only one fire that was at all extensive. This occurred between Black river and the Coulonge, and is believed to have started through the negligence of a gang of drivers who did not properly extinguish their camp fire. As there were eighteen fire accounts it means that there were that number of fires of sufficient importance to cause some expenditure to fight them beyond the regular salaries of rangers. This additional cost was \$2,989.60, and to any one who knows the value of the Upper Ottawa timber limits it is infinitesimal compared with the value of the interests which have evidently been well protected through one of the most trying seasons that the forests have experienced.

In Fire District No. 2, east of the Gatineau river, there were numerous fires, for the timber limits here come in contact with settlement, and considerable damage was done, but as most of the reports are naturally indefinite it is impossible to state fully what the loss was. From the Gatineau river on the west to the St. Maurice and Batiscan on the east, fires of greater or less extent occurred almost everywhere through the dry season of May and June. Near the Gatineau in May a fire traversed 100 square miles, destroying seventy to eighty thousand pine sawlogs of an average diameter of nine inches, besides a thick growth of young white pine. On the Lievre river thirty to thirty-five square miles were burnt over, on the Rouge river fifty square miles with 500,000 logs, on Lac Ouareau and Assomption rivers the losses were large but not estimated, on the Maskinonge and Upper Mattawin probably twelve square miles, with 66,000 logs of spruce and balsam valued at fifty cents each. On the St. Maurice many miles of green bush were burnt, and also on the Batiscan where two camps and a village with its sawmill were destroyed. On the Batiscan and Lake Edward one report gives forty to fifty square miles burnt over.

The superintendent for this fire district states that all bush fires, so far, are traced up to the settlers clearing land, and as the losses in his district were all from fires in May and the early part of June, urges that the period for which fires to clear land may not be set out be extended so as to date from May 1 to September 15. There were twenty-three fire-rangers employed in this district.

The cost of the service for the protection of the forests against fire was in the fiscal year 1902-1903, \$17,000.

MANITOBA.

In Manitoba the same conditions prevailed as in Eastern Canada, namely, a dry spring, but the drought was broken earlier, the reports showing that rain fell about the middle of May. On the west side of Lake Winnipeg a fire started on May 12, in the north-east corner of township 6, range 3, east of the 1st Meridian, and went in a northerly direction. Six settlers lost their buildings and property. Most of the timber in the district is small. Rain fell on May 17. There were other smaller fires in this vicinity with little loss.

In the Riding Mountain district there were several serious fires in the spring. Five settlers lost their effects. The fire ran mostly in dry timber, but 10,000 feet and about a section of green timber were reported as destroyed.

The Turtle Mountain reserve was unfortunate. The staff were kept on the alert watching incipient fires and were keeping them in control, but on May 14 a fire from south of the international boundary, which had received a good start, driven by a gale, swept irresistibly across the reserve in range 19. Later investigation showed that it did little damage to the large timber, but that the small timber was killed.

NORTH-WEST TERRITORIES.

At least twelve fires were reported by the fire-rangers in the vicinity of Moose Mountain reserve, in Assiniboia. For most of these the railway is responsible, but one was started by a farmer burning rubbish. The only result was the destruction of the prairie grass, but it was with difficulty that the fire was kept out of the reserve in such cases.

BRITISH COLUMBIA.

In the railway belt, although the season was dry, the fires were kept well under control. Not more than half a dozen fires were reported and none of them caused much damage. The most important noted was one on the Arrowhead branch which covered an area of about one square mile of timber, principally cedar. There were twenty-two fire-rangers employed under the Dominion Forestry Branch, eight of whom were located in the railway belt in British Columbia.

The reports from other parts of the province are nearly all to the effect that owing to the damp season no forest fires occurred. A few small fires occurred in some places, but the only one of importance was in the Atlin district. This is stated to have done considerable damage to timber, but it burnt itself out without occasioning any other loss. The causes given are prospectors' fires and Indians burning lands for the purpose of improving wild berries, but one report states that prospectors and miners are as a rule careful in extinguishing their fires and the Indians are becoming more so. From Clinton the following statement was received: 'The season throughout has been too wet since the end of last June for fire to spread. This is the first time in my experience for thirty-six years here that a report of this kind can be made. In the decade ending 1869, and also in the early seventies, aided by rainless summers, there were a very great number of extensive and disastrous fires which cleared off a lot of timber. I notice, however, that the scene of every one of these fires is again clothed with a dense growth of the various members of the pines family, and infer that there is not the slightest danger of this province ever becoming entirely denuded of a timber growth.'

R. H. CAMPBELL, Treasurer, in account with the Canadian Forestry Association.

	\$ cts.		\$ cts.
1903.—Balance from 1902..	106 15	Travelling expenses.....	9 85
Membership fees.....	507 85	Reporting annual meeting.....	83 70
Grant from Province of Ontario	300 00	Expenses of Dr. E. C. Jeffery.....	37 50
Grant from Province of British		Advertising.....	23 50
Columbia.....	200 00	Rent of stereopticon and other ex-	
Interest.....	4 96	penses of annual meeting.....	20 50
		Printing.....	20 75
		Salaries.....	200 00
		Balance.....	723 16
	1,118 96		1,118 96

Examined and found correct.

GEORGE JOHNSON, } *Auditors.*
 JAMES M. MACOUN, }



BOAT-HOUSE AT RIVER CACHÉ, LAURENTIDES PARK, QUEBEC.

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Ami, H. M., M.A., D.Sc., F.G.S., F.G.S.A.	Ottawa, Ont.
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Alexander, P.	Regina, Assa.
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Angus, A. F.	Manager, Bank of Montreal, Regina, Assa.
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Bertram, John.	9 Walmer Road, Toronto, Ont.
Bell, Jas. A.	St. Thomas, Ont.
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Baird, Thos.	Crystal City, Man.
Brown, Alex.	Glenora, Man.
Beavis, H. J.	Crystal City, Man.
Burke, Rev. A. E.	Alberton, P.E.I.
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Blackmore, Wm.	Cardston, Alta.
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Biggan, E. B.	Pulp and Paper Magazine, 18 Court St., Toronto, Ont.
Brown, H.	Secretary-Treasurer, Montreal Lumber Co., Montreal, P.Q.
Bosshart, Otto	Care of F. G. Todd, Landscape Architect, Montreal, P.Q.
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Costigan, Hon. John.	Ottawa, Ont.
Creighton, Graham, Education Office.	Halifax, N.S.
Conant, Thos.	Oshawa, Ont.
Cochrane, W. F.	Macleod, Alta.

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Campbell, F. J., Care of Canada Paper Company.	Windsor Mills, P.Q.
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Commerce, Manager of the Bank of.	Barrie, Ont.
" " "	Belleville, Ont.
" " "	Collingwood, Ont.
" " "	Warton, Ont.
" " "	Peterborough, Ont.
" " "	Sault Ste. Marie, Ont.
" " "	Cranbrook, B.C.
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REPORT

OF THE

SIXTH ANNUAL MEETING

OF THE

CANADIAN FORESTRY ASSOCIATION

HELD AT

QUEBEC, MARCH 9 and 10, 1905



OTTAWA
GOVERNMENT PRINTING BUREAU
1905

CANADIAN FORESTRY ASSOCIATION

OFFICERS

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HIS EXCELLENCY THE GOVERNOR GENERAL.

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<i>New Brunswick</i> .—His Honour J. B. Snowball, Lieut.-Governor, Chatham.	<i>Alberta</i> .—William Pearce, Calgary.
<i>Nova Scotia</i> .—Hon. J. W. Longley, Halifax.	<i>Athabaska</i> .—F. D. Wilson, Ft. Vermilion.
<i>Prince Edward Island</i> .—Rev. A. E. Burke, Alberton.	<i>British Columbia</i> .—Hon. H. Bostock, Monte Creek.
<i>Manitoba</i> .—Hon. J. H. Agnew, Winnipeg.	<i>Yukon</i> .—The Commissioner, Dawson.
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Managing Editor, R. H. Campbell.

NOTICES

CANADIAN FORESTRY CONVENTION.

A Canadian Forestry Convention has been called by the Right Honourable Sir Wilfrid Laurier, Premier of the Dominion, to meet in Ottawa, on the 10th 11th and 12th January, 1906, to discuss the forests and forest conditions in Canada. All interested in forestry are invited to be present.

CANADIAN FORESTRY ASSOCIATION.

The objects of the Canadian Forestry Association are:

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-forestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the association your membership is earnestly solicited.

The annual dues are \$1. The life membership fee is \$10.

Applications for membership should be addressed to the Secretary,

R. H. CAMPBELL,

Ottawa, Ont.

SIXTH ANNUAL MEETING

OF THE

CANADIAN FORESTRY ASSOCIATION

The Sixth Annual Meeting of the Canadian Forestry Association was held in the Council Chamber of the City Hall, Quebec, on Thursday and Friday, March 9 and 10, 1905.

Among those present at the sessions were: Aubrey White, Assistant Commissioner of Crown Lands, Dr. Judson F. Clark, W. H. F. Addison, E. B. Biggar, editor *Pulp and Paper Magazine*; H. R. Muir, *Canada Lumberman*, Toronto; Hon. H. Bostock, F. W. Jones, R. Jardine, Jas. Leamy, of British Columbia; E. Stewart, Dominion Superintendent of Forestry, Dr. Robert Bell, Director of the Geological Survey, Gordon C. Edwards, Norman M. Ross, Roland D. Craig, H. C. Wallin, R. H. Campbell, Ottawa; E. G. Joly de Lotbiniere, H. M. Price, W. C. J. Hall, Monsignor Laflamme, Hon. P. E. Leblanc, Hon. R. Turner, E. Baillarge, J. C. Lange-lier, Revd. T. W. Fyles, H. O'Sullivan, W. F. V. Atkinson, J. Champoux, C. Lampson, J. S. Scott, E. M. Nicholson, E. E. Taché, Deputy Commissioner of Crown Lands, and others, Quebec; Wm. Little, Hon. Recorder Weir, Douglas Weir, Thos. Walklate, Montreal; J. T. Bertrand, Isle Verte; Col. T. G. Loggie, Fredericton; A. E. Alexander, Campbellton; E. J. Zavitz, Ontario Agricultural College; Professor Filibert Roth, University of Michigan; Dr. C. A. Schenk, Biltmore, N.C.; A. Knechtel, L. S. Emmons, Albany, N.Y.; Angus McLean, Buffalo; W. G. Power, St. Pacome; S. P. Grogan, Batiscan; Mossom M. Boyd, Bobcaygeon; G. S. Wilgress, Huntsville; S. W. Farnham, Martinville; Jos. M. Dalton, Three Rivers; Hiram A. Calvin, Kingston.

The meeting was called to order at 10.45 by the chairman, Mr. Aubrey White.

The secretary read the minutes of the last annual meeting, which were adopted.

A telegram from Mr. Hiram Robinson, expressing regret at being unable to attend, and wishing the association a successful meeting, was read by the secretary. A communication from Mr. T. M. Robinson, Gravenhurst, was also submitted, calling particular attention to the necessity for doing something to reforest the denuded tracts of the Muskoka district, and districts of that nature, where farming was mingled with the forests, and had resulted in their destruction without any effort to replace them; and also one from Mr. F. W. Godsall, of Alberta, stating that the fires had been serious in the west during 1904, and asking that the attention of the association be called to the fact in order that some action might be taken. A letter from Prince Colleredo Mannsfeld, of Austria, was also submitted, in which he expressed

his regret at not being able to be present, and extended a warm welcome to any members of the association visiting Austria.

REPORT OF THE BOARD OF DIRECTORS.

The report of the board of directors was read by the secretary as follows:—

The board of directors of the Canadian Forestry Association beg to submit their report for the year 1904-05.

The report of the last annual meeting was published at the Government Printing Bureau through the kindness and at the expense of the Forestry branch of the Department of the Interior. This report has been distributed as usual to the members of the association, members of the legislative bodies throughout the Dominion, the press and others. The annual report places the proceedings and deliberations in a permanent form, and makes them available for reference and study. The report for the past year is well up to the character of previous reports, both in material and illustrations, and the thanks of the association are due to the Dominion Superintendent of Forestry for so kindly arranging to carry what would have otherwise been a necessary but heavy expense to the association.

The following were appointed as vice-presidents for the year: Ontario, Hon. E. J. Davis; Quebec, Hon. S. N. Parent; New Brunswick, His Honour J. B. Snowball, Lieutenant-Governor; Nova Scotia, Hon. J. W. Longley; Prince Edward Island, Rev. A. E. Burke; Manitoba, Major Stewart Mulvey; Assiniboia, His Honour A. E. Forget, Lieutenant-Governor of the North-west Territories; Alberta, Wm. Pearce, Calgary; Athabasca, F. D. Wilson, Fort Vermilion; British Columbia, Hon. Hewitt Bosstick; Keewatin, the Lieutenant-Governor of Manitoba.

During the year the association has lost some of its most active members by death. Mr. John Bertram, a member of the board, and one of the strongest supporters of the association, passed away after a lingering illness. He took a large and helpful part in the proceedings of the last annual meeting, and the papers he has presented to the association at different meetings have had a strong influence in the formation of public opinion on forestry and the shaping of the forest policy of Canada. As a member of the Ontario Forest Commission he did good service to his own province, and he had been called to exercise his talents in a wider sphere as chairman of the Dominion Transportation Commission. His loss will be felt through a wide circle, both in public life and among his more intimate friends. Dr. W. H. Muldrew, who was also present at the last annual meeting, died suddenly in October after only a few days' illness. As dean of the Macdonald Institute at Guelph, he was beginning the development of a work in nature study that promised much for the future interest of children in the trees and natural objects. Mr. W. C. Caldwell, M.P.P., of Lanark, and Colonel Thos. Higginson, of Vankleek Hill, both leading lumbermen, and members of the association, have also died during the year.

We are sure that all the members of the association will sympathize fully with our honoured first president. His Honour Sir Henri Joly de Lotbinière, and with our vice-president, Mr. E. G. Joly de Lotbinière, in the loss they have sustained in the past year by the death of Lady Joly de Lotbinière. The board have conveyed an expression of their sympathy to the bereaved relatives.

MEMBERSHIP.

The secretary has made a special effort during the year to increase the membership of the association by the sending out of copies of the annual report and invitations to membership in the association to persons whose names were submitted by members. The result has been fairly satisfactory, and has resulted in a considerable increase in membership. This has been somewhat discounted by a falling off in Mani-

toba and the North-west Territories. Following is a comparative statement of the membership for the past two years:—

	1904.	1905.
Nova Scotia..	14	21
New Brunswick..	14	22
Prince Edward Island..	1	3
Quebec..	98	113
Ontario..	134	187
Manitoba..	80	72
Assiniboia..	23	22
Saskatchewan..	3	4
Alberta..	60	42
British Columbia..	25	32
Newfoundland..	—	1
United States of America..	24	32
England..	2	5
Ireland..	—	1
India..	—	1
Honolulu..	—	1
Germany..	1	1
Denmark..	—	1
Austria..	—	1
	<hr/>	<hr/>
	479	562
Life members..	33	39

The receipts for last year were \$1,845.77, and the expenditure \$930.66, leaving a balance on December 31 last of \$915.11. The amount now standing to the credit of the association is \$989.75, but against this is the account for the *Forestry Journal* for January, amounting to \$150, and the expense of this meeting, about \$100. The thanks of the association are again due to the governments of the provinces of Ontario, Quebec and British Columbia for the grants given by them to the work of the association.

OFFICIAL ORGAN.

In accordance with the instructions of the last annual meeting, your board took steps to arrange for the publication of an official organ to be devoted to the interests of the association and the advancement of the forestry movement generally.

Tenders were asked from several printing firms, and it was decided to accept that of the Rolla L. Crain Printing Company, of Ottawa, being the lowest, the contract to run for one year. Dr. Wm. Saunders, Professor John Macoun and Mr. E. Stewart were appointed provisionally as an editorial committee, and Mr. R. H. Campbell as editor and business manager. The first number of the *Canadian Forestry Journal*, the name decided on for the paper, was issued in January, and has been distributed to the members of the association. The intention is to issue quarterly for the present, with the hope that the future may lead to a development that will permit a more frequent appearance of the *Journal*. The board would like to impress on the members of the association the necessity for their rendering every assistance to the editorial management to make the magazine thoroughly representative and generally useful.

The whole question of the official organ is submitted for the consideration of the association, and it is desirable to have a full expression of opinion upon it.

The publications of the association do not, however, as yet reach as wide a public as is desirable, and the question of accomplishing this purpose by the publication and distribution of bulletins, by providing material for the public press or by special means for reaching the educational institutions, might be placed in the hands of a special committee for consideration.

FOREST COMMISSIONS.

The Forestry and Colonization Commission of Quebec has submitted its report to the government of that province. This report is full, clear, and is evidently the result of a careful weighing and consideration of the evidence submitted by persons interested in all sides of the question which came under the scope of the Commission. Some of the conclusions of the Commission in general are:—

That there is no antagonism between the holders of timber licenses and real settlers or those who honestly take up public lands with the view of clearing them and not of speculating in the timber.

That the number of speculators in government lots and in timber, already very considerable, is constantly on the increase. These interlopers are the scourge of colonization, a subject of continual trouble and, on occasion, of serious losses to the license holders and the government. The extraordinarily increased value which all woods have attained within four or five years, has caused this practice to spring up in all parts of the province and the operations have assumed proportions which have become almost a menace to the legitimately conducted lumber industry.

The first measure necessary is the division of the public domain into settlement lands and merchantable timber lands. There is a great deal of land unsuited for profitable cultivation as much by the nature as by the conformation of the soil, but very richly timbered. It would, therefore, be in the interest of the province to form these lands into forest reserves.

That the system of protection against forest fires is insufficient, and requires an increase in the number and an improvement in the personnel of the fire-ranging staff. Further restrictions as to the time and methods of setting out of fires for clearing land are recommended, and the necessity for educating the people to the need for care in handling fires is urged.

The Forestry Commission of Prince Edward Island presented its report at the last session of the legislature. The commissioners state that as almost the whole of the land in that province is held by private owners, it is evident that practical forestry must in the main be dependent for its success on private effort. This private effort should be directed and encouraged in every way possible, and it is in such direction and encouragement, the commissioners consider, the government can best, and with least expense, bring about the reforestation of such parts of the province as have been unduly denuded, can assist in preserving the forests which still exist, and can incidentally do much to beautify the appearance of the island.

The commissioners recommend that experiments might be made in planting on the white sand barrens, that the planting of trees on farms should be encouraged for the protection they afford to orchards and crops, and for the supply of firewood and timber, that planting should be done along the public roads, and that, through the schools, education should be given in regard to the value and the care of trees.

FOREST FIRES.

The resolution passed at the last annual meeting recommending the prohibition of fires for clearing in the province of Quebec, except from June 15 to August 31, was transmitted to the government of that province, and that urging protection to the watersheds was sent to the different governments throughout the Dominion.

The resolution relating to the prevention of fires along lines of railway, and especially in the construction of the new Transcontinental road, was transmitted to the Dominion government and to the representatives of the railway companies. Replies were received from the Department of Railways and from the general manager of the Grand Trunk Pacific Railway, stating that the question would be given careful consideration, and steps taken in the direction indicated by the resolution. As this is a question of the utmost importance and urgency, the association may very well reaffirm its attitude thereon.

Forest fires are still causing destruction in Canada, although their extent has been largely controlled by the fire-ranging system now generally adopted through the Dominion. British Columbia has, outside of the railway belt which is protected by Dominion fire rangers, suffered the most severely, as the season was dry throughout, and that province has, unfortunately, in spite of its great forest wealth, not provided for a fire ranging force such as has proved effective in other parts of Canada. In Nova Scotia the Fire Warden Service established under the Act passed at the last session of the legislature, has proved successful in the counties in which the system was inaugurated. The report of the Crown Lands Department shows that numerous fires were prevented or extinguished in their incipiency, and the loss in many counties, large in previous years, has been reduced to a minimum.

Under Dominion jurisdiction there were forty fire rangers employed, and the result was that there was very little destruction by forest fires, except in the Crow's Nest Pass, where there was great difficulty in controlling them. The success in the railway belt in British Columbia in preventing loss was most marked, and to show how the cost of a fire-ranging service is saved over and over again in the value of the timber protected, it will be permissible to quote from a letter received by the Dominion Forestry Branch from the Columbia River Lumber Company as follows:—

'We feel satisfied that without the fire ranging system and the extra work which was done in the last six weeks, practically all the timber tributary to Shuswap lake would have been destroyed, and, as you know, this amounts to a good many hundreds of millions of feet.'

TREE PLANTING.

The tree planting scheme under Federal management in Manitoba and the North-west Territories continues to develop. During the year 1904, 1,800,000 trees were distributed to 1,027 settlers, an average to each of 1,752 trees. In 1905 the distribution will be 2,000,000 trees to 1,120 settlers. The Forestry branch has so far sent out about 5,000,000 trees and 2,000 pounds of tree seed. Educational work in this connection is being done by addresses at the meetings of farmers' institutes, and a forestry exhibit was shown at the Dominion exhibition at Winnipeg.

In Ontario a beginning has been made in the setting out of a nursery at the Ontario Agricultural College at Guelph, from which the farmers of that province may obtain supplies of forest trees for planting. Lectures on forestry will be given at farmers' institutes and gatherings of a similar nature, to explain the plans of the government, and furnish general information on the management of trees.

In view of the difficulty experienced in British Columbia through the starting of fires in the clearing of land, your board at its meeting on October 27 last passed a resolution, which was transmitted to the government of that province, suggesting that the Bush Fires Act should be amended so as to prohibit the starting of fires for the clearing of land between the first day of May and the first day of November in each year, unless a special permit for the purpose be granted by the forest ranger or other officer appointed for the district in which such permission is asked.

In the first week of January of the present year, a forest congress was held at Washington, which was attended by a number of Canadian representatives. The congress brought together some four hundred people, representing not only the scientific foresters and the forest enthusiasts, but practical and leading men in the lumber industry, in railroad management, in mining, in irrigation and manufactures, men whom the practical necessities of the case had forced to take an interest in forestry and who showed by their presence and active interest that forestry is no longer a fad but a business question of supreme national importance. The effect of this meeting on the public of the United States should be far-reaching and it is a question worthy of consideration as to whether the time has not arrived to make a special effort of a similar nature in Canada.

A committee representing your board waited upon His Excellency Earl Grey recently to ask him to be kind enough to act as patron of the Canadian Forestry Association. His Excellency received the committee most graciously, and was pleased not only to consent to give his patronage, but far exceeded their expectations by stating that he would be pleased to do anything further in his power to assist the work of the association, and suggested that, in the event of an evening meeting being held in Ottawa during the present season he would be pleased to attend, and might arrange to have it held at Government House. This kindly action of His Excellency, and the evidences of sympathy with movements affecting the well-being of the Dominion, should give him a high place in the respect and affection of Canadians, and especially of the members of the Forestry Association.

The thanks of the Forestry Association are due to the press for their interest in its work and the notice given it in their columns from time to time, to the railway companies who have again kindly granted single fare for the annual meeting, and to kindred societies from whom assistance has been received in various ways.

PRESIDENT'S ADDRESS.

The PRESIDENT.—Gentlemen, we have now finished the formal business of our meeting, and the next subject on the programme is the president's address. Circumstances over which I had no control have made it impossible for me to prepare a written address. As most of you are aware, I am a very busy man, and this must be my excuse for not coming better prepared to address you.

There are, however, some things in connection with forestry generally and the particular work of the association to which we belong as to which I would like to say a few words.

Before entering upon the business which claims our attention, I desire to congratulate myself particularly upon the fact that this meeting, over which I have the honour to preside, is being held in the ancient capital of our country. There are many reasons which make it pleasurable to hold the meeting in the old city of Quebec. Here is the birthplace of nearly every development that has made this great Dominion the important country it now is. Here is the nursery of christian missionary work, of exploration, of commercial enterprise, of parliamentary government, and of education. Apropos of education, let me say how delighted we are to have with us this morning so distinguished a churchman and scholar as Monsignor Laflamme, who is here to support the cause and take part in our deliberations. His presence is a compliment to us, and as president of this association I tender to him its thanks for the honour of his presence.

Here, too, in the old days was exhibited that martial spirit that has always distinguished the two races from which we are sprung, the Anglo-Saxon and the Gallic. These races met in the shock of battle not very far from where we are assembled, of which battle nothing now remains, thank God, except the glorious memories of the bravery of our ancestors, and the examples of the great leaders, Montcalm and Wolfe, who offered up their lives for the honour of their countries. After what I have said, it is perhaps unnecessary to add that when we, the sons of Canada, come to this ancient city, we feel that our feet are upon hallowed ground.

I must also say how greatly indebted we are to the Quebec Forestry Association for all the kindness and courtesy it has displayed, and for making such excellent arrangements for the holding of this meeting, and to the city council of Quebec I

desire to express our thanks for having placed at our disposal its beautiful council chamber.

In connection with the subject of forestry, we are at once reminded that here, during the French regime, were promulgated the first timber regulations made on the continent of America, and it is interesting to know that some of the questions and difficulties that confronted the earliest rulers of this land have persisted during all the years since, and are as live and difficult questions to-day as they were hundreds of years ago,—for instance, the question of the right of settlers to take timber for building purposes, to cut and dispose of timber required in clearing their land for cultivation. In fact we have, running through the crown timber regulations of the provinces of Quebec and Ontario like a golden thread, certain principles that were formulated hundreds of years ago, and this is a very curious as well as interesting fact.

Now, coming to the formation of forestry associations on this continent, I think the first impetus given to anything of this kind was at a meeting held in the city of Montreal in the year 1882, which was the first meeting in connection with forestry matters held in the Dominion of Canada. The good seed sown at that meeting and at the meeting of the Forestry Association held in this city in the year 1890, at which I had the pleasure of being present, has taken root and grown to proportions upon which we may fairly congratulate ourselves. A reference has been made by some of the previous speakers to the kind interest taken in our work by the present Governor General. This recalls to my mind that Lord Stanley, now Earl of Derby, when Governor General, attended the sessions of our meeting in 1890, and commended us for the important work in which we were engaged. From 1890 down to 1900 nothing was done in the direction of creating a distinctly Canadian forestry association, though the American association had come into existence and many of us were members of it. In the latter year, however, Mr. Stewart, who has done so much for forestry in Canada, took in hand the formation and organization of the Canadian Forestry Association. It was established in Ottawa, and since then has been progressing, slowly, I regret to say, but still progressing along the lines we had marked out for the society.

The importance of the objects the association had in view was clearly understood by those who brought it to life. Those of us who took an interest in forestry knew the enormous forest wealth of the provinces of this Dominion, that we had forest resources which, if taken care of, were sufficient to provide large revenues for public purposes for an indefinite time, provided they were protected, conserved, and the timber was disposed of upon sound public principles. This association hoped, amongst other things, to impress upon the various governments interested the wisdom of taking steps to protect and husband the forest wealth entrusted to their care by a beneficent Providence. Particularly we felt that much might be done to prevent the great destruction of timber incident to forest fires. Experience had taught us that when a forest fire gets fairly started it would be impossible for even an army of men to suppress it, but we knew that much could be done to prevent the starting of forest fires if some system were devised which would inculcate a spirit of care in the use of fire on the part of settlers, hunters, lumbermen, explorers and others who might be in the forest during the dry summer season. It was thought that by placing a number

of men, to be called fire rangers, at various points in the forest during the hot summer, whose duty it would be to post up copies of the Fire Act and distribute copies of the same to parties with whom they came in contact, pointing out to them the provisions of the law and the terrible loss that might be entailed by their carelessness in the use of fire, that people might be educated to a sense of their responsibility, and that eventually sympathy would be enlisted and losses by fire materially lessened.

This fire-ranging system was first put in operation in the province of Ontario, and on a very small scale. It met with great success and approval, and ultimately the Dominion of Canada and all the provincial governments except that of British Columbia followed the lead of Ontario, as indeed did nearly all the states of the Union with very few exceptions, until it came about that the system inaugurated in Ontario has spread over the whole North American continent, with the result that a marvellous decrease has taken place in the destruction of timber by forest fires.

In addition to preserving the forest from destruction by fire, there was borne in mind the necessity for preserving the equable flow of the great rivers. We hoped to impress upon the various governments the necessity of preserving the watersheds from denudation. I need not amplify for you the dreadful things that occur in a country where the headwaters of a large river are denuded of timber. You know the floods and torrents that occur instead of the regular flow of water which exists when the heads of the streams are kept covered with forest growth.

Then there was the desire to protect the denizens of the forest, the game and birds. It would be a sad day indeed for us if the animal and bird life of the Canadian forests were destroyed. There is nothing that affords man greater pleasure or excitement than to see in the forest some of the larger of the wild animals. Even the squirrel calls up a spirit of humour when we see him running about enjoying himself to the very full. Then consider the beauties of the Canadian forest. I do not know what experience of forest life some of you gentlemen may have had, but in my youth I played Indian for several years. The forest was my home winter and summer, and to this day, and at any hour of the day, I can lay my memory tribute for scenes that make me long to be lost once more to civilization, a stranger to worry, to work and to noise. When I call up the scenes I have witnessed as I floated in a bark canoe along myriad streams and lakes innumerable, their shores clothed in living green from the highest hills to the waters' marge, not a scar or mark of fire visible, the whole landscape absolutely perfect, wholly quiet, and inexpressibly lovely, just as it came from nature's hands, one of the most beautiful of nature's beautiful works, and then think of the dread probability of this earthly paradise being blotted out and burned into a blackened waste by the carelessness or folly, or worse, of man, I am stirred to my innermost depths with the desire to prevent such sacrilege, and I have motive enough, putting everything else aside, to enlist me in the cause of forest preservation.

Protection from forest fires is one of the most important matters looking in the direction of the preservation of the timber, but it is by no means the only one. Another is the prevention of settlement or squatting on lands, which are rough and unsuitable for farming, but which have valuable timber growing upon them. Frankly, there is no more difficult question in connection with the administration of the Crown

lands in Ontario than this, because it not only raises the question of the protection of timber on Crown lands, but the more difficult one of the relations between the timber licensees and the settlers.

In the old days the only timber that had any great value to the licensees was the pine, and as we kept settlers out of the pine territory the lumbermen were fairly well satisfied. Now, however, the position is changed. Almost every tree that grows in our forests has taken on a value, and consequently the settler is anxious to get hold of a lot from which he may realize \$300, \$400 or \$500 for the timber, to assist him in making a start on his farm. If settlers were always bona fide in their intentions it would not be so bad, but in many cases the desire appears to be to get hold of the timber and dispose of it without any intention of making a permanent home. While we have been exercising great care in connection with this aspect of affairs, we have not been able to completely satisfy either the settlers or the lumbermen, and I suppose it would be considered by some that this is an evidence that we have been doing what is pretty nearly right.

It seems to me that there ought to be some attempt made to draw a line between where the lands are unsuitable for settlement and it is impossible to carry on successful farming, or build up a farming district, and the lands that are suitable for farming purposes, and to say, and stand firmly there, that we will not allow settlers to go on lands that are not suitable for agricultural purposes. It is a mistaken kindness to allow settlers to go into a country where they cannot hope to succeed as farmers, but can only eke out a living for a few years by selling the timber, after which they remove to some place else, leaving the debris on the ground behind them. I think it would be a proper thing for this association to pass a resolution upon this matter, so as to again bring it to the attention of the governments, that the question might be considered by them.

Then I wish to say something about the danger to the forests incident to railway construction. This matter was referred to in the report of the board of directors, and properly so, because we are about to build another transcontinental railway, which will run through the forest for a long distance in the provinces of Ontario and Quebec. We in Ontario have been building a railway from Lake Nipissing to Lake Temiscaming, which is intended to be extended farther north until it joins the Grand Trunk Pacific. The Canadian Pacific Company has been building a branch line from a point near Sudbury down south through the Crown lands of Ontario to Byng Inlet. In order to secure supervision and protection where railway construction is going on, we have required, in Ontario, that any railway company building a line, as soon as they commence the work of construction, must put on fire rangers, and we, that is the Crown Lands Department, are to say how many rangers are to be put on and appoint or remove them if they are not doing their work properly, but the railway company has to pay their time and expenses. The Canadian Pacific Railway cheerfully acceded to these regulations, and we have had men upon their line of construction during the past year, whose services were paid for by the railway. When the Grand Trunk Pacific commences to be built, so far as it runs through the province of Ontario, and I think from the policy of the Dominion government, in other parts of Canada, an efficient system of fire-ranging will be put in force along that line, so that

ample protection against fire may be given—indeed we shall insist upon this. Mr. Joly de Lotbinière will remember that last year we had some discussion upon this question of railways. Now, I want to say for his information than upon the Temiscaming and Northern Ontario Railway we have tried the experiment of supplying our fire rangers with velocipedes. We place the rangers six miles apart, with instructions to follow each train through their section on the velocipedes, particularly the construction trains, so as to prevent the possibility of fires caused by sparks thrown by the locomotives or from coal dropping from the ash pans attaining any serious proportions. I think if a similar policy is pursued on the Grand Trunk Pacific, and other railways running through the rear parts of the province, the result will be as satisfactory as it has been on the Temiscaming and Northern Ontario road, where last year we did not lose \$10 worth of timber, although the road was being constructed through one of the best pineries of the province.

I need not pursue in detail the different questions with which we have to deal. Taken as a whole the great object of the existence of this society has been to educate the people in connection with the protection of the forest wealth of our country. One great means of doing so is by having gentlemen of experience, and experts in their various lines of business, read papers at meetings of this institution. I am not speaking particularly of scientific men, but of lumbermen who know the practical difficulties and other gentlemen who have given the subject of forest preservation careful attention. Then we have discussions on these papers, as I hope we shall have upon papers read at this meeting, and by the publication of the proceedings of this society in which the papers read and the discussions upon them will be found, we hope to create a public sentiment which will assist the governments in taking an intelligent care of the forest wealth of the country. In the early history of this association some lumbermen had the idea that it was a society of faddists bound upon advancing their ideas, which were regarded as wholly impracticable, and merely intended to be talked about. This, of course, was a mistaken view, and we have won our way against this opinion, until to-day we are able to say that some of the most prominent lumbermen in the country are members of this association, and are assisting us in every possible way to build up a sound public opinion upon this whole question.

The question of the creation of large forest reserves is another matter that has engaged our attention. This is a policy that must commend itself to every government having large areas of public lands, sections of which are suitable for nothing but the growing of timber. It is a policy which has commended itself to most of the provincial governments, and indeed to the Dominion government. In Ontario, British Columbia, Quebec and the North-west there has been set apart already as forest reserves nearly nineteen million acres of land. In the province of Ontario we have set apart some seven million acres. In the province of Manitoba, I understand, there are three and a half million acres. In British Columbia there are six hundred and twenty-four thousand acres. In Quebec, one million seven hundred thousand acres. In all, as I said, there are somewhere between eighteen million and nineteen million acres, which have been set apart absolutely as forest reserves from which it is intended to exclude settlement. It is not the intention to exclude the public altogether, because we wish to make these reserves, under proper restrictions, play grounds for the people, as well as to protect and conserve the timber growing upon them.

Another question is that of reforestation. This is a matter which does not appeal very strongly to the average man in Canada. We seem to have such an illimitable area of forest in this country that it has been thought we can never get rid of our timber, and the idea has been that there is no necessity to bother with reforestation. In my early days in the back country the trees were regarded as the enemies, if I may so put it, of the settler, who made war upon them, cut them down and burned them up, so that he might clear his land and grow crops. This feeling still prevails in the rear parts of the country. In the early days I speak of, the timber other than pine had no value, and the only thing to be done with it by the settlers was to burn it up and get it out of the way. Now every kind of timber, owing to railway construction and the development of pulp and paper industries, has a value, and settlers are able to sell their timber other than pine for sufficient to start them out in a good way on their farms, instead of burning it up as they used to do. The fact remains that reforestation has not as yet taken any great hold upon the people of this country. I suppose we may expect to see something done in this direction later on. At the present time, beyond what has been done in the School of Agriculture at Guelph in connection with the growing of young trees which may be distributed to the farmers and others who desire to replant, we cannot point to any progress.

As one of the representatives of this association who attended the recent meeting of the American Forestry Association at Washington, I desire to say that I never was more pleased in my life than I was to see the magnificent meeting held there. The President of the United States we found to be one of the most active supporters of a forest policy. He was kind enough to come down to one of the theatres and address the association for an hour or more upon the subject of 'The Forest Wealth of the Nation,' and I never listened to a more forcible exposition of that question than I had the pleasure of hearing from that eminent man upon that occasion. From some of the President's remarks I found that they had the same classes of questions to deal with that we have in this country, and he was very strong and outspoken upon the question of people taking up lands merely for the purpose of skinning the timber, and said he was against that class all day and every day. It was only in the city of Washington, and under the circumstances that prevailed there, that we could have had such able and representative men present. The head of the American Forestry Bureau, Mr. Pinchot, perhaps the strongest man in forestry matters on the continent, did everything he could to make the meeting a success and was backed up and supported by the influence of the President. The government brought their experts from their different forest reserves. We had the engineers of the most important railways, mining experts, men interested in irrigation—almost every interest that has to do with the use or growth of timber was represented at this meeting, and the views of the varied interests were voiced by able papers read by practical and representative men. It was, taking it altogether, the most instructive meeting I ever attended, and I think a great deal of good will flow from it as far as the United States is concerned, and the inspiration given us who were there from Canada was, on our return home, to endeavour to create a strong sentiment in this country along the lines advocated at that meeting, and if possible to bring about a meeting on similar lines in the Dominion of Canada.

I have about covered the ground that I intended, but before I sit down I wish to say that while we are here as business men for the transaction of business we ought not to forget the friendships we have formed, many of which will endure for our lives. This being so, we cannot but regret when any of those with whom we have been associated at meetings of this kind are called away. During the last year this association has sustained a tremendous loss by the death of Mr. John Bertram. Mr. Bertram did not need to concern himself with anything except the cutting of his timber and the marketing of it. He had good limits, remote from settlement, and indeed everything that went to make up a successful lumbering property. He was a practical lumberman; he was indeed a strong man, well armed, but being a public spirited man of immense intelligence he chose to interest himself in forestry. He was a regular attendant at our meetings, and by his wise counsel assisted the work of this association. There was no man in all our body who was better equipped as a member of such an association. Those of you who were present at the last meeting will remember a little by-play that took place just at the close of the meeting between Mr. Bertram and myself. He objected to re-electing men who had already served as president, and talked about us 'old fellows.' I said, 'Speak for yourself; I do not admit that I am an old fellow.' He said, 'I feel as young as you do.' Since then, to our great sorrow, he has been removed by death, and we shall see his face no more. He was, above all things, a representative Canadian, a man who loved his country, and who was determined to assert his country's rights in every particular. It was perhaps more owing to his exertions than to the exertions of any other half dozen men that the province of Ontario determined that its sawlogs should not go out to feed mills in the United States. If Mr. Bertram had never done anything but that, he would have left an enduring mark upon the history of matters pertaining to the forests of this country.

Then we have also lost Prof. Muldrew, who was a well-read man of unquestioned ability on matters connected with forestry. He had gone to the Guelph school to take up forestry matters there. He was cut down suddenly in the very prime of life.

Col. Higginson, I did not have the pleasure of knowing so well, but he was an estimable gentleman, taking a great interest in forestry matters. There is just one other man who has been called away whose death was a great loss to this association and to myself personally, because he was one of the closest friends I had, and I think one of the most upright, honest men that ever lived. I refer to the late W. C. Caldwell, who represented the county of Lanark for many years. Straight and upright in every respect, one cannot think of him without believing that the country was the better for his having lived.

Then we must all regret the affliction that has come to our honoured president, Sir Henri Joly de Lotbinière and his family in the death of Lady Joly. We all love Sir Henri, and we believe that his name will be remembered for the good work he has done as long as trees grow in this country. He has our sincere sympathy in the affliction that has befallen him.

Gentlemen, my remarks have been somewhat disjointed. I have tried to speak to you of the different interests of the association, and what we are hoping to do. Before I conclude I wish to express the hope that the good work that we have brought to



CEDAR TREES (*Thuja Gigantea*) IN STANLEY PARK, VANCOUVER, B.C. [16
(By permission of the Superintendent of Forestry.)



BURGESS MOUNTAIN, EMERALD LAKE, ROCKY MOUNTAINS.

life will not be allowed to die, but on the contrary be largely extended. Every exertion ought to be made to enlarge our membership. We have only some 600 members, whereas in this great Dominion, considering the objects we have in view, we ought to have a membership of as many thousands. The way to enlarge our membership is for every one of us to exert himself with our friends and acquaintances and endeavour to induce them to become members. If this is done, I hope by the time of our next meeting we shall have three or four times the membership we have at present.

In the absence of Professor R. W. Brock, of Queen's University, Kingston, the paper prepared by him on 'Forest Fires in British Columbia' was read by Roland D. Craig, of the Dominion Forestry Branch.

FOREST FIRES IN BRITISH COLUMBIA.

PROFESSOR R. W. BROCK, QUEEN'S UNIVERSITY, KINGSTON, ONT.

I appreciate very highly the honour conferred upon me by the Forestry Association in inviting me to attend the annual meeting at Quebec, and to present a paper on forest fires in British Columbia. It is with regret that I find it impossible to do either. I should have liked to have contributed my mite toward furthering the good work of this association and to have assisted in emphasizing the seriousness of the question of forest fires. It is a subject important in all our forest areas, but particularly so in British Columbia, for here the forest represents such a large public asset, and the natural conditions render it so liable to destructive fires.

Much as I would have liked to have given this subject adequate treatment, and to have taken part in its discussion, stress of other work compels me to confine myself to a few random notes.

Any one travelling through the province is at once struck by the beauty and value of the timber, and no less by the terrible havoc wrought upon it by forest fires. British Columbia consists of a belt of alpine country, in the centre of which is a relatively narrow strip of dissected plateau-like country. The province as a whole may be said to be forest-clad, but the growth of trees is more luxuriant on the western slopes of the mountain ranges, and the interior plateau contains wide stretches of open grass-covered hills and valleys. The higher mountain ranges rise above the tree line and merchantable timber is confined to the valleys and up the mountain sides to a limited height. Many of the smaller valleys are too steep and narrow to furnish valuable timber or much of any kind.

In any country where nature deals bountifully in respect to a product we are very apt to consider such natural wealth inexhaustible, but it is unnecessary here to call attention to the fact that forest wealth is in the strictest sense limited. While British Columbia has in the aggregate a vast supply of timber, it is apparent when one considers the inroads that will be made upon it with the increased markets of the future

To make matters worse, on account of the rugged, mountainous character of the country, the only timber that is available and that has an immediate market value is that which is near transportation, and for the same reason a great deal of such transportation must be along artificial lines, that are necessarily very slowly developed, yet it is in precisely such localities, near transportation, that the bulk of the fires rage. I have not figures to show what percentage of such favourably located timber is actually destroyed and what percentage actually harvested, but I do know that the percentage lost must be appallingly large, and that unless active steps are taken to prevent this destruction only a relatively small amount of the timber now standing will ever reach the market.

The natural conditions are favourable for fires. The interior plateau is a notably dry belt, and during the long summer months everything is dried to the inflammability of kindling. Over a large area of British Columbia the precipitation is erratic. Several wet summers induce a luxuriant growth of vegetation, including a rich growth of moss. Then comes a dry season, when for perhaps three months the strong British Columbia sun scorches uninterruptedly, drying the whole undergrowth and moss to tinder. A large proportion of the forest growth is resinous. The configuration of the country and the regular air currents create a powerful and most effective draught. There is, however, one good feature, the fire is usually confined to the valley or mountain slope on which it starts, though if there be a low pass at the head of the valley

it may cross over to the opposite slope. The burnt areas are therefore usually restricted in dimensions, but on the other hand they are discouragingly numerous. So numerous are the fires in a dry season that the whole countryside may be buried under a dense pall of smoke. Last summer in the Lardeau-Duncan district, where I was engaged in field work, no topographical work could be done during the whole of August and September. Often objects, no matter how large, were invisible a hundred yards away.

The extent of the damage done to the timber by fires varies. Occasionally a fire may burn out the underbrush without absolutely destroying the timber, and such standing timber may remain sound for years. The Cascade river, near Banff, was swept by fire twenty-five years ago. Some of the burnt timber is still standing, but most is now down. Professor J. C. Gwillim informs me that it is still so sound as to be used for timbering the coal mines. Dr. G. M. Dawson, in 1886, speaks of the upper valley of the south fork of Sheep creek being a desolation of bleached fire-killed timber. In 1904 some of this was still standing, and a large amount sound.

In a dry season like last the fire is apt to consume everything. Last summer I climbed up a hillside through fine green timber, and about a week later came down the same place wading knee-deep in ashes. Not a vestige of anything combustible on or in the soil had been left. The hillside was as bare as the bottom of an alkali pond. I ran across several fires that had been equally thorough.

When a fire gets well under way only a protracted wet spell will stop it. So long as the interior of rotten logs and the roots remain dry it will smoulder until conditions are once more favourable, when it will again break forth.

CAUSES.

Not all the fires originate through human agency. Electric storms are an important source. In 1903 during one thunderstorm I saw through the door of the tent four fires start, and altogether from the camp I counted eight. Fortunately this storm was succeeded by several days of heavy rain, so that little damage was done. Electric storms unaccompanied by rain are not unknown in the high mountains during the dry season. One summer we had to strike camp and rush for safety from a fire which suddenly and without warning was started by an electric discharge from a clear sky, and which rapidly enveloped the whole mountain side. I have frequently seen traces of such fires. So far as my observations go, such storms are usually confined to the higher altitudes. Here the timber is isolated in groves, so that such fires do not usually become large.

The greater number of the destructive fires are started by human agencies. If any proof of this were needed it would be furnished by the fact that on the whole the forest matures and is preserved until man—white man and his retinue—gets into a district, and then the destruction greatly exceeds the natural recuperative powers of the forest.

Most of the fires started by man are not accidental, but the result of gross, often wilful, carelessness, and not a few of deliberate intent. In dry seasons, when the grass and moss are like tinder, a match thrown down, especially a wax one, is a source of danger. Camp fires even when extinguished with water may still smoulder in rotten logs, mould or roots, and eventually break forth.

Smudges built for horses during the fly season are a more fruitful source of fires, for they are generally built large, so as to require little attention, and to accommodate a large bunch of animals. An increase or change in the wind during the day may start a fire that before it receives attention is quite beyond control. It is of course during the dry season that such smudges are required. In 1902 I came upon a very destructive fire in the Boundary district that had originated in this way. The same season, from the top of a mountain on which we were taking a survey station, we saw a spark from a locomotive start a fire in the dry grass. Shortly after the section gang passed it on their way home. In five minutes they could have put it out.

Two days after all the men available were out trying to prevent this fire from burning the railway trestles, even the men from the mines having to be turned over to this task. A number of fires are raised in this way.

DELIBERATE FIRING.

Fire is wholly used for clearing land for buildings, ranches, railway and other rights of way, and these fires are often set at the time when the least possible amount of labour will be entailed—that is to say, right through the dry season. Were it necessary I could give instances of fires started in this way down to the end of last season, but since so many companies and individuals have sinned in this manner, there is no need to particularize. Such fires are not primarily intended to destroy large areas of forest, though it seems to be a matter of little concern if they do, but I am convinced that fires are started by individuals with the express purpose of clearing the timber off large areas in order to facilitate prospecting. This mode of deforestation is quite generally approved of by those interested in the discovery of minerals. I have learned this from widespread intercourse with such individuals, who are convinced that the end justifies the means. Last summer when we first observed the smoke of forest fires, a man remarked to me that he knew where the first fire would be, and sure enough that was one of the first. It is needless to say it was a locality where there was reason to believe good prospects could be located. Of the score or more fires which came under my notice last summer, I don't suppose that more than a couple were located where I did not know that it was desired to have the ground laid bare. When the general opinion is not hostile to such action, it must be regarded as more than a coincidence that the fires should clear just the ground that is supposed to be mineralized. I do not mean to say that in every case the fires were deliberately set, but such views tend to carelessness and prevent whole-hearted efforts at extinction.

When a fire is burning in the vicinity, back-fires are often set with the alleged purpose of checking the fire in a particular direction. It may happen that these back-fires make desired clearings, and also that they become more destructive than the original fire. It is not alone the lumbering industry that suffers. Many of the low-grade mines, and in British Columbia these will probably out-number the high-grade, can only be worked if costs are low, and timber is one of the important items of cost. A forest of timber goes into a large mine. If the timber cannot be obtained cheaply, that is, near the mine, it might be that the mine could not be worked. It is where mines are or will be that men are, and it is where men are that the bulk of the fires are; so that the destruction of timber by fires is a serious matter for the mining industry. The damage to property by these fires is also great. The prospectors lose their cabins and prospecting outfits—to them a very serious matter. Mines lose their buildings, surface plants and tramways, and until they can be replaced production is at a standstill. Whole towns are threatened and sometimes destroyed, and life itself is endangered. Thus the losses occasioned by fires affect directly and indirectly all industries and all classes of people. Yet the worst obstacle in curtailing this destruction is the inertia of an apathetic public. In whatever steps that may be taken to lessen this fire evil, the education of the public to the seriousness of the question should receive a foremost place. One of the quickest ways of doing this, it seems to me, would be to make the laws regarding fires more stringent, and to see that they are rigidly enforced. To set a fire deliberately or through wanton carelessness should be a penitentiary offence, just as any other form of wilful fire-raising. To burn down a public building in order to let more sunlight into your back garden would be arson, but it would be quite as defensible and probably as innocuous an act to raise a forest fire to aid your prospecting. It is true that notices regarding forest fires and penalties for causing them are pretty generally posted throughout the fire districts, but these laws are not enforced. I have seen a number of cases in which the responsibility for the fires could be placed, but I do not know of any one having been prosecuted in connection therewith.

It should often be an easy task to fix the responsibility for the fire on the guilty party. Without any special attempt to get at the facts, we often discover the causes of the fires we happen on, or at least promising clues. An officer who is a good woodsman and whose time is devoted to this special work should not experience much difficulty, provided he did not have to cover too great a territory. Active fire rangers should be able to do effective work. By climbing a good look-out mountain one can survey a vast stretch of country and detect fires in their incipient stages, when they can be successfully fought and checked, and when their origin is easily detected.

Locomotives should be provided with spark arresters, and section men should be compelled to immediately put out fires near the railroad.

At present one of the most serious handicaps in combating the fires is lack of any organization. It seems to be nobody's business to put out fires. Only when artificial property is threatened is any attempt made to check the progress of a fire. Last summer a fire sprang up near a town whose population was engaged in waiting for capitalists. Nobody thought of doing anything till the fire was about to enter the town.

If the laws were made more stringent, and officers were specially commissioned to rigidly enforce them and to organize for fire-fighting, I do not think a great time would elapse till the public actively co-operated, for the standard of intelligence is very high, and the western public is quick to realize and to act. The cost of protective measures should not be excessive, nor should it be any barrier when so much is at stake. The only districts that need to be covered are those where men are. The lone woodsman is seldom the cause of a fire. In wet years no protection is required. If this association will stir up the government to vigorous action, and engage in educating the British Columbia public to a sense of the value of the timber as a public asset, and of the enormous losses sustained through fires and in methods of limiting these, then it will have conferred on British Columbia and upon the country at large a great and lasting benefit.

MR. LEAMY.—Mr. President and gentlemen: I am not a politician, nor am I accustomed to speaking before large assemblages of people, so I am afraid that I will have to ask your indulgence if I do not explain myself as clearly as I might. As you have been told already, I am Dominion Crown timber agent for the province of British Columbia, and am also in charge of the fire ranging in that province. The portion of the province under my control comprises an area of about twenty thousand square miles, and in that area we employ usually eight men as fire rangers. It is a very easy matter for you to see at once that it is quite an undertaking for eight men to cover this amount of ground, but as it was merely a trial or experience at first, we did not go to any great expense until we could see how it was likely to work. We did not in fact have anything to go on, and we did not know whether the experiment would be successful or not, and consequently did not feel justified in incurring any great outlay until we could ascertain the probable result of our proposed system. The first season of the fire rangers was largely occupied by them in endeavouring to educate the people as to the value of the timber, and preventing at the same time, as much as possible, the occurrence of any fire. As any woodsman knows, once a fire gets properly started in the woods it is almost impossible to control it, and so we have been acting on the old saying, 'an ounce of prevention is better than a pound of cure,' and have always tried to stop the fires before they could get under much headway. One of the duties of the fire rangers is to ascertain when prospecting parties are going to prospect the forest ranges where they suppose minerals are to be found. Now, the usual practice of these people is to set fire in the locality in which they wish to pros-

pect and burn it as bare as possible. This is not done in the railway belt of British Columbia to-day. Our rangers follow each prospecting party; they know the towns where they outfit, and they follow them quite a long way, and inform them as to their liability should a fire occur in the district in which they are about to prospect, and in addition to this precaution serve upon them notices containing a copy of the Fire Act and its penalties. This step no doubt prevents the outbreak of numerous forest fires.

The next trouble that we have to contend with is the settler. I am sorry to have to say it, but the settler is a source of trouble, and has been the cause of very many fires in our forests. He wants to get what is called 'a clean burn,' and with this idea in his head, slashes down the timber, and after he has cut it down does not gather it up in any way, nor pile it, neither does he make any endeavour to prevent the fire from spreading beyond the actual area of his clearing. He simply sets fire to it and lets it go. Up to two years ago they used to set fire in this manner, and after they had burned about a thousand acres or so, thought it would be a good thing for me to send men to put out the fire, and would send me a request to this effect. They were beginning to get alarmed as to the extent to which the fire might spread.

As has also been mentioned in the last paper read here, there is the difficulty in getting a magistrate to fine any man committing such an offence who happens to be his neighbour. The Fire Act in the province of British Columbia, which creates the fire district and which calls the whole province a fire district, says that any person guilty of the offence of setting fire in the woods and not looking after it is liable to a fine of not less than \$50 and not more than \$200. Now, on one occasion, in my jurisdiction, the fire ranger brought up a man before one of our magistrates—and incidentally I would have you remember that the accused had been complained of by his neighbours, not by the lumbermen, the neighbours asserting that their property, fences, barns, and even their lives were in danger. I may as well add also that the man was not a Canadian, but a Swede. And it was proven that he had repeatedly set fire to his own place and to the adjoining forest, which contained very valuable timber. He had been warned repeatedly by the fire ranger, who at last realized that argument was useless, and had him arrested and brought before the magistrate. There he was found guilty of the offence charged against him, after seventeen of the neighbours had been brought in as witnesses, and I can tell you that it is an item of considerable expense to bring a man twenty or thirty miles out of the woods to give evidence in cases like this. Well, the offence was proven, as clearly as it is possible to prove anything in the world, and how much do you suppose the magistrate fined the man? Ten dollars. This is what they call carrying out the law. The law distinctly says that the minimum fine shall be \$50. I must say that I cannot see how the magistrate could possibly bring this to mean that he could fine him \$10 if he chose. The fire ranger asked the magistrate to point out the section in the Fire Act on which he relied when imposing the fine, and what reason he had for not fining the man at least the lowest amount prescribed by law, and his answer was, 'Oh, well, the man is poor, you know.' It would have been cheaper to have hoisted that man out and got him to leave the country. It would be better for a lumber-growing country that such a man should not be allowed to live in it.

Previous to the establishment of a fire-ranging system in our province, this practice of setting out fire indiscriminately was commonly indulged in, and although there was a Fire Act under which it constituted an offence so to do, little or no effort was made to enforce the provisions of the Act. Mr. Stewart, the Dominion superintendent of forestry, is entitled to the thanks of the people of British Columbia for the inauguration of the present system of forest fire ranging, and for bringing the system into its present state of efficiency.

Outside of the railway belt there are large areas of land which contain more timber than can be computed and which is not guarded at all. Prior to August of last year, I think I might say without exaggeration that there were one hundred miles of timber on fire, and nobody looking after it at all. Until the past few years the settlers did not look upon their timber as being of much value; in fact most of them looked upon it as being of no value at all. I am pleased, however, to be able to say that of late years they have come to look at it in a very different light, and are gradually being educated to the fact that their timber is a very valuable asset. Knowing this, they are not nearly as liable to set fire to it. Formerly they would just go in and burn the place clear, for the purpose of so-called cultivation. In the most of the places so cleared, if you wanted to sow anything you would have to shoot the seed into the ground with a rifle, it being in many cases steep side hills.

Reforestation, however, is taking place in such a manner that you would hardly believe it without seeing it for yourself. The whole country is covered with a crop of young cedar, spruce and hemlock (which latter is good timber out in our district, almost as useful as fir); it is all cropped over, and you can go up into the Shuswap Lake district and see four or five hundred square miles of land on which this reproduction is taking place. The Shuswap is a very large lake, having, I suppose, three or four hundred miles of coast line, with but poor means of ingress or egress, so that if settled upon there would be very great difficulty in getting out the produce after it had been raised there. In spite of this, the settlers want to get in there and settle on this land, and I hold that the government should not allow them to do this. This sort of land is not valuable as agricultural land, but it is very valuable for the new growth of timber that is upon it, and should be conserved for such purpose. This district was burned over some twenty-four or five years ago, and I know that the gentlemen here from British Columbia will bear me out when I say that it is very densely covered with a new growth of timber, a repetition of the former covering, which would at present average from twenty to forty feet in height and eight or ten inches in diameter at the stump. Twenty years hence this will be a very valuable asset in the wealth of the province, and there will be a great many million feet of merchantable timber available there. Such places as these should be set aside, as has already been recommended to the department at Ottawa, and I am of the opinion that a further recommendation from this association would help in this direction.

I made the statement once and I think that Mr. Stewart will bear me out if I venture to make it again; it is that I consider that over a million feet of timber was burned in the province of British Columbia, in order to enable one man to clear a quarter of an acre, to sow some potatoes on the place he had so cleared, and he never planted the potatoes at all.

A voice.—How much did he burn?

Mr. LEAMY.—A million feet; well, perhaps I should not say as much as a million feet, I do not want to exaggerate, but it is a fact just the same that many people have destroyed the timber in clearing their land and afterwards made no use of the land.

I have brought a couple of photographs with me which I would like the members of the association to see. They will give them some idea of what these people have to contend with in clearing their land and what they will destroy in order to get a few acres of agricultural land.

As I have a couple of friends with me here from British Columbia, I will not take up any more of your time. I did not have an opportunity to prepare anything which I might present to you in a readable form; perhaps my friends from British Columbia would like to say a few words to you; they know all about the subject and are representatives of two of the largest lumber firms in the province. Possibly you might be interested to hear their views as to the efficacy of the fire ranging system which is now in force in the province and the good it has accomplished.

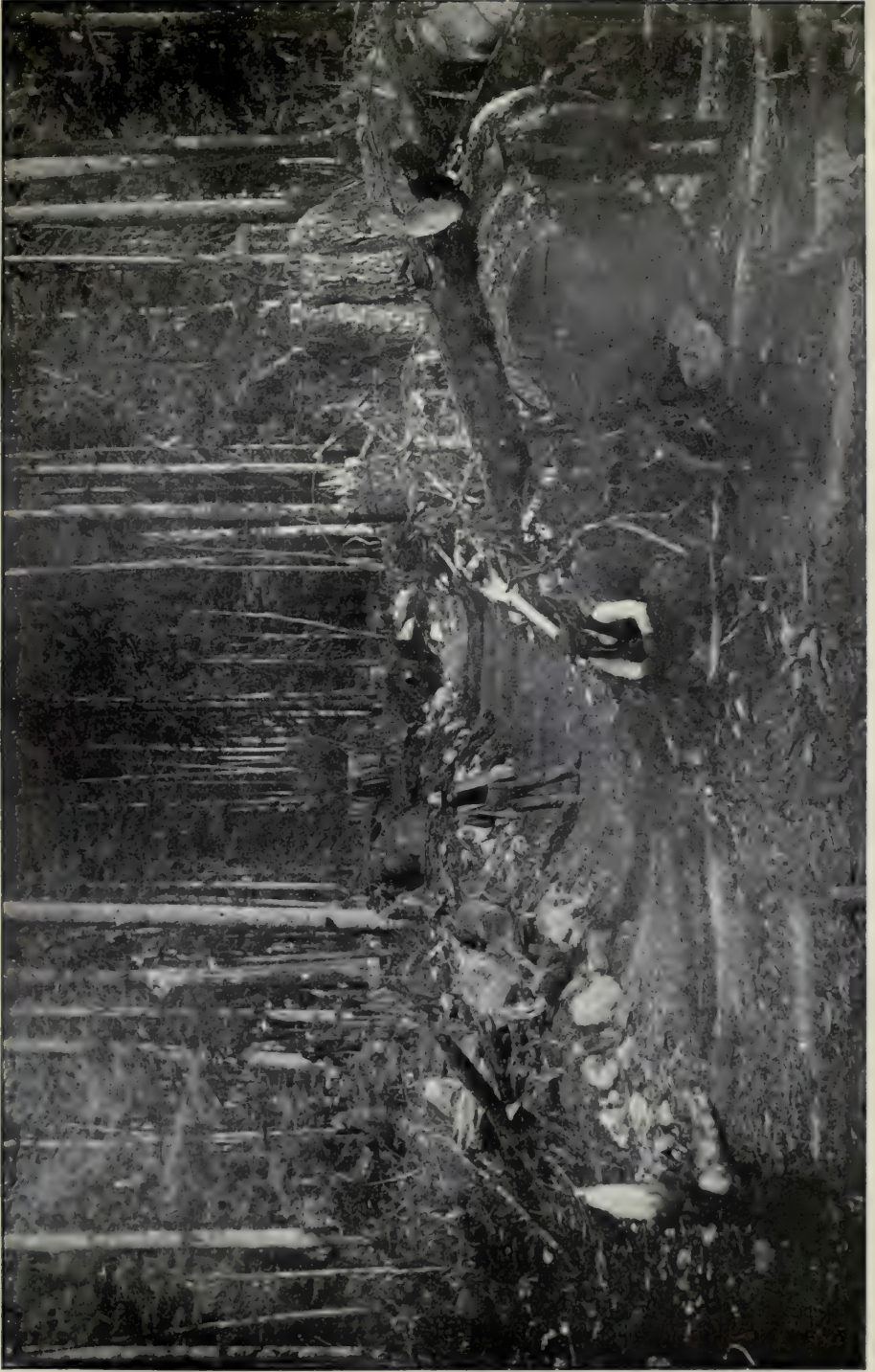
Before closing, I wish to tell you that when I asked the mill-owners if they would consider the question of establishing fire rangers and paying one-half of the expense, they immediately said, 'Certainly we want the fire rangers; we are willing to try anything to save the timber.' The mill-owners have a large amount of capital invested and I think that when business men will talk in this emphatic manner it means something. I have to thank these gentlemen for their very able assistance in carrying out the details of the fire-ranging system in British Columbia.

There is just one other point and it is that I would like to see the magistrates do their duty; I will do mine as far as I am able but if I am not assisted by those entrusted with the administration of the law, I can accomplish but little on my own account towards preserving the timber in the railway belt of British Columbia.

Hon. Mr. BOSTOCK.—I am very pleased to see here to-day so many representatives from the different provinces, and particularly from the province of British Columbia. I am sure it is a great source of satisfaction to them, as it is to myself, to be able to get here in time so that they might be able to attend this meeting, because I have found since I have become a member of the association that there is always considerable difficulty in getting gentlemen from British Columbia to join the association, because they say it is difficult to attend the meetings. Up to this time I must confess it has been a source of some difficulty owing to the impossibility of arranging anything in the way of transportation, but, I wish to congratulate the secretary of this association on having been able to arrange with the railways this year to grant us better terms, and so induce us to come down and attend the meeting.

I have listened with a great deal of pleasure to what has been said, and I want to compliment Mr. Leamy on his statement of the work he has done in British Columbia. I consider that he has carried out the work in the most satisfactory manner, but I am sorry that he is confined to such a very small section of the province.

Of course, as the map shows, his district is large, but if you saw it in comparison with a map of the province of British Columbia you would at once agree with me that his district is but a small portion of the province.



BRITISH COLUMBIA LUMBER WOODS, SHOWING LOG ROAD.

(By permission of the Superintendent of Forestry.)

Mr. JONES.—There are about twenty thousand square miles in the railway belt, and I think the area of the province is about six hundred and eighty-one thousand square miles.

Mr. BOSTOCK.—You can judge from that, gentlemen, as to the comparative sizes. Mr. Leamy's work is very excellent, but it is confined to such a small portion of the province. It is very much to be regretted that he cannot be allowed to continue his good work outside of the railway belt.

One of his greatest troubles at the present time is the fact that the provincial government, so far, has not been stirred up to the necessity of protecting the forest. The fires that occur in the railway belt occur very largely through being started outside of the belt, and there is no ranger appointed to look after them there, and no interest is taken in the matter.

Then there is another point on which I agree with Mr. Leamy. He says that the magistrates are not accustomed to enforce the penalties. They do not consider it their duty to look after the forest so much as to look after the pocket of the settler, and consequently the amount of damage that is done by fire outside the railway belt is very great indeed.

This question of fining the settlers and keeping them off land on which they are really not able to make a living is one which is coming before us more and more every day, and I hope that a very strong representation will be made by this association, as a body, both to the Dominion government and to the provincial government that they should take steps to have the land properly looked after, and appoint capable men to make a report to the agents both in the province and in the Dominion; to take the entries from the settlers and make reports to those men, showing whether the land is fit for settlement or whether it is not.

At the present time this question is left in the hands of the agents to decide whether a man shall settle in a certain place or not. As a rule the agent is a man tied down to his office, and who cannot afford the time to go out around the country and see the particular land which the settler wants to open up, and consequently he is not in a position to say whether the land is fit for settlement or whether it is not.

The consequence of this is that there is a great deal of land taken up by these settlers which is absolutely unfitted for them to make a living out of.

Then, if we could get proper forest reserves established, and notify the agents that nobody is to be allowed to settle in them, it would be a great help in preserving those valuable assets of the country, the trees, and in the future we would be in a very much better position than we are to-day.

Another cause of fires touched upon by Mr. Leamy was the miners. I think a good method to remedy that evil would be to put upon every license issued to miners a clause to the effect that if they were caught starting a fire in the timber their license would be confiscated, and they would not be allowed to get another for a certain number of years. There is no doubt a great deal of damage is done in this manner, that is, by men who want to clear the land for the purpose of prospecting.

There is also the very delicate question of the Indians. This is a very difficult question to deal with, no matter what way you look at it. The Indians have been in the country a great many years, and it is hard to teach them that they cannot do as they have done in the past, and as their forefathers did for hundreds of years. But, I think if they were trained as children in the schools, and were made to understand the value of taking care of the forests, a great deal could be done with them, and that the result would be that they would be more careful to put out any fires they made when travelling through the woods. They could be taught that instead of leaving their fires to smoulder after they are through with them, it is a simple matter to take a little earth and put it on the fire and put it out entirely and absolutely.

If this could be done (and there is no doubt that it can) a great deal of damage would be prevented, and we would be taking a practical means of preserving our forests, which are one of the greatest (if not the greatest) asset that we have in this country.

I will not take up your time any longer, because those two gentlemen from British Columbia, who are both practical lumbermen, may possibly have something to say which will be of interest. I will therefore not take up your time listening to me.

MR. F. W. JONES.—Mr. Chairman and gentlemen, I am very glad indeed to have an opportunity to attend this meeting, and feel greatly honoured at being asked to say something on behalf of the British Columbia lumberman.

In the first place I think I ought to defend him from what may have been the inference from Mr. Bostock's remarks, that we have never been here before. The explanation of that is, as you will readily understand, it is a considerable distance, and when it comes to making a trip from the western portion of British Columbia to Quebec it is about as long a trip as you can make by rail anywhere on earth.

In addition to that, the lumber interest out in that part of the country is more or less in its infancy, and we have not made the lots of money that the lumbermen have made down in the older country, through the Ottawa valley for instance. There are no millionaires out there like you have down in this part of the world. We have been given to understand that the millionaires around here are mostly lumbermen. The case is different out in British Columbia, and the consequence is that heretofore we have not been able to get the time and money to attend those meetings.

Now that we have come here, I for one am very glad indeed to have an opportunity to add my testimony as to the efficiency and value of the fire-ranging system in the railway belt in British Columbia, so far as it has gone. The only thing that is wrong with it is that there is not enough of it.

A little bit is a good thing, no doubt, but what we want is more fire rangers. I do not know whether Mr. Leamy made it quite clear to those of you who are not familiar with the west just what the extent of that railway belt is. 'Railway belt' is a term that might possibly suggest railway land. Well, it is nothing of the kind. It is a belt of land twenty miles on each side of the main line of the Canadian Pacific Railway which, I believe, the province of British Columbia turned over to the Dominion government as a partial return for the building of the railway—a sort of a bonus

towards the job. The consequence is that for a distance of twenty miles on each side of the main line of the Canadian Pacific Railway the land is Dominion land, and administered from Ottawa, and entirely distinct from the whole of the rest of the province, which is administered from Victoria. The area of that railway belt is somewhere about twenty or twenty-five thousand square miles—it is about five hundred miles long by forty miles wide. Of that area some seven hundred miles are held by the company I represent, in the shape of timber limits. That is more than any other concern happens to hold in that railway belt, and we probably pay a little more towards the cost of those fire rangers than any other firm there.

This being the case, I want to say right now that if the government will double the number of fire rangers, or multiply it by three, and administer it in the same way, and use the same care in selecting the men, and give the same kind of expert supervision as they have had from Mr. Leamy, and such direction and advice as they have had from Mr. Stewart, our concern for one would be very glad to pay its proportion of the increased cost, and we believe that we will get a good many dollars' benefit for every dollar that we spend in that way.

I may tell you that before this system was established we had one fire in berth No. 17 by which we lost about two hundred million feet of timber. The fire was caused by a man, who we believed was a squatter. You understand that there are no farmers in British Columbia. Every man who has two hills of potatoes and a couple of blankets is a 'rancher.' That distinction is made out there because they do not like to be called farmers.

While on this question of squatters, it seems to me that the Dominion government ought to arrange this for us. It seems to me that we ought to get a license from the Dominion government which would show that we are entitled to the possession of the land in the meantime, and if ranchers squat on it the government ought to intervene and give us quiet possession of the land, and settle the matter as between the holder of the land and the squatter.

They say to us now, 'Take eviction proceedings and put those fellows off.' Now, eviction proceedings have never been popular in Ireland or anywhere else, and the lumbermen do not think it is their business to be called upon to take eviction proceedings against any one. If the government took hold of the matter and dealt with it in some practical way, then the ranchers would not have any hard feelings against the lumbermen; and at any rate it is the business of the government and not the business of the lumbermen.

That is a point that might be dealt with by this association, and the government might be asked to consider the matter. It seems to me that it is an important point, and falls in with one of the objects of this association, which is the preserving of the timber that we have, in addition to the growing of another supply.

While I am speaking of the growing of another supply of timber I would like to confirm what Mr. Leamy has said in reference to the second growth in the Shuswap lake district. This is also the case in the valley of the Columbia river, above Golden particularly.

The timber, as far as I have observed, is mostly jack pine, but that is a good merchantable timber. It makes good stuff for the farmer on the prairie, and that is what the timber is mostly used for there.

The trouble with the settler out there is about the same as it is here, except in that part of the country where we are operating we do not find that the settler has any use for the timber. His idea in going in is not to cut the timber that he has on his land for what it is worth, but to get the timber off so as to clear enough room for those two hills of potatoes and to put up his teepee, and probably plant a few apple trees.

A good deal of this land is of very fair quality, and it does not take a great many acres of it to make the kind of living that the 'rancher' in British Columbia is used to—whether it is what he requires or not. Those people are not only going into unoccupied Crown timber lands, but they are going on to the limits and squatting there.

If we clear half an acre for a camp there is some fellow waiting in the distance until we take the men out in order that he may jump in there and start a 'ranch.' Of course the regulations do not give him any right there. He cannot get a title to the place; he cannot borrow money on it or anything of that kind; but so long as it is the way it is now the Dominion land agent, or some of his people, let the man quietly understand after he is there that they will give him a title when the limit is worked out and abandoned. That is about the way the thing stands now. And he gets in there, and you cannot get him out without a lot of trouble.

There is another thing that I would like to mention, and that is the distinction which everybody could observe last year between the main line of the Canadian Pacific Railway, which is the railway belt, where there was a system of fire ranging, and the Crow's Nest line running out to West Kootenay, where there is no system of fire ranging. It is true that we had some fires on the main line, and some of them came our way owing to the prevailing wind from the south. There were three or four small fires in the valley of the Columbia river where we are operating. One of them on the spur between the Bluewater and the Blackwater would have done a great deal of harm if it had not been properly attended to by the fire rangers.

Many of these fires were started by settlers or people desiring to settle. The argument they use is this: 'Well, this is timber land, and if we set fire to it it is not fit any longer for timber land, and so it will be open for homestead.'

I want to say this, however, the Dominion government as represented out there has been distinctly active and liberal in the matter of extra assistance whenever it was required to cope with those fires. We had practically *carte blanche* to go to work there and fight those fires, and call out anybody that we think necessary, and the government will help us on the expense.

Those fires have done a great deal of harm in the past. There has been a great deal of timber burned. They burned for months, and there were hundreds of millions of feet of valuable standing timber burned. There were some people put out of business owing to their mills being burned down. It is to be hoped that there was an occasional 'rancher' put out of business too.

The difference is that on the main line there is a system of fire protection and on the other line there is none, and that difference is so marked that a man riding through both lines on the train and not being acquainted with the real reason would wonder whether it was not a warmer climate that was the cause of the difference, but those who know the country and the circumstances know perfectly well that the difference is due to this fire-ranging system.

Mr. JARDINE.—I am pleased indeed to have an opportunity to attend this meeting of the association. Had it not been for the fact that Mr. Jones and myself were in Ottawa on some other business we would not have had the pleasure of being with you to-day, and taking part in these proceedings.

I must say at once that I did not expect to be called upon to say anything. I merely came down as a sort of bodyguard to my friend Leamy.

I have much pleasure in adding my testimony to what has been said by the previous speakers in regard to the invaluable services that Mr. Leamy and his staff of fire rangers have rendered to the timber industry in what is called the 'twenty mile belt.' The firm with which I am connected has a certain area within this belt, but the greater part of their land is outside of it, in the province. I think the time is not far distant when the government of British Columbia and the legislators there will awake to the fact that the timber of the province is a valuable asset, and I believe the time is not far distant when we will have all over the province this system of fire ranging, which will look after the timber interests of the country.

As has already been said, there were some very large and serious fires last year along the coast. We, among others, suffered somewhat, but having a great number of men in our camps we were able to protect our timber to a certain extent, and as a result we did not lose as much as we otherwise would have lost.

I do not know that I can say anything more to you, gentlemen. The speakers who have preceded me have said it all, and there is nothing left for me to add.

We have a province out there of which the twenty mile belt is only a very small portion. I have heard it said that you could drop Ontario and the maritime provinces into the province of British Columbia, and that you would still have something left, and if it was rolled out you could turn Manitoba and the Territories into it. It is a vast area to cover, and no doubt it will take some money to protect the timber properly, but I suppose the men who hold that timber will be glad to go down into their pockets and assist the government in carrying out the good work. I do not know what scheme has been formulated, but I believe there is something on the tapis looking towards the proper protection of the timber outside of the twenty mile belt.

Mr. STEWART.—When I undertook this work in reference to the protection of our timber we had the example of the provinces as to the system of fire ranging, but we had to follow it under conditions that were peculiar to the territory. Most of the provinces, especially Ontario and Quebec, have a very large portion of their territory under license, and it was their system to have the lumbermen appoint the rangers and pay one-half of the cost.

In the Dominion territory the greater portion is still unlicensed, and to meet the circumstances we formed the system which I thought was best adapted, and we appointed rangers. The greater part of the territory being unlicensed, the government would of course pay the greater share of the cost of keeping this system going, the idea being that the lumbermen should pay one-half of the cost of guarding their own limits. This system was carried out.

This being for such a wide territory, we had to have some system of control or inspection, or supervision, and as this railway belt in British Columbia is not owned by the railway company but by the Dominion government (having been given to it as the province's contribution for the building of the railway), I thought it was particularly desirable that that portion should be guarded, as it contained a great deal of valuable timber.

The first thing I did was to find an efficient officer to supervise and administer the rangers that were to be put to work there. This district was so far away that it would be a matter of great difficulty to administer it properly from Ottawa. I do not need to say anything more than what has already been said as to the fitness of the man I selected, or whom I recommended as supervisor of that district. I do not think it is necessary for me to tell you that he has proven himself exceedingly efficient in the discharge of his duties in which he has been engaged for the past four years. You have had an idea of the good work he has done from what Mr. Jones told you this morning.

It may seem to you something like a sort of a mutual admiration society to hear us talk of each other in this way, but it certainly has been the greatest pleasure to me to hear the testimony borne by those who have contributed to the cost of this fire-ranging system. It has been a great pleasure to me to hear their approbation of the system, and their appreciation of Mr. Leamy's success in the administration of it.

Just a word with reference to the timber reserves, and to the growing of young timber, especially in the railway belt.

Ever since I started this work I have been endeavouring to set aside forest reserves. Now, the most difficult thing that we have to encounter in this line is to know what we ought to set aside. As Mr. Leamy has pointed out to you, there are certain places in British Columbia which have been burned over, and where, although there is not much merchantable timber, the country is best adapted for the growth of valuable timber, and is covered with a growth of young trees. We intend to set this aside.

There might possibly be a wrong inference drawn from Mr. Jones' remarks. He mentioned the fact that this young timber was mostly jack pine. I think he referred to one district only.

Mr. JONES.—On the Columbia river.

Mr. STEWART.—If you go out farther west you will see that there are some magnificent young forests of fir growing up on the mountain sides.

With regard to the forest reserves, I just want to say this. Within the last two months, before the session was opened at Ottawa, I recommended the passing of a

forest reserve Act, and it was in these terms, that we would have a general Act, which had not existed before (we had the power before to set aside by Order in Council). We wanted something more than that—something more than an Order in Council, because the difficulty with an Order in Council was that influence was brought to bear on the government to have certain areas taken out of the reserve, and it was such an easy matter to pass another Order in Council, whereas an Act of parliament would remove the influence altogether. If it recommended a certain number of those reserves to be set aside, they would be set aside, and there would be no exception to it.

This was one of the suggestions I made to the minister some time ago. After consideration of the whole matter, I was of the opinion that it was better that we should have one general Act of parliament, giving the Governor in Council power to set aside reserves whenever it was considered necessary. I spoke to the minister about it, and he said, 'That does not cover it; the Order in Council can be set aside by another Order in Council.' I said, 'Can't you specify that another Order in Council shall not interfere with this special Act of parliament, so that the Order shall have the same effect as an Act of parliament?' He said that it could be done. We have had the Act prepared, and it is there waiting presentation to the House, and when we get that granted we shall ask the Governor General in Council to set aside those areas, and it will have the effect of an Act of parliament, and will meet the difficulty of having to have a special Act for every reserve that we wish to set aside.

With reference to the province, I have a resolution here that I think will be in order. I think the members from British Columbia will be pleased to have a resolution passed at this meeting, endorsing the resolution passed by the committee some time ago. I do not think that we are going beyond what we should do in passing such a resolution, and I think it will only strengthen the hands of the ministers of the provincial government in carrying out the policy which I know they are anxious to do.

Mr. Green, who is Commissioner of Lands and Works in British Columbia, said last season that he intended to take the matter up this year. I hope it will be done, and that the province will no longer be disgraced by such fearful loss of valuable timber as has taken place within the last few years.

I will put the resolution before the association in the usual way.

Dr. SCHENCK.—Gentlemen, the forestal interests represented by me are not æsthetic in character, nor do they deal with beautiful grounds. It is business forestry in which I am engaged, or forestry from the investor's standpoint, forestry from a commercial standpoint.

It is my opinion that this country requires the preservation of forests on a large scale—not, perhaps, so much the preservation of the forest as the preservation of forestal production. Forestry on a large scale, without doubt, has no birthright in this country, unless it is found to be, or else is made to be, a remunerative investment. Thus it is that I advocate forestry on business lines parallel to those pursued by the agriculturist in the field.

The farmer settling in the prairies finds himself compelled to make a number of investments for the development of his property. These investments consist in the erection of buildings, in the purchase of implements and live stock, in the construction of fences and ditches, roads, and so on. Similarly, the owner of a forest cannot get along without adding to the original timber investment certain other components which tend to bring the entire investment to the highest degree of remunerativeness expressed in the highest possible annual surplus dividend.

In many a case the forest owner is able to pay for these additional investments by reducing the value of the original capital consisting of trees merely.

It would be preposterous to advocate forestry, or the continued use of soil for tree growth, everywhere and under all conditions. Where the trees stand on absolutely agricultural soil there forestry can pursue—if it is a business—the course of forest destruction only, with a view to devoting such absolutely agricultural soil to that production under which it pays best: agriculture.

On the other hand, where the soil is unfit for the plough and unfit for pasture, there the most remunerative industry possible is that of the production of timber.

A legislative body when discussing the advisability of a far-sighted forest policy is of necessity compelled to decide, on the basis of investigation and experiment, what land within the limits of the commonwealth is absolute farm land, and what land is absolute forest land. The policy pursued by the United States has never confronted—perhaps ignored, perhaps avoided—this all important problem. In the eyes of the American, if generalization be permitted, only one legitimate use of the soil is known, and that is agricultural use. To him, forestry is merely a fad.

In your association 'the problem of absolute forest land' has been approached to-day for the first time on this continent. It is difficult, perhaps impossible, to state to-day what land is absolute forest land for all times to come. The conditions which stamp a given acre of land as absolute forest land to-day may be changed by a fluctuating population in days to come, may be altered by increased intensity and by new agricultural methods, may be reversed by the introduction of new crops. In spite of these possibilities, it is necessary that the legislature of a commonwealth delineate *a priori* the conditions which put upon a given quality of soil in a given township the stamp of absolute forest soil.

Future generations may find that the original delineation was wrong; well and good. Future generations may improve upon the present; but do not let us hesitate to do during our day what we consider to be vitally connected with the interests of our commonwealth.

In the United States we meet only too often a mistaken, or a misled benevolence interfering with a far-sighted forest policy. Many a state is desirous, above all, to create 'happy homes for the poor;' to prevent the workman from 'becoming a dependent servant;' to make 'free-holding citizens' out of 'immigrants accustomed to servile dependence.' What is the consequence, only too often, of such benevolence? The very poorest, and hence cheapest land, land forfeited for nonpayment of taxes, land on which the last owner went bankrupt, is thrown open to ignorant immigrants,



MARAINK LAKE, NEAR LAGGAN, ROCKY MOUNTAINS PARK.

ignorant of farming conditions prevailing, ignorant of the duties of citizenship, an element eventually displeased, and, finally, unpleasant because displeased. Such benevolence does not create happy homes in which the fireside gleams cheerfully; it creates homes in which dissatisfaction and envy are raised to the detriment of the country. Settlement must be properly directed, and must be permitted only on absolutely agricultural land.

As far as Crown lands are concerned, there cannot be any doubt but that all Crown lands having the character of absolute forest land should be reserved from entry. Government ownership of absolute forest land, in its influence on the lumber industry, agriculture, navigation and public health, is vastly superior to private ownership of absolute forest land. Large tracts are required for the successful practice of business forestry on absolute forest land, and such large tracts should always remain under control of the Crown. Far-sighted forestal operations can be expected in the long run only from the long-lived community—not from the private individual.

The provincial legislature can enact, for the benefit of Crown forests, any laws which may safeguard the permanency of forests in the very interest of the commonwealth, a possibility which it is rather difficult for the private individual to secure.

The political platforms of the Canadian parties are unknown to me. It seems to me, however, that every party should be willing to adopt a plank reading: 'All absolute forest land shall be singled out; all absolute forest land belonging to the Crown shall be strictly reserved; farming on absolute forest land shall be discouraged.'

PROFESSOR ROTH.—I am delighted to be with you and thank you for the courtesy extended to me. You will pardon my shortcomings, however, for I came here really to listen and to learn; I came for the inspiration which one gathers from hearing discussions such as we have heard this morning. I am prepared, however, to support in the fullest measure what Dr. Schenk has said about state forestry, or provincial forestry, or Dominion forestry being very much superior to private forestry. I have ventured to express the opinion at a former meeting that that was the experience all the world over—that the commonwealth is the good forestry, and almost the only forestry.

With regard to the selection of what is absolute forest land, I think you will have the difficulties that have been met with everywhere. The farm settler made his mistakes. The people have cleared millions of acres of land which have gradually drifted back into forest land, because they were unfitted for agricultural purposes. This mistake was made in Europe, and was repeated in the New England states. I suppose you are all aware of the fact that in the New England states there are several millions of acres of land which were regarded as agricultural lands forty years ago, and were even cleared and improved, and yet have proven totally unfit for continuous farming, and have reverted to woods or are waste. So that to-day the New England states (small country as it is) have several millions of acres less farming land than they had forty years ago.

In the selection of your forest lands you are liable to make 'the same mistakes, and on a larger scale, besides provoking, from the first, the opposition of those interested in the development of the particular section.

In the Cascades and other mountains of course the difficulty is less, and the chance of success greater, but in your province or in Ontario the case is anything but simple. On the same forty-acre lot you may find the best of muck soil and the poorest of sand, and in thousands of square miles of land you have good and poor farm land on the same section of land. Your agent will say: 'It is non-agricultural land;' but the settler says: 'But I know better, and I am willing to risk my reputation, my money and my time on making a good farm home.' Who will decide? We in the states have had experience in this direction both as to farm and mineral lands, and our successes have been few, our errors many.

You will probably find ways of solving this problem better than by simple selection. Certain areas might be set aside temporarily until more need for the lands can be shown; you may require payment for the timber; you may defer settlement until the timber has been cut over, and in various ways do away with the arbitrary feature of the simple and costly selection.

Both in this matter of land selection and in the dealing with people living in your reserves a little tact and goodwill is sure to accomplish a good deal. Show those people that their rights are respected, their interests guarded, and at the same time let them understand that the law is supreme, and must be obeyed.

JUDGE WEIR.—Mr. Chairman, will you pardon me if I refer to just one statement that has been made this morning.

Allusion has been made to the magistrates, and to the somewhat curious fact that, notwithstanding statutes fixing the minimum fine and the maximum fine, certain magistrates in British Columbia and in the state of North Carolina have disregarded these provisions of the law, delinquents being frequently discharged, or fined less than the minimum that is fixed by the statute.

I should like to say that I do not think there is the slightest doubt that where the law imposes a minimum fine the magistrate has no right whatever to condemn the accused to a fine less than such minimum, and further, I should be greatly surprised if the laws of every state and province do not as in Quebec provide a certain means of compelling magistrates to impose the penalty which the law requires—by way of *certiorari*, for instance.

If that fact were known, it would, I think, lend strong aid in such cases as Mr. Leamy and Dr. Schenk have referred to, by compelling the magistrate to pronounce a sentence in accordance with the law.

As one gentleman has referred to the pressure that is sometimes brought to bear on members to reverse Orders in Council, perhaps these magistrates are sometimes under similar pressure. But if they were made aware of the fact that the law imposes a minimum and a maximum fine, within which limits only their discretion may move, and outside of which it has no right whatever to go, they could effectively answer requests for leniency by saying, 'Well, the law is so and so, and I have no discretion

but to enforce it. I have no right even to suspend sentence, and no right to impose a fine outside the limits of the statute. My powers are clearly defined there, and I have no option but to follow it.'

What I have said is quite apart from the inadvisability which we must admit of invoking the law unless in flagrant cases, recognizing the superior advantages of educating the population by more pacific methods, to appreciate the incalculable benefits flowing from the careful nurturing of our forests.

Mr. LEAMY.—With reference to the statement made in connection with the magistrates, and the imposition of a much less fine than the law calls for, allow me to tell you this. Another party farther down the river set fire to a clearing and burned his neighbour's fences and barns. The man who suffered made a complaint to the fire ranger, who had the fellow arrested on a charge of destroying the timber on the land. He was brought before the magistrate (the same one, by the way). The neighbour swore that he had offered to compensate him for the damage done to his place, and yet the magistrate did not find that that was sufficient evidence to convict the man.

SECOND SESSION.

The second session was called to order at 2.45 on Friday afternoon, March 10. The president, Mr. Aubrey White, in the chair.

The secretary read a telegram from Mr. J. R. Booth, one of the directors of the association, regretting his inability to attend the meeting, and wishing it every success. A telegram of similar purport was received from Rev. A. E. Burke, vice-president for Prince Edward Island.

The CHAIRMAN.—There are certain recommendations in the report of the board of directors upon which action is advised. It seems to me that the better way to deal with it would be to appoint a committee on resolutions, and send the report to them so that they can frame the resolutions.

I will appoint as members of that committee Messrs. E. Stewart, F. W. Jones, R. H. Campbell, E. G. Joly de Lotbinière, Col. T. G. Loggie, Jas. Leamy, H. M. Price and myself *ex officio*.

The Rev. Dr. Fyles presented the following paper, which was illustrated by numerous charts showing the insects described:—

FOREST INSECTS.

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

Forty years ago I had the pleasure—never to be forgotten—of a tramp in a remaining portion of the primeval hardwood forest of the eastern townships. It was on the Coffin estate, in the township of Ely, and near the small settlement of Bosco-11398—31

bel. I can recall in a measure the feelings that I then experienced. On every side, as far as the eye could penetrate, arose the tall, straight, symmetrical shafts of trees. Far overhead were the intermingled branches and the dense canopy of foliage, through which no glimpse of the blue sky was obtainable. All below was in a strange half gloom; and there was unbroken silence. Whatever there was of bird or insect life was on the brighter side of the leafy covering above.

Another thing that was remarkable in this forest was the entire absence of undergrowth. One could walk without hindrance in any direction. It was the sort of forest that Fennimore Cooper and Dr. Bird delighted to portray; and I remember feeling that, however unpleasant it might be, the appearance of an Indian in his war-paint would not be out of keeping with the scene.

I was at that time in charge of a new mission, in what was called—and very appropriately called, in those days—Brome Woods; and there I built a church and a parsonage, and bought a lot of land. I resided there for eight years, entering into the every-day life of the people, and so, serving an apprenticeship to wood-craft; and there I gained much of what I know concerning forest insects and their habits.

Pardon me if I dwell for a moment upon the time, the place and its inhabitants. The seeming digression from my subject will help us to understand the conditions under which valuable stretches of standing timber may be placed in danger, and forest insects multiplied to a mischievous extent; and I trust that the retrospect will not be without its lessons for the present.

The settlement on which I lived lay at the head of a beautiful valley in the heart of the Brome and Farnham mountains. A stream ran through the middle of it, large enough to run a small mill, in which was a pair of stones for grinding Indian corn, and an old-fashioned up-and-down saw, which, when in operation, reminded one of Tennyson's

————— 'dry

High-elbowed grigs that leap in summer grass'—

the grasshoppers and crickets which see-saw their spiny shanks against their hard wing-covers, and so produce the stridulations that enliven the autumn evenings.

After running for several miles the stream fell into a beautiful little lake at the end of the valley.

The first settler in the district, Mr. John Shufelt, was still living on an adjoining lot to mine. The people generally were an exceedingly kind-hearted people, honest, industrious and hospitable; but oh, they were sadly lacking in economy in their dealings with the forest.

Excuses can be made for them; they formed a community living to themselves; they were seven miles from the nearest railway station, which was on the Col. Foster road to Waterloo. Except their own requirements there was no demand for forest products—with the one exception of hemlock bark; and that sold for two dollars per cord only. It was bought for the small tanneries in places round.

On my land and extending beyond it was a stretch of first growth maples. How barbarously the trees had been used. A former proprietor in his sugaring operations had tapped them with an axe, cutting sloping gashes six or nine inches long.

The trees were left in a state to invite the attacks of borers. They abounded with horn-tails and beetles—they were doomed, and only fit for firewood.

The settlers had beaten back the forest here and there, till they came to the black timber on the slopes of the mountains; and on the borders of this, giant hemlocks were left exposed to the winds that sometimes rushed up the valleys and mountain defiles with great fury. Again and again I saw tree after tree tumbled over by the wind. I paced one of these fallen veterans, and found that it measured ninety feet from the roots to the first branch. Generally speaking, the trees were left where they fell; and, as nature abhors waste, they were soon attacked by beetles and Siricidae, which multiplied in them exceedingly.

The woods were full of brush and tops of trees, where men had cut their winter's fuel. Brush fences, for keeping in the cattle, ran in different directions. Such a

fence was a regular *abattis*. Trees in a line were felled one upon another, and the interstices filled in with smaller trees. It can readily be believed that under such conditions forest fires were not infrequent. A fire of this kind on one occasion gave me a fright. I was driving home at night when I saw a great glow of fire in the direction of the church. I whipped up my horse and reached the top of a commanding hill. Yes, I said, it is the church; the fire is mounting the rafters and the steeple. But, on coming yet nearer, I perceived the dark outline of the building against the glow, which was that of a forest fire climbing the mountain beyond.

At the present day the pulp manufacturer is undoubtedly a great boon to the small farmers. We see piles of prepared logs at nearly every country station along our railways. I have often wondered whether the bark from these, and the brush and tree-tops, are left scattered through the woods, to take fire some day, and spread devastation over the land.

But I must without further preface come to the consideration of my subject.

Insects fall naturally under two heads: biting insects, *Mandibulata*, and sucking insects, *Haustellata*. To the former belong the borers in the tree-trunks, the twig-girdlers, and the leaf-devourers; to the latter, the cicadas, the scale-insects and the plant lice. It is difficult to tell which of the two orders is the more hurtful to vegetation. In 'God's great army' the most insignificant corps becomes occasionally, by force of numbers, a formidable array.

In the summer of 1881 the maples presented a strange appearance. Their foliage became brown and withered, as if autumn had come before its time. On examination it was found that countless multitudes of the larvæ of a minute species of moth, *Depressaria acerifoliella*, Haworth, had assailed the foliage. The larva of this species bites disks from the leaves and binds them together with a silken filament, so constructing a case for itself. It protrudes its head and forelegs from its case, and moves about the leaf eating away the parenchyma.

In 1893 another remarkable insect attack upon the maples was witnessed: nearly every leaf of the trees was drawn out of shape—its edges being fastened together with a fine web. Within the tent thus formed was a curious brown case, somewhat in the form of cornucopia; and snugly ensconced within the case was a green larva with an amber-coloured head. This truly was one of the most economical of insects!

Longfellow has said:—

'O thou sculptor, painter, poet!
Take this lesson to thy heart:
That is best which lieth nearest,
Shape from it thy work of art.'

And this larva had used up its *exuviae* and *excrementa* in forming a case for itself—an inner retreat. The leaf was its shelter and store of food; for it fed upon the parenchyma, and left only the veins and skin. The case was its stronghold. The name of the insect is *Semasia signatana*, Clemens.

Our native insect pests are bad enough, but the insect foes that we most dread are the foreigners—the immigrants, for the reason that, '*It is better to have to contend with the devil you know than with the devil you don't know.*'

The advent of *Nematus Erichsonii* is an old story now. This pest destroyed our tamaracks in the eighties, and it—

—'still goes marching on.'

Mr. A. H. D. Ross in his excellent article on 'The Forest Resources of Labrador Peninsula,' tells us that, 'Of late years the European larch saw-fly has destroyed most of the larch between Lake St. John and Lake Mistassini, and the pest is spreading northward.'—*Can. For. Journ.* V. I, No. 1, page 32.)

The Gipsy moth, the Brown-tail moth, and the Leopard moth are new importations to the country south of us.

So great a plague has the Gipsy moth been in Massachusetts that the legislature in four years (1890-94) expended \$275,000 in the effort to exterminate it, and had not succeeded; and further appropriations were required.

The larvæ of the Brown-tail moth are also injurious in Massachusetts; and as their fine barbed hairs are easily detached, and carried in the air, they often settle upon the passers-by, work their way into the pores of the skin, and cause much suffering. They are greatly to be dreaded. A lady wrote concerning them: 'We first noticed the caterpillars in 1897, and we could do nothing with them. We had to take brooms and sweep them away from the doors. They ate the leaves off the trees, so that we did not get any fruit that year, or in 1898. The caterpillars seemed to come all at once. We were all poisoned with them. The houses were full of them. They were a sight. They were on everything,—fences, shrubbery and flower bushes. The place was fairly alive with them. They were even in the bed rooms.' (Mrs. Peter Mooley, in Fernald and Kirkland's Report on the Brown-tail Moth, 1903, page 19.)

Fancy the good lady with her broom, like Mrs. Partington, sweeping back the sea.

The larvæ of the Leopard moth are *borers*. The species has in some way been carried from Europe to New York.

In Canada a very common and mischievous pest is the Forest-tree Tent Caterpillar, *Clisiocampa disstria*, Hubner. This also flourishes more abundantly some years than others. In 1899, it and its congener, *Clisiocampa Americana*, Fabricus, were so abundant in the counties of Drummond and Shefford, that they stripped the second-growth trees bare. Hordes of them crossing the railway, brought the train to a standstill—the rails having become slippery with crushed larvæ.

The larva of *C. disstria* can readily be distinguished from that of *C. Americana* (the Orchard Tent-Caterpillar.) It has a *blue* head, and a row of silvery spots down the back; while the other has a *black* head, and a continuous white dorsal line.

I consider *C. disstria* the worst of the leaf-eating foes of our hard-wood trees.

The larvæ of the Tussock Moths, *Notolophus antiqua*, Linneus, and *Notolophus leucostigma*, Smith and Abbot, are handsome but mischievous. They are tufted along the back, as the generic name indicates. Those of the latter species may be known by their red heads. Both kinds feed upon a variety of trees. Dr. Felt says of *Leucostigma*: 'This species feeds readily on elm and maple leaves, displaying a special preference for horse-chestnut and linden, and frequently does considerable damage.' (Bulletin, No. 27, N. Y. St. Mus. p. 41.)

With us at Quebec both kinds particularly affect the white willow. In 1897, which was a great insect year all over the country, the white patches of the eggs of *N. leucostigma* could be seen, in great numbers, on the trunks of the willows on Mountain Hill.

The males of these Tussock Moths are called "Vaporers" because of their jaunty flight. They skip hither and thither, as Wood says—'Like Cœlebs in search of a wife.' The females, on the other hand are most exemplary in their behaviour. St. Paul, if he had been an entomologist, would have admired them greatly—they 'go not from house to house.' They remain upon the cocoons from which they crept. There they await their mates; there they lay their eggs; and there they die.

We must not give them too much credit for their domestic virtues. They are aided by the force of circumstances in conducting themselves well—they have only rudimentary wings.

There are a number of large motths, the larvæ of which, under peculiar circumstances, might become injurious to forest-trees. Their very size makes them formidable. The larvæ of the Hawk-moths, *Sphinx chersis*, Hubner, and *Sphinx Kalmia*, S & A., feed upon the ash, though I frequently find them on the lilac. This is not surprising, for both the lilac and the ash belong to the same family of plants, the *Oleaceæ*, of which the olive-tree is the type.

The larva of *Ellema coniferarum*, S. & A., feeds upon the pine. I wish the species were a little more common, for in all these years, I have obtained only one specimen of the moth for my collection.

The larvæ of *Ceratonia Amyntor*, Hubner, feed upon the elm. They have four prominent horns upon their shoulders; and Harris on this account gave them the

name of *Quadricornis*. There are peculiarities in the form and habits of the larvæ of this species that are well worth notice.

You will remember that the leaves of the elm on the underside are strongly and regularly ribbed; and that they are often curled over on one side in a roll. The *Amyntor* caterpillars are of the same colour as the leaf; and, along the sides they have seven oblique, raised, rough lines. They lie extended along the edge of the leaf, and in that position very closely resemble the roll of the leaves near them. Nor is this all: in the autumn the leaves of the elm become rusty-brown in colour; and, that the resemblance to the leaves may be maintained, the caterpillars become of the same hue. They afford in this a remarkable instance of what is called *Mimetic Analogy*.

The larva of that stately moth, *Triptogon modesta*, Harris, feeds upon the poplar; and that of *Cressonia juglandis*, S. & A., upon the black walnut, the butternut and the hickory.

Upon a variety of forest trees, the larvæ of those magnificent Saturnians,—*Attacus Cecropia*, Linneus (the largest of our moths), and *Telea Polyphemus*, Cramer, are to be found; whilst those of *Actias Luna*, Linneus, (the most beautiful of all our moths) feed upon the butternut; and those of *Hyperchirea Io*, Fabricius, upon the elm, the bass-wood, and the balsam-poplar. The last named larvæ are set with stinging spines.

In the west the larva of that splendid moth *Eacles imperialis*, Drury, feeds upon the white pine; and the larva of *Citheronia regalis*, Fabricius—which has as many horns as the Beast in the Apocalypse, and is locally known as the 'Hickory Horned Devil'—feeds upon the black walnut, butternut and hickory.

I have never heard, however, that the caterpillars of these very large insects have done very much damage.

Of insects that injure the roots of the trees, these call for our attention:—

The White Grub, which is the larva of the May Beetle, *Lachnosterna fusca*, Fröhling. The grubs of this species are very general feeders upon the roots of plants. They have been found exceedingly injurious to young pines and tamaracks.

A formidable foe to the poplar, basswood and oak is *Prionus laticollis*, Drury, the Broadnecked Sawyer, which bores into the roots of the trees. I have not found it at Quebec; but I have seen a specimen that was taken at Sherbrooke. As it works under ground, its ravages are not easily detected.

But of the underground insect foes of the forest trees, the Cicadas are, I think, the worst. Happily this part of Canada is out of the range of *Tibicen septendecim*, Linneus, which spends seventeen years at the roots of trees, imbibing at the very founts of vegetable life. But *Cicada canicularis*, Harris, is very abundant in these parts. If you go into the woods in autumn you will hear the shrill sound produced by their little tambours or side drums which vibrate, as the boys say, 'for all they are worth.'

We have another species of Cicada, *Tibicen rimosa*, Say, but it is not common with us.

The habits of the Cicadas are interesting. The females cut grooves in the twigs of their favourite trees; and in each groove lay a row of eggs. The eggs seem to be nourished by the sap in the twigs, for they become enlarged. The newly hatched larvæ drop to the ground, and burrow till they reach the roots of the trees. Into these they drive their beaks, and then, for three years, live, by suction, upon the sap. At the end of that time they work their way out of the earth, climb for a short distance up the trees, and then writhe and twist, till their skins burst down the back. Out of the rent, in every case, creeps a perfect insect, drawing its legs out of their former enclosures, as out of boots. In about ten minutes (I have watched the process), the air has penetrated to every part of the insect's body; its wings have been shaken out of plait, into their full dimensions; and the creature is ready for flight.

If you ask me, what should be done to check the cicadas? Well, I know what I should do as regards the orchards, the sugar-bush, and the inclosed woods. I should.

in the autumn, turn a sounder of swine into them. The animals would not only eat the wind-fall apples, the acorns and beech-mast and fungi, they would grub about the roots of the trees and devour the immature kinds of flies, beetles and moths. I have seen the experiment tried; and the pigs thrive.

But a part of my subject of more interest to lumbermen is that relating to the Borers—and truly their name is *legion*.

A number of beetles belonging to the family Buprestidæ bore in the pine. Two splendid beetles of this family are *Chalcophora Virginiensis*, Drury, and *Chalcophora fortis*, Le Conte.

C. fortis is the largest and handsomest of our Buprestidæ—and perhaps, as regards our collections, the rarest. Mr. Hague Harrington speaks of it as rare at Ottawa; and I never met with it at Montreal, nor in the eastern townships; but one day I was walking under the cliff, at Hadlow, on the south side of the river, when I found specimens of both *C. Virginiensis* and *C. fortis*. There were no trees near in which they could have bred, and the insects were fresh and perfect. The discovery was a marvel to me till, on looking to the river side, I saw, stranded, a crib of pine timber; and then the mystery was solved. This incident shows how easily insects may be spread over the country.

There is a beetle called the Titillator, *Monohammus titillator*, Harris, which somewhat resembles, both in appearance and habits, the beetle called in Scotland the 'Timberman.' The Titillator, and its congener, *Monohammus marmorata*, Randall, make damaging tunnels in the trunks of the pine, and they sometimes turn up unexpectedly in places far from their native forest.

One afternoon I was sitting in my study in the rectory at Cowansville, which was then a new building. Suddenly a strange object came down with a clatter upon the book I was reading. It was *M. titillator*. Where did you come from? I said. I looked around and soon discovered a hole it had made in the casing of the door. What an experience that insect had gone through. It had sprung from an egg laid in a crevice of a standing pine. The tree into which it had eaten its way had been cut down, hauled through the woods, soaked in the mill-pond and cut up by the circular saw. The boards had been banged about in the piling, had been kiln dried, and then passed through the planing machine. That particular board in which was the habitation of the beetle had been worked by hand in the sash and door factory, planed, and fitted, and hammered, and painted, and varnished, and, surviving all the rough usage, and escaping all the deadly weapons, there lay *Monohammus titillator* snugly ensconced in his square inch of the wood, reserving himself till he could present himself as a gentleman.

The larvæ of a number of these longicorn beetles are borers in various forest trees. Those of *Monohammus scutellatus*, Say, play sad work with the spruce. A fine spruce, growing in the premises I rented some years ago, broke off near the ground. I found that, for about three feet upward, the trunk had been bored through and through in every direction by the larvæ of this beetle.

The larva of *Plagionotus speciosus*, Say, is a borer in the maple. That of the fine beetle *Saperda calcarata*, Say, bores in the poplar. The apple tree borer, *Saperda candida*, Fabr., works also in the American mountain ash and the thorn. The larvæ of *Saperda vestita*, Say, *Saperda tridentata*, Olivier, and *Cyllene pictus*, Drury, bore respectively in the bass-wood, the elm and the cedar (*Thuja occidentalis*, Linneus).

Time would fail me to enumerate the small beetles which mine between the bark and the white wood, and which at times do great harm—volumes might be written upon them.

But I must not pass over the most important of the *Lepidopterous* and *Hymenopterous* borers. Of the former we have remarkable instances in *Cossus centerensis*, Lintner, which bores in the balsam poplar; in *Prionoxystus robinia*, Peck, which, as its name implies, bores in the locust or false acacia, and in *Prionoxystus Macmurtrei*, Guerin-Meneville, which Mr. A. F. Winn has found upon oaks on Mount Royal.

Some thirty years ago I discovered *Cossus centerensis* at Cowansville, Que. At that time the insect was unnamed and undescribed, but I was not then sufficiently ac-



No. 4. — By preventing evaporation from the surface of the snow in winter and by preventing the rapid melting of the snow in spring, the forest adds very greatly to the volume and regularity of the stream flow.

quainted with the Cossidæ to know this. It remained for that able entomologist and excellent man, now gone to his rest, Dr. J. A. Lintner, State Entomologist of New York, to name and describe this fine insect.

The moth lays its eggs in crevices of the bark of the poplar. The young larvæ eat into the tree, and as they grow enlarge their tunnels. When they approach the end of their larval career they bite their way to the surface, leaving only a thin flim of bark between them and the outer air. They then retire into their tunnels, beyond the reach of the woodpeckers, to undergo their pupal change. But when the time arrives how can the footless chrysalis reascend the tunnel that the moth may escape? Nature has provided for this. Around each of the abdominal segments of the chrysalis is a row of serratures or teeth which give it a hold upon the sides of its tunnel and enable it to work its way to the outlet. It then thrusts itself about half an inch through the opening. Its case bursts open, and the perfect insect escapes.

The horn-tail, *Tremex columba*, Linneus, is a creature of formidable appearance. It has a stout aciform, but *hollow* ovipositor, which extends in its sheath from the middle of the underside of the abdomen to a length of half an inch beyond its extremity. The Tremex drives this instrument through the bark and into the soft wood of the tree (which is usually a maple or a beech), and then by muscular action it passes its eggs through the ovipositor to the end of the wound it has made. The Tremex is, in many instances, so exhausted in the process that it has not strength to withdraw its ovipositor and perishes at its post.

As soon as the young larvæ are hatched they begin to tunnel in different directions, enlarging their passages as they grow.

Other horn-tails of like habits to the Tremex are *Sirex albicornis*, Fabricius, *Sirex flavicornis*, Fabr., and *Paururus cyaneus*, Fabr., and these assail the pine.

It must not be supposed that nature has left these borers to multiply and work their will without a check. If she had, the forests would long ago have disappeared. No, a number of formidable ichneumon flies, with yet longer ovipositors, are engaged in reducing their hosts.

Indeed every kind of destructive insect has its foes. Insectivorous birds and predaceous insects under ordinary circumstances keep the spoilers within bounds. And man may give his assistance to nature for the same end. For instance, he can preserve the woodpeckers and soft-billed birds. The man who would shoot a woodpecker deserves to be ostracized. I wish I could hear more frequently the boisterous laughing call of that noble bird, the Bonnetted Woodpecker, *Picus pileus*. Alas, its beauty has been to it 'a fatal gift.' It has drawn the attention of the fowler.

When a tree is found with horn-tails affixed in the position I have mentioned, it may be known that that tree is a hopeless case. It should be felled, and split for stove wood, and then certainly one colony of borers would be destroyed.

The proper and timely burning of bush-piles will do much to lessen the numbers of insects. Brush should be burned, not when the ground is covered with dry herbage and dead leaves, but *when vegetation is lush and green*; and this is the time when insects abound, and when fire and smoke would work havoc amongst them.

It would be, I think, for the public good if our government would appoint, in every county in which lumbering operations are being carried on, and new settlements formed, *Government Foresters*, intelligent men of high character. Their duties should be to preserve the game, destroy the wolves, regulate the burning of the debris of the lumber camps and clearings, see to the due observance of forest-laws, and generally to conserve woodland interests. They should wear a uniform that their office might be known. I think that such government *employés* would have important duties to perform, and that their life would be an interesting and attractive one. I can fancy them taking up Amien's song and saying:—

"Under the greenwood tree,
Who loves to *roam* with me,
And tune his merry note

Unto the sweet bird's throat,
Come hither, come hither, come hither;
Here shall he see
No enemy,
But winter and rough weather."
and—*mosquitos!*

PROFESSOR ROTH.—I have been most delighted with this excellent resumé of the subject, and wish to say that it is perhaps the best I have ever had the pleasure of listening to. It has brought before us something which very few appreciate to its full extent.

I have enjoyed listening to the paper doubly, because of its beautiful and complete presentation and because it brings before us a subject which we are apt to shove aside as unimportant.

The average timberman in the United States, and I suppose the same may be said of his Canadian brother, is one who thinks of the man who talks of insects as one of those enthusiasts—a 'bug hunter.'

The CHAIRMAN.—A 'bug sharp.'

PROFESSOR ROTH.—Yes, 'bug sharp.' The average timberman looks upon him as simply one of those persons who chase bugs just for the pleasure of making a collection of them, and to talk about them. Very often he fails to see that the 'bug hunter' as he calls him, is the man to discover and to teach us to fight the greatest enemy of the forest.

We are apt to think of the forest fire as the greatest enemy of the forest, and we are always talking of means of overcoming it, and in the heat of the discussion we are apt to forget sometimes that we have another foe and that long after the fire we still have to deal with these 'little people.'

These 'little people' are with us, and have always been with us, and they seem to be with us whether we take care of the forest or not.

If you take the trouble to run over the little calendar which the forester in Germany carries in his pocket to make notes of things, you will find there recorded what he shall do from month to month, and you will invariably find one of the longest paragraphs devoted to the insects that he shall look after.

We have never fully learned the damage we have suffered. As an instance, permit me to call your attention to the case of the Black Hills.

People chopped down timber summer and winter. Some one suggested that it might be better to do the chopping in the winter only, but they kept on chopping, and the first thing they knew they had a pest of the little brown bark beetle, an insect so small that most people would hardly notice it. And what was the result? In 1902, one could stand on an eminence near Spearfish creek and see at one glance at least four townships of timber practically destroyed by this minute beetle, and most people knew nothing of what the real trouble was, and still less about what could be done for it.

Dr. Hopkins, of the Department of Agriculture, studied the beetle; he recommended the restriction of the cut to the infested timber, and recommended it removed as quickly as it became infested. As soon as the timber becomes infested it begins to change colour, so that this method is perfectly feasible. The result has been very beneficial. The pest is not one of these mysterious things that cannot be fought. If people of the Black Hills had restricted the cut of the timber to proper seasons or had cut all the infested timber by restricting the cut of the timber to proper seasons or could have fought the beetle back to certain lines, where the birds and the other natural enemies (of which we have heard in the Rev. Mr. Fyles' paper) would have easily taken care of it and brought back the equilibrium.

But people did not do that. They did not know what to do until Dr. Hopkins told them what they were really suffering from.

In the country we suffered losses from insects to the extent of millions of dollars every year. Most of the time the insect pest affects people in such a way that they make no complaint. So far they have endured it just the same as drought, or frost, nothing is said about it, and very little inquiry is made as to possible remedies.

I believe that papers of the kind just read by the Rev. Mr. Fyles, and instructions given along the same lines will bring home to the people who are interested in the forest the possibilities of the insect enemies, and will get the people interested, not for any sentimental reasons, but because they want to be rid of a costly and dangerous enemy or at least want to know how to fight them and thus restrict the possible losses.

COLONEL LOGGIE.—Before beginning my paper I would like to tell you this. In the first place, I wish to thank the association for giving me an opportunity of reading a paper at its annual meeting, and in the second place I would like to explain that I am not an expert in forestry. My duties do not lead me into the forest. I am simply what you might call an 'inside man,' and have never had as much opportunity to study the forest as I would like.

Perhaps I might also tell you how I came to be here and to read a paper before you. Your good secretary was roaming around Nova Scotia and New Brunswick looking for somebody to read a paper. I don't know if he found anybody in Nova Scotia, but he came to me looking pretty careworn and said: 'I wish you would prepare a paper.' Well, I kind of took pity on him and said that I would do my best.

Now, you all know that an 'inside man' has very little opportunity to study the forest as it really is. He has to keep his nose to the draughting table, or some other table, and the only chance he has of seeing the forest is when he takes his holidays.

I am very sorry that the premier of our province, Hon. Mr. Tweedie, has not found it possible to be present. He is a gentleman who takes a great deal of interest in forestry and all that is connected with it.

In New Brunswick the forest expert is hard to find. We have a great many people who take an interest in forestry and who are lovers of the forest, but I venture to say that we have no really prominent expert in forestry. The late Edward Jack was probably the only man, of late years, who could be called an expert in the matter. He was

sent by the government to the Forest Exhibition in 1884 in Edinburgh, but I do not think it was followed by anything special.

I was speaking to the lieutenant-governor of the province the day before yesterday, and he was very sorry he could not attend. Our legislature opens to-day, and you can easily see that it would be very difficult for those gentlemen who are connected with it to be here.

NEW BRUNSWICK'S FORESTS.

BY COL. T. G. LOGGIE, CROWN LANDS DEPARTMENT, FREDERICTON, N.B.

From its earliest history, the products of the forests of New Brunswick have held a first place in its trade exports. Although a large section of the province is admirably suited for agriculture, particularly the magnificent intervalles of the Rivér St. John, stretching almost from its mouth upwards to the limits of the province, a distance of 300 miles; of the Miramichi, Kennebecasis and other valleys; the broad salt marshes of the upper Bay of Fundy; still lumber has remained King.

New Brunswick contains an area of 17½ millions of acres, of this acreage 10½ millions are granted lands and 7½ Crown Lands, and the province is everywhere drained by large rivers, with innumerable branches, almost locking each other at their source.

It will thus be seen that lumbering can be carried on advantageously, as one has yet to find a section of the province, where logs cannot be cut and driven down these waterways to market. Of these rivers, the St. John is the largest, and drains nearly one half of the province. Next in importance is the Miramichi, its watershed embracing about 5,000 square miles.

The settled portions of the province are principally along the river valleys and coast line; the interior forming one vast timber preserve and embracing a territory 80 miles wide and 100 miles long, without a habitation of any kind, save the lumberman's and trapper's shanty and no sound, except the ring of the woodman's axe or the call of the hunter. Here is a domain fairly free from the ravages of fire, and timbered with all kinds of valuable lumber. The greater part of this territory is unfit for cultivation, lying on the granite and boulder formation, although the northern sections, in its approach to the Restigouche river runs into the Upper Silurian belt, and consequently has good deep soils. Everywhere over the belt both black and white spruce abounds, some pine and vast quantities of the hardwoods that have scarcely been touched, also large quantities of the finest and largest cedar in eastern Canada.

Leaving this section of the province, and turning our attention to the country lying southerly and south-westerly of the south-west Miramichi, and extending to the Bay of Fundy, we find a territory heavily cut and in places badly burned. The Nashwaak river is an exception, where Alexander Gibson, our lumber king, still reigns supreme.

FOREST FIRES.

In reading reports from time to time, of the timber domain of Canada, as well as of the United States the same story is read and re-read of devastation by forest fires. New Brunswick has not escaped. The great Miramichi fire, that swept through this province in the year 1825 is a matter of history. Scarcely a year elapses, without more or less fires, although of late we have suffered less perhaps, than our neighbours.

Our legislature and lumbermen have grappled for years with this great question, and the government has still under consideration more effectual methods for check-

ing the ravages of forest fires. In the year 1885 the legislature passed the Act now in force. It contains provisions prohibiting fires from being set between the first day of May, and 1st December, except in clearing land, obtaining warmth or necessary industrial purposes, and then precautionary measures to be taken. It is the opinion of many that no fires should be set at all, except under a written permit from the fire warden of the district. No fire to be set in the forest without first clearing away a spot five feet from where the fire is to be set. The Act provides that lumbermen shall call their crews together, read the Act and warn them as to setting of fires.

The railway companies are required to provide their smoke-stacks with a bonnet, or screen, interwoven at the draught with three wires (three times as many wires for wood as for coal) and sectionmen to pass over their sections once a day. The right of way to be cleared of all combustible material. A further Act provides that \$2,000 can be expended in any one year, in carrying out the provisions as enacted. It is the opinion of many that while the provisions are to a large extent admirable, this Act can only be carried out by a well selected corps of foresters and fire wardens, permanently employed by the province, and along the same lines as the regulations of the province of Ontario. These wardens could act as sealers of lumber, fishery and game wardens, Labour Act commissioners and in other capacities of a public nature. The outlay for such a service would be large, but the results would be far-reaching and in the best interests of the province. There is no question in New Brunswick today of more importance than the preservation of the forests.

The total area remaining in the possession of the Crown, as stated at the outset, is in the vicinity of 7¼ millions of acres, of which quantity, 6¼ millions are under timber license, the remaining one million acres, being to a large extent, burnt and barren lands. Licenses from the Crown are issued annually, but there is an understanding they will run to August 1, 1918. The stumpage on spruce, pine, fir and cedar is \$1.25 per M. sup. ft., and the yearly rental is \$8 per sq. mile.

The average annual cut for the last five years has been 120 millions of sup. feet, classified as follows:—

Spruce and pine.	95 millions sup. feet
Cedar.	15 “
Hardwood.	4 “
Hemlock.	3 “
Fir.	3 “
<hr/>	
Total.	120 “

Twenty-six sealers are employed to survey this lumber. There is a chief sealer in addition, whose duty it is to oversee the sealers under him and report to the department the various operations being carried on and the probable cut of each operator.

There are restrictions in the licenses, as to the cutting of undersized lumber, and no tree is allowed to be cut down that will not make a log 18 feet long and 10 inches at the small end. The government have, at various times been strongly pressed to allow undersized logs to be cut for pulpwood, but so far these requests have been met with refusal. In some sections where spruce has been found to be of a stunted or slender growth and would never mature to sawlogs, the government have allowed the lumber to be removed, but the quantity so cut has been very small indeed.

In administering the forests of the Crown, one of the greatest difficulties met with is to guard the department against fraudulent applications for land, under the guise of settlement.

The tendency in applying for settling lands, is to secure a lot sufficiently timbered so as to allow the settler something at the start he can turn into money, either by cutting the logs himself or selling his chance to some one else, which is directly contrary to the provisions of the Labour or Settlement Act. The greater number of those applying have no other motive than to cut off the lumber, and then allow their applications to lapse.

The department is continually holding up applications, where reports have shown the lands are unfit for settlement. The licensees naturally protest against any such incursion into their limits, and the department is left to adjudicate the matter, often to the displeasure of the settler or the licensee.

A common practice is to squat upon Crown lands, without application, clear a small portion and erect a hut. In time, the department is forced, by some settling conditions, to approve his application, although in many cases the location is made among good timber. One can easily see the result. The cleared portion must be burned and the surrounding forest is at once placed in jeopardy.

The separation of purely agricultural lands from the lands only fit for timber growth is to my mind, one of the greatest needs in our forests to-day. I have reference to lands at present only in the vicinity of settlement. Such an undertaking would, no doubt, involve a large expense. Only persons should be employed for this work whose judgment could be relied upon as thoroughly competent in judging the soils. Following this up with a corps of competent foresters for keeping down fires and supervising the cutting is the first essential to the preservation of our forests.

PRIVATE OWNERSHIP OF LANDS.

Of the lands that have passed from the Crown, I will only deal with three of the largest tracts. The grant to the New Brunswick Railway, for building a narrow gauge railway from Fredericton to Edmunston, a distance of 167 miles, was 1,647,772 acres, and embraces lands principally on waters tributary to the River St. John and including parts of the counties of York, Carleton, Victoria and Madawaska.

Mr. W. T. Whitehead, the company's agent, has this year, given me the following estimate of the quantity of lumber on these lands:—

Spruce	3,014	million sup. feet.
Fir	3,014	"
Hardwood	4,743	"
Cedar	406	"
	11,177	"
Total	11,177	"

Of this large tract the company has sold only 600 acres. Fully one-third is situate on the upper Silurian formation, representing some of the best settling lands in the province, but the policy of the company is not to sell any for farming purposes, and the progress of that section of the province is consequently retarded.

It has been proposed that the government should buy back the settling portion of these lands, which if accomplished at a reasonable price, would, in the opinion of those who have studied the question, be productive of great results.

The next largest ownership is that of the Alexander Gibson Company, who hold the fee simple on upwards of 225,000 acres located principally on the Nashwaak river, and absolutely controlling the lumber lands on that river. Mr. Gibson purchased the greater part of these lands in the early sixties and has been cutting them ever since, without a break. The growth is principally black spruce, which replenishes itself about every ten years, in cutting down to merchantable logs.

In a conversation I had with Mr. Gibson, some ten years ago, he estimated these lands as worth to him twenty dollars per acre. It must be understood, however, that any such high valuation can only be explained by the peculiar advantages possessed by the owner. Over 1,000 millions of spruce have been cut on this property since Mr. Gibson's purchase, and judging from reports, the lands to-day are fairly abundant in timber.

It may be mentioned here, that as much as 20,000 sup. ft. per acre of spruce has been cut on choice bits of this property. In this connection, I may mention the cut on a block of 3,000 acres I purchased on the Keswick river, in the year 1887, a tract not particularly well timbered at the time, but fast growing black spruce. In that

year, I let the stumpage on one million feet. Again in 1892 it produced two million feet and again in 1900 the operator paid me stumpage on two million more. In 1897 I am looking for a further crop of two millions. So much for the old Scotch proverb:—

‘Be aye stickin’ i na tree; it’ll be growin’ when ye’re sleepin’.’

The lands of Mr. Gibson have not been subject to much forest fire, partially owing to the distance from railway lines, but more particularly to the vigilance which the owner displays in dry times.

Another large tract is that located on the upper waters of the south-west Miramichi, embracing an area of 160,000 acres, which, I understand, has lately passed into the hands of an American syndicate at a price of upwards of \$600,000. The timber growth is much the same as on Mr. Gibson’s property.

SURVEYS OF TIMBER LINES.

No timber lands can be properly managed without a system of carefully prepared surveys and block timber lines, as well as accurate maps. Generally speaking the Crown Lands are blocked off in areas of six square miles, the lines running astronomically north and south and east and west, $2\frac{1}{2}$ miles each way. On some rivers blocks are laid off 5 miles each way, and in the Restigouche country the blocks are as small as 1,000 acres. The practice is to run the base lines 5 miles apart and large expenditures have in this way been made by the government. The sub-divisions of the licenses are surveyed after first getting an order from the Crown Land office, accompanied by a plan, showing in detail previous lines run, while the order contains a description of the lines to be surveyed. All these surveys have been made by blazing lines through the forests with the ordinary compass. The system is open to considerable objection, but it is found practically to satisfy those whose interests are involved.

A recommendation has been made to erect iron monuments at the corners of blocks, it being found that corner posts soon decay or are swept away by forest fires.

VALUES OF TIMBER LANDS.

My experience would warrant the statement that timber lands have doubled in value within the last ten years.

For the right to cut on Crown Lands, not including stumpage, fairly good timber lands would be worth \$200 per square mile and first-class lands \$500 and over a square mile, according to location. The price of soil right lands has probably increased in the same proportion, prices ranging from two to five dollars per acre, although some properties have lately been sold much above these figures and running as high as ten dollars per acre for prime black spruce lands, easy of access and comparatively free from fire danger.

In summing up this paper, which has already grown to too great a length, I would recommend:

- 1st. More effectual means for the protection from fires.
- 2nd. The separation of the timber lands from agricultural lands.
- 3rd. A carefully selected corps of permanently employed foresters.
- 4th. Restrictions as to the cutting of undersized timber.

Perhaps I may be expected to add reforestation, and while much can be said about tree planting, I am of the opinion our efforts at present will be better met by a more efficient preservation of our forests and more careful cutting of the standing timber. New Brunswick has yet a noble heritage in her forests. Let us then work together to preserve this heritage so that we ourselves and future generations may reap the benefits which nature has so lavishly bestowed.

In conclusion, again, let us not forget the old Scotch saying:

‘Be aye stickin’ in a tree; it’ll be growin’ when y’re sleepin’.’

Mr. STEWART.—Mr. Chairman, I would like to ask a question. I understood Col. Loggie to state that the limits had been gone over every ten years. I would like to have that point made clear. What size do they cut in order to go over it again in ten years and get another cut profitably? I may say that I understood the same thing from Senator Snowball some time ago. He gave me to understand that he cut his limits every ten years. What I would like to know is do you get the same quantity each cut, of course omitting the virgin cut. Subsequent to the virgin cut what quantity do they get, and is it the rule to cut every ten years?

Col. LOGGIE.—It is only in certain sections that they do that. It is only in a few places that the spruce is so fast growing as that. I was speaking of Nashwaak, and Mr. Gibson, the owner of that property, operates over the same ground every ten years and gets a good proportion of logs eighteen feet long and ten inches at the small end. He practically gets as much lumber each time he goes over the ground.

Mr. STEWART.—It pays him to go back every ten years?

Col. LOGGIE.—When he cuts the merchantable logs it lets the air and light get in which makes the growth considerably faster.

The CHAIRMAN.—About what area would he go over and about how much would he take out?

Col. LOGGIE.—His average cut is about twenty-five or thirty millions per annum. He has cut over a thousand million since he has been lumbering at Nashwaak.

Mr. STEWART.—What area is his forest?

Col. LOGGIE.—225,000 acres.

Dr. CLARK.—There was just one point that I would like to call attention to, and which I would like to hear discussed and have the opinion of the association on, as well as the opinion of the lumbermen from the west.

The government of British Columbia has recently doubled the ground rent and has also increased the stumpage rent. The ground rent has been increased from four to eight dollars. I think that is bad policy.

Mr. STEWART.—From four to eight dollars a square mile?

Dr. CLARK.—Yes. By putting the ground rent high the tendency will be to force the lumbermen to cut more, so that he can get his lumber off and abandon the land. On the other hand, if you put the increase on the stumpage you tend to conserve the land. I think the west is just now suffering from over-production, and this increase of the land rent would be to force them to cut as much as they possibly could so as to clear their limits up as quickly as possible. I am very strongly of the opinion that the ground rent should be kept low and not increased in any way, and that any increase that must be made should be made upon the stumpage, then the government interests and the lumberman's interests will both be conserved.

The CHAIRMAN.—If there is any British Columbia gentleman here we would be glad to hear his views on the subject.



No. 5.—The presence of large tops in a slashing perpetuate the danger from fire after lumbering for many years. These tops, being propped up from the moist soil by their branches, decay very slowly. [48

Mr. JONES.—I think we would be inclined to agree with the principle raised by the last speaker, but what he says is not the custom in our country.

In the railway belt, of which we heard so much this morning, the rental is five dollars a square mile. As soon as you get out of that—the land east of the Cascades costs you \$115 a square mile. That is for a special license. To lease-holders I think it is fifteen cents an acre, which would be \$96 a square mile. The dues are 50 cents per thousand when cut. This is the same all through.

Well, the result of that is we are holding on to our Dominion timber and cutting our provincial as fast as we can and letting it go. I do not think that anybody has come to the conclusion that he is going to go over the limits a second time. It is a comparatively new business and we have figured anyway that once we have cut it clean, and take off all the stuff that will make ties, we are about through with it.

It may be that our experience will be the same as that of the people down here, and that if we want to go over the limits again we will find them nearly as good as the first time. I do not know whether this will be the case, but the way we feel about it now is that once we have taken off all that is worth taking off we are just about through with the place.

A MEMBER.—They would not be worth a great deal if you had to pay the increased ground rent.

Mr. JONES.—Well, if we go over them again it will be our Dominion lands that we will go over and not the provincial, because we cut all of our provincial as soon as we possibly can and as close.

Dr. CLARK.—Under some circumstances it may be as high as \$160 a mile, that is 25 cents an acre.

Mr. JONES.—The special licenses are \$115 east of the Cascades, and \$140 west. Of course the land west of the Cascades carries a much heavier stand of timber, and consequently it is worth more. Then the leaseholder's rental is twenty-five cents an acre unless you are cutting a certain capacity, in that case it is reduced to fifteen cents.

Mr. CHOWN.—When the land is cleared will it be classified as timber land, or as settlers' land?

Mr. JONES.—As far as most of the timbered land is concerned, I would not give fifteen cents an acre for it. It is worth absolutely nothing when you cut the timber off it, except as scenery. It is very handsome.

The CHAIRMAN.—I do not know whether there has been any change in the regulations with respect to the land in British Columbia or not. A year or so ago lands were sold by public tender, and went to the highest bidder. The only Crown dues were so much a mile, which was reduced if a mill of a certain capacity were erected. I think it was reduced to \$96 a mile.

Mr. JONES.—That was west of the Cascades.

The CHAIRMAN.—And if the lumber was shipped from the province the dues were rebated one-half.

Mr. JONES.—Not enforced. Those were the regulations with regard to lease-hold, but the big majority is held under what is called a special license. Out there there is no objection to pay the rental.

The CHAIRMAN.—Of course this question of a high ground rent is a very vexed one. Whether it shall be high rent and low dues, or high dues and low rent.

In the province of Ontario we have our ground rent fixed, by recent sales at five dollars a mile. We sold one limit at any rate for which we got \$31,500 bonus per mile, and then the licensee was subject to a royalty on the cut of timber. I apprehend that they would have rather paid a very high ground rent, and have fifty cent dues, than been subject to that bonus or royalty on the cut.

Mr. KNECHTEL.—I would like to say a word in regard to the matter of cutting timber to a diameter limit. There is a commonly accepted notion that if you go into the forest and cut all the conifer timber down to say ten or twelve inches diameter, you can go back after a certain period and make a similar second cut, getting as much timber as at the first. Then again after a time you can make a third cut and get as much timber as before, and so you can go on in that way for ever.

I believe that to be a fallacious notion, and I believe it for this reason. The seeding of the conifer trees is not going on sufficiently rapidly to keep up a forest lumbered thus periodically.

In our forests in New York, and in the forests in New Brunswick—I am familiar with Canada to a certain extent, being a Canadian,—there is a mixture of timber, hardwoods and conifers. The hardwoods have several advantages over the conifers. They seed more often, and they will germinate and grow anywhere in the forest, but the conifers need good mineral soil. The hardwoods do not need such good soil conditions, and they are more resistant to fire, but their greatest advantage lies in their ability to sprout from the root. If you cut down a spruce, or a pine, or a balsam or a hemlock, to replace it another must grow from the seed, while if you cut down a maple or birch, or chestnut, or almost any other hard wood, many may spring from the root.

Four years ago I made a study for the United States Bureau of Forestry in regard to the seeding of the commercial species of trees, in the Adirondacks. This study was made in the primitive forest, in township 5 in the Adirondacks.

I had two boys with me to assist me, and we went into the woods and selected quarter acre patches here and there. When we came to a place where I wanted to make a study, I had one of the boys stand in the forest and the other ran out a tape line fifty-nine feet. Then we blazed the trees around at a distance of fifty-nine feet from the boy who was standing in the woods. This gave a quarter of an acre circle.

Then we marked off in this quarter acre eight squares, fifteen feet on the side, and set stakes at the corners. The boys then pulled up all the little trees that were on

these squares and brought them to me. I separated the species and divided each into three classes, which I called 'Germinated,' 'Seedlings' and 'Juvenals,' according to size, and recorded the number in each class, making note of the conditions under which they grew.

We were at that work for over a month, and I finally came to this conclusion: In that neighbourhood where, it should be stated, there is much shade and much duff on the ground, the pine and spruce and hemlock were practically seeding themselves only where there was mineral soil and on old rotting logs where, I suppose, they got the proper moisture to exist. The hardwoods, on the other hand, were seeding themselves almost everywhere—on the rocks, on the mineral soil, on the leaves and even in the moss.

It seems to me that cutting down to a diameter limit must remove the conifers from the woods, especially if we leave the hardwood, unless we can make satisfactory conditions for the succeeding ones artificially.

In Germany, where I have recently made a tour, they have endeavoured for years to bring about natural seeding of the spruce, and they have told me there that they have not yet succeeded and are dependent for their coniferous woods (excepting the balsam, which is fir over there) on raising their trees in nurseries and planting them out in the woods.

Another method that they have adopted is what they call 'seed spot method.' They go into the field and hack up spots each about a metre long by half a metre wide and sow a few seeds there. The spots are placed about a meter apart. They do not depend at all on the natural seeding of the spruce. They say that the pine will reseed itself not very badly, but they also depend on their nurseries for the culture of that tree.

Dr. SCHENCK.—The rumours relative to the possibilities of timber reproduction seem rather vague and are, in many cases, coloured by prejudice. It seems to me that an actual growth of 1,000 feet per decade and per acre is rather high. Possibly the lumberman, in the case at issue, had removed at the first cut only trees of 18-inch diameter and over. At the second cut, ten years later, when the stumpage prices had risen, he was justified to remove trees of 12-inch diameter as well. The next time, at the end of the second decade, he is apt to cut down to a diameter limit of 6 inches only, and so on, even small stuff being then of value.

In Germany, where the forests are particularly well cared for, the average production in the state forests does not exceed 65 feet board measure per acre per annum, or 650 feet per decade of years.

I cannot imagine that the forests of this country are much more productive than the woods of the old country, so carefully husbanded.

Obviously, forest soil in this country is better, or averages better, than it does in the old.

You will further admit that in a number of well described cases the reproduction of white pine has been as much as 300 feet board measure per acre per annum for a limited number of years.

The production in feet, board measure, is very large at the time at which the poles measuring from 4 inches to 12 inches diameter at chest height develop into logable trees.

On the other hand, the production during the early stages of a forest, when it is composed of seedlings and small saplings only, expressed in feet, board measure, is nil.

Thus, it seems to me that an average production of 1,000 feet, board measure, per decade on an acre of ground is an exaggeration in which we should not indulge.

It is certain that in British Columbia the growth is very much faster than it is here in the east or than it is abroad.

To judge from the 'fish stories' which I have heard last night, in conversation with a number of gentlemen hailing from the west side of the Rockies, phenomenal productions and re-productions are possible in the western province.

If these 'fish stories' are true, then I am prepared to believe that in British Columbia 10,000 feet board measure, as an average annual yield from an average acre, lies within the reach of possibility.

In furtherance of Mr. Knechtel's remarks, I beg to say that I have lived in the fatherland for many a year, and I have traversed the woods of the old country on many a trip, under excellent guidance.

The forest ranges in which splendid natural reproduction of spruce can be seen in the old country are more than numerous.

For millions of years Nature has produced spruce in the old country, and mixtures of white pine, spruce and hardwoods in the new.

Do you think that Nature will stop producing in the twentieth century?

Personally, I believe that Nature will do the same thing in the new century—or will try hard to do it—which she has done for thousands of preceding centuries.

Possibly, helped by the hand of the forester, Nature may even improve upon her old ways during the present century, producing a greater quantity of conifers than ever.

In western North Carolina it is easy to produce white pine from self-sown seed.

Yellow pine is entirely reproduced by these means and, in the management of the Biltmore estate, I never incur any expense within the woods on that score.

Similarly, the reproduction of the tulip tree (white wood), merely from self-sown seed, is easily obtained. I must confess, on the other hand, that I have been unfortunate in securing a reproduction of oak and of chestnut by seeds, naturally planted, without human aid. The reason may lie in the fact that the humus in the forests has been destroyed by fires and that the seeding capacity of the trees is checked on impoverished soil; that the weeds on the ground are heavier now, owing to forest fires, than before. I can offer theories of explanation only, but no explanation in which I take confidence myself.

Generalizations in forestry are very frequently met, each observer judging the whole continent from the facts existing in the locality with which he is best acquainted. I warn you from jumping at conclusions on the basis of local evidence.

Mr. STEWART.—Perhaps I might be able to reconcile the different views which seem to be held by the speakers regarding this subject.

I remember at one of our committee meetings we had a discussion over the growth of spruce. Sir Henri Joly de Lotbinière put an example before us, saying that it took about ten years to grow one inch in diameter. The lieutenant governor of New Brunswick cannot be here, unfortunately (as Colonel Loggie said), but if he were here I think he would be able to tell you that it is possible to produce one inch in one year, and that he has done it on his limits in New Brunswick. I understood at the time that they go over his limits about every ten years.

He afterwards sent to my office an exhibit from his limits, showing about three-quarters of an inch per annum, that is taking the two sides on the measure. The average would be over half an inch, and nearly three-quarters of an inch in diameter. Sir Henri Joly de Lotbinière has counted from the interior and the growth is slow. Governor Snowball's was from timber cut where the moisture was very great and where the growth was very fast.

I just mentioned this to show that perhaps the two views are not altogether irreconcilable.

Mr. KNECHTEL.—I think Dr. Schenck has probably misunderstood my position. I contend only this, that this practice of going into the woods and cutting to a diameter limit periodically, as the lumberman does in Canada and in New York, will not give a permanent supply of conifer timber. Dr. Schenck tells us that he gives artificial conditions for regeneration. That is a different question altogether. I do not know where he found the natural regeneration of spruce so good in Germany, for I was all through the mountains, the Erzgebirge, the Harz, the Thuringian forest, the Vosges, the Odenwald and the Black Forest. I travelled thoroughly over the country and did not see it. I also had excellent guides—the forstmeisters themselves who have charge of these forests—and I inquired particularly concerning this point at Sulzburg, where Dr. Carl Phillip is in charge, and there got definite information that the spruce is a failure so far as natural regeneration is concerned—not an entire failure, but that it is not sufficiently reproductive. I think that explains my view of the matter.

Dr. CLARK.—In regard to this matter of the natural regeneration of the spruce, I think that both the gentlemen who have spoken have stated the facts correctly, that is, in Germany you can find places where the spruce reproduces itself, you can find other places where it is not so satisfactory.

I wish to say a word in regard to some natural reproduction of white pine which has come under my observation.

About two years ago I was making an examination of a large tract of pine land in New Hampshire, which had been lumbered over about 60 years ago. The best of the timber only was then taken. The usual after lumbering fire swept through the slash

burning the brush and the needles from the surface of the ground, also killing all small trees. The large cull trees remained, however, and seeded the ground. The resulting stand was as fine as one could wish. The owners are now cutting this second growth and are getting an average of about forty thousand feet, board measure, 'rough edge' or 'round edge' per acre. This is equivalent to twenty or twenty-five thousand feet, board measure, of square-edged lumber. This shows an average annual production of 400 feet B. M. per acre per year for the sixty years. The soil was a fine deep sand and conditions were otherwise favourable for white pine growth.

I agree entirely with Dr. Schenck that nature works the same in the twentieth century as she did in the eighteenth, or the first century. I am of the opinion that if the lumberman gives her a fair chance she will continue to do the same as she has done for thousands of years. But if the lumberman goes in and cuts the pine all, and the pine only, there can be only one answer by nature. The inferior and weed trees have possession and the next crop is bound to be greatly inferior. If we maintain the conditions nature will maintain her good work; if we improve on the conditions the result will be improvement in the crop and *vice versa*.

Mr. E. G. JOLY DE LOTBINIÈRE.—Dr. Schenck's and Mr. Knechtel's remarks, as to the natural reproduction of white spruce are of a nature to make one feel that conservative forestry is insufficient to ensure the perpetuity of our spruce forests, even when cuts, at a reasonable diameter restriction, are made at intervals of from 10 to 15 years. I feel that it is presumption on my part to differ from two such well known authorities, who have given the matter such careful study and yet I humbly maintain, that under certain conditions, a spruce forest may be cropped to advantage every 15 years, without endangering its perpetuity.

The principal condition to attain this end is the strict enforcement of a rational felling diameter.

Such a course has become very difficult to put in force since the pulpwood industry has assumed such enormous proportions. Nature, with a bountiful hand, has stocked our forests, in most sections of the country, with abundant material fit only to be converted into pulpwood. It is but right that advantage should be taken of this, but in doing so, every possible care and precaution should be taken, so as to leave a sufficient quantity of young timber of proper dimensions on a tract, to replace within a reasonable number of years, that which has been removed.

The Crown Land regulations of the province of Quebec, permit the felling of white spruce at 11 inches on the stump; trees of other descriptions at 9 inches, but black spruce, balsam, hemlock and other timber fit for pulpwood, may be felled at 7 inches on the stump.

I will not attempt to criticize at the present moment these diameter restrictions, for if they were rigorously observed, sufficient timber would be left to ensure a future crop, within a reasonable number of years, but where white and black spruce are felled together, piled or driven together and cut into pulpwood and corded together, it is practically impossible to distinguish the white spruce from the black and unscrupulous lumbermen are in a position to devastate a tract with impunity.

The whole question, as I said before, depends on the strict observance of the diameter restrictions. If they are carefully followed a new crop of valuable timber should reward the conscientious and conservative lumberman after a lapse of 15 years.

We have lumbered on our limits for considerably over half a century. The pine has practically disappeared, as the necessary conditions for its natural renewal have never existed, but the spruce stands by us and at intervals of 15 years, one is sure of finding a paying crop, on all sections that have been previously carefully worked.

We do our best to prevent the felling of white spruce under 12 inches on the stump and as long as we can hold to that felling diameter or even an 11 inch one, we confidently expect to secure paying cuts over our territory, at intervals of 15 years.

How could one expect to colonize a country if all the children that were born and growing up were done away with? It is the same thing with a forest; destroy the young growth and your forest comes to a speedy end, preserve it, and it will last you and those that come after you, for generations.

Mr. KNECHTEL.—Let me explain myself more clearly. If you go into a forest you will find large trees, medium sized trees, poles, smaller growth, and very small trees. Well, you take out the largest trees. In ten years you go back again, and the medium-sized trees will then be the largest. Perhaps they will not be quite as large as the ones you took out first, but they are the largest trees, and you take them out. Then you go back again ten years afterwards and you will find that the poles of the first time are the largest trees, and you take them out the same as before, and so on until you have removed from the forest all the growth that was there when you started to cut. Now, if the seeding has not gone on during all this time, there will come a time when you will have taken all the spruce out of the woods. That seems to me to be perfectly clear.

Now, I contend that in our forests this natural seeding is not going on with sufficient rapidity to perpetuate the conifer forests if they are lumbered periodically, and the seeding is what we have to depend upon.

Professor ROY.—Just one word. I wish to join Mr. Joly de Lotbinière in giving hope. I do not believe in presenting any matter in a hopeless form unless you are obliged to do it.

Granted that we should run out of spruce in seventy-five years. Let us stick to this diameter limit which Mr. Joly de Lotbinière points out. Let us cut the first and the second and the third cuts, and at the end of the third cut, we will be ready to replace the spruce, if we have to.

By that time we shall have learned to replace it artificially cheap enough, so that we can go in and get another timber, as our friend Maxwell said, by the hundred million; but don't let us get scared. Let us see that those men who have had experience on that point give us the benefit of their experience, and let us say to them if they have been able to return in ten years and get another crop: 'Go ahead. Good for you; but stick to your diameter limit. Don't overdo the thing; be reasonable; and stick to the plan that you started out with.'

Mr. LITTLE.—Mr. Chairman,, in connection with this important subject, and the exceptional growth of spruce in some parts of New Brunswick, I may say that about a year ago I was told by one of the most extensive lumber manufacturers operating on one of the largest rivers of the province that he was unable to fully stock his mills that season owing to the scarcity of large spruce timber tributary to his operations.

About the stand of timber on Mr. Gibson's land, we are told that this is an exceptionally fine spruce district. It is about three thousand feet to the acre. Now, supposing we admit of the high average of five thousand feet to the acre, that gives one billion, one hundred and twenty-five million to start on.

Now, when you start with one billion, one hundred and twenty-five million feet, you have something substantial to work on and may cut away at the large timber for a number of years. So that you may go back over the land for a second cut, say ten years thereafter and by lowering the diameter limit a few inches, get a lot of fair sized timber, but after the ground has been cut over a second time it will take a great many years to regain the sizes of the original growth of the timber.

People talk about the rapid growth of timber. I have had some experience in watching it, and I assure you that it is very seldom that you will find a spruce tree growing in our severe northern climate fifteen or eighteen inches in diameter which is less than one hundred years old, whereas those growing in the open where everything is cleared away for them, come up more quickly; but you take the mature growth of timber here, and you will very seldom find one of the tall trees of the forest which is less than from one hundred to one hundred and fifty years old.

Dr. BELL.—I am here, Mr. Chairman, rather to learn than to say anything, and until a few moments ago, when you were kind enough to ask me to address the meeting, I did not contemplate speaking, and I have not had an opportunity to prepare anything in the way of a paper, but I will say something about our northern forests.

Some of you are familiar with the conditions of the southern forests; possibly fewer have given any great attention to our northern woods, but I think I may claim to be fairly familiar with these, having travelled for many summers in the northern country from the Atlantic coast to the Rocky mountains. I may be allowed just to make a few remarks on two of my hobbies, one of which, as you perhaps know, is the distribution of the various species of forest trees. Another of my favourite subjects is forest fires.

As you are all aware, we have in Canada more than one hundred and twenty species of native trees, ninety-five of which occur east of the Rocky mountains and the balance west. Taking the United States and Canada together we have, I think, a total of three hundred and forty species of forest trees, which is a very extraordinary number and very much greater than is to be found in any other country in the world. Just to show you the great contrast between the wealth of trees in America and Europe, I might mention that there are only about thirty species at all common or conspicuous in Europe, and originally there were only some seven or eight species in the British islands. Whereas here, on this continent, the number, three hundred and forty, is something enormous in comparison with that.



No. 6.—An ideal stand of White and Red pine, self sown from seed trees. A fire ran through after lumbering at a favourable time for burning the brush without injury to the soil or the large seed trees, though all the smaller pine trees on the ground at the time of the fire were killed. The loss of these small trees is not serious so long as the seed trees remain.

The reason for this is not entirely explained so far, but perhaps it may be accounted for by the fact that the land of North America extends much nearer to the polar regions than does the land of Europe, and the forests of ancient time ranged extremely far north. During the glacial period the forests were compelled to move south.

The creeping back of the trees towards the north is the result of the disappearance of the ice-sheet. I have devoted a great deal of study to the geographical distribution of forest trees, and have come to the conclusion that only a certain proportion of those trees have yet got entirely back or reached the most northern limits possible. Some of them have done so, their seeds being carried by the wind, such as the poplars and birches. It is possible that these have reached their northern limits. As we know, when their seeds are ripe, being attached to a large mass of down, they are carried hundreds of miles; therefore, a single tree may seed an area equal to a whole county and plant the tree as far north as it is possible for it to grow. And those trees which are not provided with a good means of transport would travel northward somewhat more slowly, in accordance with the difficulties they encounter. Some coniferous trees have very large wings compared with the weight of the seed; others have very small ones, and those with the best wings fly the farthest. Other seeds have no means for transportation. Take, for instance, the nut-bearing trees, such as the walnut and oak; their means of spreading are exceedingly limited. The greater number of the seeds would have to remain immediately under the tree that produces them, or they might be blown a little way by the wind, but it would only be a very short distance, not more than the diameter of the top of the tree, that is, the spread of the branches, or they might be carried a little distance by squirrels or other animals which would take them for food. If an unfortunate squirrel were to make caches here and there, and then was killed by a hawk, for instance, his store of nuts would remain in the ground and some of them would germinate and you would have young trees a little distance away from the parent.

Amongst the proofs that some trees have not yet reached their possible limits, I might say that where the seeds of trees, or small trees themselves, have been carried a long distance north, they are found to grow about as well as at the place from which they were taken. Sir Henri Joly de Lotbinière has proved, for instance, that the black walnut will grow at Quebec, five hundred miles beyond its nearest home in Canada. The same experiment has been tried in many other instances; for example, in the county of Peterboro, around Ottawa and in the county of Lanark. This is a very large jump, several hundred miles at once, and it goes to show that trees may be suddenly moved and become acclimatized to the new conditions, and that the change is not necessarily fatal to them.

A great many other trees have been brought a long way north, and have been found to grow just about as well as at the parent home. At Ottawa city they planted numerous kinds of shade trees taken from Rochester, some of which were not indigenous to the Ottawa valley and yet they have grown just about as well as where they come from. The city council of Ottawa made a contract for these trees and it was stipulated that they should be brought from Rochester. The result has been very satisfactory. I need not enlarge on this point, if you will accept what I say in regard to the examples I have seen in a great many instances. It is a fact that trees will bear trans-

porting a long way north, and that they will flourish after they have been transported. I think the northern limit of a tree might be called the limit beyond which it will not ripen its seeds, and beyond which it can only be grown with artificial help. If it ripens its seeds every year, or even once in many years, it may be said to be within its northern limit.

I have given special study to questions affecting the northern limits of our trees, and have embodied the result in several published maps. On my revised maps I have represented to within a possible error, in some places, of five miles, the present northern limits of thirty of our species of forest trees, throughout the greater part of the Dominion. I might explain this map to those of you who are not familiar with it. The limit lines do not run parallel, east and west, but they seem to wander all over the map. Although the prevailing direction is approximately east and west, some of them run hundreds of miles north and south; others curve around in a way that is very difficult to explain to any one who has not given the matter some study. I think that it may be partly explained by the geological conditions which have submerged and afterwards raised the level of the land, so that the old shore lines were constantly changing.

I might just mention two trees to give you an instance of how trees may guide us in forming some idea of the geological changes which have taken place in this country. Take for instance the Banksian or jack pine, which rather shuns the presence of the sea, and the balsam poplar which seeks it. By using those two trees alone as guides, we are able to point out what parts of the country were covered with water a short time ago (geologically speaking). For instance, the Banksian pine is found in the interior of the Labrador peninsula and all through the provinces of Quebec and Ontario, at the greatest distances from the sea, and on elevated lands, these elevated portions marking the islands and mainland that represented this continent a short geological time ago. The balsam poplar is found in the outer portions of the Labrador peninsula, but not in the centre. It is found around Hudson bay, and to the westward. Whenever we come near the sea we find these trees.

There is another point of great interest in regard to the distribution of trees, that in certain regions or along certain zones you can find areas that contain a given tree, and other areas which do not contain it. For instance, if you travel towards Hudson bay, you do not go very far before you get beyond the limits of certain species, such as the black ash, the American elm, and some others, but after crossing the height of land, and going perhaps a couple of hundred miles beyond the last examples you had seen of these trees, you will suddenly come upon them again. This shows that the climate is better adapted to them there, than the climate south of it, on the height of land.

There are many instructive circumstances which we might deduce from the study of the distribution of trees. The Banksian pine is perhaps the only tree that we can claim to be Canadian. It certainly does extend its limits into the United States in some directions, but the occurrence of this tree may be said to be mostly within the limits of Canada. All the other trees of Canada extend into the United States very largely.

A good deal has been said about forest fires caused by human agency. I am of the opinion that probably the greater number of those occurring in the northern forests are caused by lightning. Before the advent of the woodman the fires were due to lightning. There are some Indian traditions that they have occasionally been caused by meteorites. It seems plausible that a red-hot meteorite falling in the forest in the dry season might set fire to the moss, and spread like a fire caused by lightning.

The Banksian pine, I think, proves that forest fires have been going on from time immemorial. This tree has the strange habit that the cones must be scorched, before the seed will escape. I have seen large trees covered with the cones of many different years, and of all these not a single one had opened, but the moment they were scorched, they would open widely and allow the seeds to go. Some of them might have lain for a hundred years until this fire reached them, and then the seeds would come out just as fresh as last year's. It is difficult to explain the exact method, but it seems to me to have been a long process of evolution, and this peculiar habit proves, I think, that forest fires have always been occurring in past ages.

It is quite reasonable to suppose that those fires originated from lightning, and other natural causes. As a matter of fact even now, in the summer time we read of houses, churches and barns being set on fire by lightning. Professor Brock's paper stated that the writer had seen four cases of fires started by lightning in one day. I also have seen a couple of cases myself. I would think it very strange if it were otherwise. The same ground that would be struck by lightning when inhabited, would be struck in the same way if it were in a state of nature, and the lightning would have the same effect. I have often seen forest fires burning during the summer, and no white man or Indian had passed that way who could possibly have started them. That being the case, what could have caused them but some natural phenomenon? I have studied the matter of the forest areas that have been burned over in the Dominion of Canada, with considerable care. These fires have been very destructive, and the whole country is looking for a means of preventing or overcoming them.

In regard to the length of life of our conifers I may say that I regard the white spruce as having a growing life of from one hundred to one hundred and forty years, whereas black spruce has a growth of one hundred and fifty or one hundred and seventy-five years; tamarack, of one hundred and seventy-five or two hundred years.

Speaking of tamarack, I am reminded of the effects of insects in our forests. About 1893 or '94, the imported saw-fly came up from the direction of New York and got into the forests north of the Ottawa river. In a year or two it reached James bay, and killed the tamarack throughout that district, which was only able to live three or four years after it was first attacked by the larvæ. The young leaves were all eaten. The same thing was repeated the spring after, and the one after that again. The fourth year, very few trees showed any green at all, and the fifth year they were all dead. This destruction continued to spread to the centre of Labrador, and now it has gone pretty well all over the great peninsula, which is larger than all the countries of Europe, perhaps excepting Russia. Well, nearly every tamarack tree has been killed in that vast region, representing a loss of incalculable millions of dollars, wiped out in ten years by one species of insect. This will give you some idea of the effect that insects have upon forest growth.

The reason that those insects spread so rapidly, is the common one with all insects when they arrive in a new country, and that is, they have the ground all before them, and spread with enormous rapidity, having no enemies of their own class. Perhaps in a few years some other insect may arise and kill off the saw-flies, and so spare the tamaracks.

The CHAIRMAN.—I wish to announce that I have received a telegram from Senator Edwards, who was to have been with us, but who has been unable to come. He says that he is extremely sorry that he has to forego the pleasure of being with us, on account of a severe cold, and he gives us the most satisfactory piece of news that this association has had since its inception, I think—

‘Sir Wilfrid Laurier, who takes a deep interest in forestry, expresses a desire to have a large forestry conference at Ottawa some time during the coming summer or autumn, and authorizes me to bring the matter before the conference now sitting at Quebec. I am satisfied that the Dominion government will render suitable aid to such a conference.’

For a number of years we have been endeavouring to create a strong public opinion upon the subject of forestry. We have been gradually but systematically making converts to our cause. The most recent and most notable convert (perhaps I should not say ‘convert’ because he was in our favour before) is Sir Wilfrid Laurier, and the fact that the Dominion government is interested in the work that we are carrying on, and that Sir Wilfrid has expressed his wish that we should go to the Capital and hold a conference there, and that he will render us all the aid and assistance that is necessary, is, as I said before, perhaps the most satisfactory piece of information that this association has ever had conveyed to it.

I think we ought to elect as president of this association some gentleman who can take this matter up and arrange with Sir Wilfrid when that conference ought to be called, and work out the details for the consummation of a very successful meeting.

We have with us all the provincial governments, and now we are assured that we have the Dominion government, and we also have the Governor General of the country with us. With all this, I do not think that the association was ever in a better position than we are in to-day.

Mr. STEWART.—I am very pleased indeed that this information has come at the time it has. I was aware of this before, but I did not feel at liberty to mention it here. I was aware of the fact that Sir Wilfrid proposed calling a meeting at Ottawa. He has told Senator Edwards of the fact and Senator Edwards has communicated it to us.

As our president has said, Sir Wilfrid is not a convert, he has been for several years interested in the work which we are doing, but recently he has taken a very lively interest in forestry. And now that we have the Governor General and the Premier both heartily with us I do not see that we could possibly be better off.

As has been stated in the directors’ report, we called upon His Excellency and asked him to become patron of the association, and he not only said that he would be glad to do so, but that he would also be pleased to do anything that he could to assist us in the work we are carrying on. He even went so far as to say that he would throw open the ball room at Rideau Hall for a meeting, and would issue invitations.

Gentlemen, it is a very fortunate thing indeed that Sir Wilfrid has imparted this information to us, to go before the public at the present time.

THIRD SESSION.

Friday, March 10, 1905.

The meeting was called to order at 10.30, the president, Mr. Aubrey White, in the chair. He said:

Unfortunately Dr. Longley has not been able to be with us, but he has very kindly sent us his paper on 'Forestry in Nova Scotia.' I would ask the secretary to read Dr. Longley's paper.

The secretary, Mr. R. H. Campbell, then read the following paper:—

FORESTRY IN NOVA SCOTIA.

HON. J. W. LONGLEY.

Attorney General and Commissioner of Crown Lands.

The quantity of land available for lumbering purposes in Nova Scotia has never been, and is not now, large. The province itself is small and a considerable portion of it has been cultivated and improved. In years gone by the government was in the habit of granting outright to lumbermen land for lumbering purposes at 40c. an acre and the grant was absolute and conveyed the fee simple of the land to the grantee. The larger number of the large lumbering concerns of Nova Scotia, such as Davisons, Alfred Dickie, Nova Scotia Lumbering Company, the Margaret's Bay Company, Pickles & Mills, Clarke Brothers, Benjamin and others are all carrying on their enterprises for the most part with land on which they are paying nothing, it having been obtained by absolute grant from the government at 40c. per acre. This system of granting in fee simple was terminated in 1889 and it was provided that each lot of timber land should be leased for twenty years instead of granted outright and the price was made 40c. per acre in the case of land on which the timber to be cut should not be less than 10 inches in diameter and a lease to meet the case of pulp wood in which timber could be cut at 6 inches diameter was to pay 50c. per acre. During the last session, 1904, the price for these leases was just doubled—80c. per acre for the timber lease and \$1 per acre for the pulp lease.

The timber lands of Nova Scotia which are good, are very good, and the existence of numerous streams, lakes, &c., facilitates the manufacture of lumber and it has been shown by actual experience that the growth of timber will equal the amount cut by the lumbermen each year, provided that lumbering is carried on on a sound and economical basis. Large lumbermen in Nova Scotia cut only the larger trees in any one locality during the lumbering season, and then pass on to another, adopting the same principle, and the growth is such that in ten or twelve years another cut is available—the growth, under fair conditions, keeping pace with the cut.

The difficulty, however, has been that occasionally a great fire would sweep over the lumbering districts and destroy millions of dollars' worth of trees and very often leave the land in such condition that a fresh growth was either slow or impossible.

The problem, therefore, of preserving the lumbering industry in Nova Scotia is the prevention of fires. An Act to prevent forest fires has been on the statute book since 1883, but it has accomplished nothing because no machinery was provided for putting it into effective operation. Last year the government introduced and carried

through the legislature an Act providing for the appointment of chief rangers and sub-rangers in the different municipalities, the salary of the chief ranger to be paid by the government and the services of the sub-rangers and special time employed by the chief ranger to be paid by the municipalities out of a fund to be obtained by imposing a tax of $\frac{1}{4}$ of one cent per acre upon the holders of all timber lands of 1,000 acres and upwards. The act has been brought into operation in the municipalities of Annapolis, Digby, Clare, Yarmouth, Shelburne, Queen's, Lunenburg, Colchester and Pictou, and it is working wonderfully well, more effectively indeed than I had ever hoped. The chief ranger has been found a most effective means of preventing fires and of instantly and by authority aggregating forces to put out a fire immediately it is started. In the municipalities in which a chief ranger has been appointed no fires of any consequence occurred during the last season although it was an uncommonly dry one.

The Act provides that no bush fire shall be set without previous notice to the chief ranger and with his consent and this part of the Act is being cheerfully complied with by all persons clearing lands in these municipalities.

Reforestation is a matter which is engaging the attention of the government and of the Crown Lands Department. We should be glad to have any practical suggestions in that line, but not enough light and information of a definite character has yet been afforded to justify us in launching out in any large scheme in that regard. The department, I think, would be willing to bear the expense of a careful investigation by an expert in forestry, on the question of whether or not any practicable scheme of reforestation is possible in Nova Scotia.

We are also considering the propriety of reserving tracts of land at the head of navigable waters for special public services and it is likely that something definite in this line will be inaugurated at an early date.

This constitutes, I think, about all that can be said of a practical character in relation to forestry in Nova Scotia.

The extent of ungranted forest lands in Nova Scotia as set forth in the last Crown Land Report, is 1,516,631 acres. I estimate that the number of acres of granted land now being used for lumbering purposes in Nova Scotia would not be far short of these figures.

FOREST WEALTH OF THE PROVINCE OF QUEBEC.

J. C. LANGELIER, QUEBEC.

The census of 1901 shows that the land superficies of the province of Quebec comprises 218,723,687 acres. At the date of that census, 7,421,264 acres were under crops, in pasture, gardens and orchards, while bushes, rocks and marshes, or other untimbered spaces, occupied 1,560,960 acres, leaving for the forest an area of 209,741,463 acres, or 327,721 square miles.

Under the heading of 'Forests,' the census mentions only 5,442,204 acres. This number represents only the forest area comprised within the 14,424,428 acres of lands occupied in all the provinces and does not apply to forests situated outside of private lands, or lands held under title grants.

Conifers predominate throughout these forests; spruce, fir, pine, cedar and hemlock, enumerating them by order of predominance, form at least 75 per cent of the timber growth. Excepting white birch (bouleau) and tamarack, which grow as far as the northern boundary of the province, deciduous trees, or hardwoods, do not grow beyond the 48th parallel of latitude. The only exceptions noticed so far are a few places in the Saguenay district, and in the southern section of the Abitibi territory, where some yellow birch and black ash trees have been seen north of that latitude.

For the purpose of classifying them according to the prevailing growths, the forests of the province of Quebec may be divided into three very distinct regions:

1. The Northern Region;
2. The Central Region;
3. The Southern Region.

Let us examine each of these regions separately.

I.—THE NORTHERN REGION.

This is by far the largest of the three. It embraces all that portion of the province lying north of the St. Lawrence and of the 48th parallel from the intersection of this line by the river, a short distance west of the River Saguenay. The forests comprised within those limits cover an area of 162,749,788 acres, forming 77.58 per cent of the whole forest area of the province. This northern region embraces the territories of Abitibi, Mistassini, Ashuanipi, the county of Chicoutimi-Saguenay and the north-west section of the counties of Champlain, St. Maurice, Maskinongé, Berthier, Joliette and Montcalm—a superficies of 5,375,000 acres.

Black Spruce (*Picea nigra*), is the prevailing and characteristic growth of that region. It represents about 60 per cent of the conifers of commercial value. On the average, taking into consideration the burnt spaces, the wind-falls and the sections denuded by other causes, black spruce would certainly yield 2½ cords of pulp wood to the acre, equivalent to 1,500 feet board measure. At this rate, which is rather below than above the mark, the forests of the northern region could supply 406,874,470 cords of pulp wood, or 244 billions, 124 millions, 682 thousand feet board measure of lumber.

Those quantities, of course, include only the trees measuring seven inches in diameter on the stump, as the rules of the Department of Crown Lands do not allow the cutting of trees of a less diameter.

It takes less than thirty trees of six inches in diameter and sixteen feet in length of utilisable timber to form a cord of 128 cubic feet. Mostly everywhere those black spruce forests are very thick; in the most favourable places, the trees grow tall, close to one another, so much so, in fact, that 500, 600, 700 trees are often found in one acre of ground, which represents from 10 to 20 cords of pulp wood to the acre.

It may be added that throughout this region, where the land is higher and the soil deeper, there are many black spruce trees measuring ten to twelve inches across the stump, which materially increases the yield per acre.

As regards the number of trees, fir (*Abies balsamifera*), is nearly as abundant as black spruce, but the trees are not as tall and their yield in utilisable wood probably does not exceed 25 per cent of that of black spruce. For the whole of the northern region, this proportion represents 101,718,617 cords, equivalent to 61 billions, 51 millions, 170 thousand feet board measure.

The white spruce (*Picea alba*), will yield a much larger quantity of lumber, and 75 billion feet is certainly not an exaggerated estimate of the saw-logs which can be cut in this region, taking only the trees measuring eleven inches in diameter on the stump. Then there would still be left in the tops utilisable wood to make millions of cords of pulp wood.

In the southern section of the Abitibi territory, or over an area covering 15,000,000 acres, white spruce attains dimensions which make it equal to the finest timber of that kind to be found in the central and southern regions. In the course of his explorations, Mr. Henry O'Sullivan has seen trees measuring one hundred feet in length and twenty inches in diameter. 'White Spruce,' says Dr. Bell, 'is perhaps the most valuable tree of the district explored. It grows to a great size everywhere along the rivers and lakes, and although as a rule, it may be larger near their banks, where it often girths upwards of six feet, a considerable portion of the trees inland also attain a good size.' The timber is sound; as a rule the trunks run to a great height without branches and in every respect this white spruce ranks amongst the very best timber for the manufacture of first-class saw-logs. In this section of the Abitibi ter-

ritory, there is enough of that fine white spruce to make about thirty billion feet of saw-logs of superior quality.

Banksian pine (*Pinus banksiana*) is another kind of timber which grows in abundance throughout the northern region. It is chiefly used for making railway ties. Calculating at the low rate of only two ties per acre, on the average, there is enough of that kind of timber to make upwards of 320 million ties, or sufficient to make ties for 150,000 miles of railway.

Botanists describe Banksian pine as a stunted, short and branchy tree. This description certainly applies not to the Banksian pine of the Lake St. John and Saguenay district, where these trees grow to a considerable height and attain a diameter which renders them fit for the manufacture of saw-logs. In a shanty on the River au Rat, in 1898, a jobber cut a tree of this kind and gave ninety-one feet in length of utilisable timber, viz.: five saw logs and two ties. That tree measured fifteen inches across the stump and over seven inches at the top. In the burnt grounds and wind-falls in the townships of Albanel and Pelletier, also in those of Dolbeau and Taillon, one can count by scores of thousands Banksian pine trees measuring from forty to fifty feet in length and seven to eight inches in diameter at the small end. The wharf at Tikouape, or St. Methode, is mostly all built of Banksian pine, fifteen to twenty feet long and eight to twelve inches square. At the Escoumains mills they sawed for many years Banksian pine logs, turning out good boards which were exported to the United States. Logs of this timber are still sawed by the mills of Lake St. John. Banksian pine ties are from year to year coming to the front and looked after to such a point that they can be transported by railway from Roberval to Quebec, a distance of 190 miles, and sold at prices leaving a good margin for profit. When there will be no more cedar to supply the enormous quantities of ties required yearly by railways, one of its most valuable substitutes will unquestionably be found in that Banksian pine, which the northern region is in a position to supply for a very long period.

The fine pineries of the Lake St. John country have been depleted by the Chicoutimi mills; but in other parts of the northern region there yet remains a good deal of this timber. The census of 1901 shows that during that year there were cut in the county of Chicoutimi and Saguenay, 54,182 cubic feet of square pine and 1,217,000 feet board measure of saw-logs of the same timber.

But it is in the Abitibi territory, from the height of land northwards to a distance of about fifty miles, that pine is found more abundantly. This area embraces about 6,500,000 acres which, at the minimum rate of 50 feet board measure to the acre, would yield 325,000,000 feet. This pine is scattered over all the higher lands and hills and could be cut profitably only in connection and simultaneously with spruce; but, nevertheless it is there, and in the high and rocky grounds surrounding many parts of the lakes, it could supply material for pretty extensive operations.

Cedar (*Thuja occidentalis*) is another kind of timber which grows more or less abundantly in the southern section of the northern region. As is the case for pine, it is in the Abitibi territory that it grows more profusely. The best is found around the lakes and along the river banks. The southwest section of the Abitibi territory alone could supply sufficient of that timber to cut at least twenty millions of ties, a couple of million cubic feet of square timber, eight to twelve inches square, large quantities of piles, telegraph and telephone poles, pickets and fence rails.

Of deciduous trees, white birch (*Betula papyrifera*) is by far the most abundant all over the northern region. It is seen everywhere and in many places it occupies the ground almost exclusively. Till now this birch has been used only for fuel and for making spools and some turnery articles, but the time is, perhaps, not far distant when it will be used for furniture and also for cooperage, to make barrels and kindred articles. In the virgin forests, where white birch is a primitive growth, many trees are seen girthing ninety inches and more (see Report of the Commissioner of Crown Lands for 1898, p. 92, French version), particularly in the lower part of the rivers Alex and Peribonka, where immense quantities of those large trees grow on the mountain sides and



No. 7.—A pinary where, no seed trees were left. The after-lumbering fire destroyed all the small trees on the ground which were unmerchantable at the time of the lumbering, and in the absence of seed trees, the land lies almost wholly waste for many years.

on the higher lands. That big birch also grows in many places along the north shore of the Saguenay river. Below this river the forests of Cape St. Nicholas, on the St. Lawrence, are the best situated for the cutting of white birch to get lumber for furniture. The harbour of St. Nicholas affords all the desirable accommodation for crafts of the largest tonnage, and the forest of large birch which surrounds it could supply in comparatively exhaustless quantities big logs of the best description. That fine large birch is also found in the southern section of the Abitibi territory. Along the Bell, or upper part of the Nottaway river, there is enough of the fine big birch to cut millions of saw-logs. When this territory is made accessible by the construction of railways, this timber will in all probability afford material for large operations.

Poplar (*Populus balsamifera*) and aspen (*Populus tremuloides*) constitute another growth which is also very abundant throughout the forests of the Northern Region. There are remarkable groves of large aspen between the rivers au Rat and Mistassibi in the county of Lake St. John. Many of these trees attain a diameter of twenty-four inches, but the general average is between fifteen and eighteen inches. This timber is sound, remarkably free from black veins and knots and would yield lumber of the best quality. However, the finest timber of this kind grows in the Abitibi territory, where it attains a diameter of thirty inches and a length of fifty and sixty feet without branches or knots. In the forests of that district, there is enough of this big timber to cut about ten billions of feet B.M., which might be used for making furniture and packing cases. It might also be used to great advantage in the manufacture of soda pulp. There is no other place where this industry could get its raw material as easily and so cheap, were these forests made accessible by the construction of a railway running along the Bell river, as far north as Lake Mattagami, a distance of about 150 miles from the height of land. Taking only a strip of five miles on each side of the river, it would be an easy job to cut from twenty-five to thirty millions of cords of that fine big poplar.

Tamarack, or larch (*Larix Americana*) is perhaps more abundant than poplar. The oldest trees have been destroyed by the grub of the larch saw fly (*Nematus Ericksonii*) which has spread devastation all over the Northern Region. Still the dried trees, which are not attacked by rot, could probably be used for several purposes, namely to make railway ties. In the Abitibi district there are enough of those dried trees to make millions of ties. At all events the young trees, a great portion of which were spared by the sinister insect, continue growing and ere many years will supply a large contingency of the forest industry.

The following is a very conservative estimate of the products which the forests of the Northern Region could supply to the timber business:

Saw-Logs.

Fine, white and red.	325,000,000 ft. B.M.
Banksian pine.	10,000,000,000 ft. B.M.
Spruce.	35,000,000,000 ft. B.M.
Poplar.	10,000,000,000 ft. B.M.
White birch (bouleau).	10,000,000,000 ft. B.M.
	<hr/>
	65,325,000,000 ft. B.M.

Pulp Wood.

Black spruce.	406,874,470 cords
White spruce.	15,000,000 cords
Fir.	101,118,607 cords
Poplar.	100,000,000 cords
	<hr/>
	622,993,077 cords

Railway Ties.

Banksian pine.	320,000,000 pieces
Cedar.	50,000,000 pieces
	<hr/>
	370,000,000 pieces

Besides, and over that, fir would also supply several billion feet of lumber for domestic uses, when the country is settled, viz.: in the Abitibi territory.

Explorers have ascertained that yellow birch (*Betula excelsa*) grows as far north as fifty miles back of Betsiamites and as far back of Lake St. John, where they have measured trees of twenty-four inches in diameter. This tree also grows in the southern section of the Abitibi territory, also black ash (*Fraxinus sambucifolia*) and elm (*Ulmus americana*), but those trees are not in a quantity sufficient to make them of commercial value; they will be used for domestic purposes when the country is settled.

II.—CENTRAL REGION.

With regard to the variety and quality of the forest growth, this region is unquestionably the richest of the three. The forest covers an area of 31,649,632 acres, or 302,745 acres more than the whole territory of Nova Scotia and New Brunswick, whose collective superficies is only 31,346,937 acres. This Central Region is bounded to the south by the river St. Lawrence, and to the north by the 48th parallel, except in the upper part of the counties of Champlain, St. Maurice, Maskinongé, Berthier, Joliette and Montcalm, where the line bends southward in order to throw into the Northern Region about 5,376,000 acres of forest in which spruce, particularly black spruce, predominates.

All the kinds of commercial timber growing in the province of Quebec are found in this central region. The conifers include white pine (*Pinus strobus*), red pine (*Pinus resinosa*), Banksian pine, white spruce, black spruce, balsam-fir (*Abies balsamifera*), double-balsam fir (*Abies americana*), hemlock (*Tsuga canadensis*) and cedar. In deciduous trees, or hard woods, we have yellow birch (*Betula excelsa*), black birch (*Betula lenta*), white or silver maple (*Acer dasycarpum*), rock or sugar maple (*Acer saccharinum*), mountain maple (*Acer spicatum*), red or soft maple (*Acer rubrum*), white oak (*Quercus albus*), blue or swamp oak (*Quercus prinus*), red oak (*Quercus rubra*), hickory (*Carya amara*), butternut (*Juglans cinerea*), white ash (*Fraxinus americana*), black ash, white elm (*Ulmus americana*), red or slippery elm (*Ulmus fulva*), beech (*Fagus sylvatica*), basswood (*Tilia americana*), hornbeam (*Carpinus americana*), iron wood (*Ostrya virginica*), all the poplars and white or canoe birch.

White pine ranks first in the forests of this region, especially in the western part. Between the Saguenay and the River St. Maurice, this timber is thinly scattered amongst the other trees of the forest, of which it constitutes only a minute proportion. In those 5,004,180 acres of forest, it is probable that twenty-five to thirty million feet of white pine could be cut, of medium quality for the most part. It is more abundant in the western section of the St. Maurice territory, which contains at least 150,000,000 feet. There is undoubtedly as much on the Rouge, Lievre and Petite-Nation rivers. The richest pineries, and by far the most abundant are situated in the counties of Wright and Pontiac. They cover an area of 14,596,690 acres. On an average, they can yield 2,000 feet B.M. per acre, which would make a total of thirty billion feet. In those rich pineries, there can be counted by the score the localities where 10,000 feet and more could be cut upon one acre of land.

Red pine is one of the trees characteristic of this central region. This timber grows on the sandy and gravelly hills, which are numerous all over that district; it forms thick groves on the hill sides, where gravelly soil has accumulated and on the

dry sandy points jutting forth into the lakes. There is a sufficient quantity of this timber to supply seven or eight billion feet B.M.

Banksian pine grows nearly everywhere on the poor, rocky and gravelly lands, chiefly in the dry plains which have been formerly laid waste by fire. It is not as tall nor as good as the same kind of timber growing in the northern region, especially that of the Lake St. John valley, but nearly everywhere it is of a size large enough to make railway ties. It is larger and of better quality towards the north; 150,000,000 ties could probably be made out of this Banksian pine.

In the eastern part of the central region white spruce, as far as the number of trees is concerned, is the prevailing growth, particularly in the St. Maurice territory. It is less abundant in the Ottawa territory, but, as a rule, of better quality and larger dimensions. In the central region, and only from the first cut, there is enough of white spruce to manufacture sixty billion feet of saw-logs, taking only the logs measuring eight inches in diameter and up, at the small end. The tops of the same trees could yield upwards of fifteen million cords of pulp wood.

There is as much, if not more, of black spruce susceptible of being used for pulp wood, and the quantity of this wood, which can be cut in all this region, is over twenty million cords. The largest trees, which grow in comparatively large numbers in the more favourable situations, could be used to make masts and spars, frame timber and railway ties.

Fir is very common all over the damp grounds. Taking into consideration the fact that these trees are generally affected with rot, their yield may be estimated at 500,000,000 feet for saw-logs and 2,500,000 cords for pulp wood.

Hemlock scarcely grows beyond the 47th parallel of latitude. Hardly a few groves can be seen north of this latitude in the neighbourhood of Cape Tourmente. In the western section it grows as far north as the River Keepawa. Between these two extreme points the line marking the northern limit bends southward, describing a curve which passes south of the River Mattawin, in the St. Maurice territory. This tree, which rarely grows in groves, such as were formerly seen in the forests of the southern region, is generally large and tall. This timber could yield a couple of hundred million feet of lumber, or the equivalent in square timber. It could also produce a couple of hundred thousand cords of tanbark. Unfortunately it floats only with difficulty in the cold and heavier waters of the spring, so that it can be utilized by trade only at those places where the drive is not long or where the logs can be transported by railway.

Cedar grows throughout the whole of the central region. It is disseminated mostly everywhere in the forest; but on the lake shores and river banks it forms in many places almost impenetrable thickets. It also grows on the marshy depressions and damp flats between the hills and mountains, and it covers almost exclusively large areas of swampy lands. In the dense thickets many of these trees are small and stunted, but numberless quantities could make ties, telegraph poles and even square timber for railroad culverts. The largest trees are most invariably hollow at the stump; but these hollow butts are very profitably used in the manufacture of shingles. Fence rails and pickets are made out of the smaller trees. Calculating on the very conservative estimate of two ties per acre, on an average, there is enough of cedar in the central region to make upwards of sixty million railroad ties. Poles for electric wires would certainly reach about ten million, and the hollow butts would supply material to manufacture many hundred million shingles. Add to this several million feet of square timber for frames and culverts, myriads of pickets and fence rails, and you will have an idea of what the cedar growing in the central region can contribute to forest industry.

Hardwoods are scattered mostly all over this region, but in a much smaller quantity than conifers. Deciduous trees constitute about twenty-five per cent of the timber fit for commercial purposes outside of the lands occupied for colonization purposes.

Birch is the most numerous growth in the family of hard woods. And in this species, it is yellow birch (*Betula excelsa*) which prevails. Generally speaking, the

finest timber of this kind is found in the St. Maurice and Ottawa territories. Black birch (*Betula lenta*), is less abundant, but usually of large size. In the Ottawa territory it attains the diameter of thirty inches. Calculating upon the low basis of 100 feet to the acre, and taking only the trees measuring twelve inches on the stump, there is in this region birch enough to cut at least 200,000,000 feet B.M. of good sound lumber.

White, or canoe birch of a size to make spool wood and saw-logs would yield 150,000,000 feet or 250,000 cords. This would be the yield of the primitive growth exclusively. The second growth, which occupies so large a portion of the lands devastated by fire, will ere long supply a much larger yield, and besides a practically inexhaustible supply of fuel.

Of the maples, the hard or sugar variety is the most abundant. It is also the variety which generally attains the largest size. Practically speaking, white or silver maple is not to be found in this region. Red or soft maple is seen mostly everywhere in swamps and low lands. These two kinds of maple could yield as much timber and lumber as yellow and black birch, and also enormous quantities of fuel for home use and for distillation in the manufacture of pyroligneous products.

Basswood scarcely grows in appreciable quantity east of the River Rouge. It is generally distributed amongst yellow and black birch and hard maple, viz., in rich soil. Many of these basswood trees measure twenty-four inches in diameter. Very often two or three trunks are seen shooting from one stump, and in this case the diameter is smaller. As regards height, it is about uniform for adult trees, which are invariably tall, usually forty to fifty feet without branches. The yield of this kind of timber in the central region should exceed 100,000,000 feet B.M.

The family of poplars is represented in the forests of this region by three varieties, the balsam poplar, the trembling-leaved poplar and the cotton tree or cottonwood. In the primitive forest and in the very old 'brulés' these trees attain a considerable size and can give good saw-logs. Cottonwood, which grows only in good soil and on the river flats, is always large. Were this timber floatable the forests of the central region could supply millions of logs to the lumber industry and about fifty million cords to the pulp and paper industry.

Larch grows in low, swampy lands, alongside with cedar, black spruce and black ash. It was a tree of great size and great value. It has been destroyed by the grub of the larch fly and has no longer any commercial value. But, even in its present condition, it can supply an abundance of good firewood.

White and black ash increase in quantity and size as they grow farther towards the western limit of the province. On the rich flats of the rivers Lièvre and Gatineau and their tributaries acres of white ash trees may be seen measuring fifteen to twenty inches in diameter and from forty to fifty feet of trunk, without branches. This timber grows in all parts of the Ottawa territory, even beyond the latitude of Lake des Quinze. Black ash is also observed in all parts of that territory; the trees are as high as those of the other variety, but of smaller diameter and more abundant in number. This tree grows in swamps and wet lands. At least 125,000,000 feet of both varieties could be cut in the central region.

White elm almost invariably accompanies ash, but grows also in many places where the latter is not found. This timber, as a rule, consists of fine, big and tall trees which dominate the surrounding forests. In the rich soil of the river flats, white elm grows with so great a vigour as to support on the same stump several large trees. Upwards of 200,000,000 feet of this timber could be cut in the central region, and if the upper part of the Lièvre, Gatineau, and Ottawa rivers is ever made accessible by railway, the manufacturers of furniture and flour barrels will obtain therefrom a very considerable supply of raw material.

In the oak family, the red variety prevails, and would yield the largest quantity of merchantable timber. There are considerable groves of those trees in the Ottawa forests. Blue or swamp oak grows in many places in the valley of the Lièvre river, where hardly any red oak is seen. The several varieties of oak are found in appreciable quantity throughout the Ottawa territory and could contribute perhaps ten million feet to the resources of the lumber trade.

Butternut is found in nearly all parts of the forests east of the River Rouge and south of the latitude of Lake Keepawa. There is enough of this timber, of merchantable dimensions, to cut 5,000,000 feet for the manufacture of furniture.

Beech is rather common in the forests of the central region, from Quebec to the River Ottawa. Some very fine specimens of this tree may be obtained in the counties of Argenteuil, Labelle, Wright, and in the lower part of Pontiac. The timber could produce over 15,000,000 feet of fine boards for making furniture and wainscoting, and as many railroad ties for exportation to France, where these ties are in great demand.

A recapitulation of the details given for each of the several kinds of timber standing in the central region gives the following totals:—

<i>Soft Woods—</i>	<i>Saw-logs.</i>	
White pine.....	30,325,000,000	ft. B.M.
Red pine.....	7,500,000,000	"
White spruce.....	60,000,000,000	"
Hemlock.....	200,000,000	"
	98,025,000,000	"
<i>Hard Woods—</i>		
Birch, yellow and black.....	300,000,000	"
Maple.....	300,000,000	"
Oak.....	10,000,000	"
Elm.....	200,000,000	"
Ash.....	125,000,000	"
Beech.....	15,000,000	"
Butternut.....	5,000,000	"
Basswood.....	100,000,000	"
White birch (bouleau).....	150,000,000	"
Poplar.....	250,000,000	"
	1,445,000,000	"
<i>Pulp Wood—</i>		
White spruce (from tops).....	15,000,000	cords.
Black spruce.....	20,000,000	"
Fir.....	2,500,000	"
Poplar.....	50,000,000	"
	87,000,000	"
<i>Railway Ties—</i>		
Banksian pine.....	150,000,000	pieces.
Cedar.....	60,000,000	"
Beech.....	15,000,000	"
	225,000,000	"
<i>Poles for Electric Wires—</i>		
Cedar.....	10,000,000	"
<i>Shingles—</i>		
Bolts and hollow butts	8,000,000,000	shingles
<i>Culvert Timber—</i>		
Cedar.....	5,000,000	cub. ft.

Add to all that myriads of pickets and rails for fences, inexhaustible supplies of fire wood, and you will have an idea of the wealth and variety of the forests of this central region.

III.—SOUTHERN REGION.

It is the less extensive of the three, as it embraces an area of only 15,381,890 acres, or 7.34 per cent of the total forest area of the province. And more than 25 per cent of these 15,381,890 acres are included in grants for colonization purposes. To state the facts as they are, it must be said that genuine forests exist only east of the Chaudière river, and that the portion comprised between the Chaudière and Lake Temiscouata will be exhausted within a few years, in so far as regards the production of saw-logs.

In this southern region cedar is the most valuable timber. It is the finest cedar to be found in the province, even in Canada, excepting the cedar of British Columbia. It attains colossal dimensions in the rich lands of the silurian and devonian formations of the Gaspé peninsula, where timber explorers have found trees measuring five feet in diameter on the stump and upwards of fifty feet of clean trunk, without branches. In those rich soils, cedar grows in such an abundance that it is hardly credible for one who has not seen it. In the evidence he gave under oath before the Colonization Commission, forest ranger Aquilas Lajoie stated that out of about two acres square of land, in the township of Hamilton, Mr. Robert Sinclair did cut two thousand cedar logs, besides some spruce logs, the average contents of the logs being one hundred feet each. Many of these cedar logs, fourteen to fifteen feet in length, measured forty-five to forty-eight inches in diameter on the stump and thirty to thirty-three inches at the small end. Mr. Sinclair also cut at the same place three hundred and forty pieces of square cedar ten by ten and twelve by twelve inches, ten to fifteen feet in length, and six hundred railway ties. These facts can be easily verified by looking at the stumps, which are there yet, near the front line of lot 10, in range 13, of Hamilton. On lot 5, in range 11, of the same township, the following cut was made during the same season, 1902-03, viz., two years ago: 25,000 cedar and spruce logs, 12,000 logs of yellow and black birch, also of large white birch (bouleau), all the logs containing an average of 100 feet each, and 6,000 cedar ties. On the next lot, No. 4, the cut gave 20,000 cedar and spruce logs, 12,000 birch logs and 4,000 cedar ties. The logs averaged 100 feet each.

The township of Humqui, in the Metapedia valley, is about 120 miles west of Hamilton, on the Bonaventure river. On five lots in Humqui, viz., lots 17, 18, 19, 20 and 21, in the eighth range, Mr. Joseph Theberge, a man of long experience, swore that the cut of timber would produce 55,000 cedar and spruce logs, averaging 50 feet each, and forming a total of 2,750,000 feet for 500 acres of land, or an average of 5,500 feet to the acre, leaving aside ties and pulp wood.

The Temiscouata district is just as rich. The scalers of the Department of Crown Lands measured in this district spruce logs thirteen feet long and thirty-seven inches in diameter at the small end. The same quality of spruce grows in the counties of Beauce and Compton.

The standing timber of this southern section can supply the following quantities to the trade:—

Soft woods—

	Saw-logs.	
White pine.	75,000,000	feet B.M.
White spruce.	12,000,000,000	“

Hard woods—

Birch, yellow and black.	100,000,000	“
Maple.	50,000,000	“
Elm.	20,000,000	“
Ash.	5,000,000	“
Beech.	10,000,000	“
White birch (bouleau).	25,000,000	“
Poplar.	15,000,000	“

Pulp wood—

Spruce, white and black..	20,000,000	ords.
Fir..	10,000,000	"
Poplar..	5,000,000	"

Railway ties—

Cedar..	150,000,000	pieces.
Beech..	5,000,000	"

Poles for electric wires—

Cedar..	7,500,000	"
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Shingles—

Cedar, logs and hollow butts..	500,000,000	shingles.
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Square timber—

Cedar, for frame and railroad culverts..	25,000,000	cubic feet.
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The black birch of the Gaspé peninsula, which unfortunately is but little known, is perhaps the finest wood we have in this province for cabinet work and the manufacture of fine furniture. In colour, it looks like mahogany, and it takes the finest polish. Maple is also a superior material for the manufacture of furniture. The large white birch (bouleau) which has but a thin coat of white sap, with all the core of a reddish colour, is a most desirable substitute for cherry wood. The beech growing in the Temiscouata district, especially in the vicinity of the lake at its northeast end, would also supply material of superior quality for cabinet work.

GENERAL RECAPITULATION.

Quercus VV

Now let us recapitulate all the data given for each of the three regions, in order to make an approximate valuation of all that forest wealth. We find the following quantities:—

Saw-logs—Soft Woods.

White pine.....	30,725,000,000	ft. B.M.
Red pine.....	7,500,000,000	"
Spruce.....	107,000,000,000	"
Banksian pine.....	10,000,000,000	"
Hemlock.....	200,000,000	"
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	155,425,000,000	"

Saw-logs—Hard Woods.

Birch.....	400,000,000	"
Maple.....	350,000,000	"
Oak.....	10,000,000	"
Elm.....	220,000,000	"
Ash.....	130,000,000	"
Basswood.....	100,000,000	"
Birch (bouleau).....	10,175,000,000	"
Poplar.....	10,265,000,000	"
	<hr/>	
	21,650,000,000	"

Pulp Wood.

Black spruce.....	426,874,470	cords.
White spruce.....	50,000,000	"
Fir.....	113,618,607	"
Poplar.....	155,000,000	"
	<hr/>	
	745,493,077	"

Railroad Ties.

Banksian pine.....	450,000,000	pieces.
Cedar.....	260,000,000	"
Beech.....	20,000,000	"
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	730,000,000	"

Poles for Electric Wires.

Cedar, number.....	17,500,000	"
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Shingle Blocks.

Cedar.....	700,000,000	ft. B.M.
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Square Timber, for Frame and Culverts.

Cedar.....	30,000,000	cu. ft.
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Taken as a whole, those quantities are rather below than above the real mark, and of course, they include those trees only which have the diameter prescribed by the rules of the Department of Crown Lands.

VALUE OF THE FORESTS.

As regards the revenue to be derived by the provincial government under the form of stumpage duties, it is easy to ascertain this value, by simply multiplying the quantity of each kind of timber by the tariff rate, which gives the following result:—

White pine, 30,725,000 M. at \$1.30.....	\$ 39,942,500
Red pine, 7,500,000 M. at 80c.....	6,000,000
Spruce, 107,000,000 M. at 65c.....	69,550,000
Banksian pine, 100,000,000 M. at 65c.....	6,500,000
Hemlock, 200,000 M. at 65c.....	130,000
Hard woods, 1,110,000 M. at \$1.30.....	1,443,000
White birch, 10,175,000 M. at 65c.....	6,598,750
Poplar, 10,265,000 M. at 65c.....	6,672,250
Pulp wood, 745,493,077 cords at 40c.....	298,197,230
Railroad ties, 730,000,000 pieces at 2c.....	14,600,000
Poles, 17,500,000 pieces at 5c.....	875,000
Shingle blocks, 700,000 M. at 65c.....	455,000
Square cedar, 30,000,000 cu. ft. at 2c.....	600,000
	<hr/>
	\$451,563,731

From this, deduct one-fifteenth part, for the timber growing in seignories and on other lands held by private parties, whose timber is not subject to government stumpage, and there is left \$421,459,482, representing for one hundred years an annual revenue of \$4,214,594.

We have seen that the forest area of the province covers 327,721 square miles. Of those forests, about 84,000 miles are held in freehold by private parties and under license for the cut of timber, which leaves upwards of 243,000 miles available and to



No. 8.—A spruce slashing on a hillside where the soil is shallow and liable to be wholly destroyed if a fire occur during a dry time. Fires usually occur during dry times! The large amount of debris is not only a very great menace as regards fire, but greatly interferes with the development of any seedlings which may be on the ground.

be placed under license. At the comparatively low rate of \$75 per mile, the bonus on the licensing of those available berths would bring to the provincial treasury \$18,225,000, which spread over the one hundred years represents another annual revenue of \$182,250.

VALUE FOR FARMERS AND WOODMEN.

Now let us see what the exploitation of that forest wealth is worth for our farmers and woodmen. For a basis of calculation, we will take the average current prices actually paid by lumbermen to cut the timber and haul it to the river banks, ready for the drive, or to railway stations, leaving out the wages representing the cost of the drive. With this data, we form the following table:—

White pine, 30,725,000 M. at \$6.	\$ 184,350,000
Red pine, 7,500,000 M. at \$5.	37,500,000
Spruce, 107,000,000 M. at \$4.	428,000,000
Banksian pine, 10,000,000 M. at \$3.	30,000,000
Hemlock, 200,000 M. at \$4.	800,000
Hard woods, 1,110,000 M. at \$5.	5,550,000
White birch, 10,175,000 M. at \$4.	40,700,000
Poplar, 10,265,000 M. at \$3.	30,795,000
Pulp wood, 745,493,077 cords at \$2.50.	1,863,732,692
Railroad ties, 730,000,000 pieces at 10c.	73,000,000
Poles, 17,500,000 pieces at 50c.	8,750,000
Single blocks, 700,000 M. at \$4.50.	3,150,000
Square timber, 30,000,000 cubic feet at 10c.	3,000,000
	\$2,709,327,692

Divide this by 100 and you have \$27,093,276 to be earned yearly by farmers and woodmen for 100 years. And then there are the wages to be earned on the drive, in the mills, and the freight to be earned by railways, which would foot up to about \$15,000,000 a year.

Some will perhaps object that a large portion of this forest wealth is unavailable and consequently worthless, because the timber cannot be taken out of the forest by water.

This objection can apply only to the forests in the territories of Mistassini and Abitibi, for the rest of our forest domain is traversed in all directions by numberless rivers on which timber is driven to the mills, to the seashore and seaports, and to railways which carry it to the great centres of trade and commerce. In this respect few are the countries enjoying as good accommodation, as great advantages and as much facility as the province of Quebec for the removal of timber from the forest, particularly with regard to soft woods. The exploitation of these forests on a lesser or larger scale is merely a question of demand for their products and of necessity this demand should increase with time, population and the exhaustion of forests in other countries.

Now, for the exploitation of the forests of Abitibi and Mistassini is there not a bright prospect in the North-west Territories? Ere many years the five or ten millions of farmers who will have settled in these territories will want large quantities of timber and lumber for their buildings; the thousands of miles of new railroads which shall be built to carry the millions of bushels of grain raised in those vast territories will require scores of millions of ties and considerable quantities of timber and lumber. Are not the forests of Abitibi and Mistassini in a favourable position to compete for this trade? The timber and logs could be so easily driven on the Nottaway and Rupert rivers to the port at the mouth of these two great rivers and thence

carried by sea crafts to Fort Churchill, a distance of 900 miles. From Churchill about 350 miles of railroad, through a general level and very easy country, would take that timber and lumber to the centre of the best farming and wheat lands in those territories. Manitoba is striving to get a railroad built to York Factory, to connect with navigation on Hudson bay. If that project ever materializes would not that procure a desirable outlet for the forest products of Mistassini and Abitibi? Transportation by waterways is comparatively so cheap.

As regards Abitibi, there are four companies chartered to build railroads intended to reach James' bay through this territory, three from south to north, and one from east to west. In all probability the Grand Trunk Pacific will also run through that territory, and this should impart practical value to its forests. A piece of railroad about seventy-five miles in length, from Lake Victoria northwards, could bring the timber of that portion of Abitibi to the Ottawa river, on which it would be driven to the mills and railway stations on this river, and thence the lumber would be shipped in the same manner as the lumber sawn from logs cut in the Ottawa territory.

But to remain on the safe side, let us take exclusively what is actually available, viz., the forests of the southern and central regions, and only 30,626,876 acres in the northern region, comprising the upper section of the six counties of Champlain, St. Maurice, Maskinongé, Berthier, Joliette, Montcalm, and 25,250,876 acres of the most accessible woodlands in Chicoutimi and Saguenay. This brings down to 109,055,427 acres the forest area actually available.

At the conservative estimate per acre of two and a half cords for black spruce, one-half cord for white spruce tops, and one-half cord for fir, the following quantities of pulp wood could be cut on those 30,626,876 acres of wood lands: Black spruce, 76,567,190 cords; white spruce, 15,313,438 cords; fir, 15,313,438 cords, forming a total of 107,194,066 cords. Computing the white spruce saw-logs at only 500 feet B.M. to the acre, this territory would produce 15,313,438,000 feet of lumber.

Hard woods have a commercial value only so far as they are accessible to railroad transportation, either for the raw material or the manufactured. Under our present circumstances, not more than 20 per cent of our hard woods enjoy the advantage of accessibility to railroad transportation, and in order to make a correct estimate this must be taken into account. With all those deductions and restrictions, the actual contents of our available forests may be stated as follows:—

		Storage.
<i>Saw-logs—</i>		
White pine.	30,400,000,000 feet at \$1.30	\$39,520,000
Red pine.	7,500,000,000 " .80	6,000,000
White spruce.	87,313,438,000 " .65	56,753,735
Hemlock.	200,000,000 " .65	130,000
Birch.	80,000,000 " 1.30	104,000
Maple.	70,000,000 " 1.30	91,000
Oak.	2,000,000 " 1.30	2,600
Elm.	44,000,000 " 1.30	57,200
Ash.	26,000,000 " 1.30	33,800
Beech.	25,000,000 " 1.30	32,500
Butternut.	1,000,000 " 1.30	1,300
Basswood.	20,000,000 " 1.30	26,000
White birch (bouleau) . .	35,000,000 " .65	22,750
Poplar.	53,000,000 " .65	34,450
	125,769,438,000	\$102,809,335
<i>Pulp wood—</i>		
Spruce.	148,870,628 cords at \$.40	\$59,548,251
Fir.	27,913,338 " .40	11,165,335
Poplar.	11,000,000 " .40	4,400,000
	187,783,966	\$75,113,586

Railway ties—

Cedar..	220,000,000 pieces at \$.02	\$4,400,000
Banksian pine..	211,253,352 " .02	4,225,067
Beech..	4,000,000 " .02	80,000

435,253,352 \$8,705,067

Poles for electric wires—

Cedar..	17,500,000 pieces at \$.05	\$875,000
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Shingle bolts—

Cedar..	1,300,000,000 feet B.M. at \$.65	\$845,000
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Square timber—

Cedar..	30,000,000 cubic feet at \$.02	\$600,000
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The total of stumpage dues amounts to \$188,958,188.

Distributed over a period of one hundred years, this represents for the provincial government an annual income of \$1,889,581.88 per annum in stumpage duties.

For farmers and woodmen the cutting of the logs and the preparation of the timber, delivered on the river banks or at the railway stations, represents the following amount of wages for men and horses:—

Saw-logs—

White pine..	\$182,400,000	
Red pine..	37,500,000	\$219,900,000
		<hr/>
Spruce..		349,253,752
Hemlock..		800,000
		<hr/>
		\$569,953,752
Hard woods..	\$1,340,000	
White birch..	140,000	
Poplar..	159,000	1,639,000

Pulp wood—

Spruce..	\$372,179,570	
Fir..	69,783,384	
Poplar..	27,500,000	469,462,954
		<hr/>
Railway ties..		43,525,335
Poles for electric wires..		8,750,000
Shingle blocks..		8,450,000
Square cedar..		3,000,000
		<hr/>
		\$1,084,781,041

Putting together the government dues and the wages of woodmen, the different kinds of timber represent respectively the following values:—

Kind of Timber.	Gov. dues.	Wages.	Total.
Spruce..	\$116,301,986	\$721,433,322	\$837,735,308
Pine..	45,520,000	219,940,000	265,420,000
Fir..	11,165,335	69,783,000	80,848,719
Cedar..	6,720,000	42,200,000	48,920,000
Poplar..	4,434,000	27,659,000	32,093,000
Banksian pine..	4,225,000	21,125,335	25,350,402
Hard woods..	428,600	2,190,000	2,618,600
White birch..	32,750	175,000	197,750

In the total of \$1,293,183,779, spruce forms 64.78 per cent and pine 20.52 per cent. Fir comes in for 6.25 per cent and cedar for 3.78 per cent.

The saw-logs, in government dues and wages, form a total of \$674,312,287 for all, and the pulp wood \$544,576,540, a difference of only \$129,735,747, which clearly shows the possibilities of the pulp wood business.

Now, if instead of taking only 25,250,876 acres in the counties of Chicoutimi and Saguenay, we would take all the 87,494,628 acres of forest comprised in those counties, it would add to the quantity of floatable pulp wood 155,609,380 cords of spruce and 38,902,345 of fir, or a total of 194,511,725 cords, which should yield \$77,804,690 in stumpage dues for the government and \$486,279,312 in wages for woodmen, or a total of \$564,084,002. Add this to the \$441,962,954 given above for spruce and fir pulp wood, and you reach the phenomenal total of \$1,006,046,956, representing the value of our floatable pulp wood in government stumpage and wages for woodmen, leaving aside over thirty million cords of poplar and all the black spruce and fir we have in the territories of Abitibi, Mistassini and Ashuanipi which comprise 69,879,160 acres of spruce forest.

The pulp wood of Abitibi and Mistassini is not actually available, as it will have to be taken out by railroads which are not yet built; but the wood of Ashuanipi is just as available as that of any other section of the province, as it can be driven to Hamilton Inlet, a good sea-port on the Atlantic, about 250 miles north of Belle Isle Straits. From Hamilton Inlet to the ports of the United Kingdom the distance is about 1,750 miles. There is a company lumbering on the Hamilton river, and running a large saw-mill at the mouth of Goose river, which debouches into the head of the inlet, which shows that lumbering operations are practicable in that district. The forests of Ashuanipi have an area exceeding 20,000,000 acres, capable of yielding 50,000,000 cords of spruce and 10,000,000 of fir pulp wood.

This territory of Assuanipi looks only as a parcel or a strip on the map of the province of Quebec, but its area exceeds by about 7,000,000 acres that of Nova Scotia, by over 2,000,000 acres that of New Brunswick, and it nearly equals that of the state of Maine, which comprises only 21,145,600 acres.

There are many large water-powers in Ashuanipi, namely the Great or McLean Falls, on the great Hamilton river, about fifty miles distant from the head of tide. Those falls are 302 feet high, and it is considered that they could develop an average of over one million horse-power.

All those facts may convey an idea of the possibilities of our province in regard to the pulp and paper industry, taking into account only that portion of its spruce forests which are accessible by waterways and practically available.

EVOLUTION IN THE VALUE OF FORESTS.

White pine, some thirty years ago, was considered as the only timber possessed of commercial value, especially for the export trade. Explorers sent out to value wood lands would not look at spruce, hemlock, fir, cedar, or even red pine, which they regarded as worthless, and classed them in the category of rubbish. By and by the latter rose in the estimation of the trade, and to-day it nearly equals white pine in value. White spruce came up next, and now ranks amongst the kinds of timber most sought for, even for export trade. One of our lumber kings, the Hon. Senator W. C. Edwards, who speaks from experience, does not hesitate to say that there is more money in spruce than pine, that he regards no investment in Canada as good as an investment in a spruce limit, and prefers it to pine. Another lumber king, Mr. J. R. Booth, made the following statement in his evidence before the Colonization Commission:—

‘Formerly our explorers, that is the men we send to explore and report on the nature of the forest, would go round on the limit and report to us that there was a certain quantity of pine in such a part, and when we would ask them, what was on

the rest of the limit, they would reply, and that would settle it, 'Only rubbish,' meaning that it was of no value, and as a matter of fact, spruce at that time was of no value. To-day that very spruce on those limits renders a value equal, if not superior, to the value in that time of pine limits.

'To go a little further and to show you how the value of the forests has increased, let me say that at that time we did not put any value at all on red pine. Many years ago, after I had commenced this business, we would not have cut a red pine in logs, where we had only to cut it and pitch it along into the river or the lake and let it take care of itself; no red pine for the lumbermen at that time. Now, as we go along, wherever we can get spruce, we cut it just the same as we do the pine and the red pine too comes in now as well as the white one. The red pine is worth to-day as much as the white pine. I speak of that to show you the difference that a few years have made in the value of the forest.'

Cedar is another kind of timber formerly considered as of no value for commercial purposes and now ranking amongst the most valuable kinds of timber. 'That is a kind of wood,' says Mr. Booth, who speaks from experience, 'that will come forward as it gets better known. It is a wood of which railways will now get all their ties. A few years ago, you could not sell a single cedar tie to put in a railroad. A few years ago we commenced to put them to our line, (the Canada Atlantic Railway.) We considered that the railroad was well provided with them. To show you how the cedar tie is now valued, compared with that time, the Grand Trunk applied to me to see if I could supply them with cedar ties. I offered some tamarack ties, but word came back that none but cedar were to be bought by them. Now they use the cedar just the same as they used tamarack, and the cedar ties will last from 15 to 20 years, and the tamarack not more than five years. That shows the value of our forests. I look upon the cedar that I have upon my limits just as much as I do the pine. Cedar and what it is generally worth to us is not generally thought of by the casual observer. It is used for tubs, for ties; it makes the most reliable culverts on railways, it is used for telegraph poles, telephone poles and for the tubs needed in paper mills. We have no timber in this country to take the place of this kind of timber. Cedar is also used for fence posts and nothing can replace it. In the United States a cedar tie is more valuable than any other tie. These are some of the reasons that I say we have immense wealth at our command in our forests. If not only those that will sit down and think it over, but even if those that will give but a thought to it will pause and look around, they will see a great many different kinds of timber that we used to look upon as having no value, and we took to use them so fast too, they will soon realize what our forests will be worth in a few years.'

Some twenty years ago, the Hon. W. C. Edwards made the following statement before a committee of the Legislative Assembly:—

'I make the statement here, that I attach value to every green thing that grows upon a timber limit. As pine becomes less, I consider the value of other woods enhanced. I consider the pine, spruce, red pine, birch, maple, hemlock, tamarack and cedar of commercial value. Beech, I think, will come in too; white wood, or basswood, also. I regard it that all the timber on the limits will yet come in and be available as a commercial asset to the province.'

That prediction has been fully realized, with regard to soft woods formerly considered as having no commercial value, such as cedar, hemlock, fir, and black spruce, and it will also be realized with regard to hard woods, as they are made accessible by railroads.

A most remarkable instance of this evolution in the commercial value of our forests, is that regarding black spruce and fir. Not many years ago, black spruce, which attains but a comparatively small diameter and makes very poor lumber, was considered entirely worthless, and a lumberman talking of buying a black spruce berth would have been considered as *non compos mentis*, or out of his mind. To-day these same black spruce berths are looked after with the same eagerness and paid for at

much higher prices than white pine limits were twenty-five years ago. And I will venture to say that in many cases there is more clear money in the exploitation of a black spruce berth, where it is favourably situated, than there is in the exploitation of an average white pine limit.

THE PRINCIPAL CAUSES OF THIS EVOLUTION.

That the neighbouring states of Maine, New Hampshire, Massachusetts, Vermont and New York want timber from the province of Quebec, is a fact beyond serious contestation. Masses of statistics, of a more or less reliable character, have been published to prove the contrary. I will not worry in an attempt at refuting those statistics, but I will mention a few facts which will show the consideration which those statistics deserve.

The official trade returns show that we export yearly to the United States many millions worth of timber and lumber. If our neighbours have at home all the wood they want, why do they come here to get so much of ours and pay the cost of transportation, besides and above the intrinsic value of the wood?

The same remarks apply to pulpwood. The census of the United States shows that in 1900 the American pulp and paper mills consumed 349,084 cords of Canadian costing on the average \$6.50 a cord, and 1,160,118 cords of American spruce, costing on the average \$4.81 a cord, or \$1.69 less than the Canadian wood. This represents a difference of \$589,942. Why would the American manufacturers pay us that difference, if really they can find at home all the pulpwood they want, of the same quality and as conveniently situated? They also bought from us 20,133 cords of poplar to manufacture it into pulp, besides the 236,820 cords they produced at home. That was not sufficient, however, to meet all the requirements and the pulp mills consumed 220,155 cords of inferior woods, as regards pulp making, such as yellow birch, hemlock and kindred stuffs. If they have at home all the good wood they require and growing in situations where it is available, why do they use those poor woods, which can only yield products of the lowest grade?

I would not like to be understood as pretending that the forests of the New England states and New York are depleted or completely exhausted, which is not the case; but I maintain that practical exhaustion is near at hand through a large portion of those forests and that another portion, well timbered as it may be, is unavailable on account of the absence of waterways to take the products out of the forest, or of its remoteness from railways and inaccessibility to railroad transportation.

Nearly one-fourth of the best forests of northern Maine is in this predicament. To bring that wood to the large mills of Rumford Falls, which control mostly all the cut of that timber, they would have to float it down the St. John river, and thence use railways to carry it several hundred miles inland to the mills, which is profitably impractical. As a matter of fact, some of the proprietors of these wood lands sell the cut of this timber to the St. John's mills, to which it is of easy access by water. This, nevertheless, materially lessens the possibilities of Maine, as a pulpwood producing state, and in this respect, it is the state which above all others is endowed with the largest resources. In 1900, if the census is correct, the pulp mills of Maine used 20,638 cords of spruce imported from the province of Quebec and for which they paid an average price of \$8.24 per cord. During the same year, they used 265,359 cords of domestic spruce, which they got for \$4.99 a cord, delivered at the mills, or \$3.25 less than the Canadian spruce. Why would those mills pay \$3.25 more per cord for Canadian spruce, if they have at home all the wood they want and of the quality they require? Of the 196,180 cords of spruce manufactured in the Mills of New Hampshire, 87,139 cords, or 44.11 per cent, came from the province of Quebec. The mills in Vermont consumed 56,958 cords of spruce, of which 25,442 were brought from our province. The mills of the state of New York, representing

in number over 20 per cent of the 763 pulp and paper mills of all the United States, manufactured into pulp 505,154 cords of spruce, 141,729 of which was Canadian spruce. 45,227 cords of Canadian spruce were also used by the pulp mills of Indiana, Pennsylvania and Wisconsin. Besides the wood, the American mills purchase about $\frac{4}{5}$ ths of all the pulp manufactured in the province of Quebec.

All those facts show that the paper industry of the United States wants our pulpwood and that the demand from this source will increase at the same rate as the home supply decreases. I would not say that the American pulp and paper manufacturers cannot do without our wood, but I contend that they can do much better with it, and on this contention I base the opinion that the requirements of the American manufacturers impart to our forests of pulpwood a value which can only increase with time, if we take care not to bar that trade by unwise regulations or legislation.

Our pine forests stand nearly in the same position: their value shall of necessity increase in the same ratio as the exhaustion of the pineries in the United States.

Mr. George W. Hotchkiss, secretary to the Chicago Lumberman's Exchange, ranks amongst the men who are the best informed about this matter, in which his opinion is an authority. In 1888, he wrote as follows:—

'One hundred years ago, Maine, Vermont, New Hampshire, New York and Pennsylvania, could boast vast forests of white pine. West of the lakes, Michigan, Wisconsin and Minnesota, so late as fifty years ago, were unbroken in forest resources, and the white pine predominated.

'To-day Maine gives us some spruce and a little small sapling pine, such as would hardly have been sent for fire-wood in her palmy days of lumbering. Vermont, New Hampshire and New York may still boast an occasional clump of trees, but have lost all pretensions of lumber-producing regions. Pennsylvania has a few hundred million feet on the sides of the Alleghanies, but has dropped out of the list as a lumber producer. East of the Great Lakes nought remains (excepting the spruce forests of Northern and Eastern Maine) save hemlock and hardwood, and these in very limited quantities, insufficient to supply the home demand in a majority of localities. Michigan, Wisconsin and Minnesota are the last remaining resort for lumbermen east of the Rocky Mountains. Originally there was probably 150,000,000,000 feet B.M. in Michigan, but fifty years' work has reduced the supply to probably not over twelve to twenty billion feet, with an annual average cut for the past five years of not far from four and a half billions; and the cutting is so close as to exterminate all the pine timber on the tract operated upon. Wisconsin can hardly be estimated at over thirty-five billions, little more than would suffice to supply the consumption of the United States as a whole for one year.

'Minnesota, set down in the census of 1880 as having 11,000,000,000 feet B.M., an amount disputed by some as too high, by others as too low, if allowed to-day at 10,000,000,000 could furnish but one year's supply for the mills of the north-western pine producing states. In fact, if the mills of these three states were run to their capacity for six years there would be but little pine left for the seventh year's production. And these estimates of timber include the red and Norway pine which forms a noticeable percentage of the whole. In Michigan and Wisconsin there are still large quantities of hardwood, but it is not being cared for with that appreciation of its value which is desirable. It has, however, this advantage, it can be reproduced; pine can not.'

A few months ago the *Mississippi Valley Lumberman* published the following statement:

'The pine forests of Michigan have been consumed and their lumber product has ceased to be an important factor in the general market. The annual output from that state is now below a billion feet. Wisconsin mills still continue to manufacture about two billion feet of lumber annually. In our investigations to secure information upon the probable extent of the standing white pine in the northwest, we have compiled the following data for Wisconsin: In 1897 the Department of Agriculture of the United States government made a calculation of the white pine timber then standing in Wisconsin. This was based on estimates furnished by lumbermen. The research was

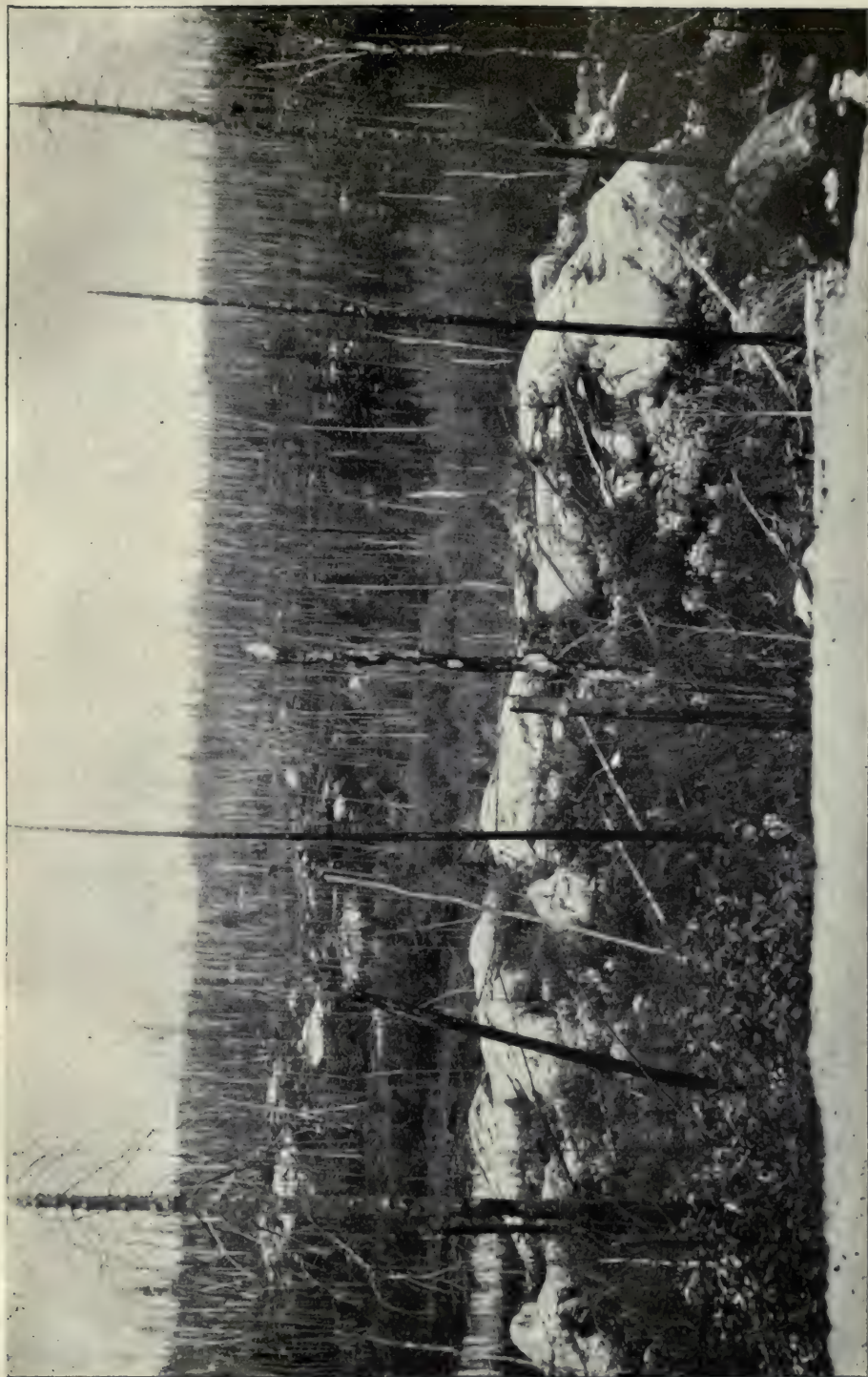
made as thorough as possible and conducted among the smaller producers as well as the larger manufacturers. From these estimates the standing timber in Wisconsin at the beginning of 1897 was stated at eighteen billion feet. The reports of the different mills which draw their log supply from Wisconsin timber show that there has been cut since that time 13,643,669,200 feet. Taking this amount from the eighteen billion feet standing in 1897 will leave the present amount of standing timber at only 4,356,330,600 feet. A general survey of Wisconsin forests and of the reported holdings by the different owners of stumpage in the state makes these figures seem correct. If the mills continue to saw white pine as vigorously as in the past, Wisconsin will cease to be a white pine lumber producer within the next three years.'

If Minnesota had only eleven billion feet of white pine in 1880, as stated by Mr. Hotchkiss, there should not be much left now. In other words and compared to what there was formerly, practically speaking there is no white pine left in the northwestern states.

This exhaustion of the American forests accounts to a great extent for the evolution in the value of the forests of the older provinces of Canada. For want of pine the New England markets have accepted spruce; the same change has been going on for the last few years on the markets of the state of New York, and ere long it will also take place on the market of Chicago, which takes yearly about two billion feet of lumber.

The extension of our railway systems is also a great factor in the enhancement of our forest values. Accessibility by railroad has already made available a great part of our hard woods. Several roads are projected which will run east and west through the central region, with terminals on the Georgian bay, where they will connect with steam navigation on the Great Lakes. Scores of millions of feet of hard woods in the forests to be traversed by these railroads, which are now worthless, will be turned to account as soon as such means of transportation will allow to carry them profitably to the furniture factories of Grand Rapids and the unlimited market of Chicago. By this route the pine and spruce of the Ottawa territory will travel only 125 miles by rail and less than 500 by water to reach the market of Chicago, which absorbs yearly about two billion feet of lumber, and also the market of Milwaukee, which takes an average of 250,000,000 feet. Actually, these markets are closed to the products of the upper Ottawa territory by the excessive length and cost of transportation. In one of his reports Mr. Henry O'Sullivan shows that several thousand square miles in the north-eastern section of the territory contains an abundance of good pine and spruce timber which can be made available only by the construction of railroads. The remoteness of part of these forests excludes their products even from the Ottawa market. 'In case,' he says, 'of a railway being built anywhere in the vicinity of Kakabonga or Bark lakes this whole region, covering one thousand square miles of territory, might be served with lines of steamers in connection with the railway. Although the first quality of pine has been culled here some years ago, there is still a great deal in the interior, and owing to the great distances and roughness of the rivers, the cost of driving is such as to forbid the handling of spruce or second quality stuff of any kind. With a railway and steamboat service it would be different; mills could be built on the spot and every kind of sawed lumber shipped by rail.

'In the last mentioned report, I dwelt on the great advantage that would accrue from the diverting of the Lake Victoria waters by the valley of the Dumoine, if it were possible to do so; but in the event that this may be found impossible, a more desirable and beneficial alternative would be the building of a railway through that country. A glance at the general map of that region will show that between the discharge of Lake Barrière and the discharge of Lake Des Quinze, there are over six thousand square miles of territory drained by the Ottawa and its tributaries above Lake Des Quinze, that can never be developed to any advantage without a railway. I am not prepared to say that all this great extent of six thousand square miles is fit for agriculture or well timbered; but I can safely say that more than half of this area is within the limits of the best pine-growing region now available in the province, and that a great deal of good agricultural land may be found there also.



No. 9.—Forest and soil destruction in Northern Ontario, in the region of the great Biscotasing fire. A large proportion of this area will never again produce a valuable stand, for the soil which was destroyed by the fire was an accumulation of ages.

'Of course if there were mills on the spot or if easy access could be had to this region, a great deal of good timber which is now left to rot could be utilized; but when we consider the awful distance, some seven hundred miles, that this timber has to be driven to the market, second quality stuff cannot pay.'

The Grand Trunk Pacific, probably, and the Quebec & Lake Huron Railway, for a certainty, will open this territory within three or four years, and more in the new Abitibi territory, thus imparting a high value and making practically available those six or seven thousand square miles of rich wood lands, and adding so much to our forest wealth and resources.

The same factors will in the same manner contribute to the rapid evolution in the value of our forest wealth in many other sections of the province.

QUANTITIES CUT FOR DOMESTIC USE AND EXPORT.

On this point, the census of 1901 supplies the following statistics:—

<i>Pine—</i>		
	Ft. B. M.	
Saw-logs..	445,036,000	
Square timber..	15,595,484	
	<hr/>	460,631,484
<i>Spruce—</i>		
Saw-logs..	599,447,000	
Square timber..	41,792,520	
	<hr/>	641,239,520
<i>Hemlock—</i>		
Saw-logs..		38,121,000
<i>Cedar—</i>		
Shingle blocks and squares..	68,777,000	
Piles and poles..	2,738,440	
Ties (2,703,807)..	8,111,421	
	<hr/>	79,626,862
<i>Hardwoods—</i>		
Elm..	3,465,860	
Ash..	2,104,444	
Yellow and white birch..	6,877,808	
Maple..	963,276	
Oak..	718,156	
Hickory..	151,000	
	<hr/>	14,082,344
<i>Pulpwood—</i>		
Spruce, cords..	474,178	284,506,800
Fir..	52,687	31,609,200
	<hr/>	<hr/>
	526,865	1,549,817,210

The several quantities are converted into feet B.M., for the purpose of facilitating comparisons.

HOW LONG WILL OUR FORESTS LAST ?

The most plausible manner to answer this question is to compare the contents of the forest with the yearly consumption, as shown by the census. And not to overstep the limits of sound reality, we will take only the reduced quantities given for that portion of our forests actually available and enjoying the advantage of accessibility to railroads and waterways. Dividing the quantity in stock or in forest, by the quantity of the yearly consumption, the quotient shows the number of years during which the supply will last. This result is shown in the following table:—

	Stock.	Yearly Consumption. Years.	
Pine, feet.... .	37,900,000,000	460,631,484	82
Spruce, feet	87,313,438,000	641,239,520	137
Cedar, shingles and square, feet.	1,660,000,000	68,777,000	24
Cedar ties, No.	220,000,000	2,703,807	81
Cedar posts, No.	17,500,000	119,072	147
Hard woods, feet.	356,000,000	14,082,334	25
Pulp wood, cords.	176,783,966	526,865	334

The number of years shows the mathematical period of duration, without taking into consideration the various circumstances of a nature to shorten or to lengthen that period. Fire, indiscriminate settlement, unwise or unlawful cutting, waste in lumbering operations, the power of self-reproduction on the part of certain kinds of timber and the extension of railways through the forest, are in this respect factors of potent efficacy and deserving of the most serious consideration.

For those who have given special attention to this matter it is a well known fact that fire has destroyed many times more valuable timber than has the axe of the lumberman. This is especially the case with regard to pine. Before a committee of the Legislative Assembly, Hon. Mr. Edwards stated as his 'candid conviction that at least twenty times as much has been destroyed by fire as has been cut by the lumberman, having regard to the destruction of young timber that was growing at the time of the destruction.'

That statement refers to the pineries of the Ottawa territory, which contain practically all the pine we have in this province. If fire is allowed to continue its work of destruction, it would not be safe to extend the duration of pine beyond forty or fifty years.

Then there are the inroads under the pretext of settlement. As far as can be ascertained by the records in the Department of Crown Lands during the last sixty years the regular lumber business has removed from the forests of Pontiac and Wright about 18,000,000,000 feet of pine. If forest fires, caused chiefly by settlers in clearing lands, have destroyed not twenty times, but only as much, the total removed by lumbermen and destroyed by fire amounts to 36,000,000,000 feet, which would mean that under the present circumstances as regards forest fires and the same rate of production by the lumbermen the stock of pine now available in the upper Ottawa territory will be gone within fifty years hence. Forest protection has been better for the last few years, but the inroads of colonization are getting worse from year to year, so that there is not much hope of improvement as regards the preservation of the pineries. And the regular cutting by lumbermen will most probably increase as they have better means to ship their products to the ports on the great lakes and thence to Chicago, which demands more every year and pays higher prices as pine disappears from Michigan, Wisconsin and Minnesota.

All these circumstances considered, it may be said without exaggeration that fifty years is the longest time which may be assigned to the duration of our pineries. Of course, self reproduction of the forest might help prolonging that period, but there is not much to expect from this source. Pine only reproduces in some sections, under the most favourable circumstances, and it remains to determine whether, even under these favourable circumstances, it will keep on reproducing.

Cedar is in the same position as pine. It is not so much exposed to destruction by fire, but the indiscriminate and senseless cutting which has been going on for some years and increases all the time will soon make that timber a thing of the past, as is now the case in Maine, where the same practice prevailed for some ten or twenty years.

Hard woods in the sections where they are actually available will certainly last the period assigned to them, even under an increased production, and taking into consideration what new railroads will make accessible from year to year, the supply may be regarded as practically inexhaustible.

Our supply of spruce, for saw-logs and pulpwood, if protected against fire and prudently husbanded, is practically exhaustless. As a rule, this species reproduces by natural growth in fifteen or twenty years, if you cut only the big trees and leave the smaller ones—nine inches and under in diameter—to grow. The spruce forest is not, by the nature of the wood, so much exposed to fire as pine, and in case it is run over by fire, the timber can be cut profitably after the disaster, which is not generally the case with burnt pine. And by cutting only the larger trees, you stimulate the growth and development of the smaller ones, which then have more room and light, a circumstance which tends to stimulate the growth and improve the quality of the wood.

Unfortunately the desirable results which we might expect from this self-reproduction of spruce are wiped out by our irrational system of colonization. By granting lands for colonization purposes indiscriminately and allowing settlers to take lots far away from settlements, we force the limit holders, the very men who have the greatest interest in its preservation, to destroy that forest in which they have invested large sums of money. In order to serve their best interests and secure permanency for their investments, lumbermen endeavour to prolong their trade by careful cutting and careful manipulation of the timber on their limits; but they are human just as other people and when they apprehend that they are to lose the fruit of their labour and wise husbandry, through the invasion of colonization, they quite naturally try to make the most out of the situation, they forcibly give up the system which they have followed for years in the management of their domain and cut everything out of which they can make money and realize as much as they can, for the purpose of recouping themselves for past disbursements. They act upon the principle that charity begins at home.

In this respect, however, the speculator or bogus settler is the chief factor in the destruction of the forest. As he practically pays nothing to secure the right to cut the timber, as he has not to maintain the value of an investment, as he is not, like the limit holder, bound to cut only the trees of the diameter prescribed by the regulations of the department, as, above all, his sole and only object is to make as much money as possible in as short a time as possible, he simply sweeps the forest, cutting and removing even twigs, if he can get money for them, and leaving not a tree of a size to bear seed for another growth. Moreover, the heaps and masses of branches, chips and other inflammable material which he leaves on the ground, invite fire, which generally answers the call and once started extends its work of destruction to the neighbouring green forests.

For one who has not verified the facts on the spot, who has not seen them with his own eyes, it is impossible to form an adequate idea of the damages caused by squatting or the location of settlers in the middle of the bush, more particularly in a pinery. I submit the following facts to those who are disposed to study the question in good faith and impartially:

Some years ago a man by the name of Antoine Lafond settled in the forest near Lake Cagamont, on the Eagle river, far away from other settlements. In clearing land for a crop of potatoes which yielded five bushels, he started a fire which destroyed *three hundred million feet of pine*. The pine so destroyed would be worth to-day \$390,000 to the government in stumpage dues, \$1,800,000 in wages for woodmen and at the low rate of \$4 per M standing, \$1,200,000 in profit for the holder of the limit. To put it briefly, to raise a crop of five bushels of potatoes, that settler destroyed tim-

ber which to-day would be worth at least \$3,390,000. The country thus laid waste is now a worthless desert, where no settler would care to locate, so that this land is lost to all purposes.

In his evidence before the Colonization Commission, last year, Mr. J. G. Gillies swore that his firm has lost in the same manner one hundred million feet of pine in the Temiscamingue country, which represents a loss of \$1,130,000 to the government, the woodmen and the limit holder. The late Mr. Alexander Lumsden mentioned two other similar cases where, in order to clear a few acres of bad lands in the Lake Kippawa region, fires were lighted that destroyed more than one hundred and twenty million feet of pine.

If this system is allowed to continue any longer, the prospect of our pineries is not bright.

Our spruce forests have suffered considerably from the same cause. In the north-eastern part of the province, the trouble is with the Indians. For the purpose of signalling or creating blueberry plains to attract bears, or through negligence in camping, they start fires which destroy every year vast areas of forest. In regard to this, Dr. Low, in his valuable report on the Labrador peninsula, mentions facts deserving the consideration of all those who take any interest in the preservation of our forests.

HOW TO PRESERVE OUR FOREST WEALTH?

Many propositions have been submitted for the preservation of our forests, amongst which are cultivation and replantation. In the province of Quebec, these methods are neither desirable nor practicable. First of all, the government has not the means to carry on a system of silviculture on such a footing as to produce appreciable results. In the second place, where reforestation would be perhaps the most needed, our public lands are in the hands of capitalists who have invested their money in forest as a business matter and who cannot reasonably be expected to adopt any new system of forest management, unless the ultimate returns are shown to be greater than those accruing from the ordinary methods of lumbering. As plainly stated by Professor Fernow, the only reason for lumbermen and most private owners to adopt forestry, is the financial one, and here, as it is the case in the United States, every plan of forest management must be in a measure a compromise between the owner of the forest and the scientific forester. It is also a matter of compromise between the government and the limit-holder. The object of the latter is to cut as much timber as possible without injuring the productive power of the forest, but he will most willingly leave a certain amount of capital invested in forest in the form of growing wood, obtaining his returns from the sale of merchantable timber after the necessary period of growth has passed, if he has the guarantee that his holdings will be fairly protected against dishonest encroachments under the pretext of colonization and against fire, which is the natural consequence of those encroachments.

Therefore, in the province of Quebec forestry as a practical matter is limited to protection against fire and the inroads of timber pirates raiding the forest under the pretense of promoting colonization. 'Rules,' says Professor Fernow, 'which are considered axiomatic abroad must often be set aside, and frequently results which could be obtained by the expenditure of a small amount of money must be satisfied because the owner of the forest cannot afford to make the investment. A sustained yield, an allotment of the forest into divisions, a permanent road system, the accessibility of all parts of the forest at one time, fire lines, improvement cuttings, and the like, which are usually considered a part of forest management in Europe—each must, in many instances, be given up as impracticable, for the present.'

Those sane and practical remarks apply to our province as they do to the state of New York, and should guide our action in matters of forestry. All our efforts should tend to the organization of a thoroughly effective system of protection against fire and the classification of our public domain into woodlands and farming lands,

with the view of securing free access to the latter by *bona fide* settlers and strictly excluding wood pirates, thus securing the limit-holders in the tenure of their holdings, thus encouraging them to adopt in their operations a system which would secure the perpetuity of the forest by self or natural reproduction. Let this system be adopted, and our forests, particularly our spruce and pulpwood forests, are practically inexhaustible, even under a production increased ten fold, compared to what it is now.

Our system of protection against fire has been materially improved of late, but is still inadequate and lacks that high degree of effectiveness which should characterize it. The law is good and would reach the end for which it was enacted if it was thoroughly observed, but when it comes to its strict enforcement, political influence interposes and the best interest of the province is removed to the back ground. In its report the Colonization Commission made the following recommendations which should be carried out:

'The staff charged with this service are too subject to political influences to perform their duties with the energy and independence which alone can secure its effectiveness. In several cases political influence has caused the post of fire ranger to be entrusted to men who have neither the activity nor the ability required to properly fill a position upon which depends the preservation of the greatest source of wealth of the province.

'All the license-holders have in their service permanently guardians of provision depots, overseers and foremen who possess a thorough knowledge of their respective territories, as well as of the neighbouring establishments. We know of no men who are better in position than these to perform the functions of fire ranger. We are of opinion that these men should be chosen and appointed in preference to all others and that no others should be named, except in the localities where there are none in the neighbourhood of timber limits under license. They also should be vested with all the powers conferred on justices of the peace by articles 1353 and 1358 of the revised statutes.

'Of course, the government should retain the control of this service and for this purpose have one or two special officers whose duty it would be to see that it was done actively and effectively. These officers would keep moving about all the time from 1st April to 15th November in the territories placed under their control and would be bound to recommend the dismissal of any fire ranger for neglect or incompetency.'

'Against the fire danger,' says Professor Fernow, 'constant patrol seems to be the only help, all other means seeming more expensive and less efficient. Again the personnel of the organization is of first moment, and even when proper persons have been chosen, only a constant inspection and oversight will keep the organization alive, its members on the alert.'

The main object of a good organization should be rather to prevent than to stop conflagrations. When a fire is started it will very rapidly gain headway and run its course, all efforts notwithstanding, until a rain, a water course or swamp stops its spread. Therefore, the first duty of the fire rangers should be to control the setting of fire to clearings in the neighbourhood of green forest. During the dry season no settler should be allowed to burn a clearing without having previously notified the nearest fire ranger, who should be on the spot with the force of men required to control the fire and prevent its spread where it is set in a dangerous place.

With our democratic principles of government, it is perhaps a big undertaking to bring our people to appreciate the necessity of such a control and it is perhaps in preparing public opinion for this evolution that societies like the Canadian Forestry Association would contribute in the most efficacious way to the maintenance of the forest, at all events as regards the province of Quebec. Instead of wasting our efforts in growing a new crop of wood, let us limit them within the rather heavy task of keeping what is already grown and available.

In this respect, it may be said that the government is not doing enough, comparatively, for the protection of our forests. Our public buildings are worth less than \$3,000,000. To protect them against fire we paid, in 1903, for insurance premiums

and salaries to guardians, about \$50,000. In 1903, fish and game yielded a revenue of \$63,119. For the protection of this source of revenue, we employed a staff of 315 fish and game rangers, to whom we paid \$20,000 in salaries. For the same year, 1903, the receipts from woods and forests brought to the provincial treasury \$1,241,814. For the protection of this, our largest source of revenue, we employed a staff of 99 fire rangers to whom we paid \$17,000 for salaries and expenses, to which the limit-holders contributed their fair share.

Now, when we spend \$50,000 to protect public buildings worth \$3,000,000, when we spend \$20,000 to protect a source of revenue which yields \$63,119 and which can be very easily and promptly renovated if temporarily destroyed, are we justified in spending only the meagre and inadequate bagatelle of \$17,000 to protect against irretrievable destruction a forest estate constituting the best, the most valuable and available asset of the province, an asset worth billions of dollars, capable of bringing to the provincial treasury a yearly revenue of \$2,000,000 and procuring to our farmers and woodmen over \$10,000,000 a year in wages and the sale of farm products?

The classification of public lands, such as authorized by a law passed by our legislature last year, will do much to lessen the danger from fire, if it is faithfully and energetically enforced. Colonization will be concentrated and it will be much easier to protect the green forests against the fire started for clearing purposes. With a good staff of active and intelligent fire rangers at hand, the danger will be minimized, and it is reasonable to hope that this legislation will produce the most desirable results, if political influence does not interpose to block the accomplishment of this important reform. This law, if fairly but rigidly enforced, will also hit the death blow on the nefarious brood of speculators on lots and timber pirates that constitute one of the greatest dangers for the forests.

Fires started by Indians are the most difficult part of the problem. Indians are under exclusive control of the Dominion government, who should be induced to take the steps required to prevent them from causing in the forests of the north-eastern section of the province damages which already amount to millions of dollars. In case the federal authorities would fail to accomplish this, the provincial government will perhaps come to the determination of applying to Indians that disposition of our law which forbids any one to go into the forest without a permit, during the dry season. And if this disposition is not in our statutes, it should be enacted. As regards action on the part of the Dominion government, the collaboration of the Canadian Forestry Association would be a great help, and I hope we will have the benefit of this collaboration.

The CHAIRMAN.—I really cannot allow such a paper as this to go by without saying a few words in commendation of the great care and attention which Mr. Lange-lier must have devoted to the preparation of it. I think it is one of the most exhaustive papers, and one of the most interesting papers, and one of the best papers in every respect that has ever been read before the association.

Any man hearing a paper of that nature read, or reading it from a report, must be seized with all the information necessary to enable him to realize what a great wealth the province of Quebec has in its forests, and how it can best be conserved, and why it ought to be protected. I do not think it is possible that anybody could have written a better paper upon such a subject than the paper we have just had the pleasure of listening to.

Mr. LITTLE.—I would like to show why we have such difficulty in protecting our forests. Our forests are more liable to loss by fire than any other forests in the world. As the subject is one of the greatest importance I have taken the trouble to prepare a short paper, which with your kind permission I will read.

FOREST FIRES AND MAKING SQUARE TIMBER IN THE WOODS.

BY WILLIAM LITTLE.

Honorary President of the Canadian Forestry Association.

As the subject of forest fires is of extreme importance to Canada, I crave your indulgence for giving some reflections of my own with reference to the serious losses sustained in some of the older provinces of the Dominion with which I have had personal experience.

This is a topic about which so much has been said and written of a character to leave the false impression that the great aim of nature was to destroy the forests by fire as rapidly as possible, and that all efforts of man were futile in prolonging their existence—a plea made by Crown Lands Commissioners as an excuse for their imprudent disposal of timber limits at the merest trifle of their value, and also by careless lumbermen for conducting their operations in a wasteful and reckless manner. And with the government at the same time actually deluding ignorant people to settle on the Laurentian rocks, covered only with a few inches of leaf mould, which as soon as exposed to the sun's rays by the removal of the timber is dried up and blown away by the winds and from which they can at best eke out a miserable existence for a very few years, while constantly exposing the surrounding timber to the risk of fire—it is hardly to be wondered at that millions of acres of valuable timber have been needlessly sacrificed.

My own experience has taught me that in the great majority of cases the fires came after the lumberman, not before him, and that with proper precaution and ordinary care fully grown pine forests even should not be considered a hazardous risk. They are not so considered in Germany or France or other European countries where proper precaution is taken for their protection. In France pine forests have been insured against loss by fire at as low a rate as one franc per thousand francs on trees fifty years old and upwards, or say one-tenth of one per cent per annum for mature timber.

In Sweden and Norway, where the forests are nearly all coniferous, the fire loss is comparatively trifling. Indeed I am advised that it is only to Americans and Turks that belongs the invidious distinction of being the great destroyers of the forest.

In corroboration of this immunity from loss by fire when the forests are properly administered permit me to give some replies sent in answer to inquiries made by General C. C. Andrews, chief fire warden of the state of Minnesota, in 1902, respecting losses by fire in European countries.

From France the report was:—"In the temperate and cold regions of France (that is in the larger portion of the territory,) the fires are but few and cause slight damage." Norway with a state forest area of 2,537,000 acres, and private forests of 18,000,000 acres reports: "The damage caused by fires is inconsiderable in the public forests. Many years there is none, and the damage done to private forests is of small account and not reported." Sweden with 18,000,000 acres of forests reports: "Only 1,200 acres damaged and loss about \$10,000." Prussia having over 6,000,000 acres of state forests from which it derives a net revenue of \$8,500,000 reports: "About 3,600 acres damaged in the four years from 1892 to 1896." Austria receiving a net revenue of \$693,000 from 2,573,000 acres of state forests reports: "An average loss of \$32,000." Bavaria with 2,150,000 acres from which it derives a net income of \$3,227,000 reports: "The damage caused by forest fires is quite insignificant, being in 1890 only \$964, and in 1894 only \$1,686." The Duchy of Baden with 240,000 acres and a net revenue of \$667,000 reports: "For the nine years 1879-1888 the damaged surface was 99 acres, and the damages, \$2,225." Wurtemberg with 400,000 acres and a net revenue of \$1,774,000 reports: "A fire loss of \$640." And Saxony with 432,000 acres of forests and a net revenue of \$1,946,000 reports: "The average loss is \$300 a year."

All of which goes to show that when any ordinary care is given to the preservation of the forests the loss by fire is when compared with their extent and value a mere trifle, and while an investigation would, I have no doubt, prove that more valuable timber is annually destroyed by fire in the province of Quebec than in the whole of Europe in a quarter of a century that this great loss is chiefly due to the lack of a proper system of forest administration.

I never knew an instance where a forest fire or a fire of any kind burnt any longer than fuel was supplied to it in a proper condition for burning. This is the whole gist of the matter.

So that where our forests have suffered most severely from fire it would be found to be almost wholly due to the abominable manner in which lumbering operations were carried on in the past, and that nearly all recent grand conflagrations were due to the inflammable matter left by lumbermen in their operations, and that they and fraudulent or deluded settlers and not the elements are primarily responsible for the greater part of the losses caused by fires in the white pine forests of America.

It was so in the great Miramichi fire in New Brunswick in 1825, and about Moosehead lake in Maine the same year: it was the same in the great Poshtigo fire of 1871 in Wisconsin, and the great fires of 1871 and 1881 in Michigan; and also what is called the Hinckley fire in 1894 in Minnesota. All these fires were in districts where extensive lumbering operations had been carried on for years—where the forests were left filled with the dried tops, branches and other debris resulting from such operations.

And to show that I have good reason for attributing the great fire losses to imprudent lumbering I will endeavour to give some exposition, imperfect though it may be, of the manner in which the making of square timber was carried on in the provinces of Ontario and Quebec during the greater part of the past century, which makes it apparent that it would be difficult to devise a process better adapted for insuring the burning up of the pine forests of the country than that employed in the making of square timber in the woods.

The character of the timber required for this trade I give in the words of the late Hon. James Skead, of Ottawa, for many years one of the most extensive operators in this timber trade, as described by him just forty years ago (1865), together with the yearly averages of the different kinds of timber cut for market at that time, when he said:—

“The square timber must be selected with great care, nearly perfectly straight, and entirely free from knots, shakes or other blemishes. It must be hewed perfectly square and must carry the same thickness throughout, a very slight taper indeed being allowable.”

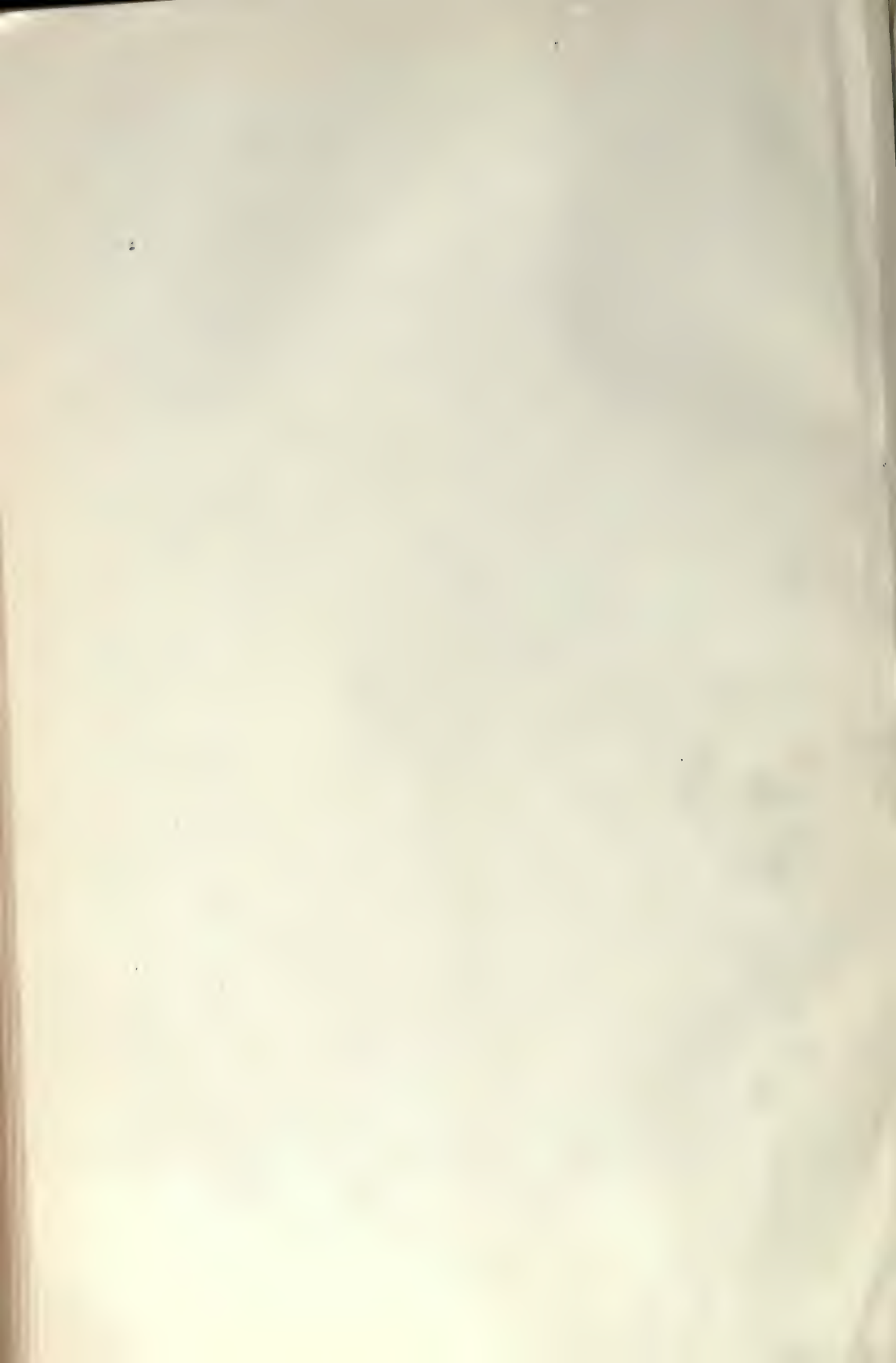
About one twenty-fifth of the standing pine is fit for square timber. It must be totally free from blemishes of any kind over thirty feet of its length, and should square at least fifteen inches.

The average yearly quantity of square timber then arriving at Quebec was, of square white pine 17,655,000 cubic feet, red pine 2,566,000, oak 1,585,000, tamarack 987,000, ash 142,000, and birch 92,090; making a total amount of square timber of 24,486,000 cubic feet, together with 250,000,000 feet board measure of sawed planks (deals), 250,000,000 board measure for home consumption, and 250,000,000 feet for the American market. The whole making 86,986,000 cubic feet, or over one million and three-quarter tons.

At that time it would appear that the square white and red pine amounted to about the same quantity when turned into feet board measure as was used for home consumption, or shipped in the shape of deals to Great Britain, or lumber to the United States; but in reality the drain on the forests for square timber more than equalled in value all that taken off in saw-logs for the manufacture of lumber and deals, for the same tree that would make a stick of 100 cubic feet, or 1,200 feet board measure, would saw into deals fully double this amount, or 2,400 feet board measure, and fully 2,000 feet when sawn into inch lumber; and since it was only the selected trees that were taken and they were to be free from knots or other defects for at least



No. 10.—The effect of a soil fire which slowly but surely eat its way along the forest floor. The trees are all killed—though unscorched except at the roots—and the soil absolutely destroyed wherever it was shallow.



thirty feet from the butt, the value of such timber must have been fully double that used for making saw-logs. I may remark that by some strange illusion the public accepted as a fact the dictum that the loss in the making of square timber, as compared with cutting the tree into saw-logs, was only about one-third or one-fourth part of the timber, as it was considered that when sawing the stick into lumber the saw cut away one-fourth of the wood into sawdust, which was supposed to equalize the waste when squaring, but the great loss arose from squaring the stick to the size of the square of the top end or nearly so, so that when the stick was 50 feet or over in length this smaller square caused so much of the butt to be cut away as to make the contents not to equal one-half what the tree would have made if sawn into deals or lumber.

But great as this loss of the most valuable part of the trees was, it was a mere trifle as compared with the subsequent loss to the forests occasioned by its manufacture in the woods owing to the great mass of combustible material left behind to become the ready means of spreading fires.

In order to get the timber from the woods the first thing to do was to make suitable roads on which to haul it to the landing places on the streams, and here you will see began the work of preparation for forest devastation.

The foreman, or boss as he is called, after having decided on the routes of his main roads into the body of the timber, sets his men to work to clear away everything, large or small, and pile it just outside of the line of his roads which had to be made sufficiently wide and straight to enable the longest sticks to pass without obstruction, and when completed you will find two continuous brush heaps piled one on each side of these roads that in a few months' time, exposed to the sun and winds, become completely dry and ready to ignite at any moment, and to carry the fire into the very heart of the forest. Timber roads were then made branching out from these main roads in all directions through the woods to reach the trees suitable for square timber. The chopper after having selected the choicest tree would assure himself that it was sound before cutting it down, which he did by striking the tree sharply on all sides with his axe, just as your doctor does by tapping with his fingers on your chest and back to ascertain if all is right within. When satisfied that the tree is sound he examines it carefully on all sides from bottom to top, noting which way it leans, and the size and position of its largest limbs, in order to decide how to cut it so as to make it fall where least liable to be broken or injured in falling, and where it would be most easily squared and removed, all of this requiring both experience and judgment, and should the ground be uneven he cuts down a number of small trees to make what is called a bed for the large trees to fall on and escape injury in falling, and in this way many growing young trees are sacrificed which would be in a few years fit for saw-logs.

After the tree is down the chopper examines the butt for shakes or rot in the heart, which is often found in very old trees, and if so to decide how much must be cut off the butt to make the stick free from rot or shake, otherwise it would be rejected as a cull, and often the most valuable part of the tree for clear lumber would be chopped off and left to rot in the woods. And lest it should be supposed this heart rot had the effect of injuring the surrounding wood, it may be said that while the heart of the tree may be several centuries old and have rotted away so as to leave the tree hollow butted, the remaining wood may be quite sound throughout, and more clear lumber might be got from such a log when sawn parallel with the outside than if it were sound throughout and sawn in the ordinary way.

If the tree has fallen in a suitable position for being hewn, work begins without severing the top from the trunk, otherwise the top is cut off usually just where the clear bole of the tree reaches the lower limbs of the crown, then after canting the trunk over till placed in a satisfactory position to be scored and hewn, the chopper chips off, or rosses as it is called, a few inches of the bark on each side of the top of the stick to enable the liner to chalk-line it to the size it will square, and to show the scorer how deep he may cut notches into the sides of the stick, without cutting into

and injuring the new surface of the stick when squared. These notches are usually cut about thirty inches apart along each side of the stick, and are sometimes as much as a foot in depth near the butts of large trees, while owing to the ease with which clear pine is split the wood between these notches, called score blocks, is often blocked off by an expert chopper with a single stroke of the axe. After the removal of these score blocks the scorer chops and chips off all surplus wood remaining, as close as possible, without cutting quite down to the line of the proposed squared surface. Then the hewer follows with his broadaxe and hews off all wood left by the scorer down to the line, and obliterates all traces of the scores made by the scorer's axe. After both sides are hewn square, the stick is then canted over on to one of its flatted sides, and the other two sides are lined, scored and hewn, and the stick is then ready to be skidded and hauled to the landing.

I may remark that so skilful do some of these men become from constant use of the broadaxe, that I have seen one, when hewing a large mast stick that was over six feet in diameter at the butt, to hew a clean surface of over four feet in depth so smooth and perfect that it looked as if it had been carefully planed, and where one could with difficulty discern where a stroke of the axe had been made upon it.

Now, let us compare the condition of the forest before and after the timberman had completed his work and removed the timber, and assuming that it was a grove of mature pine say from 200 to 300 years old, you would have found before the advent of the timberman, that the ground was strewn with many layers of pine needles, only the top layers of which were at all dry, the bottom layers being moist near the ground owing to the crowns of the trees making a close canopy and shading the forest floor from the rays of the sun. Underneath this close canopy you would find little, if any, underbrush, and not enough loose wood lying about to make a fire hot enough to cook your dinner, so that even if a fire were started and overran the ground it would find only a few surface leaves dry enough to burn, and could do but little damage to the timber; nor was there much danger of its spreading since there were no roads opened up through the woods for the winds to enter and scatter about the burning leaves.

If you would go there the following summer, after the removal of the timber, you would find the forest canopy broken through almost everywhere, and the sun's rays penetrating the forest floor of pine needles till they became as dry as tinder, so that the first sparks reaching them would start a fire that might set the whole forest ablaze. You would find in place of the old pine tree that under natural conditions had withstood the risk of fire and tempest for several centuries, and under like conditions would do so till it died of old age, there was now left only a worthless stump, about which were a lot of dry pine chips scattered broadcast in all directions over the forest floor of dry pine needles, and these pine chips increasing in size and quantity close to and around the stumps. Then from the stump is seen strewed along the ground for thirty feet and upwards, according to the length of the stick of timber removed, four rows of score blocks lying on the bed of dry pine needles, partially covered with dry pine chips, with more pine chips scattered about for a distance of from twenty to thirty feet along both sides of these four rows of score blocks which were cast off the stick by the scorer's axe; while on top of chips and score blocks lie strewed along from the stump to the tree crown the hewings and shavings made by the hewer with his broadaxe. Here you would find the massive crown upheld from the ground by the strength of its lower limbs, with many of its limbs and branches broken off and thrown about, littering the ground in all directions; and altogether limbs, branches and leaves drying and dying in the rays of the summer sun; while out of its dying stem is seen the turpentine gum exuding and dripping to the earth to catch the flame of any passing fire.

And when it is known that dry white pine is one of the most easily ignited of all our forest woods, and the most inflammable parts of this wood are the tops, limbs, branches and leaves, all of which are left behind to furnish fuel as it were to aid in burning up the rest of the forest, and all permeated with turpentine gum, and these together with the dried pine blocks, chips and shavings lie scattered about, covering

the forest floor of dry pine needles, and all exposed to sun and wind, and ready for any chance spark to set them on fire and burn up the surrounding timber. And when it is also known that there was added regularly year after year for the greater part of a century an average of over two hundred thousand of these fire-spreading timber zones throughout the forests in all pine timber sections of the country, the debris left by each stick covering an area of ground of probably five thousand square feet in extent, would it not look as if it would require almost the constant intervention of Providence to save the pine forests of the country from destruction by fire.

I know that it may be said that there are sections of the country where fires have been very destructive to the forests, and yet no square timber had been made therein, but I know of few sections where the lumberman had not been in advance of the fire; and the manner in which saw-logs were got out, say fifty years ago, when hardly any value was placed upon the timber, was but slightly less destructive to the forests than in making square timber. At that time only first quality deals, which were called merchantable, were regularly purchased; and although buyer and seller might agree on a certain proportion of seconds, all qualities below these grades were culls. Then only what were called deal logs, or logs that would saw out largely clear lumber, would be taken from the woods—the slightest defect culled the log—with the result that the whole lumbering country was overrun by jobbers to get deal logs for the insatiable saw-mill; trees were cut down, every one of which, and every part of which, would now be taken with avidity, were on account of some trifling defect left to rot in the woods; net works of roads were made everywhere through the woods to be grown up afterwards with underbrush—one of the chief means of spreading the fire—and no thought whatever was then given by any one to check the spread of fire when started, unless in the vicinity of fences or buildings.

Even to-day those intrusted with the administration of our affairs scarce give a thought to the seriousness of the situation, and even boast of our forest wealth, when the invaluable white pine, our most important forest resource, is about gone; and our lumber merchants in the city of Montreal, at the mouth of the great Ottawa river, that only a few years ago we were told contained inexhaustible supplies of the finest white pine, are now forced to send to the southern states and the Pacific as the cheapest places from which to supply their customers with suitable timber for building purposes.

And instead of exporting from Quebec 23,147,500 cubic feet of white pine, as was done in 1863, when I was engaged in this trade, the total export last year was only 1,491,843 cubic feet or little over six per cent, while the prices which then ranged from 6 to 16 cents per cubic feet have now more than quadrupled, and range from 35 to 65 cents per foot for smaller and inferior timber.

And to know that there are good reasons for believing that a large amount of pine that has been needlessly sacrificed to the flames might have been saved, one has only to read the recent Crown Lands and Forestry reports of Ontario, where it is shown that since the province inaugurated a fire-ranging system very few serious fires have occurred, and doubtless many million dollars' worth of timber have been saved to the country. Its efficiency being highly appreciated by all Ontario limit holders, who also contribute to its cost, and in commendation thereof I heard Mr. J. R. Booth state at one of our forestry meetings that, 'one forest fire occurs now where there were ten a few years ago,' and he attributed this satisfactory result to the excellent system of fire-ranging in operation now in the province of Ontario.

From the report of the Crown Lands department of Quebec for the fiscal year 1901-2 I find that out of receipts paid into the treasury by limit holders of over one million dollars (\$1,055,037), there was expended for the supervision and protection of the provincial forests from fire on an area of 116,500 square miles, equal to 72,500,000 acres (the area of leased limits alone amounting to 62,952 square miles, equal to 40,000,000 acres), the petty sum of \$7,226 !

This makes the annual cost of fire protection about \$100 for each million acres, or less than 6½ cents per square mile, while at the same time the government is receiv-

ing from the limit holders, besides the bonuses paid and timber dues, an annual rental of \$3 per square mile, which amounts on this account alone to the sum of \$1,763,983.

During the same year (1902) the province of Ontario with only 18,191 square miles of territory under license, being less than one-third that of Quebec, expended for fire-ranging services nearly five times as much, or \$34,200, and saved thereby millions of dollars' worth of timber from being destroyed by fire—this being a situation wherein an ounce of prevention is worth many pounds of cure, and where it would cost less to save one thousand dollars' worth of matured timber than to grow ten dollars' worth of young trees.

But common sense would indicate that in our eastern provinces of Canada so especially adapted for the successful growth of timber, and where it will in a few years command higher prices than in many parts of Europe, owing to the enormous demands that must be made upon us, not only by the northern states of the American Union, but by our own great central treeless territories, it would be prudent to expend in the salvation and growth of timber not only to the extent of thousands of dollars, as is done in Quebec, or tens of thousands as in Ontario, or hundreds of thousands as in some of the minor European countries, but even millions of dollars as in France and Germany, where they not only get returns of from two to five dollars for every one expended, but have their stocks of timber increased and made more valuable each succeeding year; whereas we possessing without outlay on our part some of the most valuable forest lands on the earth's surface, have been treating them in the same improvident manner as the prodigal spendthrift who keeps selling off portions of his patrimony every few years to meet his extravagances till all is gone.

RESOLUTIONS.

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

1. *Resolved*, that this association has learned with great pleasure through a telegram from Senator Edwards that the Right Honourable the Premier of Canada has expressed his desire that a Forestry Convention should be held during the coming summer or autumn in Ottawa, and that the Dominion Government will render suitable aid to such a convention.

The Association desires to express its great gratification at the interest in its work indicated by this action on the part of the Premier of the Dominion and to express its hearty concurrence in the suggestion for holding such a Forestry Convention, and the Executive Committee of this Association is hereby authorized to confer with the Right Honourable the Premier and to take such steps as may be necessary to carry out the proposed convention; and that a copy of this resolution be sent to Hon. Mr. Edwards for presentation to the Premier.

2. *Resolved*, that in view of the proposed construction of a new transcontinental railway and the projection of other lines passing largely through coniferous forests, the attention of the governments of the Dominion, and the provinces and also of the railway companies, be called to the serious danger of loss of valuable timber consequent upon the construction and operation of such lines, if all possible precautions to prevent the starting of fires are not taken, and to urge that the question be given full and careful consideration, that to the end sought the party or parties contracting to build the different sections of the said roads be required to enter into an agreement for an efficient equipment and control to prevent fires, that at such seasons as may be necessary an effective patrol be established along the afforested line of railway, and that the officers both of the governments and the railways be required to use all possible diligence to prevent the starting or spread of fires through defective equipment or through the carelessness of the operations or negligence of the employees under their control.

3. *Resolved*, that in view of the difficulty in dealing with cases of fires started for the clearing of land and for other purposes, the Canadian Forestry Association beg to respectfully submit to the government of the province of British Columbia that the Bush Fires Act of that province should be amended so as to prohibit the starting of fires except for cooking or other domestic purposes between the first day of May and the first day of November in each year, unless a special permit for the purpose be granted by the forest ranger or other officer appointed for the district in which such permission is asked.

And that permits for the clearing of land by fire shall only be issued after inspection of the locality by said forest ranger or other officer, and that any forest fire ranger appointed by either the Dominion government or the government of the said province shall have the authority of a constable in dealing with all offences under the said Bush Fires Act.

4. *Resolved*, that in view of the difficulty in dealing with cases of fires started for the clearing of land and for other purposes, the Canadian Forestry Association beg to respectfully submit to the government of the province of New Brunswick that the New Brunswick Fire Act of 1885 should be amended so as to prohibit the starting of fires except for cooking or other domestic purposes between the first day of May and the first day of December in each year, unless a special permit for the purpose be granted by the forest ranger or other officer appointed for the district in which such permission is asked.

And that permits for the clearing of land by fire shall only be issued after inspection of the locality by said forest ranger or other officer; and that any forest fire ranger appointed by the government of the said province shall have the authority of a constable in dealing with all offences under the said Act.

5. It having been represented to the Canadian Forestry Association that a large part of the right of way of the Intercolonial Railway running through the province of New Brunswick is not cleared of young growth and other combustible material, as provided by section 11 of the New Brunswick Fire Act, passed in the year 1885, which section provides: 'Whenever a railway passes through woods, the railway company or owner, &c., shall clear from off the sides of the roadway, from the lands taken for such railway, or up to the edge of the forest on such lands taken by the said company for said railway, all brushwood, logs, and like combustible material, by burning the same at a safe time, or otherwise removing the same.'

It is therefore resolved that the attention of the Minister of Railways be called to the above matter, and the Association respectfully asks that steps be taken as soon as possible to clear the right of way of this combustible material.

Resolutions of thanks were passed to those who had so kindly entertained the Forestry Association in the city of Quebec, to the railway companies for privileges granted, to the press for numerous courtesies, to the governments who had so kindly made grants in support of the work, and to those who had prepared papers for the meeting.

COL. LOGGIE.—I would like to say that there is something that I forgot to tell you yesterday when I was reading my paper, and that is that the province of New Brunswick has passed legislation to form a provincial park, or forest reserve. This park contains nine hundred square miles of territory. The Act provided that it be proclaimed by Order in Council, and the government chose a particular park, but they have never been able to lay it off yet. Perhaps it would be well for this association to draw the attention of the Premier to the fact that it would be well to deal with this matter. We could comprise it in a resolution, and I do not think it would be very much out of place now, seeing that we are dealing with forest reserves.

The CHAIRMAN.—Don't you think, Col. Loggie, that where the government has passed an Act declaring its intention to do something, which can be done by Order in Council, that it would be scarcely the thing for us to force immediate action upon them? I have no objection to a resolution being passed as you suggest, but it just occurs to me that if they have passed an Act which gives them authority to do certain things, that they will do them in their own good time. There may be some difficulty in selecting the area, of which we have no knowledge.

I am not anxious that this association should assume any more than the government of the province.

COL. LOGGIE.—The Act was passed two years ago, and all that time has elapsed. The thing has probably gone out of their minds altogether.

The CHAIRMAN.—Do you think that this will bring it to their minds?

DR. CLARK.—I do not think it would be advisable for the association to pretend to advise the government in a matter of this kind, unless the facts were fully laid before us.

MR. CHOWN.—Several gentlemen have suggested to me that no matter of greater importance has come before this meeting than the one to which I referred a few moments ago. In order that it may be brought properly before the meeting, I have drafted a resolution, which I think will not meet with any very serious opposition.

I therefore beg to move the following resolution, which is seconded by Mr. Craig:—

'That in view of the very serious results in different states through heavy taxation on forest acreage, the Canadian Forestry Association respectfully urge upon the different provinces that revenue from forest lands be so far as possible raised by stumpage dues rather than rentals.'

I do not know whether you will allow us to discuss this matter now, Mr. Chairman, but a great many of us feel that a resolution of this kind would, in the present state of the forest, in the Dominion, perhaps be as valuable and as large a step as we can take.

I have not made the resolution in any way personal to British Columbia, or to any of the other provinces. It is simply an expression of the opinion of the Canadian Forestry Association that the provinces should raise their revenues from stumpage dues, and from the sale of the rights, rather than have high rental, which led to the complete clearing of the land, as has been said before.

The CHAIRMAN.—Before that resolution is put to the meeting I want to say that I think it is scarcely fair to propose a resolution at this time that is so far reaching in its effects as this, and which requires so much thought and discussion, and which brings this association into antagonism with the well considered policy of the different provinces. Personally, I do not think that we ought to do anything of the kind. If the question is going to be taken up, I will have to ask somebody to take the chair, and I will proceed to discuss it.

I do not think that we ought to take up a resolution so broad as this one at this hour of the day (one o'clock), a resolution which is so controversial in its character, and of which we have had no notice.

Mr. CHOWN.—I do not want to appear discourteous, but it has been suggested that perhaps the association might accept it as a notice of motion for the next annual meeting of the association.

The CHAIRMAN.—There is no necessity of giving a notice of motion.

Mr. CHOWN.—Well, will you allow me to make it as a notice of motion, so that it may be printed in the minutes, and come up for discussion next year?

The CHAIRMAN.—I would like to hear from the gentlemen from British Columbia on this question. It affects them more than anybody else. The resolution is not exactly correct as it now stands. There is no taxation on timber limits in Ontario.

Mr. CHOWN.—I said 'in other states,' and I had the State of Michigan in my mind.

The CHAIRMAN.—There is no provincial taxation in British Columbia.

Mr. JONES.—There is under certain circumstances. It depends upon whether they are according to grant or license. The license gives you only the right to cut, and is not taxable. But a great deal of the timber there is cut in such a way that you have to buy the land, and that renders you liable to taxation.

The CHAIRMAN.—That is private property.

Mr. JONES.—Yes, but it is timber land.

Col. LOGGIE.—I think it would be advisable for us to postpone the discussion of this matter until next year. It is a very important subject, and we have not the time to deal with it as it should be dealt with. A great part of the revenues of the provinces are raised in this way. As my information now stands I would have to vote against the motion as it reads at present. I think, perhaps, it would be better to postpone it till next year, and we will have time to consider it.

Mr. RECORDER WEIR.—Perhaps it would be better for us to deal with it as Mr. Chown asks. He simply asks, as I understand it, that it be placed upon the minutes, and then it will be discussed and adopted or defeated at the next annual meeting. During the interval we will have it before us in order that we may study it, and when the time comes we will be prepared to discuss it in a full and proper manner.

The CHAIRMAN.—So far as I am personally concerned I would rather that it did not go upon the minutes as a notice of motion. Why cannot we deal with it the same as any other resolution?

Mr. BOSTOCK.—Perhaps the mover and seconder, seeing the view that is being taken of the matter, would withdraw the motion before getting an expression of opinion from the association.

I think the position taken by our chairman is a very wise one, and that the association should confine itself as far as possible to principles, leaving the details to those who are concerned.

If we keep to those lines we are pretty safe, and the influence of the association will be increased rather than diminished. If we persist in this we might get ourselves into bad odor with some of the provincial governments.

I would suggest to the mover that if he were to withdraw his motion after having it specially before the meeting his purpose would be attained.

Mr. STEWART.—I think the object of the mover has been attained, so far as having it before the meeting is concerned. This discussion will appear in the minutes.

Mr. CHOWN.—Although we should not be too fearful, I am fully aware of the fact that some people rush in where others are wise.

I do not see that it can do any harm to take this as a notice of motion. It does not commit the association to anything till it is adopted. If it should be refused then we shall have had the opinion of the Forestry Association on the subject.

I am not so formidable a person that anybody will be influenced by the fact that I gave a notice of motion of what I considered to be the proper thing for us to do.

Mr. PRICE.—I heartily endorse the action of our president in asking that this motion be not put before the association now, because I am of the opinion that at the next meeting when it comes up, that it will be time enough for us to deal with it then.

I think it is undesirable to bring in any element that might produce a conflict of opinion during the year.

The matter cannot be settled at this meeting, and I do not see the use of it appearing that we dealt with it at all, unless we are in a position to discuss it properly and intelligently.

Another thing, I do not generally believe in notices of motions. I think that they are an undesirable thing for several reasons.

I therefore hope that the mover will not persist with his motion at this time.

Dr. SCHENCK.—Not being a Canadian, I am perhaps not entitled to an opinion in this discussion. In addition, I must confess to be insufficiently acquainted with the detail of the system of ground rents, of which I have merely a reading knowledge.

It has been stated that the Canadian Forestry Association must deal with principles only. Now, if there is a principle underlying the idea of conservative forestry, it is certainly that of 'the conservative conduct of a remunerative business.'

As a business, forestry depends, like all other industries, largely upon the rate of annual taxation. The government can raise an industry by taxation or can kill it by taxation; encouraging it by low taxation, or destroying it by heavy taxation. As far as I can see, the ground rents rest on the timber limits in exactly the same man-



No. 11.—A pulp-wood slashing on which was cut over 50 cords per acre, showing how the real or supposed interest of a private owner often results in the total destruction of the forest. It only awaits the all but certain after-lumbering fire to make the land a desert indeed. [96

Photo. by J. F. Clark.



ner in which the taxes rest on the timber land in fee simple south of the international boundary line.

If a legislature wants to dig the grave of conservative forestry, it can do so by charging it with heavy taxation (or ground rent), or by refusing it protection from unjust assessment, emanating from a short-sighted political attitude.

In the lake states the forest has been killed, in many a case not by the lumberman, but by high taxation.

The United States have propagated their industries during the last 25 years, more or less artificially, by paternal taxation. I refer to the indirect taxation, consisting of high customs duties on importations competing with home production.

Undesirable industries—for instance, the liquor industry—may be restricted, on the other hand, by high taxation. Similarly, we can down conservative forestry for ever by imposing on the forest a rate of taxation (or ground rents, the result being the same) which the forestry business cannot endure.

It can be readily proven that the final gross revenue obtainable from conservative forestry is offset by the counter action of heavy annual fees (taxes or ground rents), accumulating at a compound rate of interest, like the premium in a life insurance.

It seems to me that the Canadian Forestry Association cannot avoid for any length of time to touch the sore spot of ground rents, one of the most vital interests of forestry being involved in the problem. Not knowing whether it is wise, from the political standpoint, to force the problem to the front to-day it might be as well to delay further discussion until our next meeting.

The CHAIRMAN.—I will be quite ready to discuss the question at the proper time, and in the proper place. This resolution is of so controversial a character that we could not possibly pass it without a very long discussion. If we are to dispose of this resolution now, the chances are that we will have to abandon the excursion which has been planned for us.

Mr. RECORDER WEIR.—It is not so serious as that, Mr. Chairman. Mr. Chown is prepared to accept your suggestion that the controversy involved in dealing with the resolution be postponed till next meeting. He simply gives notice of motion that the matter will be brought up then. It is clearly a matter of vital importance, and it is evident that there are two sides to it. It seems to me that Mr. Chown is simply exercising his constitutional rights in offering it as a notice of motion, to come up at the next annual meeting for discussion and disposal. If this is accepted we need not spend any more time over it.

The CHAIRMAN.—That is just what I thought. If there was any necessity for giving a notice of motion in order to have it before the next meeting, there would be absolutely no doubt of his right to make it as a notice of motion.

Mr. CHOWN.—Well, I would ask to be allowed to let the matter drop, and have the motion withdrawn.

Senator BOSTOCK.—There is just one thing that I would like to say before we adjourn, and that is would this association take into consideration the advisability of meeting in British Columbia next year? I think it would be a very great assistance to the forest interests of that section of the country, and if the association could see its way to coming out there I am sure that not only the people but the lumbering interests as well will tender them a very hearty welcome to the province.

We have big reserves out there, and some big trees, and it may be interesting for some of the members to see things as big, and bigger, than they have in this part of the world. I might also say that we have some big fish there.

Without detaining you longer, I would be very glad if the association could arrange to meet in British Columbia next year.

Mr. STEWART.—Until we know definitely what shape this Ottawa meeting is going to assume I think that perhaps it would be as well for us to leave the matter of the selection of a place for the next annual meeting open. Leave it in the hands of the executive. At the present time it is almost impossible to say where we should hold it. If we are to meet in Ottawa it might change our ideas and plans. I think under the circumstances that we had better leave the matter in the hands of the executive. I think we can trust them to do what is right.

The CHAIRMAN.—I would suggest that it would be a good idea that the question of the place of the next annual meeting of the association be left in the hands of the board of directors, and if they find that the proposed conference at Ottawa does not interfere with the annual meeting, that they endeavour to arrange it so that British Columbia be considered when they are making the selection of the place.

Senator BOSTOCK.—I would be very pleased to leave it in that way.

The meeting then adjourned till ten o'clock in the evening.

ELECTION OF OFFICERS.

The session being called to order at ten-fifteen p.m. by the president, Mr. Aubrey White, the election of officers was proceeded with, and resulted as follows:—

PATRON—His Excellency the Governor General.

HONORARY PRESIDENT—Aubrey White, Toronto, Ont.

PRESIDENT—E. G. Joly de Lotbinière, Quebec, Que.

VICE-PRESIDENT—E. Stewart, Ottawa, Ont.

SECRETARY-TREASURER—R. H. Campbell, Ottawa, Ont.

BOARD OF DIRECTORS.

J. R. Booth, Ottawa, Ont.; Hiram Robinson, Ottawa, Ont.; Monsignor Laflamme, Quebec, P.Q.; Wm. Saunders, LL.D., Ottawa, Ont.; Thos. Southworth, Toronto, Ont.; H. M. Price, Quebec, P.Q.; Dr. Robt. Bell, Ottawa Ont.

VICE-PRESIDENTS FOR THE PROVINCES.

At a subsequent meeting of the Board of Directors the following Provincial Vice-Presidents were appointed:—

Rev. A. E. Burke, Alberton, P.E.I.; Hon. J. W. Longley, Halifax, N.S.; His Honour J. B. Snowball, Chatham, N.B.; Hon. S. N. Parent, Quebec, P.Q.; His Honour the Lieutenant Governor of Manitoba, Winnipeg, Man.; His Honour A. E. Forget, Regina, Assa.; Wm. Pearce, Calgary, Alta.; F. D. Wilson, Ft. Vermilion, Atha.; Hon. H. Bostock, Monte Creek, B.C.; Hon. J. H. Agnew, Winnipeg, Man.; Hon. Nelson Monteith, Toronto, Ont.

On Friday afternoon a pleasant trip to Montmorency falls was taken, through the kindness of the Quebec members, and was thoroughly enjoyed by all.

In the evening a session was held in Morrin College Hall. An interesting description of 'A Forest School,' illustrated by a number of views of students at work in the forest, was given by Mr. W. H. F. Addison, of the Yale Forest School. This was followed by an illustrated lecture on 'The Forest as a National Resource,' by Dr. Judson F. Clark, Forester, Ontario Bureau of Forestry.

On Thursday evening a banquet was tendered to the visitors by the Quebec members of the Forestry Association. The splendid character of the hospitality of the city of Quebec was shown on this occasion, and elicited the strongest expressions of appreciation on the part of the guests. Brilliant speeches were made in response to the various toasts, and special reference may be made to that of Monsignor Laflamme. Speaking in reply to the toast of the Educational Institutions, Monsignor Laflamme, referring to a paper on Forest Insects read during the afternoon, said that the writer had overlooked three very injurious bugs, namely, *Ignoratio communis*, *Indifferentia generalis* and *Influentia politica*. For the first two education and popular agitation are the remedies; for the last the Reverend Abbé had no specific to offer. He urged that steps should be taken for the establishment of a school of forestry in Quebec, or for the sending of students to France to take a special course at the forest school at Nancy.

THE FOREST AS A NATIONAL RESOURCE.

JUDSON F. CLARK, Ph. D.,

Forester of the Province of Ontario.

The resources of any nation are the natural resources of the country occupied, together with what population and capital it may have or may be able to attract. Population and capital may increase or decrease, may be imported or exported, but the natural resources are a limited quantity not capable of being increased, though through mismanagement they may be decreased and even destroyed.

Countries having great natural resources are certain, sooner or later, to become great and prosperous, for there is ever a surplus of capital and labour seeking opportunity for profitable employment in the development and utilization of natural resource wherever it may be found.

The natural resources of a country are its climate, its soil, its minerals and its fisheries. The climate and soil together furnish the conditions for its agriculture and its forests. The agriculture is chiefly concerned with problems of food and clothing, the forest with the problems of wood and water.

The forest may be regarded as a national resource as the source of supply of several raw materials which are altogether, or all but altogether, necessary for modern modes of living. Chief among these materials is wood. Second only to its importance as a producer of wood is the function of the forest in regulating the flow of the streams to prevent on the one hand such calamities as floods, erosion, and silting, and on the other to conserve the water for domestic use, irrigation, power, and navigation. The forest is also a national resource in its beneficent effect on climate; in providing an ideal playground for all the people; and as a field for the employment of capital and labour, in which respect it is second only to agriculture.

In a new country containing apparently inexhaustible forests abounding with streams having a sustained and regular flow, it is perfectly natural that the production of wood and the conservation of water should at first demand but a minor consideration, if indeed they be considered at all, while practically the whole attention and effort of the people and government will be directed to the development of the agriculture, mining, manufacturing and lumbering industries and to transportation problems.

In common with other heavily wooded countries, this has been the history of Canada. As the natural supplies of wood become more and more limited, and the effects of deforestation more and more evident in the irregularity of stream flow and in other ways, the problems of forest and water conservation demand ever increasing interest and attention, and we may hope that the place of the forest as a national resource of first magnitude will be finally fully appreciated. May that day come before irreparable injury is done to the forest lands of Canada!

The most obvious and perhaps the most important function served by a forest is that of supplying raw materials for the industries of a nation. Wood is of course the chief material produced, though bark for tanning, turpentine and allied products, and even sugar are all products of much importance.

Wood has ever played a most important part in the history of civilization. Indeed, civilization without wood is almost inconceivable. Dr. Fernow has well said that it surrounds us either as a convenience or a necessity from the cradle to the grave. We are rocked in wooden cradles, we play with wooden toys, we sit on wooden chairs and eat from wooden tables; we are instructed by reading wooden books, printed with ink made from wood, entertained by wooden musical instruments, and at last are laid away in a wooden box. In mining, manufacturing and transportation wood is used



No. 12.—In the virgin pinery. These trees average fully 200 years old.

at every turn. Every hundred tons of coal require two tons of wood to mine it. Every pound of iron, every ounce of gold or copper requires wood to mine it, wood to refine it, wood to transport it.

Not only do civilized countries use vast quantities of wood, but they are ever increasing their consumption. This is, I think, a fact not generally appreciated; indeed, when one recalls the large amount of substitution of wood by iron, steel and cement which has taken place during the last one or two decades, it is almost past belief that the consumption of wood should be still on the increase. Yet it is undoubtedly a fact. There is no civilized country in the world whose trade statistics are worth anything which does not indicate exactly this condition. Indeed there is little doubt but that the *per capita* consumption of wood of all civilized countries materially increased during the decade from 1890 to 1900, a decade characterized by greater substitution than any that preceded it, and by rapidly advancing prices of wood the world over, both of which must have had an opposite tendency.

Great Britain may be taken as a good test country for the purpose of discovering modern tendencies of wood consumption. Her statistics are compiled with great care, and volumes of materials as well as values are everywhere available. She imports practically all her wood, hence all kinds of wood are dear, and are naturally used with economy. She is one of the leading nations both in the production and consumption of iron, steel and cement. Surely here, if anywhere, the consumption of wood will show a falling off commensurate with the increasing price. The contrary is the case. The accompanying diagram (No. 1 on the right) shows the total imports less the exports of hewn, sawn and split woods for the fifteen years, 1886-1900. It will be seen

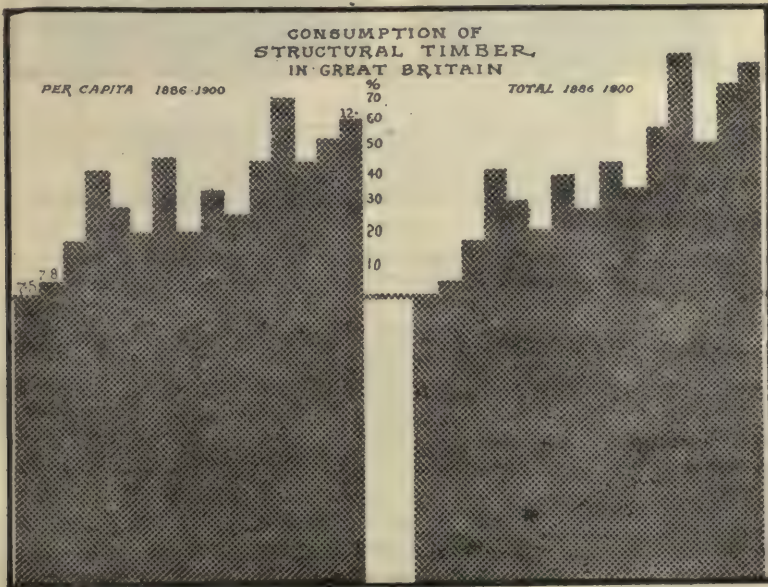


DIAGRAM No. 1.—Showing on the right the imports less the exports of the United Kingdom, of hewn, sawn and split timbers for each year from 1886 to 1900. The same table is shown on the left reduced to a *per capita* basis.

that the increase in the consumption of wood during these fifteen years was about eighty per cent. On the left of the same diagram is the same table reduced to a *per capita* basis. It will be noted that notwithstanding the increased use of substitutes, and the advancing prices, the average man increased his consumption of wood about sixty per cent in the fifteen years. The *per capita* consumption of cabinet woods as shown in diagram No. 2 (on the right) increased even more rapidly, amounting to

over one hundred per cent during the period; but all other increases are eclipsed by that of the consumption of wood pulp (diagram No. 2 on the left), which increased from nine and one-half pounds *per capita* in 1886 to thirty-nine pounds in 1900, an increase of over 300 per cent.

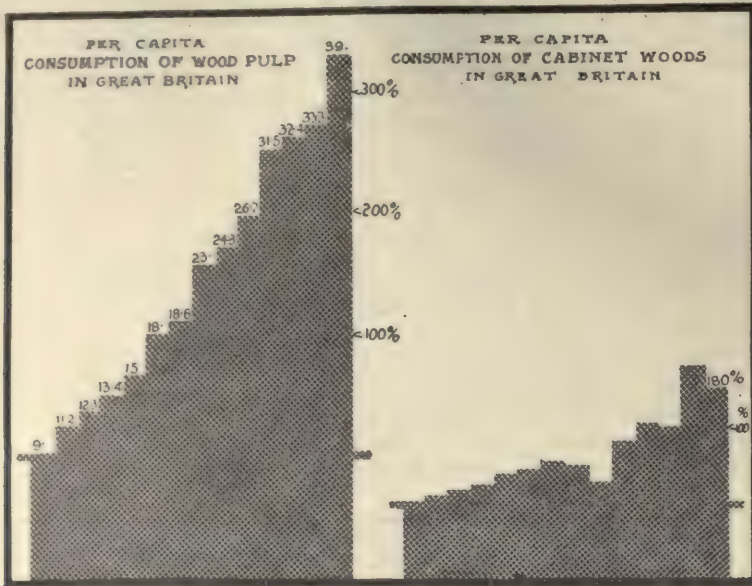


DIAGRAM No. 2.—Showing on the right the *per capita* consumption of cabinet woods in the United Kingdom for the years 1886-1900, and on the left the consumption of wood pulp during the same period.

The same tendency is shown by Germany and other European countries. The German Empire, with twenty-four per cent of the land under forest and practising the most intensive forest management in the world, has notwithstanding a greatly increased production of wood in recent years, failed utterly to keep pace with her increasing needs. Up to 1863 Germany was a wood-exporting country. By that year her growing home consumption had overtaken her production, and imports and exports equalled each other. Since then, keeping pace with the development of her modern industrial life, her needs for wood have steadily grown, and despite her increased production her imports exceeded her exports in value to the amount of \$70,000,000 in 1900, and the unfavourable balance still grows.

Nearer home we find the same story, but with even greater emphasis. The United States *per capita* consumption of 160 feet board measure in 1850 has steadily grown from decade to decade, until in 1900 it reached 460 feet. The total consumption has grown at a much more rapid rate (see diagram No. 3), for the increase of population has been very great. In 1850 between three and four billion feet supplied the needs of the nation, and in 1900 it required more than thirty-five billion feet. The rapidly advancing prices of the last decade, aggregating fully one hundred per cent, have failed to materially check this tremendous consumption, for the latest statistics indicate a small but substantial increase in the *per capita* consumption. We have not sufficient data at hand to determine the present *per capita* consumption in Canada, but we may safely assume that the tendency is similar here to that of other civilized nations.

Not less noticeable than the increasing demand for timber by civilized countries is the diminishing of the supplies of such kinds and qualities as are most generally useful, and nowhere has the diminution of supplies more strongly contrasted with in-

creasing home consumption than in North America. Were it possible to limit the annual cut in North America to a volume equivalent to the annual growth, as now

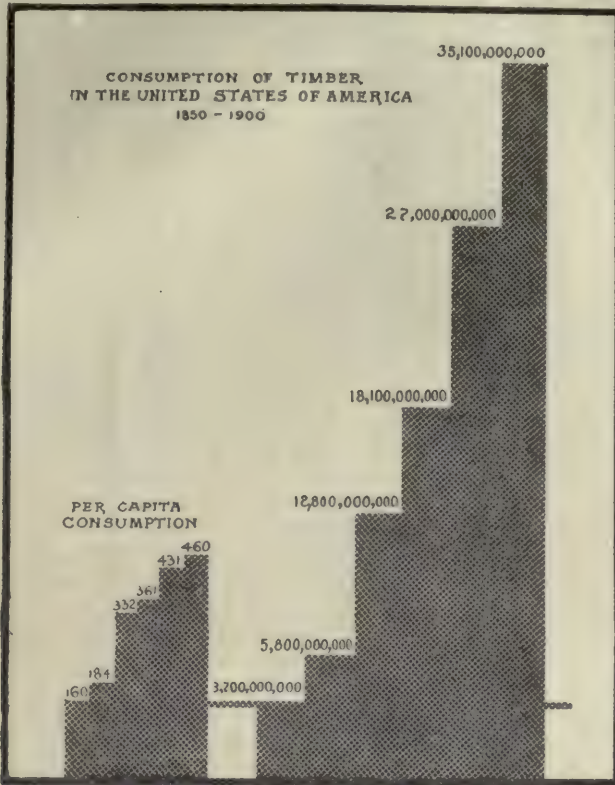


DIAGRAM No. 3.—Showing on the right the increase in the total consumption of wood in the United States by decades from 1850 to 1900. On the left *per capita* consumption is given for the same period.

obtains quite generally in Europe, there would be such a shortage of supplies that not only would exportation become impossible but prices would advance to previously unheard of figures. The gradual exhaustion of the remaining forests, together with their devastation by fire, will soon force this result, and the most of us will live to see the day when North America will import at great cost a poor substitute for the cargoes of the finest timber in the world which she has been sending to foreign lands at practically the cost of cutting and transportation.

The conservation of water for useful industrial purposes and for the prevention of calamities by flooding of the streams, is a function of the forest which is second only in importance to that of wood production. The keynote of worth in stream flow, whether for irrigation, power, navigation or domestic use, is *sustained flow*. Likewise the keynote of safety from floods, erosion or silting is *sustained flow*, and the forest is the great and almost only regulator of stream flow.

The rainfall of any country returns to the air and the ocean in four ways: by evaporation and transpiration, called the 'fly-off,' and by surface run-off and seepage run-off, which together form the stream flow.

The evaporation and transpiration of moisture on forested areas is well known to be much less in temperate climates than from non-forested areas. The less that is returned to the air, the greater the amount left for the stream flow. The greatest value of the forest, however, is in decreasing the surface run-off, and thereby increas-

ing the seepage run-off, by which latter is meant that portion of the rainfall which enters the soil and reappears at lower levels in the form of springs. This checking of the surface run-off is due to the rapidity with which forest soils absorb the water as it falls, the ease with which it percolates downward, and the obstruction presented to quick flow over the surface by leaves, twigs, moss, etc., giving the water which does not at once enter the soil more time to penetrate as it moves slowly towards lower levels. A further advantage of forest cover in water conservation is the slowness with which the snow melts in the evergreen forest as compared with denuded hillsides, thus preventing disastrous floods in early spring by distributing the flow from the melting snow over weeks instead of days as is the case where it is exposed to the full glare of the sun and the sweep of warm winds. On the eastern slope of the Rocky mountains the forest cover has still another and very important function in checking the sweep of the dry Chinook winds, which evaporate the snow so quickly on exposed areas. It has been found that the rate of evaporation from snow surfaces under these conditions is at least several times as rapid as that from a water surface under similar circumstances. A snow fall of a foot or more in the depth may entirely disappear on these hillsides where the forest is wanting, in two or three days without even wetting the soil. To the various factors which have been mentioned as being of value in the forest in preventing the surface run-off and thereby increasing the seepage run-off should be added the decaying roots found in every forest which form canals for the downward percolation of the waters to the deeper soil layers, also the protection against frost in the soil provided by the even blanket of snow. This frequent absence of frost in forest soils enables much snow water to sink into the soil as it melts which would otherwise be forced to run off superficially.

The surface run-off or flood water is ever a danger and in large volume is ever a curse. The seepage run-off or spring water is, on the contrary, one of nature's choicest blessings. Having once entered the soil the seepage waters percolate slowly downward to reappear weeks or perhaps months afterward at lower levels in the form of pure spring water, which must ever be the ideal source of water for domestic use. The streamlets from the springs unite lower down the valleys to form the larger streams, which in their fall over cliffs give man his cheapest power. When the water reaches the plain it may be used again, this time to double, triple, or even quadruple the crops of the farmer by irrigation. Finally the residue passes to the rivers and gives man his cheapest highway for transportation. Truly a story of blessings is the story of the water from the forested mountains.

In most cases the first step towards the conversion of forest clad hillsides to denuded slopes with the corresponding conversion of the steady-flowing mountain stream to a torrent when the snow is melting or the rain falling and to a dry bed when there is neither melting snow nor falling rain, is lumbering.

Logging may be conducted so as to be ruinous to a forest or it may be merely injurious or it may be beneficial. It all depends on how it is done and what happens afterwards. Unfortunately a combination of destructive lumbering and its all but certainly following slash fires has proven so disastrous to North American forests that the popular mind has come to associate lumbering an necessarily an evil to the forest. As commonly practised it has been and is exceedingly detrimental to both future wood production and water conservation. In America the absence of a market for the debris left by the logger is much the greatest hinderance to ideal methods of forest management. It is fortunately not an insurmountable obstacle and in many cases the value of the forest product is already such as to bring a practical solution within reach and the inevitable advance in stumpage values will in the near future make it universally applicable. There is no reason why the white pine forests of Canada should not be logged so as to improve the condition of the stand by the removal of all mature and over-mature timber, and that without endangering the forest, for values are such that the government can well afford to pay twenty-five cents to burn the debris caused by cutting a thousand of logs which is worth from four to seven dollars on the stump.



No. 13—A fine stand of spruce, cutting about 25 M. ft. per acre, with a dense undergrowth of balsam. These spruce trees average over 200 years old. The soil is very shallow and rocky, wholly unfit for agriculture. [104



During the last year the debris from logging some twenty-five million feet cut in a Minnesota pinery has been successfully burned when conditions were favourable for a safe burning with all the care necessary to safeguard the seed trees left standing and the younger trees which were already on the ground, but which were not sufficiently mature to be removed. The cost of this brush burning was about fifteen cents per thousand of the timber cut. In some cases where the weather was too dry to do the burning as the logging proceeded, and it was on that account necessary to make a second operation of it, the cost was somewhat more, but in no case exceeded twenty-five cents per thousand. The lumberman who had charge of the brush burning told me that if he were open for an engagement he would be glad to take a contract to burn the brush in any Canadian pinery cutting eight thousand per acre at twenty-five cents per thousand. The most important feature of brush burning after lumbering is the safety it gives the forest from accidental burning later. A second and very great advantage is that a slight burning off of the moss and needles on the surface of the soil makes conditions very much more favourable for the pine seeds to make a 'catch,' as the farmers say of their clover. It has been repeatedly found that a very much more abundant catch of pine seedlings is to be found on areas having the surface burned over than where no fire has run. This is because the pine seed on germination has less difficulty in reaching mineral soil and thus coming in touch with permanent moisture. That the absence of tree tops and brush piles on the ground gives the seedlings a better chance to develop after they are once rooted is of course self evident. There are two features of this appearance of fire as a friend of the forest which will bear emphasizing. The utmost care must be taken to burn only when the soil itself is wet, that is, at a time when the burning may be controlled, and in the second place we should not forget that the operation is for the benefit of the future forest, hence the cost should be borne not by the lumberman whose interest is only temporary, but by the state which must look upon it as an investment which will return with large dividends when the crop which it saves or helps to reproduce will have become ready for the axe. It is of course self evident that the practicability of such a forestry measure for any given locality will depend on local conditions, more particularly on the value of the stumpage on the tract concerned.

While there are many instances in North American forests where fire has through accidentally favourable circumstances proven a friend to the forest, there are probably a hundred times as many cases on ten thousand times as many acres where it has proven a terrible foe. Although most of our forest fires follow the lumberman and are a direct result of the condition he brings about in the woods, they are by no means all chargeable to this account. There are in our northern coniferous forests vast areas which have been burned over where no lumberman has ever swung an axe. These fires are in most cases due to the carelessness of the Indians and to lightning, though not a few are to be attributed to the white man who has made his way through these forests as surveyor, explorer, hunter, or tourist.

Fire in the forest is alike the greatest enemy of wood production and water conservation. Light surface fires are not uncommon in pineries, especially in the South, which do no harm to the large timber but which destroy all small trees and seedlings, and by burning the litter on the surface of the ground do a temporary injury to the soil both as regards its fertility and water holding capacity. More severe fires frequently kill all the standing timber although it is exceptional for the large trees to be so completely destroyed as to be worthless for lumber if cut within a year. This, however, sometimes happens, the very trunks of the large trees being burned. Over much the larger part of our northern woodlands the soil contains a very large proportion of organic matter. Should the fire occur during a prolonged drought the soil itself may and often does burn clear to the rock beneath. Subsequent rains wash the ash and the remaining residue of mineral soil into the crevices or carry it quickly down the slopes leaving the rock bare.

The forest may quickly recover from the destruction of the undergrowth if the old trees still live, for a reseedling will presently follow. The destruction of the young

trees by the after lumbering fire may on the other hand mean the laying waste of the tract for a long time, for in the absence of seed trees of the desirable species the ground can only become occupied by weeds and such inferior trees as birch and poplar, which on account of the lightness of the seeds may be blown in from great distances. The destruction of the small trees and seedlings by such slash fires is indeed often the ruination of what was once a valuable forest so far as the future production of valuable timber is concerned. The destruction of the soil itself is of course much the greatest possible calamity, for not only does it remove for all time the possibility of restoring the forest but it brings about the most dangerous possible condition as regards stream flow. The rain falling on such a soil-burned area runs quickly downward bearing with it a full load of ash and silt. Streamlet unites with streamlet to form torrents in every gully. The torrents unite to form floods in the larger valleys. Reaching the level agricultural lands the floods spread out and slack the speed of their waters sufficiently to deposit the coarser gravel and sand as they flow onward seeking the shortest course to the ocean. Could any contrast be greater than that of a mountain stream before and after the destruction of the forest by fire. In the first case we have the spring streams flowing perennially from that unsurpassed reservoir, the forest soil, with its blessing of pure water, and steady flow for domestic use, for power, for irrigation, and for navigation. The forest destroyed, the streams become torrents during rains which rushing valleyward loaded with silt and debris from the steeper slopes, may become agents of destruction or irresistible power. This destructive power is shown by the carrying away of bridges, homes, and even whole villages; in the silting over of the agricultural lands of the valleys often making them entirely worthless, and in the filling up of the river and harbour channels by the deposit, as the flood finally slows down, of the finer particles of their soil load robbed from the mountain side.

Just a little over a century ago, the French people under the influence and misapplication of Adam Smith's teachings regarding ownership of property, divided up much forest property which had been formerly held by the state. As private owners are always prone to do, the new proprietors proceeded to lumber their little holdings. This lumbering with its following fires destroyed the forest of about a millions acres in twenty mountain compartments in the Alps, Cevennes, and Pyrenees. The denudation of the million acres caused the destruction of some eight million acres of once fertile soil in the valleys by erosion and silting, whole communities becoming impoverished. The French government has since spent \$20,000,000 in reforesting the denuded mountain slopes, but so great has the injury been from the erosion of the soil that it is estimated that \$30,000,000 more will be required to complete the task.

FOREST OWNERSHIP.

From what has already been said of the functions of the forest it will be evident that the state which has in its care the interest of all the people and of future generations as well as present populations is logically the only rightful owner of large areas of non-agricultural lands. Private ownership always means utilization for private advantage. In the great majority of cases the only interest the private owner has is that of financial profit and in most cases it is desired that the returns be realized at an early day. Even when private forest properties are managed conservatively there is in America practically no guarantee that should the property pass to heirs or the personnel of the ownership change in other ways that the conservative policy would be continued. This, however, is not the most important feature. Private ownership, meaning as it does, that private and local interests only will be consulted in matters of policy, it follows that a forest which may be of the utmost importance in conserving the water supply of a city, or of an area requiring water for irrigation, or some power plant, may nevertheless be exploited as the immediate interest of the private owner dictates wholly without regard to the injury inflicted on industries at lower

points in the drainage area by the disturbances of the water stages, or the destruction that may be wrought by floods as a direct result of the denudation of the hillsides. The same line of reasoning applies to climate. What possible interest has a capitalist residing in Toronto or New York in maintaining a favourably humid atmosphere in New Ontario or British Columbia? In this connection might also be mentioned the value of the forest as a playground, as such it is admittedly unexcelled. In private hands, however, it is all too common, that the area is fenced about and warning notices by the score posted to warn the seeker after health and recreation that 'trespassers will be prosecuted.'

The time element in the maturing of a forest crop is an exceeding great barrier to private forest management. There is no line of business in which men ordinarily engage which requires the looking forward for more than a decade or at least two decades. Wood growing, however, requires the constant planning in advance for 60, 80, 100, and even more than 100 years. So great indeed is this influence of the long time element on the business of wood growing that the great law of supply and demand is paralyzed. To illustrate: If the demand for wheat increases in relation to the available supply, the price rises, the farmers sow a larger acreage and presently the increased demand has resulted in an increased supply. The same is true of practically every commodity which may be reproduced or even mined, except wood. The demand for wood has steadily risen during the last century. The prices notwithstanding large natural supplies have steadily risen, and during the last decade as exhaustion of supplies is seen in the distance have very rapidly risen. This rise in price has not yet resulted in an increased production of wood nor will it—judging from the history of nations—ever appreciably increase the production until the evils of a wood famine have been long felt. On the contrary, although increased demand means increased prices, increased prices means increased *harvesting*. Increased harvesting means in North America that larger areas be cut over and cut more closely. This on account of the greater amount of debris leaves the forest in much worse condition for the all but inevitable fire, and as a net result of the greater demand under private ownership we have *decreased* production.

The fire problem is essentially an educational problem. The stringent regulations which are not only desirable but absolutely necessary for the safety of the forest must be uniform on adjoining areas and must be at least moderately uniformly enforced. Ideal regulations for the protection of the forest from fire strictly enforced here and there by a few wise owners would lead to resentment and very probably reprisals on the part of the careless, while the same regulations enforced uniformly throughout the country by the government would be respected and presently lead to a much more intelligent appreciation on the part of the public of the importance of protecting the forest from fire. The fact, too, that the influence of a fire on an area is by no means confined to that area (as shown by the relation of forest and stream flow), but may be of the utmost importance a hundred miles from the point when the fire actually occurred gives the question of fire protection a distinctly public relation.

Perhaps not the least of the reasons why the fee simple of forest lands should be retained by the state is the fact that the profits of holding naturally grown timber lands are very largely—almost wholly—due to the development of the country (a national condition) and to the approaching exhaustion of the more valuable timber forests of the world (an international condition) and are thus the property of the whole people, and as such are more equitably employed in reducing taxation than in swelling the private fortunes of speculators. The profits in holding lands for a rise in stumpage have in recent years been very great. There are probably few present who do not know of particular instances of forest lands having doubled, trebled and even quadrupled in value during the last ten years. This increase in the value of stumpage is not alone due to the increase in demand for wood products, but to the ending of the long period of the giving away of timber lands which has been so recklessly practised alike by the various states and by the United States national government, and the dawning of a day when the great bulk of the available timber supplies in the United States are in the

hands of strong financial interests which can afford to await the cleaning out of the supplies which remain in less far sighted hands. The 'unearned increment,' as Henry George would call it, will yield a bountiful harvest for those who have been wise enough to provide themselves with large supplies. In Canada we must thank our fathers for the wisdom shown in keeping this most valuable natural asset for the whole people. It is our duty to conserve it by wise utilization and transmit it unimpaired to the generations who follow us.

CANADIAN FOREST RESOURCES.

The forest resources of Canada are very great. Just how great no one at present can know, for vast areas known to be forested are as yet quite unexplored. It would, of course, be a fatal error to assume that they are inexhaustible. Twenty years ago the white pine in Michigan was regarded as inexhaustible. To-day six million acres which thirty years ago carried the finest white pine forest in the world have been abandoned by their owners for taxes and lie almost wholly waste, a man-made desert, the combined result of a reckless use of the axe and a still more reckless use of fire. While it is very improbable that any considerable body of men hold that the forests of Canada are inexhaustible, I believe that not a few over-estimate the national forest wealth. True, we have some hundreds of millions of acres of forest lands. Lands which on account of their non-agricultural character must, or at least should, always remain under forest cover. Such an area is almost beyond human comprehension. So, too, I fear is the destruction of the forest by fire in this northern vastness. I have read with some care the stories told by explorers, surveyors and trappers and all tell a tale of forest destruction by fire during the last twenty or thirty years, which, if the total could be brought together, would stagger belief. I have myself made a somewhat extended trip beyond the height of land in northern Ontario, and during the three weeks' travel I did not see a square mile of forest which did not show traces of having suffered by one or more fires during the last 150 years. A section of Banksian pine, cut near Mattagami, on the western border of the Temagami forest reserve, showed positive evidence of having suffered from severe fire four times within the last 66 years, at intervals of 9, 13 and 42 years respectively. The lesson from what we do know regarding the occurrence of fire in the far north is a double one, viz., that we must at the earliest possible moment reach the Indians in that country and do whatever may be done to educate them to use greater care in the use of fire, and that in the meantime we must not bank on forest resources proportionate to forest area until we know more about this portion of our asset by examination at first hand.

Should, however, the injury and destruction of the northern forests be quite as great as I fear, we have still without the shadow of a doubt an asset in our woodlands which if conserved by wise use will make Canada one of the richest of the nations. In considering the future of our forests it is of the utmost importance to note that we have for our nearest and most accessible neighbour a nation which now consumes more than half the sawn lumber produced in the world. This nation is also growing several times more rapidly than any other civilized country. It has before it still greater possibilities of wealth and growth in population. The Mississippi valley is undoubtedly the richest valley in the world and will by the time another crop of trees is grown contain fully 100,000,000 population. The forests of the United States are being decimated more rapidly than was ever before witnessed in the history of the world. The most optimistic predictions state that the present supplies can scarcely meet the present demand for more than sixty years. But the consumption of wood increased *ten fold* during the last sixty years. What must be the situation if it should increase five, three or even two fold during the next sixty years? Beyond a doubt a revolution with regard to our conventional ideas of the value of stumpage lies before us. It has indeed already begun and events are moving swiftly.

But while we in Canada should take a careful survey of the broader field of the world's markets that we may intelligently hold or dispose of our surplus stocks, the

insuring of an adequate supply of timber for the development of the resources of our own country is of the greatest importance to us. We are on the threshold of a great national development. Presently millions of people will be seeking homes in the comparatively treeless plains of the west, and aside from the character of the population of the future, nothing will contribute more largely to our national advancement than an abundant supply of timber.

In the past our forest management, with the exception of somewhat better protection from fire and in the retaining of the fee simple of the land in the state, has not differed materially from the forest management that has devastated the forests of the United States, and which has begun the story of the man-made desert in our own north country. Recently a tremendous step in advance was taken in the adoption of the policy of placing the non-agricultural lands in permanent forest reserves. The next and only logical step will be to train men in practical forest management that the forests on these lands may be handled so as to yield the largest possible revenue in perpetuity.

The possibilities of revenue from our vast heritage are very great. I have on other occasions committed myself to figures on this proposition, which I consider to be very conservative. I will content myself to-night by saying that there is no reason why under a system of rational forest management, the present revenue from Canadian forest lands should not be increased manyfold, *not only without injury, but with actual benefit to the forest.*

THE CONSERVATION OF NATIONAL RESOURCES.

Nothing can be more important than that the natural resources of a country be conserved intact. War, folly, or unrighteousness may result in the destruction of accumulated wealth, in the degradation or decimation of populations, but if the natural resources of the country be unimpaired, rehabilitation will be but a matter of time. On the other hand, the destruction of the natural resources is striking at the very foundations of prosperity, and sooner or later will transform the richest lands to poverty. To illustrate: Egypt has during the past ten thousand years been repeatedly devastated of her accumulated wealth, but is again to-day entering upon what promises to be the most prosperous period of her long and checkered career. She is fully recovering, or at least *may* fully recover from all kinds of former loss because her one natural resource—*water for irrigation*—has remained intact. Germany—for centuries the battle-field of Europe—has in recent years become more populous and more prosperous than during any other period of her history, notwithstanding repeated destruction of property and decimation of population in former times, for the natural resources of the country remained practically intact.

On the other hand, we may have many melancholy examples of the destruction of the natural resources. Mesopotamia, once famed as the most fertile country in the world, in which Herodotus said that the grape could not be grown because of the excessive humidity of the climate, is now a weary waste of sand and rock incapable of supporting one man in poverty where it once supported a hundred in comfort. Palestine, once a land flowing with milk and honey, Sicily, for a long time the granary of the Roman empire, and Greece, are also excellent examples of countries which were once the home of a teeming and prosperous population, but which with the destruction of their forests by reckless lumbering and fire have become the prey to erosion by wind and water, and are to-day mere shadows of their former glory, without hope of ever materially bettering their conditions. *They have destroyed their soil and water, and generations yet unborn must reap the fruits of an ancient folly.*

But we do not need to go as far afield to find the *man-made desert*. There are tens of thousands of acres of it in the state of New York, in Pennsylvania, in Michigan, in New England, in California. But to come still nearer home, there are tens of thousands of acres of it in British Columbia, in Quebec and in my own province

of Ontario, particularly in the Muskoka region and along the line of the Canadian Pacific Railway. *But it is yet early in the day.* Canada is *yet* in a position to be free from the curses of posterity in this regard. The wisdom of her management of her forest lands in the next half century will determine for ages whether *she was* or *was not* a worthy custodian of an almost unbounded wealth.

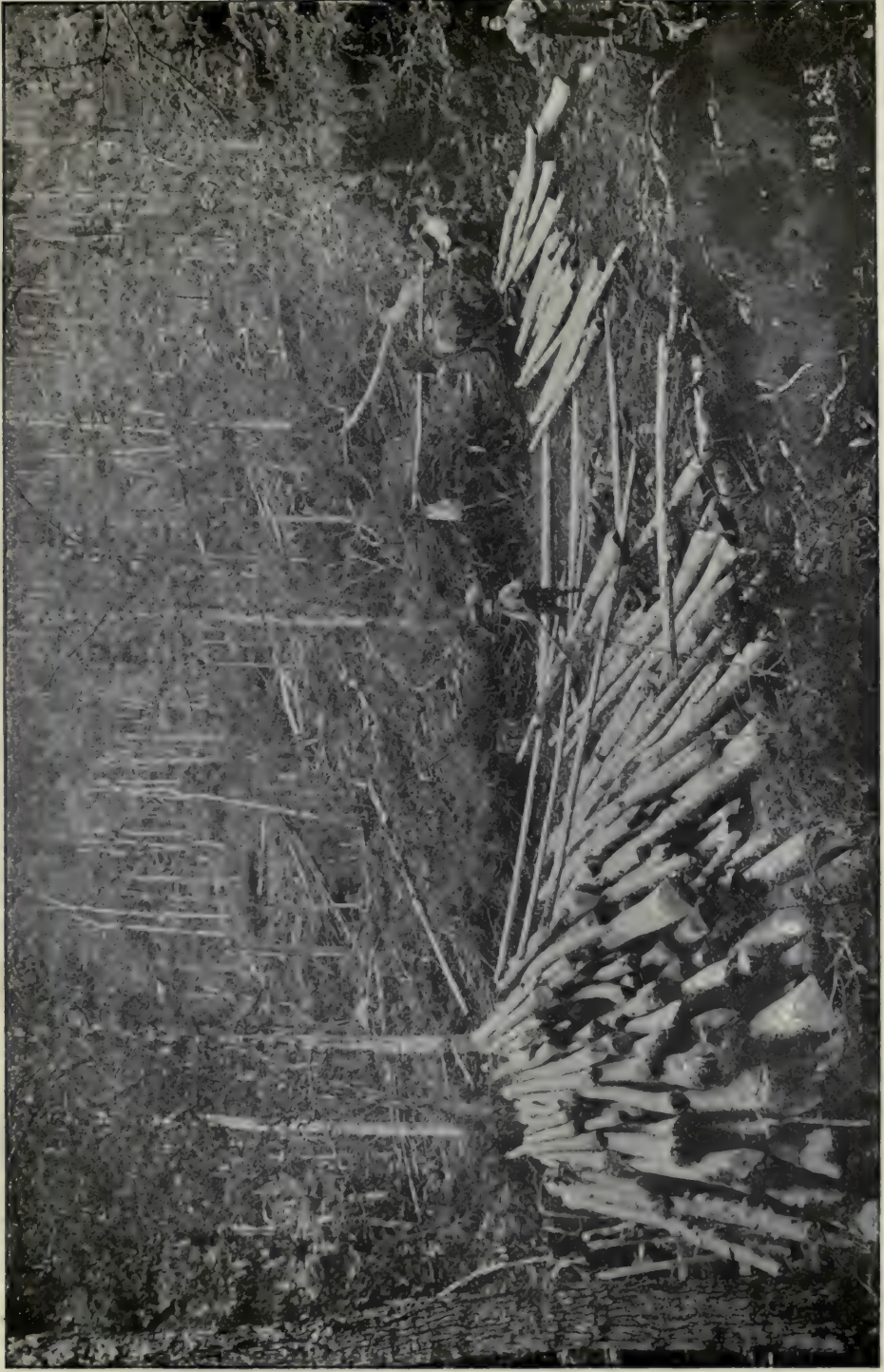
(The illustrations Nos. 1 to 14 in this report were supplied by kindness of Dr. Clark to illustrate his lecture. Owing to a misunderstanding the plates were made full size and had to be distributed through the report.)

TREASURER'S REPORT.

1904.

NORMAN M. ROSS, Treasurer, in account with the Canadian Forestry Association.

Receipts.	\$ cts.	Expenditures.	\$ cts.
1904.			
Balance from 1903	723 16	Rod and Gun Publishing Co.....	420 00
Membership fees.....	503 16	Printing and stationery.....	160 51
Grant from province of Ontario	300 00	Travelling expenses.	162 45
Grant from province of Quebec.	200 00	Salaries.....	152 00
Grant from province of B. C.....	100 00	Wreaths	27 00
Interest.....	20 45	Advertising.....	4 48
		Commissions on cheques.....	2 50
		Express and telegrams.....	1 72
		Balance.....	916 11
Total.....	1846 77	Total.....	1846 77



No. 14.—The cutting of miniature timber, greatly to the detriment of the forest and the ultimate financial loss of the owner. The private owner is prone to cut too early. Early cutting may, however, be made necessary by failures on the part of the State to adequately protect woodlands from fire or by the imposition of unjust taxation.



MEMBERS OF THE CANADIAN FORESTRY ASSOCIATION.

Ami, H. M., M.A., D.Sc., F.G.S., F.G.S.A.	Ottawa, Ont.
Anderson, J. R.	Deputy Minister of Agriculture, Victoria, B.C.
Aylsworth, W. R.	Belleville, Ont.
Alexander, A. E.	Campbellton, N.B.
Alexander, P.	Regina, Assa.
Aylmer, Hon. F. W., C.E., P.L.S.	Golden, B.C.
Atkinson, W. F. V.	1 Des Grisons St., Quebec, P.Q.
Allen, H. S.	Cardston, Alta.
Angus, R. B.	Montreal.
Angus, A. F.	Manager Bank of Montreal, Regina.
Armstrong, J. S.	Rothsay, N.B.
Adams, Geo.	New Westminster, B.C.
Arbuckle, Jas. T.	Crystal City, Man.
Addison, W. H. F.	80 Cumberland Street, Toronto, Ont.
Agnew, Hon. J. H.	Provincial Treasurer, Winnipeg, Man.
Butler, M. J.	457 Laurier Ave., Ottawa.
Bell, Robt. B.A.Sc., M.D., LL.D., F.R.S., F.R.S.C., F.G.S., F.G.S.A.	Geological Survey, Ottawa, Ont.
Bostock, Hon. Hewitt.	Monte Creek, B.C.
Booth, C. Jackson.	Ottawa, Ont.
Boyd, M. M.	Boycaygeon, Ont.
Bell, Jas. A.	St. Thomas, Ont.
Benjamin, S. P.	Wolfville, N.S.
Bryce, Rev. Geo., M.A., LL.D.	Colony Street, Winnipeg, Man.
Baird, Thos.	Crystal City, Man.
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