



Group of Forest Trees, chiefly Maples, on old road at Carleton Place, Ont.

Canadian Forestry Journal.

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EIGHTH ANNUAL MEETING.

The Eighth Annual Meeting of the Canadian Forestry Association was held in the Railway Committee Room of the House of Commons, Ottawa, on Thursday and Friday, March 14th and 15th, 1907, and was well attended. Mr. Elihu Stewart, President of the Association, presided over all the sessions.

Among those present were: Messrs. H. M. Price, Quebec, Vice-President of the Association; Wm. Little, of Montreal; Hiram Robinson, Ottawa, and E. G. Joly de Lotbiniere, of Quebec, past Presidents.

Senator W. C. Edwards, Rockland, Ont.; Senator G. F. Baird, Perth Centre, N.B.; Senator L. G. Power, Halifax, N.S.; Senator W. D. Perley, Wolseley, Sask.; Senator J. V. Ellis, St. John, N.B.; Senator J. H. Legris, Louiseville, P.Q.; Senator H. Bostock, Monte Creek, B.C.; Senator Geo. G. King, Chipman, N.B.; Messrs. J. B. Kennedy, M.P., New Westminster, B.C.; Geo. Taylor, M.P., Gananoque, Ont.; Duncan Ross, M.P., Greenwood, B.C.; Dr. J. Barr, M.P., Shelburne, Ont.; Geo. Perley, M.P., Ottawa; J. B. McAllister, ex-M.P., of Campbellton, N. B.; Mr. W. A. Charlton, ex-M.P.P., Simcoe, Ont.

Prof. John Macoun, Dr. Robt. Bell, Dr. Wm. Saunders, Mr. W. T. Macoun, Mr. J. M. Macoun, Ottawa; Messrs. W. B. Snowball, Chatham, N.B.; R. E. Young, Ottawa; F. Page Wilson, (Pulp and Paper Magazine), Toronto; A. E. Alexander, Campbellton, N.B.; Henry W. Selby, Toronto, Ont.; Gordon C. Edwards, Ottawa; Thos. Southworth, Toronto; E. J. Zavitz, B.A., M.S.F. of the O. A. College, Guelph, Ont.; J. B. Miller, Parry Sound, Ont.; John Hendry, Vancouver, B.C.; H. McNeill, Vancouver, B.C.; Rev. Dr. Fyles, Levis, P.Q.; W. J. C. Hall, Quebec, P.Q.; W. R. White, K.C., Pembroke, Ont.; Henry Lovett; E. J. Darby, of Ottawa; G. Simpson, Ottawa; A. H. D. Ross, M.A., M.F.; H. C. Wallin, F.M.; F. W. H. Jacombe, M.A., M.F., Ottawa.

The plan of the programme for this meeting differed from those of previous meetings. Instead of having a number of formal papers, the printed programme presented a number of subjects for discussion, designating the leaders of the discussion. Under this scheme forestry topics of interest to the lumberman were taken up on Thursday afternoon, while topics affecting the farmer's woodlot were discussed on Friday morning. The leader in Thursday afternoon's discussion was Hon. W. C. Edwards, while Mr. W. T. Macoun, Horticulturist of the Ottawa Experimental Farm, introduced Friday morning's topics.

Telegrams of regret at inability to be present were read from Dr. C. A. Schenk, of Biltmore, N.C., and Prof. Filibert Roth, of the University of Michigan.

REPORT OF BOARD OF DIRECTORS.

The Report of the Board of Directors was then read, and, on motion, adopted. It noted the holding of successful conventions at Vancouver, B.C., and at Fredericton, N.B., making special mention of the attendance at the former of the Governor General and Lady Grey. The coming convention at Yarmouth, N.S., was also noted.

The membership of the Association for this year, and for last, was reported as follows:

| | 1906 | 1907 |
|---------------------------|------|------|
| Ontario..... | 368 | 373 |
| Quebec..... | 225 | 229 |
| New Brunswick..... | 77 | 84 |
| Nova Scotia..... | 67 | 68 |
| Prince Edward Island..... | 6 | 5 |
| Manitoba..... | 115 | 115 |
| Saskatchewan..... | 53 | 61 |
| Alberta..... | 90 | 83 |
| British Columbia..... | 85 | 120 |
| Yukon..... | 2 | 2 |
| Newfoundland..... | 1 | 2 |
| United States..... | 56 | 61 |
| Other Countries..... | 13 | 19 |

The receipts for the past year were \$2,138.12, and the expenditure \$1,239.08; there is thus a balance of \$899.04 to the credit of the Association.

The Provincial Governments of Ontario and Quebec were thanked for grants in aid of the work; also the railway companies for special privileges, and the press for reports given of proceedings.

Important legislation had been passed by the Dominion

Government in "The Dominion Forest Reserves Act." By this Act twenty-one forest reserves, with a total area of 3,420,200 acres, were set aside; of these reserves, six were in Manitoba, three in Alberta, four in Saskatchewan and eight within the "railway belt" in British Columbia. An examination of the timber on these reserves was in progress, with a view to their scientific management, including Rocky Mountain Park, Yoho Park and Glacier Forest Park, the area of land now reserved is 7,200,000 acres.

Important legislation had also been passed by the Legislature of New Brunswick. By this Act a complete survey of the Crown lands of the Province is to be made, and a classification of these lands. Streams were also to be examined as to their availability for lumbering operations and as to whether measures should be taken to conserve their flow. The Lieutenant-Governor is authorized to take measures to preserve the timber lands of the Province.

The tree-distribution in the North West had been successfully continued during the year.

The resignation of Mr. E. Stewart from the position of Superintendent of Forestry was noted with regret. His part in the founding of the Canadian Forestry Association, and generally in the awakening of interest in the forestry movement had been a prominent one, and he was to be congratulated on having initiated it and placed it on a stable basis.

PRESIDENT'S ADDRESS.

The address of the President, Mr. Stewart, reviewed at some length the foundation and progress of the Association, noting its increase in membership from 244 in 1901 to 1,222 in 1907. Projects deserving of encouragement were the planting of avenue trees along country roads and lanes, of groves on unproductive land, the retaining of woodlots where land had not been completely cleared up and the granting of partial or total exemption from taxation on woodlands.

An opportunity was now open to nurserymen for the growing of forest nursery stock on a large scale, which could, no doubt, be done at a profit. If nurserymen would not take up this matter provincial governments should establish nurseries from which stock might be got to plant up denuded limits.

On the aesthetic side, more particularly, the aid of the women of the country might be enlisted for the cause of forestry.

In granting patents to wooded lands a proviso should be inserted that at least ten per cent. of the area conveyed should be retained by the patentee in forest, the timber to belong to him for his own use.

The tree-planting on the prairie continued to develop. In 1905, 85 per cent. of the trees sent out were found to be living. Including those to be sent out in the Spring of 1907, sufficient trees had been sent out to plant two rows, eight feet apart, on each side of the C.P.R. track from Montreal to Vancouver.

Despite the work already done, only a beginning had been made in the work of creating forest reserves. The whole timbered area along the Eastern side of the Rocky Mountains should be reserved as soon as possible. Unless this were done, the flow of the rivers, such as the Saskatchewan and Peace Rivers, that rise there would be seriously interfered with, and the bad effect on the agriculture of the prairie provinces would be very marked, and the great irrigation schemes now planned for a large part of Alberta would be much impaired, or rendered useless.

In the discussion following the reading of the report, Mr. E. J. Zavitz referred to the excessive cost of forest tree seeds in Ontario. White pine seed was then quoted at \$2 to \$2.50 per lb. Under those conditions it was cheaper to import seedlings. Red pine seed could not be obtained; this tree, the speaker thought, would be very serviceable in planting up many waste areas in Ontario. Mr. Zavitz also urged the Association to make an effort to have the duty on tree seeds abolished.

In Ontario they were carrying on a scheme of co-operative planting on waste land with considerable success. One such plantation had been made in Durham County on a ridge of drifting sand; this is now doing nicely; at the time of its planting, however, people had laughed at the work.

Mr. R. H. Campbell emphasized the importance of more information regarding the public lands of the country, referring with approval to the action recently taken by the Province of New Brunswick in this regard. Definite information on these lines was one of the greatest needs of the forestry movement at the present. Especially was such information needed with regard to the great northern territory of Canada, north of the present provinces. At that very time a committee of the Senate was taking evidence along this line, but few of those who gave the evidence had explored the country, outside of the direct lines of travel. A thorough exploration should be made, such as that made some years ago by the Ontario Provincial Government of their Northern territory.

Prof. John Macoun spoke particularly of the necessity of preserving the forests on the eastern slopes of the Rocky Mountains. He described some of the magnificent forests of the region as they stood prior to 1885, and showed the bad effect of their destruction by fire in causing mud slides in spring and in decreasing the flow of the streams in summer. Destruction of the forests would decrease the amount of moisture that the prairies

would receive through their rivers. Cultivation of the soil on the prairies had already increased its capacity for retaining moisture.

In answer to a question from Mr. H. M. Price, Prof. Macoun explained his theory of the trees increasing the supply of moisture through cooling the atmosphere and thus bringing about precipitation.

Dr. Saunders also spoke of the importance of preserving the forest referred to. He referred also to the efforts being made in the direction of irrigating lands, and the establishment of an experimental farm in southwest Alberta.

Dr. R. Bell spoke in regard to the influence of the forests on rainfall, supporting Prof. Macoun's theory. He illustrated his point by references to the flow of the Ottawa River and of other rivers flowing north from the Height of Land.

Mr. Stewart, after a brief reference to the influence of the forests on the climate, referred to the term "forest reserve" and its meaning. The purpose of setting aside a reserve was not to retain the timber uncut, but to so manage the forest that it would yield a permanent supply.

An interesting discussion on the death of ash trees throughout Quebec, and also to some extent in Ontario, and also on the effects of the larch sawfly was participated in by Mr. E. G. Joly de Lotbiniere, Rev. T. W. Fyles, Mr. H. M. Price, Prof. John Macoun, Dr. Saunders, Mr. Hiram Robinson, Mr. Thos. Southworth and Mr. W. J. C. Hall. The death of the ash trees in Quebec was generally attributed to a succession of droughty years. The sawfly was reported to be still active in certain sections, as in the Abitibi country. It was noted that some of the older larch which had been severely attacked by the sawfly and had been for some time apparently dead, had survived and were again putting forth leaves.

Mr. Hall informed the meeting that the Quebec Government was about to set aside, as a forest reserve, all the country in the Ottawa Valley on the Quebec side, outside of the boundaries of the townships already surveyed, extending from the eastern watershed of the Riviere du Lievre to the Ontario boundary line.

Mr. Lovett urged the necessity of tax exemption on woodlands and of reforestation denuded land. He suggested using prison labor for the planting on the denuded land.

Mr. W. B. Snowball spoke of the importance of the forests to New Brunswick. He cited from personal experience, the Baie du Vin as a stream whose flow had greatly decreased as the result of the cutting of the forests at its head-waters.

THURSDAY AFTERNOON.

Thursday afternoon's session opened at 2.30 p.m., the President, Mr. E. Stewart, in the chair.

The Secretary, Mr. R. H. Campbell, read a message from His Excellency Earl Grey expressing his deep interest in the work of the Association and his regret at being unable to attend the meeting.

The afternoon's session was devoted to a discussion of the problems confronting the lumberman, the suggested topics of discussion being as follows:—

Hon. W. C. Edwards, in opening the discussion, noted the change that was coming over the popular idea that the Canadian forests were "inexhaustible." With proper management of her forests, however, Canada could maintain a home supply of timber in perpetuity. As regards forest policy, Canada was far ahead of the United States. Of all the provinces, Quebec had the best system, allowing the licensee a perpetual right to cut on his limit, provided he kept within certain restrictions. The Maritime Provinces, in requiring the timber to be cut off within twenty-one years, pursued a less prudent policy, while Ontario, reducing even this period, was pursuing a "suicidal policy." Quebec's restrictions were that the limit-holder must cut no pine tree measuring less than 12 inches on the stump, and no spruce less than eleven inches. It was safe to say, he thought, that Quebec, if care were exercised in cutting, might have a large supply of spruce in perpetuity. He was himself interested in a timber limit in Gaspé where it was proposed to take off only the annual growth; they would probably not cut under eleven inches. That limit, he believed, would steadily grow in value.

A measure of great importance has been the establishment of the fire ranging system begun by Ontario.

Illegitimate cutting of timber, under pretence of settlement, was one thing on which lumbermen were making war.

The timber resources and water powers of Quebec gave her promise of great things to come. But if the forests were stripped off, both timber and water powers would go. A cement mill at Ottawa could be run for \$130,000 less than another mill of similar capacity at Durham, Ont. The Ottawa mill was run by water power, the Durham mill by steam power; hence the difference in the cost of running. The speaker believed that Quebec would yet be the largest manufacturing centre of the continent, on account of her water-powers.

Exploration of the country and its division into land suitable for farming, and that suited only for forests was a pressing necessity. Allowing settlement too near forest regions would mean risking the destruction of the forests by fire. If both forest land and farming land were present in nearly equal proportions in an area, such an area should not be opened for settlement till all the purely agricultural sections had been taken up.

As to fires, in times past lumbermen themselves had been



Grove of Sugar Maple, Rock Elm with man in foreground to show height of tree. On old road at Carleton Place.

responsible for starting a good many—from neglecting camp-fires on the drives, for instance. Now-a-days they were more careful, and fires used on the drive were carefully put out. Legitimate settlement, in setting fires for the purpose of clearing land, had also been responsible for many fires. Campers, also, had their share of responsibility. The worst cause of fires, however, was illegitimate settling or squatting in the Gatineau district, a fire which resulted in a loss of a million dollars worth of lumber had been set by a man who wished to clear land for raising about five dollars worth of potatoes.

In preventing fires, patrol was the best general scheme. More stringent laws might perhaps be needed. Squatting within timber limits must be absolutely prohibited in order to obtain freedom from fires, as must also settling for farming purposes on land too near forest areas.

A necessary measure for the preservation of the forest was the enforcing of a diameter limit. Spruce, according to the speaker's experience, should not be cut under eleven inches. It was different in the case of pine. Here reproduction was not so good, especially in a mixed forest. It might be possible, however, to cut a pure pine forest in perpetuity. On the Edwards' limits no pine was cut under fourteen inches. Preservation and careful cutting could, the speaker thought, ensure reproduction of white pine, with planting when necessary. Planting or sowing must be done where the timber had all been cut off.

Mr. Stewart expressed the opinion that sowing of the seeds of coniferous trees would not be a success on account of the delicate nature of the young seedlings.

Mr. J. B. Miller agreed with Mr. Edwards in regard to the prevention of squatting, and the danger of fires set by the squatters. Unless steps were taken to preserve the forests from fire, he did not believe there was any use in setting a diameter limit for the cutting. As a means of fire protection, settlers should be kept off the forest lands. It would pay the Government better to manage their forest land in this way. The Ontario Government, only a few days previously, had sold the timber on 36 square miles of timber for a total price of about \$626,000—nearly \$30 per acre; and such land was not worth \$5 per acre for farming purposes. As to fires, he thought practically all of them were started by tourists, very few by Indians. The risk of fire from railway construction had been pretty well held in check. A common error was that Canada possessed more timber than the United States; on the contrary, if Canada attempted to supply the American market for one year, the whole northern belt of timber would have to be stripped.

Mr. White, Mr. McAllister, Mr. Alexander, Mr. W. A. Charlton, Mr. Wallin, Mr. Price, Mr. Snowball, Mr. W. J. C. Hall,

Mr. Duncan Ross, M.P., and Dr. Fernow, also took part in the discussion. Mr. Hall exhibited and explained the operation of a spark arrester which had been used with satisfactory results on the Quebec and Lake St. John Railway during the previous summer. Mr. Hall also quoted a table showing the total extent of land included in the forest reserves of Quebec to be about 160,000 acres, divided as follows:—

| | |
|---|------------------|
| Gaspé Park..... | 2,500 sq. miles. |
| Rimouski Forest Reserve..... | 1,250 " " |
| Addition to Laurentide National Park..... | 660 " " |
| Chaudière Forest Reserve..... | 320 " " |
| Saguenay and Labrador Reserve..... | 109,000 " " |

These Reserves were withdrawn from settlement, but the timber was allowed to be cut.

THURSDAY EVENING.

Dr. B. E. Fernow, who has since been appointed Dean of the Faculty of Forestry in the University of Toronto, lectured in the Railway Committee Room on Thursday evening on "The Aims of the Forester." The session was well attended.

Dr. Fernow, in his characteristic able manner, set forth the aims of the Forester in raising trees for a timber supply. When it came to harvesting his crop, the aim of the forester was identical with that of the lumberman. The forester, however, in his treatment of the forest, always kept in view a continued production of trees on the same tract of land. The growth of trees in the forest, the growth of seedlings, the structure of wood, the decay of timber and other topics were also taken up.

FRIDAY MORNING.

Friday morning session was devoted especially to planting and woodlot work. The suggested topics on the programme were as follows:—

The relation of forest shelter to crop production.

How can the wood lot be improved?

What species of trees should be selected for the wood lot? Are rapid growing trees the most profitable? Or are those of slower growth which produce more valuable wood?

How and when should planting be done? To what extent is cultivation necessary? What is the cost of these operations? May seeding be substituted for planting?

Where can young stock be obtained? What ages and sizes are most successful?

Mr. W. T. Macoun, Horticulturist at the Central Experi-



Group of young Balsam Poplar. In the open, Britannia, Ont.

mental Farm, read a paper on "The Establishment, Maintenance and Improvement of Farm Forestry," which is printed in another part of this issue.

Dr. Fernow pointed to the fact that, in considering growth, volume and not height alone or diameter alone, must be taken into consideration. Still another point that must be looked to was the quality of the material. In forestry work close planting must be the rule. A great drawback to planting in America was the very high prices of the trees; he had found it cheaper to import trees than to raise them here. Norway spruce and Scotch pine were the cheapest trees he knew. European species such as these often when planted, grew better than native species.

Mr. E. J. Zavitz spoke particularly of waste land planting in Ontario. In spite of the generally fertile character of the soil of older Ontario, there yet remained a large area of waste land. The species they were planting most of all was white pine; Scotch pine, European larch and black locust were also being used. The insect pests would in course of time be remedied by Nature's means. The white pine seedlings they were importing from Germany. The planting would cost at most, \$6 to \$7 per acre on sandy soil, and at present prices for white pine, this was a good business proposition. In growing white pine from seed they had had a great deal of trouble from the damping-off fungus.

Dr. Saunders justified wide planting in some of the Experimental Farm plantations, on the ground of the experimental and educational value. Regarding planting in groups composed of but one species the same thing held. In Manitoba, Alberta and Saskatchewan, conditions were very different to those of Ontario; there the Manitoba maple, cottonwood and white willow were the most serviceable trees. European larch might yet, perhaps, be successfully grown in these provinces. Further experiments would be made at the new experimental farms near Lethbridge and Lacombe.

Prof. Macoun touched especially on the problem of growing wood for fuel in the West. He quoted from an article by Mr. N. M. Ross, describing how in four years fuel to the amount of $3\frac{1}{2}$ cords had been obtained from shelter belts at the Indian Head Experimental Farm. What was needed in the Northwest, for the growth both of trees and of other plants, was the conservation of the moisture. He quoted instances from his own experience to show that, with proper conservation of moisture, trees and other plants would flourish abundantly through all the prairie country.

Mr. Stewart made a brief reference to the progress of the forest planting work in the West.

The meeting then adjourned.

FRIDAY AFTERNOON.

At the afternoon session the first business taken up was the report of the Committee on Resolutions. After discussion, the following resolutions were adopted:—

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

RESOLVED.—That in view of the large expenditure made on irrigation works in southern Alberta, and the intimate relation of the flow of the irrigation streams to the forests of the eastern watershed of the Rocky Mountains, this Association would specially urge upon the government of the Dominion the necessity for the protection of the forests on this watershed.

RESOLVED.—That the Government of the Dominion be urged to supplement the work undertaken by a Committee of the Senate to enquire into the resources of the districts of the West to the north of the Saskatchewan River, by making a special exploration of such districts to obtain as thoroughly as possible direct and accurate information in regard to the resources and conditions of that region.

And that in any exploration made, each party should be accompanied by an expert timber surveyor, who will be qualified to estimate and report upon the timber.

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

That this Association approves of the policy of forest reserves adopted by the Dominion and provincial authorities, and favours the extension of such reserves as may be found practicable from time to time, so as to eventually embrace all lands suited only for the production of timber;

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

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

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

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

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

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

THEREFORE RESOLVED.—That this Association would urge the government, both federal and provincial, to take steps to encourage as far as possible, both by instruction and by giving facilities for obtaining nursery stock suitable for afforestation, a more general interest in tree planting, especially on such lands as are at present unfit for ordinary agricultural purposes, and this Association would further urge the Dominion Government to make, if possible, further efforts in this direction in the prairie regions where the results from tree planting are bound to be of inestimable value to the whole country.

RESOLVED.—That the government be, and is hereby requested to place forest trees and forest tree seeds imported for afforestation purposes on the free list.

RESOLVED.—That in the granting of Crown Patents of wooded lands a proviso should be inserted that at least ten per cent. of the area conveyed should be retained by the patentee in forest; that this timber should belong to him for his own use and not for barter or sale but to be so cut as not to impair the said area as a permanent wood lot.

RESOLVED.—That the attention of the Governments of the Dominion and the Provinces be called to the danger to the forests resulting from the operating of prospectors for minerals in the forested districts, on account of the recent great development in mineral exploration and would urge that measures be taken by which the governments may be in a position to keep

sufficient control of the movements of prospectors to prevent the careless or wilful setting of fires and that in districts where prospecting is being carried on, the Fire Ranging Staff should be specially strengthened in order to deal with the situation.

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

That to the end sought, the railway companies constructing and operating such roads should be required to furnish the most modern and efficient equipment and control to prevent fires;

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

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

RESOLVED.—That this Association learns with pleasure that the commissioners of the Transcontinental Railway have largely met the recommendation of this Association regarding the protection of the forested areas through which the railway passes.

The election of officers was then proceeded with, and resulted as follows:—

Patron.—His Excellency Earl Grey, Governor-General.

Honorary President.—Rt. Hon. Sir Wilfrid Laurier.

President.—Mr. H. M. Price, Quebec.

Vice-President.—Mr. W. G. Snowball, Chatham, N.B.

Secretary.—Mr. R. H. Campbell.

Asst. Secretary.—Mr. A. H. D. Ross.

The matter of whether to continue the publication of the *Forestry Journal* in its present shape, or to amalgamate with *Rod and Gun*, was discussed, and Mr. Taylor, proprietor of *Rod and Gun* was heard with regard to the latter proposal. Decision was finally left with the Executive Committee.

The meeting then adjourned.

THE FOREST RESERVES OF THE PROVINCE OF QUEBEC.

The ideas of public men in the Province of Quebec were for a long time rather opposed to the creation of Forest Reserves, but a change took place about 1895, when the Act erecting the National Park was passed in the Local Legislature. Nothing further, however, was done in this way until ten years later, when great strides were made; now, only two years later, Quebec has I think under reserve, a larger area than any other province in the Dominion.

The question of stability and duration of these reserves is the first one which presents itself to the minds of those most immediately interested; in this connection doubts, if any there be, will perhaps cease to exist on perusing the text of the Law under which the Reserves are created. R.S.Q. 6, Ed. VII., C. 15.

"It is lawful for the Lieutenant Governor in Council, upon the recommendation of the Minister of Lands and Forests, to set aside certain tracts of forest lands of the Crown, vacant at the time, *to be and remain forest reserves.*"

The wording of the above clause makes it abundantly clear that the Government is desirous in this matter, and took all possible precautions to ensure durability of tenure. But behind the Government is public sentiment, awakened largely by the action of the Canadian Forestry Association. The individual who would attempt to legislate these reserves out of existence to-day would find the ranks of thinking men against him, and in a short time he would give up the task as hopeless. Twenty years ago he would have succeeded; to-day the result would be just the reverse.

It is manifest then that opinions have changed, a new order of things exists and has taken a hold upon the people, we are thinking of the future, we are doing something for posterity, and our successors will have no reason to upbraid us for short-sightedness.

The President of the Association found it necessary to explain at the last annual meeting that a forest reserve did not mean prohibition of cutting timber, but was a measure calculated to allow removal of mature growth, thus enabling the lesser sizes to attain full growth in a shorter time than otherwise would take place, but withal to preserve the forest floor and a generous nucleus of younger trees; all this with a view to

perpetuating a full volume of water in the rivers, and thus to encourage industrial establishments to erect plants operated by water power; furthermore to foster agriculture and avoid the necessity of resorting to the very expensive system of irrigation which denudation of the forests *forces* upon a country.

It would be a difficult task then for anyone to argue intelligently against reservation of the forests upon such lines as Mr. Stewart points out, and it may be taken for granted that the great mass of our people understand the policy to be sound and practical, and that opposition to it will meet with general disfavor.

To revert to our subject, the Laurentides Park was erected in January, 1895, comprising some 2,531 square miles, a small addition was made later, bringing up the area to 2,640 square miles, and finally in December, 1905, all the unorganized territory to the north was taken in, forming a total area of 3,271 $\frac{1}{2}$ square miles.

In April, 1905, the Gaspesian Forest Reserve was created by Order in Council, said reserve comprising 2,500 square miles; on the 9th March, 1906, this reserve was created a Park by Act of the Local Legislature, upon exactly the same lines as the Laurentides Park.

In January, 1906, a reserve was created between Lake Temiscouata and the River Matapedia, styled the Rimouski Forest Reserve, comprising 1, 249 $\frac{2}{3}$ square miles, and protecting the narrow strip between the St. Lawrence and the New Brunswick line.

Next the North Shore was given attention, and the immense Saguenay and Labrador Reserve was established by Order in Council, comprising an area of 109,360 square miles. A strip of land ten miles deep is left for possible settlement all along the coast, and when the line gets near Lake St. John it runs further inland in order to provide for the needs of colonization. The Ottawa Reserve was created by Order in Council in April, 1907, and takes in all the territory in the basins of the River Liévre and the Ottawa, less certain townships as described in the Order in Council. The area of this reservation is 27,652 square miles.

By Orders in Council passed in March and May, 1907, the whole of the St. Maurice River basin, part of the Rouge, and part of the Maskinongé River basins were created a reserve, less a number of townships to the south and a few high up on the St. Maurice. The area of this tract is 21,121 square miles.

Besides the above, certain lands in the Chaudiere River basin were erected into a reserve, the area being about 320 square miles.

SUMMARY.

| | | |
|------------------------------------|---------------------|------------|
| Laurentides National Park..... | 3,271 $\frac{1}{2}$ | sq. miles. |
| Gaspé Park..... | 2,500 | " |
| Rimouski Reserve..... | 1,249 $\frac{2}{3}$ | " |
| Saguenay and Labrador Reserve..... | 109,360 | " |
| Ottawa Reserve..... | 27,652 | " |
| St. Maurice Reserve..... | 27,652 | " |
| Chaudière Reserve, say | 320 | " |
| <hr/> | | |
| Total..... | 165,474 | sq. miles |

There are several millions of acres of land surveyed and at the disposal of settlers outside of the above reserves, so ample provision is made for them. The lumber business is our mainstay, and if these reservations are kept intact, our magnificent water-powers will command a high price, the timber lands will take on great value, and capital will have a substantial guarantee of security accorded it by reason of these prudential measures. Surely, if we can manage to avoid extensive forest fires, the annual increment on this vast area will more than equal the annual draft made on it, if moderate intelligence is practised by the people in the lumber trade.

H.

The long delay in issuing this number of THE FORESTRY JOURNAL is due to the continued illness of THE EDITOR. The next number will be issued very soon after the regular date of publication.

While there are perhaps not many members of the Forestry Association who will subscribe to everything in Mr. Roy's address published in this issue, his conclusions and recommendations are of great value as coming from a man of long experience in every branch of the lumber business.

SOME QUESTIONS RELATING TO THE ESTABLISHMENT, MAINTENANCE AND IMPROVEMENT OF FARM FORESTRY.

BY W. T. MACOUN., Horticulturist Central Experimental Farm, Ottawa.

The different phases of farm forestry were so well covered in the admirable papers on this subject which were read at the great Forestry Convention held at Ottawa last year, that there is really little which can be stated in a general way which these papers did not cover, hence in discussing some of the questions on the programme for to-day, I have thought it best to confine my remarks mainly to what has been done at the Central Experimental Farm during the past nineteen years under my own observations, and from these observations endeavour to answer the questions before us.

There is no time in the history of Canada when the farmer's wood supply has meant so much to him as at the present time. The increasing price of lumber, the growing scarcity of wood for fuel in the older settled parts of Ontario, and the natural scarcity in some parts of the prairie provinces, the uncertainty of the supply of coal which reached an acute stage this winter, and its high price, combine to impress upon the farmer as never before the great importance of maintaining and producing a supply of wood which will be ample for his various needs, and which will make him as independent of the outside world in this respect as he is in the matter of food.

We believe that with the generation which is now growing up, but still at school, there will be a greater interest taken in trees than there has been since the chief object was to get them out of the way so that the land could be cleared and made ready for the plough and harrow. This desire for destruction, bred of necessity, seems to have descended through several generations, if one is to judge by the bare surroundings of the average farmhouse in Ontario and Quebec and in the Maritime provinces, where many a farmer has no trees or shrubs about his home to shade in summer and protect from the cold winds of winter, and appears to be indifferent to the improvement in the appearance of the surroundings which a few trees and shrubs would make. We believe, however, that this will all change and very soon.



375
In White Pine Plantation at Central Experimental Farm.
Trees planted 16 years.

There are at the Central Experimental Farm about twenty-one acres devoted to the growing of forest trees in belts and clumps. There are in these plantations about 23,000 trees. In addition to these belts of trees there are about 5,700 trees and shrubs grown in an Arboretum of 65 acres in extent. In this Arboretum the trees are planted far enough apart so that they will develop as individual specimens with their side branches alive or almost quite to the ground.

The first planting was done at the Experimental Farm in the autumn of 1887, and there has been more or less planting each year ever since.

The forest belts extend along the whole northern and western boundaries of the Farm, the belt along the western side being 165 feet wide, and that on the northern boundary 65 feet, the total length being nearly $1\frac{3}{4}$ miles. There is an evergreen plantation also occupying about two acres.

The trees were planted for the purpose of giving information on a number of points, among which being: 1st. Information as to the rate of growth of the best timber trees when grown on different kinds of soil and at different distances apart; the distances chosen at first being 5 x 5 feet, 5 x 10 feet and 10 x 10 feet apart. 2nd. As to how the growth of trees planted in blocks of one species compared with those grown in mixed plantations. 3rd. As to what influence the forest belts would have on the crops in the adjoining fields, in regard to the shelter afforded by them, and also how far from the belt the crop would be affected adversely. The improvement of the landscape was also taken into consideration in planting the trees. It was hoped also that the object lesson afforded would be an inducement to farmers to plant trees.

In giving some of the results we shall take up the questions on the programme and attempt to answer them from our own experience.

Three of the questions should be taken together, namely: How and when should planting be done? What sizes and ages are most successful? May seeding be substituted for planting?

The method of planting will depend on the size of the trees and the condition of the ground. If the soil has been under cultivation, is free of stones and is well prepared and the trees quite small, the cheapest method is to open furrows with a plough as deep as possible and plant the trees in them. The tree may be held in the hand and the soil tramped in from both sides. If the trees are larger it will be necessary to open the holes with a spade. In rough ground when furrows cannot be made the trees should be planted with a spade or dibble. In planting, the trees should be set about one inch deeper than they were in the nursery to allow for a slight heaving which may take

place the first winter, and also to have the roots in as moist a soil as possible at first, without being too deep.

The method followed at Ottawa has been to plant with a spade with the rows lined out, as in the kind of planting done there it was desirable for the sake of appearance to have the trees as straight in the rows as possible.

Most of the planting has been done in the spring at Ottawa, but in the provinces of Ontario and Quebec and in the Maritime provinces good success will usually follow fall planting if small trees are used. There are two drawbacks to planting in the fall, the first, the liability to heave in winter if the ground is wet, or if of a mucky or peaty nature; the second, the danger of drying out in winter. Where there is a good snowfall and quite small trees are used, there is little danger of the trees drying out in winter, as they will not be exposed to the dry, cold winds, but the consequences from heaving are sometimes serious, unless the trees are looked after in the spring and tramped down. This is very liable to be neglected on a farm owing to the rush of spring work, hence where soil which is liable to heave is to be used spring planting is to be preferred, but if the soil is well drained and is not of a mucky nature the planting may be done in the autumn, a time when the farmer could give much more attention to the work than in the spring.

Of a mixed plantation of 3,442 trees, or about 2 acres, made at the Central Experimental Farm in the autumn of 1894, the work being continued until almost winter, there were 347 which died. Nearly half of these were American arbor-vitæ, tamarac and canoe birch which had been transplanted from a nearby swamp to the forest belt and had few roots, so that the number actually killed by winter was small. There was considerable heaving in this belt the winter following the planting in muck soil, but the trees were tramped down in the spring. Trees of all ages, from one to eight or ten years or more, have been planted at Ottawa, but for best results two to three year old trees have been found the most satisfactory, and should be used. Most deciduous trees should have one season's growth in a seed bed, and one in a nursery, before being set in the permanent plantation. The Manitoba maple or box elder being an exception, this tree making a strong enough growth the first year to be large enough for planting out.

The best trees of conifers to plant should be judged by size rather than age, as trees of the same age may vary much in size. Trees from 1 to 2 feet in height are the most satisfactory for the farmer, the best average being probably about 18 inches. Trees smaller than 1 foot may be smothered or lost, and trees larger than 2 feet are more difficult to transplant successfully, and in the case of pines, especially, often take several seasons to become

well established, not to mention the large loss which there is almost sure to be.

May seeding be substituted for planting? In special cases, Yes; but generally speaking, No. Where the air is moist and comparatively cool, as on Prince Edward Island, for instance, seeds germinate readily when they fall to the ground. In Ontario and Quebec and the prairie provinces the air is drier, and they do not germinate so easily, although in the natural forest, or on the farm where the soil has been cultivated and the seed falls in mellow ground, it will quickly germinate if the seed ripens in early summer, as the elm and silver maple, or in early spring in the case of other deciduous trees, the seed of which ripens in the autumn and falls to the ground. Where seeding is necessary in sparsely wooded lots the conditions are usually not very favorable to germination of seed as the land is probably hard or in sod. The soil can, of course, be loosened and seeds sown, but it is not often possible to do this economically and with good success. It is so easy to grow deciduous trees from seed that for the average farmer and for the average wood lot seedlings are much the most satisfactory to plant. In the case of the conifers the farmer may find it more desirable to buy the seedlings than raise them himself, as in the seed bed they require perhaps more attention than the average farmer is willing to give, although with a fair amount of care there is no reason why he should not grow his own trees.

The next question is: To what extent is cultivation necessary?

The answer to this is, briefly: It all depends on circumstances; method of planting, and the kinds of trees planted being two of the most important factors.

In order to have thrifty growth the surface soil must be comparatively loose to admit air, and help to retain moisture. In a forest where ideal forest conditions prevail the surface soil which is protected from the sun and from dashing rain by leaves, which are on the trees and on the ground, is loose. The conditions also are favourable to the retention of moisture, and with the proper proportion of light and shade, which is found under good forest conditions, the trees should grow straight, tall, and free from side branches. To get the most rapid growth in young trees under artificial conditions, the soil should be cultivated or the surface protected in some way from the direct rays of the sun, and from heavy rain, so that the ground will not become baked. Cultivation is also necessary to rapid growth at first on account of weeds, which should be kept down. Under some circumstances it is not possible nor desirable to cultivate, as for instance in rough ground, where if the trees live through the first season they will usually get established

and ultimately do well. The amount of cultivation necessary depends very much on the distance apart the trees are planted, the kind of tree and the way they are mixed. At Ottawa our experience has been with trees 10 x 10 feet apart, 10 x 5 feet apart, 5 x 5 feet apart, 3 x 3 feet apart, and 2½ feet apart. In some cases the trees are in clumps of single species, and in others they are mixed.

Ten by ten feet has been found much too far apart to plant trees where cultivation is given as it would be under almost any circumstances. In some parts of the belt it was necessary to cultivate the ground between the trees for ten years before the trees interlaced sufficiently to shade the ground well. At 10 x 5 feet apart cultivation was not necessary so long. Even at 5 x 5 feet apart cultivation was necessary in some soils between thin foliaged trees, such as ash and walnut, for eight years after planting. In mixed plantations with trees 5 x 5 feet apart, cultivation was necessary for from four to five years. It is evident that this distance is too great for a farmer to plant trees with the idea of cultivating them, as few farmers would cultivate a plantation that long. This distance is also too great from the standpoint of timber production.

In 1899 nearly 5,000 trees and shrubs were planted out in rows 2½ feet apart each way, mixed in such a way that a large proportion of them were shrubs planted merely for the purpose of saving cultivation. The shrubs used for this purpose were ninebark or *Spiraea*, *Neillia opulifolia*, alder buckthorn, *Rhamnus Frangula*, rosemary willow (*Salix rosmarini folia*), and sand cherry (*Prunus pumila*). The trees planted in this way have done well. The ground was cultivated for only two seasons. It has been found, however, that this distance is a little too close, as it was necessary to lop off some of the branches of the shrubs to prevent the trees being smothered, the shade being very dense. It is apparent from our experiments that trees planted about 3 feet apart each way, 3 x 4 feet apart, or 4 x 4 feet apart, depending on the trees used, would be the most satisfactory distance for the farmer, from the standpoint of economy in cultivation and getting the ground shaded.

The next question is: How can the wood supply be improved? This may be answered briefly here as the subject has been discussed several times already before this Association. Protect the wood lot from farm animals, which destroy seedlings and tramp the soil. Remove the old and fallen timber and preserve the younger trees. Plant young trees to fill up any openings. Plant a row or rows of evergreen around the outside of the wood to check the wind and lessen evaporation in the plantation.

The next question to consider is: The Relation of forest

shelter to crop production. The forest or wood lot influences the ordinary farm crops in several ways. It helps to hold the snow in winter in adjacent fields, and in doing so ensures more moisture to the growing crops the following summer. If the wood lot is on a slope or hillside, the rain and water from melted snow are prevented from running rapidly away and sink gradually in the soil where this moisture may help to supplement that moisture in adjacent fields, or even fields not close by. The snow held by the wood lot or forest belt often proves beneficial in protecting fall wheat and fruit trees and bushes from extremes and changes of temperature. The wood lot checks the force of the wind, and in doing so lessens the evaporation of moisture from the soil, and so is again beneficial to crops. There are few authentic records which show the actual value of windbreaks or forest belts. There is one case which was referred to by Dr. Wm. Saunders, in the fourth Annual Report of the Canadian Forestry Association, and which has since been quoted, and may be mentioned here. Dr. Saunders said:

"I happened to be passing Indian Head some three years ago in the spring after a very violent storm. Mr. MacKay, the Superintendent, and I went over the ground and we found the protective influence of the forest growth on the plains there was about 50 feet for every foot in height that the shelter belt grew; that is to say, a shelter belt 10 feet high protected about 500 feet wide of field. We had a field of barley that was sown alongside of one of the belts and other fields of grain at other points. The protective influence of the belt was very marked. The storm had been a very violent one, and the trees were about 15 feet high, and for 750 feet out the grain was green and well protected and in good condition, while beyond that it began to get thinner and thinner, and for a few feet it was entirely obliterated. There the whole crop was wiped out by the force of the wind blowing the plants out of the ground. We measured this at several points and we found that for each foot of growth there was about 50 feet of protection. I referred to this in our next annual report, but this is a thing that I think should be widely known—the advantage that tree growth is on the north-west plains in affording protection to the ordinary field crop of the country."

At the Central Experimental Farm no records have been made of the favourable influences of forest belts on crop production. The adverse effect on crops close to the trees has, however, been observed, but this has been due to the fact that the crops have been planted very close to the trees, and doubtless more moisture and plant food have been withdrawn from the soil than is good for the crops. Farmers have noticed the injury to crops in the vicinity of avenues of shade trees, and some are on this account not favourable to avenues on the farm, nor even

narrow forest belts, believing that the injury offsets the benefits which are obtained from them. Where the fields are larger, as in the prairie provinces, any injurious effect that there may be to crops is so much more compensated for by the benefits from them that the injury is not thought of.

The best place for the forest plantations on the farm are without doubt the steep hillsides where the soil cannot be easily worked, and the stony ground or poor soil agriculturally.

The questions which are, perhaps, the most interesting are: What species of trees should be selected for the farmer's plantation? Are rapid growing trees the most profitable, or are those of slower growth, but producing more valuable wood? These questions might be answered briefly thus: The most profitable species to the present generation who desire to plant trees are some of the rapid growing trees. The most profitable for the generation which are to come, are the slow growing trees planted by the present generation, hence the wise man will plant for himself and for his children and grandchildren, which he can do economically by a judicious mixture of species.

We shall give here the measurements of some kinds of trees growing in the forest belts at the Central Experimental Farm and then make a few comments upon them.

GROWTH OF TREES IN FOREST BELTS AT CENTRAL EXPERIMENTAL FARM, OTTAWA.

| NAME | Year Planted | Yrs. Plant'd | Height or Age when planted. | DISTANCE | SOIL | Height 1906 |
|----------------|--------------|--------------|-----------------------------|----------------|------------------------------|-------------|
| White Pine | 1889 | 18 | 8 to 10 inches | 5x5 ft. | Light Sandy loam with gravel | 31' 8" |
| " " | 1889 | 18 | 8 to 10 inches | 10x10 ft. | " " " " | 30' 9" |
| Scotch Pine | 1888 | 19 | 18 inches | 5x5 ft. | Low sandy loam with gravel | 29' 5" |
| " " | 1888 | 19 | " " | 10x10 ft. | " " " " | 28' 3" |
| " " | 1887 | 20 | 9 inches | 3x3 ft. | Light sandy loam & gravel | 31' 8" |
| Norway Spruce | 1889 | 18 | 18 inches | 5x5 ft. | Poor, light sandy loam | 23' 1" |
| " " | 1889 | 18 | 18 " | 10x10 ft. | Light sandy loam | 27' 11" |
| " " | 1888 | 19 | 15 " | 5x10 ft. mixed | Clay loam | 35' 8" |
| " " | 1888 | 19 | 15 " | 5x10 ft. " | Light sandy soil | 33' " |
| European Larch | 1888 | 19 | 2 feet | 5x5 ft. | Gravelly soil | 37' 2" |
| " " | 1888 | 19 | 2 feet | 10x10 ft. | Low sandy loam | 33' 11" |
| Canoe Birch | 1889 | 18 | 3 years | 5x5 ft. | Low sandy loam | 33' " |
| " " | 1889 | 18 | " " | 10x10 ft. | Light sandy loam | 35' 4" |
| White Ash | 1889 | 18 | " " | 5x5 ft. | Light sandy loam | 37' 8" |
| " " | 1889 | 18 | " " | 10x10 ft. | Black muck | 29' 3" |
| White Spruce | 1888 | 19 | 15 inches | 5x10 ft. mixed | Light sandy loam | 30' 7" |
| " " | 1889 | 18 | " " | 5x10 ft. mixed | Gravelly Soil | 34' 6" |
| " " | 1889 | 18 | " " | 5x5 ft. | Poor sandy soil | 17' 4" |
| " " | | | | 10x10 ft. | " " " | 20' 8" |

In order to give some information from our own experience regarding the relative ability of the slower growing trees to live and thrive under the shade of faster growing species, I shall read some notes made in the mixed forest belt in the autumn of 1904, and confirmed recently. These notes are used for the first time here. The following notes were taken in a belt of mixed trees

planted in the autumn of 1894, so that just ten years had elapsed since the time of planting. The trees consisted mainly of Austrian pine, Scotch pine, white pine, Douglas fir, Norway spruce, Rocky Mountain blue spruce, American arbor-vitæ, tamarac, box elder, American elm, green ash, red ash, white ash, American elm, rock elm and canoe birch. The soil where these trees were growing was mostly black muck.

Austrian Pine—Does not stand shade well. In some instances has been killed outright.

Scotch Pine—Suffers badly in shade. In some instances has been killed outright. Where not killed, leader is destroyed and tree is very weak.

White Pine—Stands shade a little better than Scotch Pine, retaining its leader when the Scotch does not.

Douglas Fir—Is much weakened by shade, but retains leader.

Norway Spruce—Stands shade better than any of the pines.

Rocky Mountain Blue Spruce—Stands shade about as well as Norway Spruce, but does not stand as much chance of developing as the Norway as it grows so slowly.

American Arbor-vitæ—Stands shade well, but makes little growth in it.

Tamarac—which was transplanted from swamp in 1894 has pushed up rapidly and is holding its own, but as foliage is comparatively thin it does not injure other trees. This tree has done better in the moist gravelly soil than in the black muck, and in the gravelly soil is as tall as the American Elm.

American Elm—Has reached the greatest height and is towering above most other trees. It has made a good straight trunk. This and the Box Elder should do well together. The dense shade of the Box Elder should force an upward growth of the Elm, and the Elm be able to hold its own on account of its rapid growth.

Red and White Ash and Box Elder—are almost as tall as the American Elm and are all holding their own. The dense shade of the Box Elder is what has done most to injure the Pines.

Black Ash—is little more than half the height of the White.

In addition to the foregoing, the following notes were taken in a mixed belt of trees planted in the spring of 1888, the trees having had seventeen years' growth. The soil in this belt was gravelly and well drained. The trees were planted 5x10 feet apart.

European White Birch—are the tallest trees.

Green ash, box elder and Scotch pine are about equal in height. Austrian pine is from four to five feet shorter.

Norway Spruce, where it has had a chance, is considerably taller than Scotch pine, and European larch is about the same height as Norway spruce.

There were no American elms for comparison in this part of the belt.

In another part of the belt where the trees were planted 5x5 feet apart in the spring of 1893, the soil being sandy loam, well drained, with more or less limestone rock in it, the following notes were made:

Austrian Pine—Have nearly all been killed by the shade.

Scotch Pine—Where much shaded, are very weak or dead.

White Pine—Has stood shade better in this belt than Scotch Pine, but have not grown so fast where not influenced by shade.

Norway Spruce—In this soil, on account of its rapid growth, has outstripped most heavy foliated trees and is among the leading ones.

The American Elm—Is not among the leading trees here and is barely holding its own, and in some cases has been nearly or quite killed. The soil is evidently not moist enough.

Red Ash—In this soil has not made rapid growth and many trees are dead.

White Ash—Is one of the leading trees.

European White Birch—Is the tallest tree, but they are now beginning to die. By 1906 most of the White birch were dead.

White Oaks—Have been killed by the shade, but they appear to stand it fairly well as trees are alive, which are much shaded, although they are making little growth.

The Black Walnut trees have shot up tall and straight and are among the leading trees, but many were overshadowed before they got ahead and have been killed, or are barely alive.

Red Oak—Has shot up well and is one of the leading trees.

Rock elm has done well.

Norway Maple—Has shot up well and is among the leading trees.

Hard Maple—Though slender, is shooting up.

Red Maple—Side by side with Norway maple, is affected about the same by shade and is about equal in height. Norway is, if anything, slightly leading and is the most vigorous tree.

White Spruce—Though standing shade well, got behind in the race and is not a leading tree.

American Mountain Ash—Stands shade well.

After nineteen years' experience with many species of trees, planted at different distances apart, both in plantations of single species and where mixed, some conclusions have been drawn as to

the best trees for the farmer to plant where the conditions are somewhat like those at Ottawa.

In our judgment, the average farmer of to-day should plant the trees which will be most likely to look after themselves the soonest, but which will not destroy one another until those which have to be removed first are large enough to supply a fair amount of fuel. At the same time, and keeping this in view, he should choose, as far as possible, those trees which will give him the best fuel and the best wood for other purposes.

The simplest method of planting would be to use white pine or Scotch pine, and Norway spruce, either in blocks by themselves or mixed together. These three trees all grow rapidly, shade the ground quickly, will not destroy one another for a long time and are all useful for timber. Although making considerable fuel in a short time, they are relatively poor for this purpose, hence some other kinds should be grown with them.

In our experience the canoe birch, European white birch, American elm and European larch make a large amount of wood during the first twenty years, and are among the most useful for fuel at this stage. They shoot up very rapidly and getting a fair supply of light make a good trunk development. Being thin-foliaged, these trees do not destroy other kinds that have not grown so rapidly. The European white birch begins to fail and dies at Ottawa at from sixteen to twenty years of age, hence will be removed naturally if not needed for fuel. Individual specimens of black locust, which have done well, have probably made as much wood as birch or elm, but they are so subject to borers and sucker so badly that from our experience we should not recommend them for the farmer's plantation.

Basswood is a rapid grower, but was not planted in such a way that we can judge of its usefulness in the farm woodlot.

The trees just mentioned as giving a large amount of fuel early in the history of the forest plantation may be mixed with the white pine, Norway spruce and Scotch pine, the latter with their denser foliage shading the ground well and killing the side branches of the trees planted for fuel.

To the species already described, it is now necessary to add others which will supply good fuel later on and will furnish wood for other purposes.

For fuel we should suggest the hard maple and red oak. The former does not grow as rapidly as any of the trees already mentioned, and for the first twenty years will have to endure considerable shade, which it is capable of doing. The red oak has grown rapidly at Ottawa and has held its own with all the species mentioned. While the wood is not considered very valuable for working, it stands fairly high in fuel value.

To the foregoing trees must now be added other species, the wood of which is both high in fuel value and otherwise generally useful. The white ash is a rapid growing tree and is very valuable for fuel and for many other purposes, and is especially useful to the farmer, as parts of so many tools, implements, etc., are made from it. Twenty years after planting it will be large enough to use in various ways, and as it grows older is increasingly valuable.

A few trees of white or bur oak should be in the farmer's plantation, these trees endure shade fairly well, and if the planting is planned so that they will get a chance to develop after a few years they will eventually be among the most valuable trees in the plantation.

Black walnut is a good tree where there is thick planting, as it shoots up rapidly and as it is a light-needing tree, the side branches which do not get it will die, thus ensuring a clean trunk. Only a few trees are necessary in the plantation as it will be a long time before they will be very useful.

By judiciously mixing the trees which have been mentioned, the farmer may have a supply of fuel and wood for lumber and other purposes with little labour in the production of it.

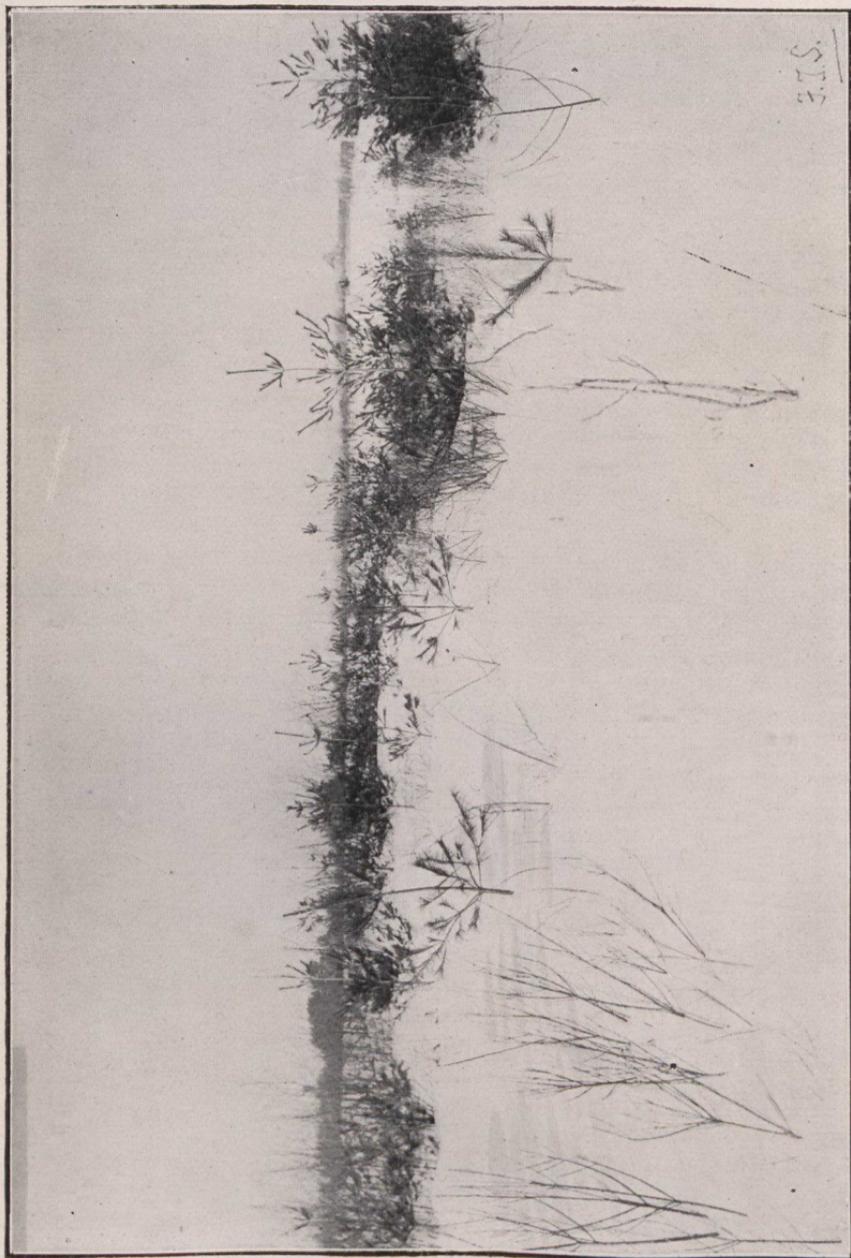
In planting trees we should, from our experience, plant those which are to remain a long time, such as the pines, hard maple, oak and walnut, at least ten feet apart with others between them.

In the Prairie Provinces the box elder or Manitoba maple, is used largely in tree plantations. Our experience has been that being a very rapid grower during the first twenty years and making a very dense top, it is too destructive to other species unless kept down with much labour. Mixed with birch, ash and American elm, which could hold their own, it would be useful in shading the ground and killing side branches.

Two other questions may be coupled, namely: Where can young stock be obtained? What is the cost of establishing a plantation?

There is no firm in Canada, so far as we know, that supplies a good assortment of forest tree seedlings in large quantities. There are, however, two sources of supply in Canada, but the trees can only be obtained as yet subject to agreement to carry out instructions. The first is the Nursery Station of the Forestry Branch of the Dominion Government at Indian Head, Sask., in charge of Mr. Norman M. Ross; and the second is the Nursery at the Ontario Agricultural College, Guelph, Ont., in charge of Mr. E. J. Zavitz.

From the United States I have received six catalogues of firms offering forest tree seedlings by the thousand, and there may be others. These firms are:—



Trees and Shrubs planted $2\frac{1}{2}$ x $2\frac{1}{2}$ feet apart in Autumn of 1899. The shrubs were used to shade the ground quickly.
This photo was taken in March, 1907, and shows White Pine above Shrubbery.

R. Douglas Sons, Waukegan, Ill.

D. Hill, Dundee, Ill.

Herbert A. Jackson, Portland, Maine.

C. L. Whitney, Warren, Ohio.

Evergreen Nursery Co., Sturgeon Bay, Wis.

Shenandoah Nurseries, Shenandoah, Iowa. This firm does not advertise evergreens.

The prices for some of the trees recommended for planting range as follows:—

Norway Spruce, 12-18 inches, transplanted, \$24.00 to \$40.00 per 1,000, Strong seedlings, 12-15 inches, are advertised at \$12.00 per 1,000, and transplanted trees 9-12 inches at \$18.00 per 1,000.

White Pine: 12-15 inches, transplanted, \$30.00 to \$40.00 per 1,000. Transplanted trees 8-12 inches, \$24.00 per 1,000.

Scotch Pine: 12-18 inches, transplanted, \$35.00 per 1,000. 8-12 inches, transplanted, \$16.00 per 1,000. Seedlings 10-12 inches, \$8.00 per 1,000.

White Ash Seedlings: 12-18 inches, \$4.00 to \$10.00 per 1,000.

American Elm Seedlings: 12-18 inches, \$1.75 to \$8.00 per 1,000.

European Larch: 15-18 inches, \$8.00 to \$10.00 per 1,000.

Hard Maple: Seedlings, 12-18 inches, \$8.50 per 1,000.

White Oak: 12-15 inches, \$10.00 per 1,000.

Red Oak: 12-18 inches, \$8.00 per 1,000.

Birch: 12-18 inches, \$5.50 per 1,000.

Some nurserymen make a specialty of certain kinds and offer these lower than others.

Only one English catalogue has come under my notice recently, namely, that of Dickson's Nurseries, Chester, England.

The following quotations are made from their latest catalogue:—

Norway Spruce: 12-18 inches, transplanted, 40 shillings or about \$10.00 per 1,000.

White Pine: 12-18 inches, seedlings, evidently not transplanted, 35 shillings, or about \$8.50 per 100. Not quoted by the 1,000.

Scotch Pine: 12-18 inches, transplanted, 45 shillings, or about \$11.00 per 1,000.

European Larch: 12-18 inches, transplanted, 21 shillings, or a little over \$5.00 per 1,000.

There are two French firms which we have dealt with. These are Pierre Sebire & Son, Ussy (Calvados), France, and Barbier & Co., Orleans, France.

Trees can be procured in France for the following prices:—

Norway spruce: 10-20 inches, transplanted, \$3.00 per 1,000.

White Pine: 8-14 inches, transplanted, \$5.50 per 1,000.

Scotch Pine: 8-16 inches, transplanted, \$3.50 per 1,000.

American Elm Seedlings: 14-24 inches, \$1.55 per 1,000.

European Larch: 2 year seedlings, 6-14 inches, \$1.50 per 1,000; 3 year, transplanted, \$4.00 per 1,000.

European White Birch: 12-20 inches, \$1.90 per 1,000.

The name of a German firm which makes a specialty of white pine has been given to me by Mr. E. J. Zavitz, Guelph, Ont. It is J. Heins & Son, Halstenbeck, near Hamburg, Germany.

To the prices given above should be added from 25 to 30 per cent. for transportation from France or England.

The above figures will give a fair idea of what it costs to procure forest tree seedlings.

Seedlings of nearly all the trees mentioned can be easily grown by the farmer, and while he might not be able to raise them much more cheaply than he could obtain them from large nurseries he would have them when needed.

The cost of planting and cultivation depends so much on the character and condition of the soil and price of labour that one cannot state accurately what the cost would be likely to be. At Ottawa no record of cost of planting and establishing plantations has been kept. At the Experimental Farm, Indian Head, Mr. Angus MacKay, Superintendent, found that a half acre of box elder, 3x3 feet apart had cost at the rate of \$13.50 per acre at the end of the third season. This included the cost of planting. A half acre planted 4x4 feet apart cost at the rate of \$10.80 per acre.

At 3x3 feet apart, 4,840 trees per acre are required.

At 3x4 feet apart, 3,630 trees per acre are required.

At 4x4 feet apart, 2,722 trees per acre.

THE BEAVER IN ITS RELATION TO FORESTRY*

BY PHILIP COX, PH. D.

At no period in the history of the province has there been so general a recognition by its people of the great value of its forests, both direct and indirect, as at present. This conviction has been forced upon them by several considerations, among which a few may be mentioned. The general decrease of productive forest-areas and consequent increase in the value of timber and wood products, have directed attention to the forest, and stimulated interest therein. The beneficial influence of forest-areas on the climatic conditions of a country, and their relation to the productions of the soil, are being better understood as more attention and study are given to the scientific principles involved. The agency of the forest is contributing to the water supply of a country, which of late years is being utilized for power purposes has been fully established.

It requires only a superficial knowledge of these principles to enable one to draw the following inferences:—

1. The forest screens the land from the direct rays of the sun and retards evaporation of moisture.
2. It increases the average annual rainfall not only over its own floor, but surrounding agricultural districts.
3. It exercises a cooling influence and renders the climate more humid.
4. Adding to the annual precipitation and reducing evaporation to a minimum, it conserves the water supply of a country, more especially if the water-sheds and sources of streams be forest-clad.
5. Local droughts in farming districts must decrease in frequency and severity according to the extent of surrounding forests.
6. It protects the adjacent agricultural sections from the force and severity of winds, which would otherwise often do serious damage to crops.
7. The volume of water in rivers, streams, lakes, and other catch-basins, will be in proportion to the extent and density of the forests along their margins and covering their sources.

* Read before the Miramichi Natural History Society, Feb. 20th, 1906.

8. Increase of humidity of soil and air, due to these various agencies, must render forest fires less frequent and destructive.

9. Under such conditions the growth of forest-trees would be more rapid, and decomposition of those waste products accelerated, whose presence are now a great danger to the forest.

As year after year adds its quota to the burnt areas of forest lands, and the annual out-put of timber decreases in size and quality, thoughtful people are beginning to compute the time, not far distant, when the forest must cease to be such an important asset and source of revenue and business as at present, unless measures be taken to preserve existing areas from deterioration by fire and wasteful cutting, and aid nature in the reforestation of large tracts that have been swept by fire. The question may be said to have already passed discussion; the best means to accomplish the end is pressing for solution, but with regard to it there is a great variety and wide divergence of opinion.

To assist in arriving at a correct conclusion, it would be well to pass in review and consider carefully the natural conditions of the forest in primitive times during the period of its greatest development. What were these conditions, how far have they been changed or completely destroyed, what can be restored in whole or in part, and what steps can science and art take to assist the natural agencies in the work?

A great change has come over the forest since the advent of Europeans. In early times the forest of New Brunswick exceeded any east of the Great Plains in the size and grandeur of its trees—especially the White Pine, whose majestic proportions have ever been a favorite theme for the pen of the poet and brush of the artist. Its floor was seamed by a net-work of rivers with their thousands of branches, ponds, and lakes, which, like a great system of veins and arteries, imparted vigor and stability to the whole. Everywhere the forest humus was moist; every brook and streamlet was noisy, rushing beneath the shading arms of giant trees, babbling over pebbly bottoms, or leaping down falls and over barriers of various kinds that nature or accident had interposed to retard its journey to the sea. The prolonged and copious supply of water from the snow, melting slowly on the densely shaded forest-floor, sank into its deep spongy mould, trickled through the earth enriching the soil with its fertilizing burden, and continued during the greater part of summer to issue forth along the slopes and in the valleys through countless springs and rivulets. Like conditions retained the summer rainfall which made good from time to time the diminution of moisture caused by a slow evaporation. Lakes and ponds innumerable dotted the forest-floor and dispensed their coolness and humidity on all sides.

Here were ideal, because natural, conditions of forest growth

and permanence, but, as was implied above, the lumber business, settlement, and the waste and abuses attending both, have brought a great change over the face of the forest. From the water-ways have been removed all obstructions to the rapid drainage of the forest and depletion of the water supply. Streams, brooks, and rivers have had their channels cleared of every impediment to the easy, rapid, and uninterrupted flow of the water. The natural density of the forest, which in primitive times stood guard against a too rapid melting of the snows on the one hand and evaporation of moisture on the other, has disappeared before the thoughtless axe and destructive fire. Settlements have extended into the wilderness in all directions—veritable tongues of fire—which are fringed everywhere with ruin and desolation. Railroads have proved to be the forest's greatest enemy, whose paths through the province are everywhere marked by wide tracts, seared and blackened, and rendered unproductive for half a century or more. Water-sheds have been stripped of their tree-growth and thus robbed of the power to contribute to the water supply. Everywhere the forest has been opened up by fire and axe to the parching effects of sun and winds.

What are some of the consequences which result from these untoward conditions? Whenever a few warm days occur in early spring, the snow is rapidly melted, and the surface, stripped of its deep spongy mould and hardened by exposure to the alternate heat and rain of summer serves but as a floor over which the freshet rushes to fall into the nearest brook and hasten unimpeded to the sea. A similar fate is in store for the summer rainfall. Thus under present conditions there is the minimum of water deposited and absorbed, and the maximum carried away in a few days, leaving the brooks and rivers comparatively empty and the surface dry before summer even begins. Is it to be wondered at that the forest is often parched in autumn and becomes a prey to devastating fires?

Foremost among the provisions of any wide measure of forest protection must stand the solution of the problem how to arrest and hold even this diminished water supply where it will do the most good. Various suggestions have been made. Some advocate the erection of dams on rivers and floatable streams, forming large catch-basins; but while the presence of such water areas must exercise an influence for good on the forest growth immediately adjoining, they must of necessity from their limited number and position be of little use to the forest as a whole. The maze of streams, brooks, and rivulets to be found on the forest floor would not have their supply sensibly increased by such means, and it is in the bosom of the forest country, in the region of the little water-ways, where the supply should be retained in order to have it contribute most to the growth and preservation of the forest.

Does the careful study of primitive conditions reveal the presence and operation of any special means to this end, other than those already mentioned? Explore the valley of some brook and note the little meadows, that occur one after another, sometimes six or seven in half a mile. At the lower margin of each, a dam of earth and decayed sticks may be made out, extending from one side of the little valley to the other, here and there worn away, but the course and outline can still be made out. These meadows, each only a few acres in extent, were once catch-basins, or beaver ponds, whose builders and tenants have long since been destroyed, but evidence of their busy and useful lives and labors survives. In primeval time and in the palmiest days of forest magnificence every brook and stream was dotted with ponds, which caught and retained a bountiful supply of water right in the heart of the wilderness, where its salutary presence was of the greatest value. Try to conceive how many of these forest-embowered lakelets were once to be found on the thousands of brooks and streamlets which thread every portion of the province. Take an imaginary stand on some hill-top, and, with the telescopic eye of the eagle, sweep the billowy sea of green around you, and note the glinting and flashing of light from innumerable silver points on the verdant surface—a second firmament with its glittering gems. You have beneath and around you a panorama of nature's beauties and utilities, an admirable illustration of how she conserves her productive energies and makes all her agencies mutually beneficial; a wealth of magnificent trees and forest grandeur encircling countless ponds and lakelets, every one the happy home of busy architects whose lives and labors are being expended in preserving their wood-land home in its wonted attractiveness and beauty.

It is easily understood that as the long winter wore away, the water in these ponds would diminish in volume, and the opening of spring must find them nearly empty. Then came the melting snow and freshet, and soon every pond was filled to its utmost capacity. Who can calculate the volume of water that was thus stored in the heart of the forest, and its beneficial effect on the soil, vegetation, and climate! The efforts of man, along even the wisest lines, must pale into insignificance, when compared with such agencies as these.

Though a century or more has elapsed since the beaver was nigh exterminated and the ponds made tenantless, the hand of time has not been able to obliterate the traces of their homes, yet the sites now recognizable must only be a fraction of what were to be seen in primitive times. Available records are not at hand of the number of beaver skins annually exported from the province during the French regime, when the destruction must have been very great, for the fur was in high demand. Yet notwithstanding the immense annual drain made upon the stock for



New Beaver Dam on Whirlpool River. Sept. 23, 1906.

half a century or more before the province passed under the power of Britain in 1763, it is a matter of record that one merchant firm alone of St. John exported 60,000 skins or upwards annually for some years after 1783. Hence the conclusion is justified that in primitive times these animals were exceedingly numerous in this well-watered section of Canada, and as it is their habit to separate into small communities and establish homes more or less apart from one another. they must in time have penetrated every part and built their little catch-basins therein. That age was contemporaneous with the period of greatest forest development, while the destruction of the beaver marks the introduction of a series of changes in the natural conditions which ushered in the period of decline.

In the efforts about to be made to increase the extent and conserve the productiveness of forest areas, it is not possible to restore all ancient conditions, but the protection of the beaver by wise and stringent measures, well enforced, can easily be had without injury or loss to any interest. Moreover the animal is quite prolific; and as the otter, its worst enemy after man, has become rare, twenty-five years of protection must find it well represented on the brooks and streams of the forest, pushing forward with all its proverbial industry and skill those works that were largely the life and strength of forest growth.

It may be objected that the indefinite multiplication of these water-plots must reduce considerably the productive areas of the forest, and result in the loss of much timber owing to the drowning of the trees on these pond-sites, but a little consideration will show that it is the least valuable of the forest trees that grow in these little valleys, and can well be spared to furnish room for a prime necessity of luxuriant growth. Moreover the beaver does not use for food or building purposes any of the most valuable timber trees, but contents itself with the birch, willow, poplar and alder, the least valuable. The loss from both these sources must prove trifling when compared with the gain to the forest and country as a whole.

Another objection is the annoyance so many dams may cause the lumberman who must break, or remove them from floatable streams. As pointed out above, the beaver, if unmolested, finds its favorite home on streams and brooks which are generally too small for driving purposes, and it is only when relentlessly hunted and persecuted by man that its wonderful intelligence has driven it to occupy the larger streams where it can more readily circumvent the wiles of its enemies.

Every lover of nature and intelligence displayed in nature, must, apart from the mere question of utility, long to see the protecting hand of man extended to this wonderful architect of the forest, whose wisdom, skill, and industry have made it an at-

tractive subject for the moralist and scientist. But when it is found on probing the secrets of its busy life, that it is doing a mighty work, laying the foundation of forest greatness and wealth, contributing to the productive energies of nature on all sides; building up the rich intervalles of valleys with material which must otherwise be lost in the sea; feeding the summer channels of rivers with a bountiful supply of cool, refreshing waters that invite inland the numerous finny tribes of the sea; and transforming what sad experience shows may become a barren, into all the glory of the primeval forest, then should the admirers of nature join with the votaries of science and business in demanding a perpetual close season for the beaver.

One of the latest bulletins issued by the Forest Service branch of the U.S. Department of Agriculture (Circular 99) deals with the question of forest planting on semi-arid plains. While the suggestions in this circular refer more especially to the southwestern States, some of the trees recommended for planting on the dry plains are in every way suitable for Canada. Among these are cottonwood (*Populus deltoides*), American elm (*Ulmus Americana*), Manitoba maple (*Acer Negundo*), and red cedar (*Juniperus Virginiana*). The first three are already used extensively in our Northwest, but the need of a tree that will grow on dry hillsides has long been felt. The red cedar seems to supply this need. The climate of southern Saskatchewan and southern Alberta ought to be suited in every way for the growth of the red cedar and as it is one of the most durable of woods when in contact with the soil it would replace the softer woods now used for fence posts and similar purposes. It is a slow-growing tree and would never grow to great size on our prairies, but its hardness and durability make it well worth planting.

OUR FORESTS—PAST, PRESENT AND FUTURE.*

BY HENRY ROY.

GENTLEMEN OF THE FORESTRY ASSOCIATION:—

At this time of our life, a person of fifty years and more, cannot begin to remember what the forest was when he was a boy, what the forest has done since he became a man, and what it is doing for him now that he is getting to be an old man. Those who had to make their living in the forest, say 50 or 100 years ago, were considered very miserable, were considered very common, because they could reach only for misery. There was no education for them, there was no money to be made. A great many had to live by hunting and fishing, and very little money could be got for any kind of timber, almost nothing. I did it myself with my father—chopped cordwood, hemlock and spruce, and drew it six miles, for only one dollar a cord. Oh, what a change now, especially for soft wood that had no price, except pine.

I can say that if Canada is so prosperous now it is due chiefly to the wood industry—by paper making or pulpwood sold and taken from the forest where it used to be an encumbrance to the new settler, where he had to burn this wood, and do very near as much work for nothing as he now does for about \$6.00, which he is getting right at home. Gentlemen, we are now in a century of luck, and the only danger is that we might grow proud or indifferent. We should be all very glad the forest man can make just as good a living as the city man, as the farming man, and be able to buy from city and farming people and pay with cash for all he buys. Now, let us see that nothing will stop that industry, but on the contrary, we should do all we can to foster it, to help it, to create a still better market for this wood, pulp and paper. We must not be discouraged nor afraid that we are going to be short during our lifetime or during the lifetime of our children, because every acre that is cut will give an acre of land that can become cultivable for hay and grain if it is good soil, and if it is non-cultivable land the timber will grow back very quickly, just as quick as men are growing, and quicker. Do not be afraid to give your wood, providing you get a good fair price for it. Look at what we have in Canada.

* Paper read at the Forestry Convention, January, 1907.

I will begin with Quebec, because I never travel through the Maritime Provinces, and will let others speak for that country.

Millions of acres have never seen the white man in them yet, and have a big and ripe crop of timber on them. It is falling down in places, because trees are like anything else. They live so many years and then die. Some kinds grow very quick, but do not live long. Spruce is the shortest-lived tree in the forest. I have seen, and can show you, where no trees were ever cut down, and there are nearly as many lying on the ground as there are standing. They are the white spruce, especially in British Columbia where they grow big and fast. Pulpwood will not become exhausted, as some people say it will who have never travelled through Canada and seen what there is. If they had, nobody would talk that way, because you cannot cut the trees down as fast as they grow on the millions of acres that will always be good for that purpose, because cultivation will not be made on poor, sandy and rocky soil that was made by Providence to fulfil the needs of man. Ontario has a great deal of that land that will never be fit for any other purpose except to grow timber, and to make timber grow you have to take away one crop every hundred years, which is not very often. We can take away two crops every century and have it very good and very great. I have seen myself where wood was cut clean to my eyes, and to-day there is first class wood growing in the same place, and hardwood too.

British Columbia can furnish enough to revolutionize the price of that industry. It has all kinds of water power. It has any amount of great spruce, the best in size and the best in quality. It has a seaboard of 700 miles; with all kinds of rivers and inlets to take the wood from the forests. It is at the door of the western market, Japan, China and Australia.

Gentlemen, there is only one thing we must not do, and that is, we must not cut enough to glut the market. That is all the risk. The quantity is nothing. We have it and will always have it. It is not necessary and it is not obligatory that paper should be all made of pulpwood. It is only a few years ago that no wood at all was entering into the pulp of which paper is made. You all know it, too. It is only yesterday that paper was made of straw and wild grass. When I was a dealer in hay I bought hundreds of cords of straw which I used to send to Aroostook, New Hampshire, for paper making. And I was always against the farmers selling this straw at \$2 or \$3 a ton delivered, pressed, because it was worth more than that to enrich the soil and make the grass grow big for making butter and cheese.

Now, gentlemen, a great many of you probably do not know that the wood pulp industry has done more for farming

land than anything else in the world. It was made so by Providence and told by Christ, that everything should be adjusted in this world. Give to the land what belongs to the land (the straw), and take in the forest what Nature has made for men, to be used with care and only when profit would be realized.

For fire protection we are all right one way, because a great deal of land that grows such timber is low ground, and being low it is damp and watery, and in some parts the snowfall is very heavy and in consequence, the winters are long and the summers short. The summers being short the fires cannot last very long. It is not like some countries that have no winter, where fires can run for years and years without stopping. Still we can recommend everyone who goes into the forest to be careful about setting fire, and I am very glad to see in the Statutes that it is an offence punishable by fines and jail for any one committing such offences against the country's treasure, against the King's land. Still fires will occur sometimes. Fire sometimes is a punishment from God. It is just like an earthquake. It cannot be stopped. It runs in towns, where there are all the best contrivances invented by man and the use of water-works, as if these were no use. It runs on the prairies where there is no wood at all. It runs in farming country where it burns barns, houses and fences.

Now, gentlemen, there is something to be done, to start to push men in helping forestry. Every man that owns and occupies land should have some trees planted in proportion to his land. And it should be the kind of trees that are strong every way. When I say strong every way, I mean the trees that grow fast, live old and grow big. We have those trees here. They are native to the country and native to the north part of the continent of America, of which we occupy the biggest and the best part, and adapted to men and trees for their health and safety for long living. We have two kinds of trees that are superior to anything else with our rich soil and cold country. These are the elm, red, white and yellow, and the oak, white and black. The elm and red oaks should be planted all along the main roads and all farm roads in every parish of each Province, and in every corner where the land is not cultivated; and also to make shelter for stock during the hot sunny days of the pasturing time. Now, gentlemen, that could be done without any cost whatever. The seed can be got here in this country. What would it cost to plant 25 trees each year, until all the bare places on a man's farm would be filled? Nothing.

The elm is a tree that grows very fast. Elms that I have seen planted myself, can to-day cut 30-inch logs at the stump. The same thing with red oak, and what beautiful trees they are!

When a man remembers that those trees grow for 200 years and become of a huge, immense size, what a profit you would have, you men of the land, if you would give the land a chance to help you to make riches, to keep you warm, to give material for every day use. Elm in 100 years will be very dear. It is used to make cheese boxes. We are going to make cheese forever, I think, and we should think of providing for the boxes for 50 years and more. It will be the same with the red oak, that native tree that grows along Lake Champlain, Lake Ontario, the St. Lawrence River, the Mississippi and Missouri, and even in Golden Park, California.

Now, look at the price of oak at present, and it is nearly all red oak which is used in finishing houses. It is cut thin and veneered on other wood, and it makes the best finishing for rich and strong houses. I have made horse stable floors with oak, and covered bridges on farms; and I also bought some in British Columbia to make wagon boxes for drawing minerals, that I paid \$150 per thousand feet for.

Both the elm and oak can grow in any clay, rich loamy soil, and also on sandy land if it is not too high to make it dry. I can show you right here in Ottawa both kinds that are not 50 years old, and very big, long, and healthy, and on very sandy soil. It would give me great pleasure to show you what the elm is on Sandy Hill, right in this city of Ottawa, the Capital of Canada. I am sure there is in every Province, ground that would grow those trees, the same as it grows apples, clover, wheat, etc.

There are some still richer kinds of woods, but they do not grow so fast, neither would they grow in all kinds of soil as those two aforesaid.

Other kinds are: red elm, that would grow in rich gravelly land; white ash, also in same land, and walnut that grows in low, rich alluvial land, and also on rich, stony land where hardwood grows. Silver poplar is another kind of soft tender wood that grows very fast and makes a very nice whitewood for inside finishing. It is quite rare in Canada. It does not grow in great quantities in any forest, but it could be got, and I think it would surpass any other kind in the quickness of its growth.

Quite a few of you, gentlemen, are aware that France has great forests that have been planted, and they used for that purpose land that was good for nothing else. It was a desert of sand along the Atlantic around Bordeaux and other places. The sand was blown by the west wind into the vineyards, doing a great deal of damage. They planted a wood called balsam, which was native to that country. And to-day, they not only furnish ties for their railroads, but export quite a lot to England.

Another example: In 1868 I was in Illinois for one winter. I travelled quite a bit through the State, and it was barren of

trees except along the rivers. A premium was offered to those who would plant a grove of cottonwood, or anything better. Nearly every farmer planted such a grove as was asked by the legislature of that State, and some planted quite a bit more where the land was not perfect to grow corn or other grain. Four or five years ago I visited that same country again, and, gentlemen, I was very much surprised to see those groves, planted with little seedlings and seed sown in the ground, changed into big trees serviceable for a great many purposes. We can do the same here all through Canada, I am sure.

Now, gentlemen, I am about finished. I thank you very much for your kind attention. And, let me tell you before I sit down that it is to the interest of every citizen of this country to improve the industry of forestry by planting the right kind of trees. Do not have anything to do with foreign seed or trees. We do not know them, and we all know that quite a few have bought and tried foreign trees and they did not prove a success. A notable example was "l'érable jiguère."

Our native trees are the trees that will grow always. Their quality is good enough, and their quantity will make them remunerative in time, even in our own days. Let us also encourage this industry by not putting any embargo on our exported wood in pulp or otherwise, in planks or any other kind, as long as the prices offered and paid by the foreigner will cover all expenses and leave a big margin for the wood itself. If we were to stop the export we might drive that industry elsewhere. It might go to Africa where the forests are immense, and where labor costs nothing. The white man is looking up places for the markets of the world for just the same industry that we have in our land. We can furnish the world for centuries with wood for paper and lumber, and keep our straw for manuring the land for more butter and cheese.

THE POET OF THE FOREST.

In his poem of "Neighbor John," McLachlan, the Canadian singer, presents the picture of one who stands unmoved in the presence of the beauty and glory of Nature:

Talk not to him of yonder trees
Their Gothic arches throwing;
For John but sees in all those trees
So many sawlogs growing.

It is, unfortunately, true that many of those who do business in the great forest see about them only the opportunity to place upon the market the noble crop which Nature has provided. But one cannot talk with the best of our lumbermen, or hear these men speak at a Forestry Convention without feeling that at their heart of hearts their feeling for the woods is not that of the calculating business man, but that of the lover and enthusiast. The ever-changing, yet ever-constant charm of the forest as a home; the primal place of these woods in our economic system, and so in our national life; the history of nature and of man in these solitudes, a history which is one long, vivid romance,—these things rather than the mill or market cause the lumberman to remain a lumberman, just as the indefinable charm of the sea commands the life of the sailor. Every man who loves the woods has felt the desire to communicate to others the glory he has seen in them. But the contrast between the sentiments that move him and the best words he can command drives him to life-long silence. Such a man cannot but feel that some day a man will arise whose thought is clear, whose tongue is touched with divine fire of poetic expression, and who will be able to interpret to the world the sentiments which in himself vainly cry for utterance. "The Poet of the Forest—" what a noble title this would be for a man. Who would not aspire to such usefulness and glory?

There is at least one candidate for this office, as shown by the little volume of poems that has reached us. "In Forest Land"* it is called, and the author is Douglas Malloch. The ambition of the author thus expresses itself:—

For I would find that sweetest chord
That makes the forest harmony,
Would wake at will the music poured
To every zephyr by the tree.

*"In Forest Land," by Douglas Malloch; 1906; American Lumberman, Chicago.

To know thee more my spirit longs,
O melody of leaves astir;
O forest, let me sing thy songs,
O, make me thy interpreter.

This verse shows that Mr. Malloch is possessed by the spirit of wonder, which is the first essential of poetry, and that he has the teachableness which Nature demands of those who would voice her many moods. It shows also that he has that nameless skill which makes words not merely the means of expressing thought, but the means of giving that undertone of sound which makes the lines not merely a melody, but a harmony. The poem from which this verse is taken is the first in the book, and is entitled, "The Melody of Leaves Astir." Our own Lampman need not have been ashamed of that title, or of the three verses which follow it. And, though the songs of this singer range from the vision-weaving of this first poem to the rough burlesque of lumber-camp humor, or the awful tragedy of accident in the woods or on the drive, there seems always the tone of the dreamer who tries to "dream true." Here, for instance, is his portrait of "The Lumberjack." Our readers, we believe, will say that it is a true likeness, and that it reveals something of the inner nature of those unconscious heroes of the solitudes:—

THE LUMBERJACK.

An untamed creature of the forest wilds,
He lives to that wild place a soul akin—
A man whose days are often steeped in sin,
And yet whose heart is tender as a child's.

His strength is like the strength of mighty pines,
His outward form a bark of many scars;
His head he carries proudly in the stars,
The while his feet are meshed in tangled vines.

Calamities throw vise-like tendrils out
To seize him in their hindering embrace;
The thorns of wrong whip sharply in his face,
And poisoned things encompass him about.

He braves disease, the storm, the falling tree,
The near, quick water that would hold and drown;
But all earth's terrors cannot bear him down,
Or make this man of dangers bend the knee.

He breathes the air the sturdy maple breathes,
He walks the soil the selfsame maple feeds;
To forest sources looks he for his needs—
Oh, where are trees and men like unto these?

The reader who is familiar with the work of the Canadian poets cannot read this book without being struck, at almost every page, with the resemblance which the work bears to that of "The Khan." It may be a mere accident of originality, or it

may be the widening influence of a vivid and forceful style such as the "The Khan" undoubtedly has,—whatever the cause, resemblance is there.

Like the true poets of all times, from Shakespeare to Kipling, Mr. Malloch adds to his ecstatic tone of nature a love of men that shows itself in rich and rollicking humor. His story of "The Fall of the Champion," being the tussle of the expert shingle-packer in trying to pack his bride's trunk for their wedding journey, will cause every reader a hearty laugh. The same may be said of "When Patti Sang at 36." Mr. Malloch's humor shows itself not less in shrewd, homely, sound philosophy, in which also the love of the everyday man is manifest. For instance, "Bill." This little poem shows that "Bill" is greatly in contrast with the men about him, for these are exceedingly clever people who have almost succeeded in doing wonderful things; as inventors, musicians, or what not. But:—

Yes, Bill's an ordinary man,
 But then we treat him just as free
 As if it had been Nature's plan
 To make poor Bill like you an' me.
 When Jim needs money to invent,
 Er Pete er Mike mus' pay a fine,
 We know why Bill's among us sent—
 Fer that's the time fer Bill t' shine.

Mr. Malloch is not a singer of a mere locality. His poems take us from New Brunswick to Oregon, and from the Carolinas to the wild North Shore of Lake Superior.

If the work before us is that of a young man, as we take it to be, it should be followed by others. The tone of it is true, and the work conscientious. There are ranges of forest music which these poems do not interpret; but if, as we believe, the work is that of a growing mind and springing ambition, there is every reason for the author to hope that his may be the honor and unspeakable pleasure of giving to the dwellers in other places in America, and throughout the world the thrill of Nature and life in the forest.

"In Forest Land," while a small book, is perfect in mechanical make-up. It is illustrated with a number of wonderfully fine photographs by Sidney Vernon Streater, which photographs have been well interpreted by the engraver and the pressman.

A. C. C.

THE NATIONAL IRRIGATION CONGRESS.

A National Irrigation Congress will be held at Sacramento, California, U. S. A., September 2-7 inclusive next. This will be the Fifteenth Annual Session of this body, the objects of which are the development of national policies of irrigation construction, forest conservation and administration, stream management and control. It is considered one of the greatest national gatherings held in the United States, both by reason of the high character of the attendance and because of the important influence which is exerted by it on national legislation.

Largely as a result of the annual meetings of this Congress, the United States has within the last few years adopted an entirely new policy with reference to the forests and arid lands of Public Domain.

The new Forestry policy of the United States is designed to insure the best uses of the forested areas consistent with the perpetuation of the forests. It has a double object. First, to foster the timber supply. Second, to protect the water sheds of the country by retaining the forest cover. This system is new and it has both advocates and opponents, who make it a point to be heard on the floor of the National Irrigation Congress. More than one hundred million acres have been placed in forest reserves, and the administration of these lands is in the hands of the Department of Agriculture at Washington.

The coming session of the National Irrigation Congress is expected to be more than a national affair. The problems of forest conservation and administration and of arid land reclamation cannot be localized. They are as broad as the world is wide, and consequently the Executive Committee of the Congress, which is the permanent organization, is inviting the Nations of the World to take part in the session which will take place at Sacramento, California, next Fall, and it is expected a number of foreign countries interested in these problems will be represented by high officials, and that this session will be of world-wide interest and importance.

Of all the States of the Union, California is perhaps most interested in National irrigation and National forestry. Nearly one-fifth of the area of the forest reserves are in that State, and the greatest single irrigable area is in that State. Sacramento, where the session will be held, is centrally located, being in the midst of the great valley of the State where approximately ten million acres of dry lands await irrigation, while the waters that

would make them fertile flow to waste. Great forests clothe the mountain ranges which surround this valley, and in these mountains are the forest reserves and vast forested areas in all conditions, varying from silvan solitude where the sound of the axe has not yet been heard, to cut-over lands where the problems involved are those of reforestation and fire prevention.

An Interstate Exposition of irrigation lands products and forest products will be held simultaneously with the Congress. The California State Fair will follow, opening with parades, electrical illuminations and other features on the closing day of the Congress. There will be excursions to various portions of the State, where excursionists will be hospitably entertained. In these, and in other ways the people of California will exert themselves to entertain delegates, and thus enable them to see the State during the harvest period to the best advantage. Many men prominent in the affairs of the United States and of the several States will attend this session. Among these will be United States Senators, Congressmen, Governors of States and Territories, probably some of the members of the President's Cabinet and others of National and International reputation. Men interested in problems of forestry practice and, especially, forest administration, are expected from a number of Foreign Countries.

YALE UNIVERSITY FOREST SCHOOL

NEW HAVEN, CONNECTICUT, U. S. A.

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

THE SUMMER SCHOOL OF FORESTRY is conducted at Milford, Pike County, Penn. The session in 1907 will open July 5th and continue seven weeks.

FOR FURTHER INFORMATION ADDRESS

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