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The Woods North of Prince Albert, Saskatchewan. (See p. 175.)

Photo by W. J. James, Prince Albert.

Canadian Forestry Journal.

VOL. I. OCTOBER, 1905. No. 4

CANADIAN FORESTRY CONVENTION.

OTTAWA, 10th, 11th and 12th JANUARY, 1906.

OFFICIAL CALL.

Office of the Prime Minister of Canada,
Ottawa, 21st August, 1905.

To the Public of the Dominion of Canada:

Canada possesses one of the largest areas of virgin forest of any country in the world and is ranked by European experts first, or among the first, of the important sources of the world's timber supply for the future.

The preservation of the streams in perennial and constant flow, which is largely controlled by the forests on the watersheds, will have an important influence on the industrial and agricultural development of the Dominion. The expansion of our electrical and mechanical industries will be regulated to a great extent by water, which forms the greatest source of power in all countries, and some of our western districts are dependent on irrigation to ensure the success of agricultural operations.

In all the older provinces the clearing of the soil has been carried to such an extent that the ill effects on the water supply and on agriculture are clearly marked, while on the western prairies the need of sheltering trees for houses and fields is seriously felt by the settlers.

The early construction of the Transcontinental Railway, and of other railways, through our northern forested districts and the consequent opening of those districts to general traffic, will increase the danger from fire which has already been a most active agent of destruction.

These conditions are not new; they have from time to time received public attention, and during the Session just closed Parliament authorized the summoning of a convention for the more thorough discussion of the same.

I therefore hereby call a public convention to meet in the City of Ottawa on the 10th, 11th and 12th of January, 1906, under the auspices of the Canadian Forestry Association, and to this convention are specially invited:

Members of the Senate and House of Commons,

Lieutenant-Governors of the Provinces,

Members of Legislative Councils and Legislative Assemblies of the Provinces,

Dominion and Provincial Forest Officials,

Members of the Canadian Forestry Association,

Representatives of Lumbermen's Associations,

Representatives of Boards of Trade,

Representatives of Universities,

Representatives of Agricultural Colleges,

Representatives of Farmers' Institutes,

Representatives of Railway Companies,

Representatives of the Canadian Mining Institute,

Representatives of the Canadian Society of Civil Engineers,

Representatives of Associations of Land Surveyors,

Representatives of Fish and Game Associations, and

All others who take an interest in Forestry.

An invitation is also extended to the Bureau of Forestry of the United States, the American Forestry Association and the State Forestry Bureaus and Associations to send representatives to this Convention.

WILFRID LAURIER.

In accordance with the official summons issued by the Right Honourable the Premier of the Dominion, arrangements have been made for a Canadian Forestry Convention to be held in Ottawa on the 10th, 11th and 12th of January next, to consider the forests of the Dominion and their national importance.

This Convention is held under the auspices of the Canadian Forestry Association and the organization and carrying out of the project has been placed in the hands of the Association.

The subjects to be considered at the Convention will be discussed under the following divisions:—

1. The Nation and the Forest.

2. Forestry in relation to Agriculture and Irrigation.

3. The Forest and the Lumber and Pulp Industries.

4. The Relation of our Forests to our other Industries: Railways; Water Powers; Mining; Building Trades; Wood Working Manufactures.

5. Scientific Forestry and Forestry Education.

By the kindness of the Canadian Railway Companies a single fare rate over their roads on the certificate plan will probably be allowed delegates, regardless of the number in attendance. In regard to rates on railways in the United States, announcement will be made later.

Fuller announcement will be made later to the members of the Canadian Forestry Association by circular and for further particulars application may be made to the Secretary of the Convention.

ORGANIZATION OF THE CONVENTION.

Honorary President:

HIS EXCELLENCY THE GOVERNOR GENERAL.

President:

THE RIGHT HONOURABLE SIR WILFRID LAURIER.

Vice-Presidents:

HIS HONOUR SIR HENRI JOLY DE LOTBINIÈRE,
R. L. BORDEN, M.P.

Executive Committee:

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

His Honour Sir D. H. McMillan,
Lieut.-Governor of Manitoba.

His Honour A. E. Forget,
Lieut.-Governor of Saskatchewan.

Hon. Sydney Fisher,
Minister of Agriculture for Canada.

Hon. W. C. Edwards,
President, Quebec Limit Holders' Assn.

Chas. M. Hays,
General Manager, Grand Trunk Railway.

Hon. S. N. Parent,
Chairman, Transcontinental Ry. Commis.

Hon. Nelson Monteith,
Minister of Agriculture for Ontario.

Hiram Robinson,
President, Hawkesbury Lumber Co.

Hon. J. H. Agnew,
Commissioner of Lands for Manitoba.

Hon. F. J. Sweeney,
Surveyor-General of New Brunswick.

John Hendry,
President, B. C. Lumber and Shingle Manufacturers' Association.

Rev. A. E. Burke,
Vice-President, Canadian Forestry Association, Alberton, P. E. I.

H. M. Price,
President, Quebec Pulpwood Association.

Dr. Robert Bell,
Director of the Geological Survey of Canada.

Aubrey White,
Hon. President, Canadian Forestry Assn.

E. G. Joly de Lotbiniere,
President, Canadian Forestry Assn.

E. Stewart,
Dominion Superintendent of Forestry.

M. J. Butler, C.E.,
Deputy Minister of Railways and Canals.

Cecil B. Smith, C.E.,
Chairman, Temiscaming and Northern Ontario Railway Commission.

Thos. Southworth,
Director of Forestry for Ontario.

Dr. Judson F. Clark,
Forester for the Province of Ontario.

Wm. Little,
Westmount, P.Q.

Hon. H. Bostock,
Vice-President of the Canadian Forestry Association.

D. McNicoll,
General Manager, Canadian Pacific Railway.

Hon. A. E. Turgeon,
Commissioner of Lands and Forests, Quebec.

Hon. R. F. Green,
Chief Commissioner of Lands and Works for British Columbia.

Hon. Arthur Drysdale,
Commissioner of Crown Lands for Nova Scotia.

J. R. Booth,
Ottawa.

Hon. A. B. Warburton,
Charlottetown, P.E.I.

B. E. Walker,
General Manager, Bank of Commerce.

F. W. Jones,
President, B. C. Mountain Lumbermen's Association.

Wm. Saunders, LL.D.,
Director of Dominion Experimental Farms.

J. S. Dennis,
Director of Irrigation for the Canadian Pacific Railway Company.

Monsignor J. U. K. Laflamme,
University of Laval.

F. C. Whitman,
President, Western Nova Scotia Lumbermen's Association.

Wm. Pearce,
Vice-President, Canadian Forestry Association, Calgary, Alberta.

Norman M. Ross,
Assistant Superintendent of Forestry for Canada.

F. D. Wilson,
Vice-President of the Canadian Forestry Assn., Fort Vermilion, Alberta.

J. L. Campbell
President, Western Lumbermen's Association.

Secretary: R. H. CAMPBELL,

Secretary of the Canadian Forestry Association,
Department of the Interior, Ottawa.

THE MONTREAL FOREST CONGRESS,

21ST, 22ND AND 23RD AUGUST, 1882.

The calling of the Canadian Forestry Convention for January next, naturally turns attention to the Forest Congress, held in Montreal in 1882, which was the first great meeting to deal with the subject of forestry held in Canada. It was in fact a joint meeting of the American Forest Congress and the American Forestry Association, two separate Societies for the advancement of forestry, and it resulted in a junction of their forces. The selection of Montreal as a meeting place was the result of an invitation given by several Canadians who attended a previous meeting at Cincinnati.

For the organization and success of this meeting, while credit is due to many, the most active part was taken by Mr. Wm. Little, of Westmount, who was the Vice-President of the Congress. He not only gave unsparingly of his time and energy, but also personally bore the greater part of the expense, including the publication of a special edition of the Montreal *Herald*, containing a report of the proceedings and the papers in full. It is to a copy of this special issue that we are indebted for the information from which this article is compiled. Mr. Little is still as strong a supporter of the movement as ever and has held the office of both President and Honorary President of the Canadian Forestry Association.

In looking over the report and the names of those in attendance one is struck with the way in which it links the present with the past. Some of those whose names appear are still prominent, some have passed into history. Among those on the local committee were Hon. (now Sir) H. G. Joly, Principal Dawson, Joseph Doutre, Professor Harrington, G. L. Marler, Hon. A. W. Ogilvie, Sir Hugh Allan, Hon. Louis Beaubien, S. E. Dawson, Hon. John Hamilton, Sir Francis Hincks, Dr. T. Sterry Hunt, James Little, Hon. E. H. Spring-Rice, J. K. Ward, N. S. Whitney, A. T. Drummond. Others who were present were: Dr. B. E. Fernow, J. R. Booth, J. G. H. Bergeron, E. H. Bronson, Hon. Geo. Bryson, W. C. Edwards, Rev. T. W. Fyles, Dr. Wm. H. Hingston, Robt. Hamilton, T. C. Keefer, Jas. Mills, W. G. Perley, A. E. Russell, Wm. Saunders, G. W. Stephens, Peter White, Hon. J. S. C. Wurtele, E. E. Taché, W. R. Thistle.

The papers presented covered a variety of subjects relating to forestry, some of a scientific nature, others descriptive and some dealing with practical applications of principles.

Some were presented by lumbermen, others represented the agricultural interests. Many of them were very valuable, though there was in others considerable more of theorizing than of actual experience. Even these latter, however, were suggestive and at least showed interest and enthusiasm. Several descriptive of the trees of different classes or districts gave useful information for reference purposes. Canada was largely represented on the list.

On Monday evening a meeting of a more popular character was held at the Queen's Hall. At this meeting an address was given by Hon. Henri Joly. Mr. Joly stated that the timber supplies of Canada were considered inexhaustible, and therefore it was difficult to arouse interest on the question. He, however, pointed out that the lumber that Canada supplied to England was not one-fourth of the import while what was sent to other parts of Europe was but as a drop in the sea, and yet cutting had so far advanced that it had reached the height of land between the St. Lawrence and Hudson Bay. Mr. Joly thought that not only should the forests in existence be protected but that something should be done to plant trees where they did not now exist. He instanced his own experience with a forest tract of 100,000 acres. From this he turned out 35,000 to 40,000 spruce logs every year, and by following the rule of not allowing any tree under twelve inches in diameter to be cut he expected to have a supply of spruce in perpetuity. A little joke by Sir Henri, which will be appreciated by anyone conversant with the history of the Province of Quebec, and which was received by the audience with laughter and applause, is well worth repeating, although it contains a heresy according to what are usually accepted as orthodox forestry ideas. Mr. Joly said that some people were of the opinion that our Governments should take hold of this matter as men's lives were too short, but he could assure them that if men's lives were short Government's lives were generally still shorter.

The principal address of the evening was made by F. B. Hough, Chief of the Forestry Division of the United States, and was too comprehensive for any attempt at summary. His statement of the principle on which the question of forestry should be approached is worthy of quotation. He said:

"It has often been said, in a way intended to be amusing, that 'posterity has done nothing for me—why should I care for it?' Now, this is neither wise nor witty. It is not wise, because it is foolish—nor witty, because, like an oft told tale, it has lost all novelty and is at best but a stale and silly joke.

"It is part of true wisdom to look upon this beautiful earth as held by us in trust—it is, at best, only a life lease that a man holds to the estate for which he holds an absolute deed of pos-

session—and it is our solemn duty to so manage this trust as not to dissipate its value or perhaps render it wholly incapable of restoration."

A suggestion made by Dr. Hough, which has perhaps had effect on the policy followed in Canada, was that experimental stations for the testing of trees on the plains of the West should be established. As Dr. Saunders was present at the meeting this hint may have been the starting point for the useful experimental work which has since been done in the Canadian West.

In a paper from the standpoint of the lumbermen Hon. J. K. Ward, of Montreal, pointed out what he considered to be improvements required in the management of the forests. Emphasizing the need of providing for the best use of the standing timber, both by protection and utilization, he made the suggestion: first, that there should be greater economy in manufacturing, both in the mills and in the woods, turning to better account the slabs, &c., in the former, and discouraging the making of square timber as much as possible in the latter; second, that on government lands the law as applied to pine should extend to spruce and tamarack, i.e., that no tree less than 12 inches at the stump should be cut down for commercial purposes; third, that fire should be more closely watched. On the last point the suggestion was made that the Government, which is most interested in the preservation of the forests, should employ as many men as are thought necessary in each agency to look after and trace the origin of fires on the public domain, giving them the power to take evidence so as to bring to punishment those who either wantonly or carelessly set fire to or cause the destruction of valuable property. In regard to settlement Mr. Ward urged that no lands unfit for settlement should be offered for sale and stated his view that in selling lands to settlers it should be made a condition of sale that twenty acres in every hundred should be given free, and that it should be forever kept as woodland.

A special committee had been appointed at a previous meeting to report on forest fires. The report submitted by this committee pointed out the damage done by forest fires. It said that the fires raging season after season through the forests have caused a greater and more irreparable destruction, inflicting deeper harm than the combined lumber industries of the past and the present day. The harm done was not only to the timber but to the soil, the constantly recurring fires resulting in the total destruction of every particle of organic matter in the surface soil, reducing it to a state of aridity and barrenness. The report did not make any suggestion as to a remedy. From several of the lumberman in the convention, however, there

came practical suggestions on this question. The most complete statement was made by Mr. Peter White, M.P., of Pembroke, and may be quoted, as one of the most important results from this Convention was the raising of and the suggestion of a means of solving the problem of protection of the timber from fire. His statement was as follows:—

Experience showed that the forest fires along the Upper Ottawa occur between May and August, those months inclusive, and his suggestion was to prohibit the starting of fires for clearing or other purposes within these four months. He would also suggest the division of the timber lands into districts each under the guardianship of a policeman resident within it; one duty of such functionary being to visit every settler towards the close of winter, say some time in March, to give him all necessary information and caution as to the requirements of the law in regard to this matter. He believed that there was very little incendiarism in the lumbering regions and that the bulk of the fires that occurred originated in ignorance and carelessness. Officials, such as he had suggested the appointment of, ought to keep a careful watch at all the principal avenues of districts liable to be laid waste by fire. He thought that the estimate offered of the loss by this cause, as compared with the product the lumbermen secured, was far too moderate; he believed it would be nearer the mark to say it was ten to one, than to represent the two as approximately equal. As to precautions it might be urged that as the lumbermen had so large an interest at stake they might be looked to to provide the necessary precautions. That was true in a sense, and he had no doubt that those concerned would willingly submit to the imposition of a small tax, if necessary, for the purpose of securing the required protection. The firm with which he himself was associated had for years looked after their own interests in this matter, but it was obvious to every one that it was out of the power of private individuals or business firms to act with the authority and force which the Government could command.

The discussion was continued by Hon. Geo. Bryson, Mr. Thistle, of Ottawa, Hon. J. K. Ward and others who supported Mr. White's statements, and on motion of Hon. Mr. Joly a committee was appointed to formulate recommendations to the Governments on the subject.

To complete this phase of the Convention's work it may be added that the resolutions submitted by this committee were as follows:—

(1) The reservation of all pine and spruce lands unfit for settlement for lumbering purposes exclusively.

(2) The prohibition of burning brush by settlers in the vicinity of fir trees during May, June, September and October.

(3) The division of timbered country into districts, and the appointment of forest police, under a superintendent with magisterial powers, whose duty it shall be to detect and punish offenders and provide for the extinguishing of fires.

(4) The cost of maintenance of this protective force might partially be met by the imposition of a moderate tax on the parties owning or leasing timber lands.

Mr. Wm. Saunders, of London, (now Dr. Wm. Saunders, of Ottawa), read a paper on "The Growth of Poplar Trees for the Manufacture of Paper and Charcoal." Dr. Saunders spoke of the extensive demand for poplar for paper making which in many sections made it difficult to supply the demand from the immediate neighborhood, with the result that this wood, previously of little value, commanded a price nearly or quite equal to that for the most valuable kinds. The paper gave descriptions of the different species of poplar and their distribution. It is a notable commentary on the change which has taken place in paper manufacture since that time to observe that in the discussion on this paper spruce was not even mentioned.

In a communication from Mr. Edward Jack, of Fredericton, N.B., the following interesting statement was made in regard to New Brunswick:—

"For more than twenty years I have been engaged as land surveyor and timber explorer in New Brunswick, and have followed the white pine down to the mountains of North Carolina and East Tennessee and from my experience in the subject of woods can say that the neglect of forestry in New Brunswick and Nova Scotia, as well as in the Province of Quebec, is really lamentable. In New Brunswick we make no distinction between timber and farming lands, allowing and encouraging settlers to locate themselves upon spruce and hemlock land, the damaging result of which policy can be estimated by the loss of hundreds of thousands of dollars, while the unfortunate settler finds himself very often worse off at the end of ten years than he was at the date of settlement. A study of New Brunswick Forestry and a proper map accompanied by a written report would show intending settlers where to place themselves, as our spruce and pine lands, as well as the greater part of our hemlock lands, are unfit for settlement purposes, being poor and requiring much manure to render them productive. One-third of New Brunswick is in the millstone grit formation. This was once covered with spruce, pine and hemlock, being well adapted for the growth of these trees, and had we proper forestry regulations the growth of these woods on the dry and sandy plains of the millstone grit district might be made a constant source of profit and revenue to the Province. * * * * I think we should first find out from the explorations of competent and reliable

persons in what parts of the Province our valuable timber (hard as well as soft) is found, and after the matter has been well discussed, determine on what course of action to pursue. Until this be done it is of little use to attempt the formation of any scheme for forest preservation."

Dr. B. E. Fernow submitted a valuable paper on "Conditions of Forest Growth." In opening he pointed out the difference between agriculture and forestry—that the agriculturist had to bring about an artificial condition of the soil while the forester's aim was to preserve the natural condition. Inasmuch as the trees derive a large proportion of their material from the air, they do not depend to any great extent on the chemical character of the soil. The claim was therefore made that any soil in its natural condition contains sufficient organic material for any timber growth; that therefore the change of species observed on this continent can hardly be attributable to an exhaustion of the soil but rather to its physical condition, its depth and looseness and, depending on these, the capacity of absorbing and retaining moisture, which properties may be increased or even compensated for by a sufficient layer of humus. Attention was also called to the relative light requirements of trees, now so familiar a principle in forestry, as an important item in deciding the plans of management. In summarizing Dr. Fernow stated that the principal effort of the forester must be to preserve and increase the good condition of the soil since upon it depends the productivity of the forest. The measures to be adopted for this purpose are not so much to be sought in direct operations on the soil, but mainly in certain considerations in the selection of species, methods of management, terms of rotation, interlucation, methods of reproduction and in the general care of the forests. Of all methods of management the timber forest with natural reproduction from seed trees is best calculated to maintain the vigor of the soil for the shade enduring species, if the cutting is done with necessary prudence so that the soil is exposed as little as possible. Next to this method comes absolute clearing, with immediate artificial re-seeding or re-planting. This is almost the only method advisable for light foliaged trees. From this statement it will be observed that Dr. Fernow's views have changed in some respects.

Mr. Edward Haycock, President of the Ottawa Iron and Steel Manufacturing Company, Limited, spoke of the importance of the forests to the steel industry in a paper on "Canada's Forests and her future as a Steel Producer." Mr. Haycock stated that in the manufacture of steel for the future, wood charcoal was a necessity.

"Spain, Algeria and the Mediterranean islands with their rich ores have no wood. England is in a similar position, Nor-

way nearly so. Sweden, the present great steel producing region, is rapidly approaching the same position. Germany and France are in the same situation. The United States, with their vast consumption and rapid increase of charcoal blast furnaces, will hardly be able to keep up their supply many years. Russia's freights and internal dissensions kill the possibility of a supply being drawn from her. Where then can the coming "Steel Age" derive its supply from unless from Canada with her extensive woodlands and rich ore beds."

Alas for prophecies!

A paper on "Forest and Fruit Culture in Manitoba," by Mr. J. W. Taylor, United States Consul at Winnipeg, was transmitted by the Government of that Province to be read at the Convention. As to the causes of the present condition of the treeless areas in the West, Mr. Taylor quoted a statement made by Capt. Palliser in 1858 as follows:—

"Large tracts of country now prairie lands have at one time grown valuable forests and their present absence is the result of the repeated ravages of fires. Where a scattered and stunted growth of willows is found as a general rule was ancient forest land, which when dug to a sufficient depth still discloses numerous roots of destroyed timber. It is most lamentable to see so often such masses of valuable timber destroyed, almost invariably by wanton carelessness and mischief. The most trivial sign of one Indian to another has often lost hundreds of acres of forest trees, which might have brought wealth and comfort to the future settler, while it has brought starvation and misery to the Indian tribes themselves by spoiling their hunting grounds."

It was noticed in the Red River Settlement, although the primeval forest along the course of the river consisting largely of oak, elm and ash, had been long cleared away, as much for building the block or timber houses of the early settlers as for fuel, that yet there had been a succession of poplar and other trees of quick growth. Artificial aids to the reproduction of the forest were however adopted such as the Tree Culture Claim Act of the Dominion Government, under which 160 acres of land might be obtained by planting part with trees under certain conditions.

An interesting item in the history of forestry legislation mentioned was an act passed by the Legislature of Manitoba in 1882 by which the residue of the great highways and road allowances, after reserving one chain for road purposes, can be transferred to adjacent owners on the payment of one dollar per acre. The strips of land contiguous to the highways were thirty-three feet on each side in the case of the great highways and eighteen and a half feet in road allowances. Contracts with

the adjoining owners were to be executed by the Minister of Public Works, who was authorized in case of failure of the occupant to properly comply with the requirements of the law, to make such arrangements as will complete the work, charging the expense on the adjoining premises. The occupant was required to break the ground the first year, cultivate to crop during the second year, and plant in trees, seeds or cuttings during the third year. The trees were to be planted in straight lines and not more than twenty feet apart. The following kinds of trees, as being best adapted to the climate might be planted, namely: oak, ash, elm, ash-leaved maple, poplar, balm of gilead, spruce, tamarac, balsam, pine, wild cherry and hawthorn.

Probably the most important result of the Congress was its deliverance on forest fires, as it undoubtedly gave the impulse and suggested the line of action which has been so beneficially adopted throughout Canada in the fire ranging system.

The reports received at the Forestry Branch of the Department of the Interior of the results of the tree planting, which has been done in the West, make a most favorable showing. The number of trees set out under the direction of the Forestry Branch which are now alive and vigorous, will average ninety per cent., while trees in some of the groves planted out in 1902, are now by actual measurement from thirteen to fourteen feet in height.

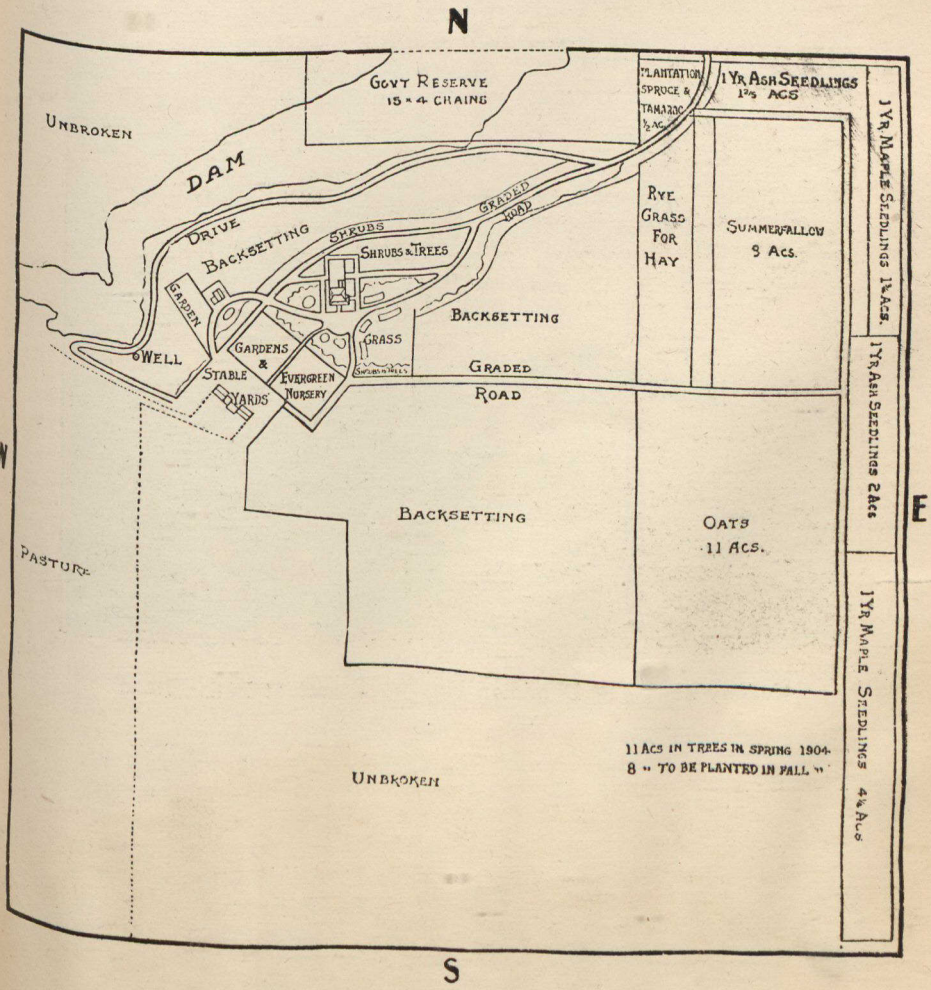
The Woods and Forests Department is just now engaged upon the considerable task of providing for the reafforestation of Windsor Great Park. His Majesty's first interest in sylviculture was aroused when, as a young boy, he assisted his father, the late Prince Consort, to plant out the clumps of elms and oaks at Windsor and Osborne, which have since developed into sturdy plantations. The King has noted with interest the progress made by these early experiments of his, and has accordingly desired to associate his régime with a scientific plan for perpetuating the forest scenery of the Royal precincts. Thus the gaps left in the various avenues of the Great Park by the frosts and winds of recent years are being systematically filled up, a new avenue is created as an approach from the park to Frogmore, and clumps of young forest trees are being planted out upon bare spaces here and there, the intention being in some instances to preserve the symmetry of the plantings first made by the King's illustrious and far-seeing father.—*Timber Trades Journal.*

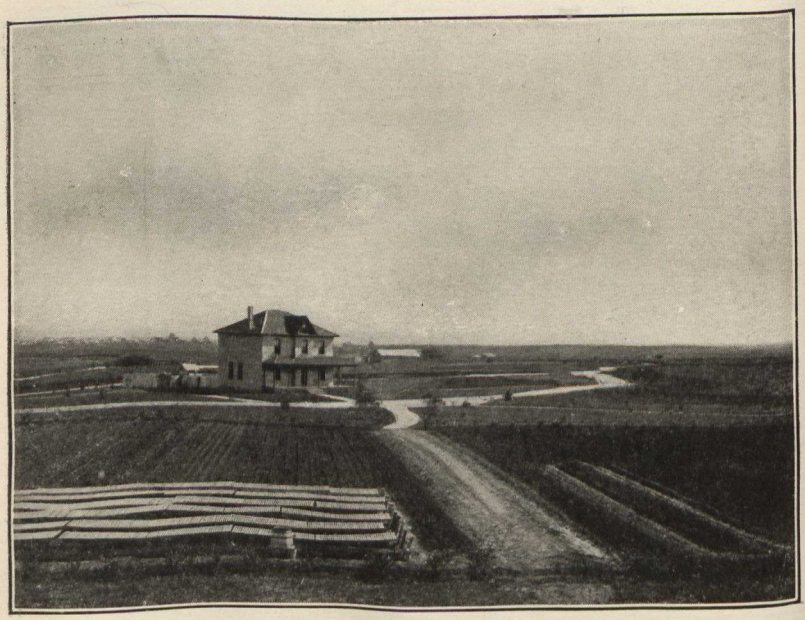
NURSERY STATION

INDIAN HEAD, ASSA.

1904.

SCALE 9 CHAINS TO 1 INCH.





Nursery Station of Dominion Forestry Branch at Indian Head.

TREE PLANTING IN THE WEST.

Norman M. Ross, Assistant Superintendent of Forestry for Canada.

Five years ago, in the spring of 1901, the Forestry Branch of the Department of the Interior commenced a system of practical co-operation with the settlers on the Western prairies with a view to assisting them in the formation of shelterbelts and woodlots on their farms. In order that the system might be successful it was decided as its main feature, to supply free of charge, seedling stock of hardy forest trees to those who were willing to comply with the regulations of the Department. Since the scheme was put into force the number of settlers desiring to take advantage of this offer has increased very rapidly year by year so that a very large number of seedlings are necessary to supply the increasing demand. This spring something in the neighborhood of two million seedlings were sent out and it is expected that from three to four millions will be required annually in the future.

To grow this number of seedlings of the varieties suited to the country requires a large area of ground. From the experience in the nurseries during the past three years it is found that on an average 80 to 90 thousand seedlings of ash or maple can be grown per acre. The ash are allowed to stay in the nursery two years and the maple only one. About 75% of the trees distributed consist of these two varieties. About 50 or 60 acres will have to be devoted to nursery stock each year to supply the three or four million seedlings which it is thought there will be a demand for. During the past three years a few acres on the Brandon and Indian Head Experimental Farms have been placed at the disposal of the Forestry Branch for nursery purposes. The amount of ground, however, available on these farms is now too limited for the increased work. It was therefore found necessary to select a site for a comparatively large nursery entirely independent of the Experimental Farms.

A quarter section of 160 acres situated a mile south of the town of Indian Head in the new Province of Saskatchewan on the main line of the Canadian Pacific Railway was decided upon as being the most suitable, owing to its proximity to the Experimental Farm where nursery operations were then being carried on. The land was virgin prairie but the soil is lighter than that in the immediate vicinity and

water is obtainable from a large dam on the property. This dam gives a practically unlimited supply, a very important feature in the west where good water is often hard to obtain in any abundance. The land is bare of trees so that there is no natural protection, however this is not much of a drawback as the hardy varieties can be raised successfully without protection while the more tender varieties can be grown on the few acres which have been used during the past seasons on the Experimental Farm and which are well protected. In another year or two sufficient shelter will be provided on the new nursery from the trees planted in the spring of 1904.

In the spring of 1903 a start was made by breaking and backsetting about 30 acres. In 1904, although the soil had not really had sufficient cultivation (as in the Western climate freshly broken sod takes a considerable time to rot), about 12 acres of this ground were planted to permanent shelter and a few sown with seeds of ash and maple to obtain seedlings for distribution. Eight acres were allowed to lie fallow to bring it to a better state for sowing in the fall; the remainder of the cultivated ground being sown to grass for hay and oats for feed for the horses. During the summer of 1904 suitable buildings for the horses, implements and men necessary for the working of the place were erected and an additional 40 acres broken up and prepared for cropping in the following year. The 160 acres was fenced and the main roads and walks graded up and gravelled. The accompanying sketch plan shows how far the work had advanced by the fall of this year. The strip running along the east and part of the north boundaries will be a permanent belt, a similar strip will be planted on the other boundaries as the soil is brought to a fit state of cultivation. The plots for growing the broad leaf seedlings are narrow strips an acre in size, running north and south and will be separated by hedges of caragana which will not be allowed to grow more than six or seven feet high. These hedges will afford ample protection and prevent the snow from drifting off the ground in the winter. About 25 acres will be needed annually for growing hay and oats and any ground not otherwise utilized will be planted to permanent plantations to illustrate the growth of the different varieties, the best mixtures and the best distances apart to plant the trees. From such plantations as these it is hoped to obtain reliable data as to the cost of planting and maintaining a wood lot and the probable revenue which may be derived from the various methods of planting and the different kinds used.

At present about ten acres are occupied by buildings, yards, drives and ornamental grounds. Along the edges of the main drive and round the lawns about 6,000 hardy shrubs were planted this spring (1905), and some two acres in front of the residence

seeded down to grass. It is desired to make this part of the grounds as attractive as possible in order to impress visitors with the beautifying effect of trees and shrubs when planted round otherwise unattractive buildings. The absence of anything of this nature is one of the most prominent features on the majority of prairie farms, in some cases from indifference but in most owing to the general impression that a great deal of skill and labor are necessary to produce a good effect, whereas only the most elementary principles of plant life have to be observed and the labor entailed is surprisingly small compared to the result obtained and the additional value of a property when the grounds are neatly and attractively laid out.

The varieties of trees principally grown for distribution are the native maple or box elder and the native green ash; besides these the native elm and white birch are grown from seed in smaller quantities, Russian poplars and willows from cuttings. A small number of conifers have been raised from seed each year, principally the native white spruce and Scotch pine. Other varieties such as Jack pine, *Pinus cembra*, *Pinus ponderosa*, *Pinus flexilis*, Colorado blue spruce (*Picea pungens*), balsam fir, Norway spruce and European larch are also being tried. The Colorado blue spruce, judging from specimens grown on the Experimental farm and individuals seen elsewhere, is a most promising tree for the North West.

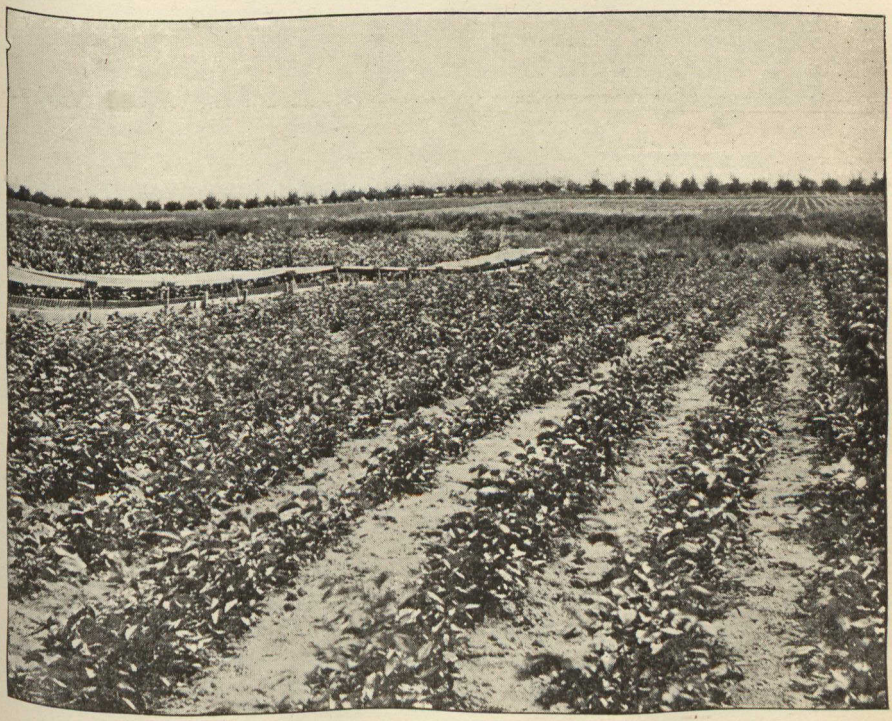
The conifers are grown under a completely different method to that used for raising the broad leaf varieties. The seed of the latter is sown in such a manner that as much of the subsequent cultivation as possible may be done with horses. Drills are made, with a horse cultivator, 30 inches apart, and in these the seed is sown by hand, the drills being covered in again by a harrow toothed cultivator. The horse cultivator is used among the seedlings all summer and in the fall a tree digger is employed for the removal of the crop. Comparatively little hand work is employed as in this country land is comparatively cheap so that at present there is no advantage in growing the seedlings more thickly, horse labor is not so expensive as in some other countries and laborers' wages are very high. Conifer seeds are sown in very carefully prepared seed beds and the young plants protected by lath screens for two years. When two years old the seedlings are transplanted to rows, the rows are made about 10 inches apart and the plants set 3 to 4 inches apart in the row. Cultivation between the rows is done with the double wheel hand hoe. The seedlings remain in the transplanting rows two years and are then ready to set out in permanent plantation. The manual labor entailed in sowing, weeding and transplanting coniferous seedlings together with the length of time they must remain in the nursery, makes the raising of this class of stock

rather expensive as compared with the broad leaf varieties. The evergreen, however, is a tree especially suited to a country where the winters are so long and where thick windbreaks are such an advantage, so that the cultivation of this class of trees should be encouraged as much as possible. Nowhere in the west have conifers been extensively planted, but there is no doubt that several varieties will prove quite hardy and also profitable.

During the past five years something over 5,000,000 seedlings have been distributed from the nurseries of the Forestry Branch. In the future it is the intention to grow all the stock that may be required on the new nursery station at Indian Head which is now well equipped for the purpose and will in a very few years be well sheltered by the trees already planted for windbreaks. Any varieties hardy to the Northwest can then be grown from seed without fear of damage being done by the strong wind storms which at certain seasons of the year are extremely violent.

In the report of the Boer Delegates, Messrs. Jooste, Lane and Rood, on the agriculture and stock farming of Canada, Australia and New Zealand, which has recently been published under the title of "Agriculture within the Empire," they have the following to say in regard to Forestry when summarizing their conclusions:—

"The planting of trees for shelter for stock and for future farm requirements should not by any means be overlooked. In fact this is a very important factor in successful farming. We recommend Cypresses, Pines and Wattles and any of the many varieties of Australian Eucalypts or Gum trees, all of which grow rapidly. Gum trees are especially desirable for fence posts, farm buildings, sheep and cattle pens, &c. It is a good plan to plant small groves of trees here and there about the farm, because a sheltering clump of trees will break the cold winds of winter and afford shade during the hot summer months, besides adding greatly to the beauty of the homestead. We noticed everywhere on our travels that progressive farmers always laid out small plantations, and the results were invariably found to fully repay the trifling initial cost and trouble. For garden hedges the Cypress pine will be found to answer as well as any, being very dense and hardy and standing both extremes of heat and cold."



Forest Nursery at Indian Head.

WOODLAND TAXATION.

Judson F. Clark, Ph.D., Provincial Forester for Ontario.

I.—On Lands in Private Ownership.

The application of forestry methods to the management of woodlands, whether they be the large areas of the lumberman or the woodlot of the farmer, must find its justification in an affirmative answer to the eminently pertinent and practical question: Will it pay?

Among the many points to be considered in determining the answer to this query under any given circumstances, none, with the single exception of protection from fire, should receive more earnest consideration than the present and prospective taxation of the property. The fairest prospect for large returns from a policy of conservative lumbering may be nipped in the bud by a tax rate that makes it in the financial interest of the owner to strip the land of whatever is merchantable at the time, preparatory to abandoning it, much as he may regret having to do so. This, indeed, has been the history of the destruction of many millions of acres of the finest forest lands in North America.

Of prime importance in dealing with all classes of forest lands, the question of woodland taxation has recently acquired added interest in Ontario and other Canadian provinces in view of the necessity of planting on a large scale in the near future to offset the rapid destruction of the woodlots in the farming sections. It is natural that the woodlot owner should take more interest in the tax rate applied to his plantations than that applied to a woodlot already fully grown, for, come what may, years must elapse before he can realize on the crop on which he pays the tax. From the standpoint of the state, however, it is of quite as great public interest that the woodlands already in existence be conservatively managed as that the woodland area be extended by planting.

The principles governing the taxation of woodlands are of course the same, whatever the origin of the forest, once it has passed in fee simple to private ownership, and no distinction should be made in tax rates on this account.

Any discussion of the principles of woodland taxation must have regard to the three following considerations:

1. *The Assessment Basis:*—Whether or not the assessment valuation should apply to the value of the land or the value of the land plus the value of the timber standing on it at the time.

2. *The Rate Basis:*—There is a fundamental difference between levying an annual tax on properties producing an annual income and levying an annual tax on properties producing an income at intervals of a considerable number of years only.

3. *Woodland Tax Exemption:*—Whether there be any special economic reasons why lands bearing wood crops should be taxed at a different rate from lands producing other crops.

I.—The Assessment Basis.

It has been the custom and the law of most states and provinces in North America to include the value of the standing timber with that of the soil in assessing woodlands for taxation purposes. This is both unjust and unwise, and is certain to result detrimentally to woodlands wherever practised.

Forest crops differ from field crops in that the product of any one year's growth cannot be harvested at the end of the growing season, as is the rule with other crops. Thus the portion of wood which is produced during, say, the fifth, tenth, or fifteenth year of a tree's or plantations' growth must remain on the ground until there has accumulated fifty, sixty, or seventy years' growth, when the whole may be sold to advantage. The growth produced during the earlier years of the tree's life is to all intents and purposes simply *stored* in the trunk of the tree until such time as the whole has reached a merchantable size. To add the value of a forty year's growth of pine trees to the value of the soil for taxation purposes is really as unfair in principle as to add the value of the last forty year's grain crops to the assessment valuation of a grain field. The forty years' growth of pine is not there for investment purposes. It is there simply because the nature of the crop requires the accumulation of decades of growth to make the whole merchantable.

It cannot be too clearly kept in mind in this connection that the soil and climate, and they alone, are the natural producing factors whether the crop be wood or wheat. To add the value of standing timber to the assessment is clearly a case of double taxation in that to the value of the producing agent—the soil—has been added the value of its product—the trees.

Unjust in principle, taxation of the growing trees is nothing short of disastrous in practice in that it provides an incentive to prematurely harvest the crop, the proceeds from which may then be invested where it will not be subject to taxation.

Fortunately in Ontario the law requiring that woodlands be assessed according to their sale value—including the timber—has not been generally enforced by the township assessors. The law, however, as it stands is vicious in principle and should

be amended. Timber-land owners in other states and provinces have not always fared so well. The State of Michigan furnishes a particularly instructive object lesson of the results of placing a heavy burden of taxation on standing timber. There on six million acres of non-agricultural lands, which thirty years ago carried one of the finest forests in the whole world, and which to-day are lying almost wholly waste, is to be seen the logical conclusion of the policy of assessing woodlands at a higher rate than that indicated by the capacity of the soil to produce wood crops.

The high taxation made but one kind of lumbering possible —to wit, the cutting clean of whatever was merchantable at the time as fast as it could be marketed, followed by the abandonment of the ruined tracts to the state for taxes. This policy was forced on the lumbermen landowners greatly to their regret and financial loss by the authorities who were responsible for the tax, but who failed to see that they were killing the goose that laid the golden egg. The net result was the transformation of a magnificent pine forest to a wilderness at a cost to the lumbermen of tens of millions of dollars, because of the forced haste in harvesting, but at far greater cost to the state as a whole in the total destruction of the forests on lands wholly unsuited for agriculture, to which must be added the loss of a lumbering industry which, had it been conducted on conservative principles, could have been a source of wealth to its citizens in perpetuity. Wisdom in this matter of taxation has not yet been fully learned, and the destruction of the remnants of Michigan's forests proceeds apace.

II.—The Rate Basis.

In discussing the fundamental difference between the levying of an annual tax on properties capable of producing an annual income, and the levying of an annual tax on properties capable of producing an income at long intervals only, it is well to bear clearly in mind that this is purely a question of mathematics. It can, however, best be understood by studying a concrete case. To make this case as simple as possible the following conditions will be assumed:

1. That the properties to be compared be two plots of land of equal producing capacity, and at present without any crop whatever. By equal producing capacity is meant that each plot shall be capable of producing during the next sixty years a net annual yield at the time of harvest of, say, $10 per year, whether devoted to the production of field crops or wood. If devoted to field crops the $10 would be realized annually, but if devoted to wood production the annual growth of wood must remain in place till the end of the sixty years when the total will be worth $600 net.

2. That one plot, call it No. 1, be devoted for 60 years to the production of farm crops, and that the other, No. 2, be planted to trees to be harvested at 60 years.

3. That money be worth 5% per annum compounded annually to the owner of the lands.

4. That it is desired to adjust the taxation of the two plots so as to bear equally heavily on the production of the farm crops and the wood crop.

The problem: If $1.00 per year be the tax assessed on plot No. 1, devoted to the field crop, what should be the annua tax on the woodlot, plot No. 2?

The relative burden of tax rates on crops can best be discovered by finding in each case *the proportion the amount of the tax bears to the net value of the crop at the time of the harvesting of the crop.* This being so, tax rates on plots Nos. 1 and 2 must be so adjusted as to take an equal proportion of the net value of the crops on Nos. 1 and 2 at the time of harvesting. For example, a tax rate of $1.00 payable yearly on plot No. 1 would be equally burdensome to the owner as a tax of $60.00 payable at the end of every 60 years on plot No. 2. In each case the tax would amount to just 1-10 or 10% of the *net product* at the time of harvest.

Taxes, however, are usually paid annually whether the owner receives an annual or periodic return from his land. $60 payable at the end of every 60 years being the equitable tax rate for plot No. 2, it remains to be found how much would be required to be deposited annually at 5% compound interest to amount to the $60 at the end of 60 years. The equation is

$$\frac{\$60.00}{(1.05)^{60}-1} \times .05 = 17 \text{ cents.}$$

That is, a tax of 17 cents per year paid annually for 60 years on plot No. 2, money being worth 5% per annum, will at the end of the 60 years have amounted to $60, or 1-10 the value of the then maturing crop.

Hence, the conclusion that if money be worth 5% per annum to the farmer, and that it requires 60 years to mature his woodlot plantation—two assumptions which can hardly be doubted—*an equitable tax rate based on the value of the soil for producing purposes should be in the case of woodlands but 17-100 or 17% of the rate paid on neighboring lands of similar quality used for the production of farm crops.*

The amount of the unfairness of a *similar* annual tax for both plots may be seen by comparing the accumulated value of the tax rate up to the time of harvesting the crops. For this purpose, let the annual tax on each plot be $1.00.

The crops on plot No. 1, being annual crops and having a net annual value of $10, it is clear that 10% of the net product goes to taxes. In the case of No. 2, which is planted to trees, 60 years must elapse before the harvest, and therefore 60 annual payments of $1.00 each. The value of this at the end of 60 years is

$$\frac{1.00}{.05} \times (1.05)^{60} - 1 = \$353.58.$$

Inasmuch as the whole value of the crop is but $600 at that time, it follows that 59% of the entire yield is consumed in taxes instead of but 10%, as should be the case to make the taxes an equal burden on the production of both classes of products.

The higher the interest rate used in the computation, and the longer the time taken to mature the forest crop, the more startling becomes the comparison.

The following table shows in percental values the proportionate taxation which woodlands, yielding periodic crops, can bear as compared with agricultural lands of similar net producing capacity. Column 1 gives rotations from 40 to 100 years; columns 2, 3, and 4 give the percentages according as money is valued at 4, 5, or 6%, per annum.

Rotation	4%	5%	6%
40 years	42.1	33.1	24.9
50 "	32.8	23.9	16.5
60 "	25.2	17.0	10.7
70 "	19.2	11.9	6.8
80 "	14.5	8.3	4.3
90 "	10.9	5.7	2.7
100 "	8.1	3.9	1.6

Thus, for example, with a rotation of 70 years, and money worth 5%, the proper proportion for a woodland tax rate as compared with the tax rate for farm lands, would be 11.9 per cent, or in other terms, if the rate for the cleared lands be 15 mills, the rate for the woodlot should be 1.78 mills on a soil value assessment.

The finding, then, of the proportionate tax rate to be applied to woodlands as compared with neighboring farm lands is a purely mathematical consideration, depending wholly on (1) the value of money to the landowner, and (2) the number of years required to bring to maturity an ordinary crop of trees. What rotation and what rate per cent. should be adopted in this province in determining this proportion, admits of some discussion. *Five per cent.* is perhaps a fair return for investment of capital

in woodlands by farmers and lumbermen where there is no danger of loss by fire, and the average Ontario forest tree certainly requires full 60 years to reach maturity. On this basis the equitable rate for woodland taxation will be 17% of that for lands under farm crops, or in other terms, when the ordinary rate is 10 mills, the rate for woodlands should be 1.7 mills.

III.—Woodland Tax Exemption.

There are several reasons which may be urged in favor of the remission of part or all the taxes on such woodlands as are maintained wholly for the production of timber, and which receive sufficient intelligent care to keep them up to a reasonable standard of production. They are

(1) The value of woodlands to the community in general by virtue of the beneficent influence exerted on the climate by moderating the force of heavy winds and by favorably influencing the humidity and temperature of the atmosphere; and by the very favorable influence exerted in regulating the flow of streams.

(2) The long time element in the maturing of a forest crop is a great discouragement in wood production. There is no line of business in which men ordinarily engage which requires the looking forward for more than a decade or at most two decades. Timber growing, however, requires the constant planning in advance for 60, 80, or even 100 years. So profound is the influence of this long time element that the great law of supply and demand is paralyzed. To illustrate: If the demand for wheat increases in relation to the available supply, the price rises, the farmers sow a larger acreage, and presently the increased demand has resulted in an increased supply. The same is true of hogs and horses, or of any other commodity which may be reproduced or even mined, except wood. The demand for wood has steadily and tremendously increased decade by decade for upwards of a century. The prices, notwithstanding the opening up of vast virgin forests which cost man nothing to produce, have steadily risen, and during the last decade, as exhaustion of supplies is seen in the distance, have very rapidly risen. This rise in price has not yet resulted in an increased production of wood, nor will it—judging from the history of nations—ever appreciably increase the production of wood until the evils of a wood famine have long been felt. On the contrary, although increased demand has meant increased prices, increased prices have only meant *increased harvesting*, and increased harvesting has meant and still means in North America that larger areas are annually cut over and cut more closely. This on account of the greater amount of debris left

A typical Ontario Wood Lot.

in the woods, leaves it in a much worse condition for the all but inevitable after-lumbering fire, which all too often leaves the land a waste, hence the net result of the greater demand for wood products in the case of lands held in private ownership is not an increased but a decreased production.

This tendency for an increased demand to result in the decimation of woodlands is not confined to North America, nor our own time, but has been the history of the forest wherever it is held in private ownership unrestrained by state control. There has, however, never been a better illustration of its workings than has been witnessed at our very doors throughout the farming sections of Ontario during the last ten and more particularly during the last five years. The value of standing timber has doubled within a few years with the result that the woodlots have been sacrificed at a hitherto unprecedented rate, and one that has alarmed every thoughtful observer. And yet not one farmer in a thousand, perhaps not one in ten thousand, has done any planting on a commercial scale. More serious still, not one farmer in ten has paid the slightest attention to caring for what woodlands remain. On the contrary, the all but universal practice of grazing the farm woodlands effectually prevents any recovery which nature might essay.

(3) A third plea may well be entered for the removal of all restraint on the production of a commodity which, while so peculiarly in a class by itself so far as regards the laws governing its production, is without exception the most useful raw material of all manufacture, and an indispensable agent in all production and transportation. Aside, indeed, from the character of its population, nothing contributes so much to the material progress and happiness of a nation as an abundant supply of timber at reasonable prices.

In view, then, of the value of woodlands to the community as a whole, the peculiar temptations to deforestation due to the long time element involved in the production of timber, and the indispensable character of wood in modern industrial life, the state may well exempt from taxation such private woodlands as are devoted exclusively to wood production, and which come up to a reasonable standard of production.

It stands to reason of course that such tax exemption should be made only in so far as seems necessary to prevent excessive deforestation in the agricultural sections, and to insure a future supply of wood for domestic use.

II.—On Lands Owned by The State.

The Canadian provinces, with the exception of Nova Scotia, have adopted the only safe policy of retaining in fee simple the ownership of the non-agricultural lands for the purposes of wood production.

That this object may be successfully accomplished, it is essential that the lands be kept under a crop of trees by either natural or artificial means. It is quite beyond the scope of this paper to discuss methods of reforesting, but a few general principles will be briefly mentioned, that the influence of taxes on the management and reproduction of the forest may be clearly seen.

The reforesting of non-agricultural lands on a large scale presents many practical difficulties which are not met with, or met with only in a modified form, in restoring woodlots and shelter belts in an agricultural district. The greatest bar to the replanting of denuded or burned areas of non-agricultural lands, is the danger of subsequent destruction of the plantation by fire. This is practically eliminated in farming sections where over-clearance has been practised. The planted woodlot has a further advantage over plantations on wild lands for commercial purposes, (1) in the amount of expenditure necessary in making the plantation, it being possible on farms to do the work at odd times in early spring at a minimum of cost; (2) in the practicability of greatly increasing the financial returns of the plantation by giving it greater care as it developes, such as the removal of inferior trees to favor the development of the better, thinnings, etc. Such attentions are of course wholly out of the question on wild lands where there is no market for the inferior materials which would be removed in these "improvement cuttings"; (3) in the nearness to market, enabling the farmer to dispose of the better grades at much better advantage—the cost of transportation being saved—and to utilize much material profitably which is ordinarily waste in the lumber woods; and (4) in the fact that the farm woodlands, if rightly placed, may have a very great value in favorably influencing the local climate and thereby increasing the profit of farming the neighboring cleared lands, and in enhancing the beauty and value of the farm property.

Commercial tree planting must for the present be very largely limited to agricultural districts. As soon as the fire problem is satisfactorily solved, it will undoubtedly be extended to large areas of wild lands which have been devastated by unwise lumbering and by fire to such an extent that seed trees of the valuable species are not present, thus precluding the hope of satisfactory natural recovery. Wherever the forest still remains, however, *a natural regeneration of the most valuable species by*

a conservative lumbering of the present stand must in all cases be regarded as the basis of the forest policy. Such natural regeneration is to be preferred as being vastly cheaper and in many if not most cases quite as efficient as artificial planting.

All methods of natural re-seeding of forests—and they are many to suit the many varying conditions found in the forest—agree in at least one thing, viz: that trees which, under a clean-cutting system, might be cut and removed at a profit must be left on the the ground in greater or less number that they may maintain the production of the soil by growing to a larger size themselves, and by seeding up the spaces opened by the removal of their neighbors.

Any method of taxation, lease, or sale of woodlands which makes it in the interest of the operator who controls for the time the standing timber to cut clean or to cut the more valuable species only without regard to the future of the forest, is evidently prohibitive of any system of natural re-seeding.

The virgin stands of timber on the public lands of the different Canadian provinces are disposed of under some form of lease or license, which although differing widely in detail, are in all cases practically the same in principle. The timber is paid for under these leases as follows; (1) by a payment of certain "stumpage dues" of so much per M on the amount of material removed at the time of logging; (2) a ground tax or "rent" of so much per square mile per annum; and (3) where the limits have an estimated value over and above the "stumpage dues" and "ground rent," and are put up at public auction, a portion of the value of the timber is paid for in a third form, termed "bonus," which of course varies very greatly according to the location and character of the timber sold. In recent sales in this province the "bonus" has proved to be the largest portion of the market value of the stumpage sold.

Before discussing the influence of these financial conditions on the manner of cutting which the lumberman may adopt, it must be admitted that in justice to himself he must cut according as he will receive the greatest financial return for himself and his family. It may also be assumed that being a lumberman, and in most cases also a mill owner, he has a very real interest in the protection and development of the forest as a log producer in perpetuity. The fact that lumbering in Canada has in the past been almost uniformly destructive to our forests is due not to any lack of interest in the future of the forest on the part of the lumbermen, nor even chiefly to a lack of knowledge of how to care for the woods—though doubtless this has contributed—but primarily to a *lack of security from fire and from theft* (by "timber sharks," who in the guise of settlers steal his timber); and

to *the financial conditions imposed at the time of the sale, and the uncertainty as to what changes in this respect may be made in the future.*

The three ways in which the lumberman pays for his logs have each a special bearing on how it will be most profitable for him to cut the timber. The tendency of the stumpage dues, which are paid only when the logs are actually harvested, is towards conservative cutting. The higher the stumpage dues, the more careful will the lumberman be to select only the more mature timber, certainly no immature timber which has a stumpage value of less than the stumpage dues will be cut. The payment of a portion of the stumpage in the form of a cash-in-advance "bonus" has quite the opposite tendency. Assume, for illustration purposes, a pine stand cutting ten million feet of mature timber which has an average market value of ten dollars per M as it stands, or a total of $100,000. If sold at public auction on a stumpage basis for $10 per M the operator will cut no trees which when manufactured will not yield at least $10 per M over and above the cost of manufacture. Suppose, however, that $80,000 of the purchase price be paid cash in advance in form of "bonus" with the stipulation that the remaining $2.00 per M be paid as stumpage dues when the timber is cut. The same operator who in the first case found it in his interest to cut no trees which were not worth $10 per M on the stump will now find it in his interest to cut whatever may have a stumpage value of $2.00 per *M*. The cutting of the young pines having a stumpage value of between two and ten dollars per M may under circumstances be the main difference between good forestry and destructive lumbering.

The annual payment of a "ground rent" per unit of area held by the lumbermen is worthy of special consideration. The payment of any annual tax on woodlands tends to early cutting and discourages holding for a second crop, hence affects the harvesting unfavorably from the standpoint of practical forestry. How great will be this unfavorable influence depends on the amount of the tax and the rate of interest demanded by the lumberman for the capital invested. Wherever there is a ground rent levied it becomes necessary for the lumberman when planning logging operations to consider carefully whether it will pay him to cut with care that he may return again after a period of years for a second crop—reasonable safety from fire being assured—or whether the tax will eat up the profit of any yield that he may hope for over and above what can now be realized by cutting clean without regard to the future. This is the only point of view from which the lumberman as a business man can regard the logging of the lands under his control, whether they be owned or leased.

The following table gives the annual "ground rent" payment per square mile for the different provinces and on Dominion lands, and the sums to which these annual payments amount for different periods of from 30 to 100 years. In this computation money is reckoned to be worth 6% compounded annually, which is below rather than above the mark for capital invested in immature forests on wild lands.

Relation of Ground Rents to Conservative Lumbering.

		30 yrs	40 yrs	50 yrs	60 yrs	80 yrs	100 yrs
Ontario and Quebec	$ 3 00	251	492	923	1,686	5,611	18,418
Ontario (recent sales) & Dominion lands east of Yale, B.C.	5 00	419	820	1,539	2,809	9,352	30,697
New Brunswick	8 00	670	1,312	2,462	4,495	14,964	49,114
Dominion lands west of Yale	32 00	2,682	5,250	9,848	17,979	59,856	196,458
British Columbia	96 00	8,045	15,749	29,544	53,938	179,568	589,373
	160 00	13,408	26,248	49,240	89,896	299,280	982,288

From this table a lumberman may see at a glance what his tax bill will be when he returns for a second logging on his lands. To make a second logging profitable he must find on his return a stumpage value, *over and above the then government stumpage dues*, sufficient to offset the two following items before he can reap any return other than interest for his invested money:

(1) The value of the trees which he refrained from cutting at the first logging together with compound interest on this value at, say, 6%.

(2) The tax bill, which at $5.00 per annum will have amounted to $ 419 at 30 years
1,539 at 50 years
9,352 at 80 years or
30,697 at 100 years.

Particular attention is directed to the manner in which the tax bill runs up the longer the time between loggings. This is the most significant feature of all taxation where the tax is annual and the return periodic as has already been fully discussed.

The whole influence of a ground rent is towards *early utilization* and *clean cutting* with the *abandonment of the land after the destruction of the forest.* The practical effect of this tendency in any given case will be in proportion to the amount of the tax. In Ontario and Quebec where the rate is $3.00 per square mile over large areas, the injury is least; in British Columbia where the small mill owner must pay $160 per square mile, it is greatest.

Where the tax does not exceed $5.00 per square mile, and there is fair safety from fire and false settlement, its unfavorable influence should not be so great as to deter operators from conservative lumbering, especially on pine lands where stumpage values are comparatively rapidly rising, for where a goodly share of young trees remain on the ground a second logging may be undertaken in perhaps thirty or forty years. The conditions would be exceptionally favorable where an earlier return would be possible unless the lumberman be giving up the idea of continued crops and intends to cut to a smaller diameter at the second logging than at the first.

In view of the fact that first-rate white pine cannot be grown short of upwards of 80 years, it will be seen that in the matter of sowings and plantations the ground rent is a much more serious matter. That this is a very practical question is evidenced by inquiries from limit holders regarding the practicability and cost of reforesting pine lands by these methods. It is evident, however, that a ground rent of $5.00 per year may be a very serious deterrent to artificial reforesting by sowing or planting or even to the use of any of the cheaper methods of natural seeding by the lumberman, for he must meet a tax bill averaging over a thousand dollars per year for the twenty years between the 80th and 100th year of the stand.

New Brunswick with an $8.00 ground rent places a much greater financial obstacle in the way of progressive lumbermen who would care for the forest, but all Eastern and Central Canada is outclassed in this respect by recent legislation on the Pacific Coast where on federal lands the tax is $32.00 and on provincial lands $96.00 and $160.00 per square mile.

The prohibition thus imposed on all hope of holding the lands for future crops may best be emphasized by repeating the amount of the tax bill as shown by the table. Assuming that the British Columbia lumberman has built a mill of sufficient capacity to enjoy the lower rate of $96.00 per square mile per annum, he would find on his return for a second logging a tax bill as follows:—

At	30 years	....	$8,045 00
"	50 "	....	29,544 00
"	80 "	....	179,568 00
"	100 "	....	589,373 00

Should he be so unfortunate as to be a small mill owner, the above amounts must be increased 40%.

Presumably this extraordinary piece of legislation, exacting a high ground rent and merely nominal stumpage dues (50c. per M), was intended to "develop" the lumber industry. Whatever the motive or intention, the result must be clear to every

student of forest taxation. The lumber industry of the West will under this policy be "developed" as was the lumber industry of Michigan. The finest of the forests will first be taken up and exploited in feverish haste. The lumbermen will be constantly struggling with a problem of "over production," which will cut profits down to the last notch. The forests will be cut without thought of holding them for a second crop, for it would, under such a policy of taxation, be impossible to hope for a satisfactory return. All trees which will now earn a dollar will be cut, and the fierce after-lumbering fires in the huge debris which accompanies western lumbering will complete the work of destruction. As in Michigan the lumber industry, after having been thus artificially "developed", will collapse, and if there still remain other forests to exploit elsewhere, British Columbia may yet do as Michigan is doing to-day—import at a cost of several times her former selling price a poorer substitute for the billions of feet of timber which a few years since were sold practically at cost of logging and milling, and her legislators will be inquiring how many millions of dollars will be required to reforest the denuded mountain sides. Unfortunately, the reforesting of much of this mountain land will be found impracticable, even impossible, for with the burning of the debris, the soil itself will in many cases also be destroyed.

No words can too strongly condemn the policy of the Pacific province. It is, however, simply an exaggerated form of the policy in vogue in older Canada, and in the reckless stripping of British Columbia mountain sides at the present time is a valuable object lesson to all Canada as to the character of the results to be anticipated from the collecting of a portion of the value of the logs sold in the form of a ground rent.

To remove all possible misapprehension from the minds of any who may think that the "bonus" or "ground rent" is other than part payment of the value of the logs sold by a province or the Dominion to the lumbermen, it is perhaps permissible to remark that lumbermen do not pay money out in the form of "bonuses" or "rents" for their health nor for any purpose other than for *logs*, and all their payments to the province, no matter under what form they may be made, are payments of a portion of the estimated value of the already grown or growing logs.

To sum up: the payment of a portion of the value of the stumpage in the form of a cash-in-advance "bonus" is not only disadvantageous to the legitimate lumberman—as distinguished from the limit owner who speculates in the people's forest asset—in that it locks up a large portion of his capital which should normally be used in the development of his business, but it is exceedingly disadvantageous to the forest, especially when a

time limit is set, as has been done in some recent sales, after which there can be no renewal of the annual license. Under these circumstances the lumberman as a business man has no choice except to cut clean whatever has a value above the stumpage dues preparatory to the abandoning of the ruined land. The payment of a portion of the price of the logs in the form of an annual "ground rent" tax is equally mischievous in tendency, and may even in Quebec and Ontario where it is quite low prove a very great bar to the reforesting of waste lands by private enterprise.

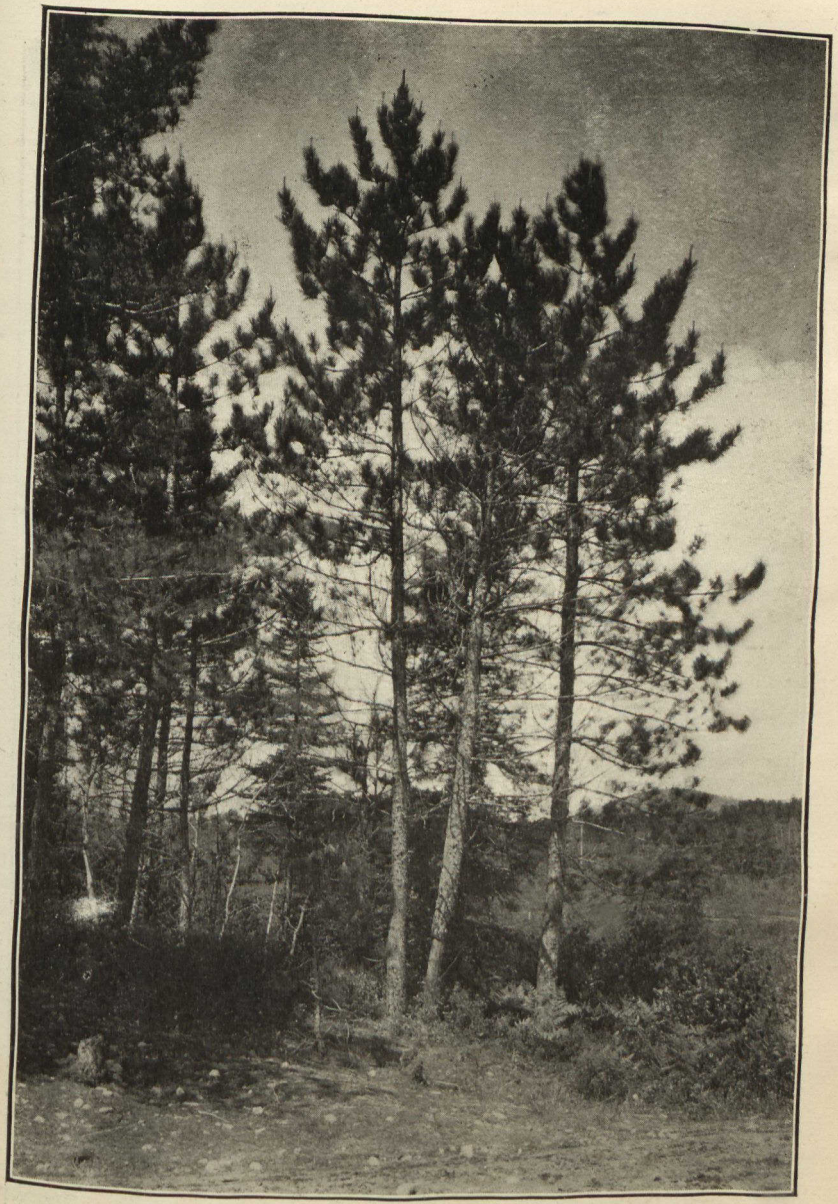
There is no form of sale so conducive to conservative lumbering of forest properties with a view to their development as producers of logs in perpetuity as the placing of the whole payment of the lumberman's price for the logs as stumpage dues of so much per M to be paid when the logs are cut. This is not only theoretically indisputable, but has in practical lumbering operations on both public and private lands been abundantly proven to be satisfactory to buyer and seller, and of the utmost advantage to the forest.

Mr. R. S. Cook, of Prince Albert, has on his grounds at that place a bur oak (*Quercus macrocarpa*) from Manitoba, which is now about sixteen feet in height and in perfect health. Mr. Cook expresses the opinion that this is the most northern oak on the continent.

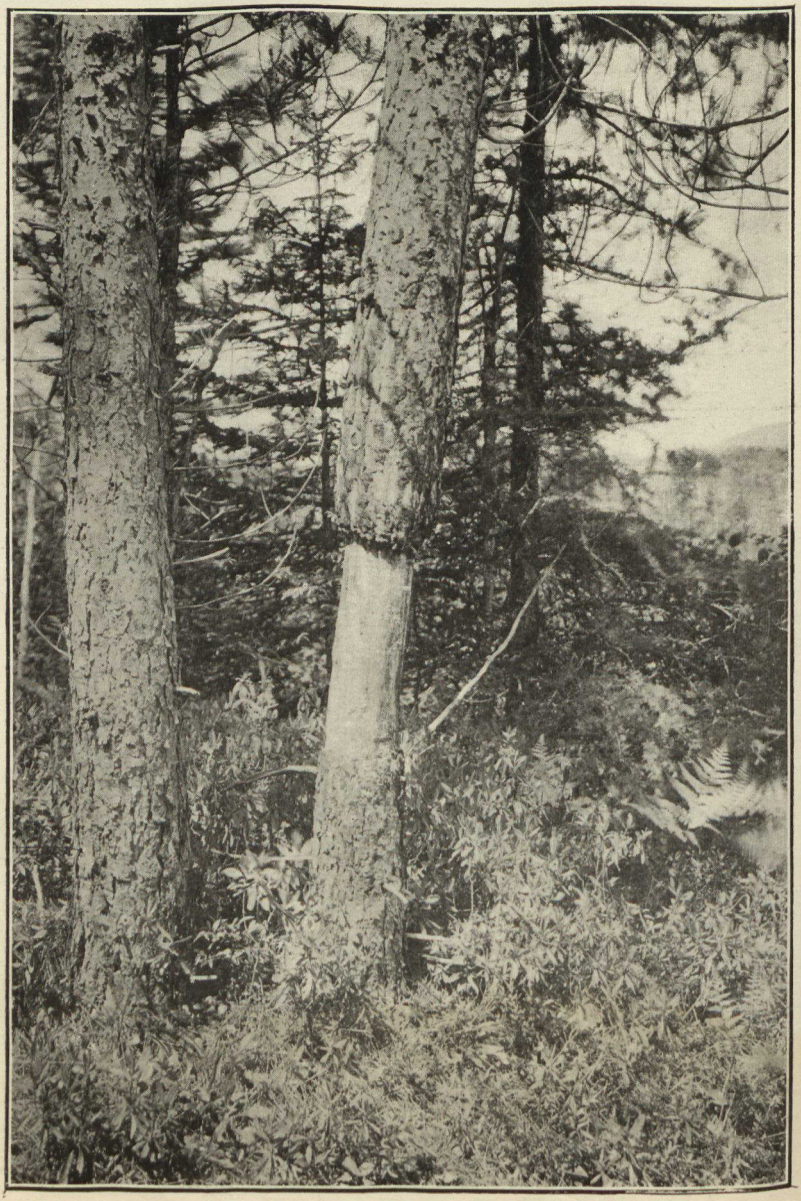
We publish two photographs illustrating the hardiness of Norway Pine, which have been received through the kindness of Mr. A. Knechtel, Forester to the New York Forest, Fish and Game Commission, and which were accompanied by the following note:—

Close to the road leading from Paul Smith's to McColloms' in the Adirondacks, stands a Norway Pine tree which shows a remarkable hardiness. Nine years ago a strip of bark was removed from this tree leaving the trunk entirely bare all around the tree for a length of one foot. The tree is still alive and has during the nine years made a diameter growth of two inches. Its increase has, however, been only above the girdled part. The dimensions are as follows: height of the tree, 30 feet; diameter of the girdled part, 5.23 inches; diameter just above the girdle, 8.3 inches; just below the girdle, 6.4 inches.

The handicap in the struggle for existence is now, however, beginning to be apparent in the growth, as some of the branches have scanty foliage.



A Live Norway Pine Tree Girdled Nine Years Ago.—No. 1.



A Live Norway Pine Tree Girdled Nine Years Ago.—No. 2.

WEST AFRICAN FORESTS AND FORESTRY.

A. Harold Unwin, D. Oec.,
Forester, Benin City, West Africa.

In days gone by when Portugese and British adventurers sailed along the above named coast no one thought very much about the trees they saw, and less about starting any forestry operations there.

Since then times have changed and the Coast (as it is termed) now produces, besides its well known palm oil, quite an appreciable quantity of the world's mahogany supply.

In the above term is included not only six large British Colonies but also several French, German, Portugese and Belgian territories, besides finally the practically independent country of Liberia. The following remarks are, however, confined to the portion extending from Lagos, along the "Bight of Benin" to Calabar reaching back about 200 miles on both banks of the Niger to Idah, usually termed Southern Nigeria, a Protectorate of the British Empire.

Its products are largely palm oil and kernels, but also many others, including especially timber (mahogany, cedar, walnut) and rubber of several kinds.

The forests containing these latter export commodities are of vast extent, but present quite a different picture to either Canadian deciduous forests or the northern coniferous areas, where one so easily gets so many thousand logs of waney timber per mile, besides saw logs. Here one is content with about 400 per mile, and a maximum yield of perhaps 1,200 logs ! ! !

The tropical forest is in fact a vast arboricultural collection. On one square mile quite 50 or even 100 different species of trees (they have not been actually counted) might be found, besides shrubs, creepers, vines and small flowering plants and ferns. Such endless variety alters the forest problem considerably. In the aggregate there are many of each kind, especially of the commoner kinds such as mahogany.

All the land nominally belongs to the people, and is worked through their chiefs, and finally now by the white man with the consent of these latter. Anyone may put in an application for a large or small area (9 square miles up to 400 as recently granted), and lease it for usually seven years. It may, however,

be abandoned before the expiration of that period or renewed for a long time. The lessee gets the right under a deed to cut and take out certain timbers, usually mahogany, cedar and walnut, and any others he may find of value, except ebony.

Locating the merchantable allowable trees next occupies attention. Nothing under twelve feet circumference, if mahogany, may be felled.

The felling operation started, and usually with platforms as the mahogany have large buttress-like roots extending 10 to 15 feet up the stem, half a day to a day's work may bring a good 18 footer of 300 to 400 years' growth to the ground with two Bini axemen hard at it all the time.

The squaring then takes place so that only the best material with scarcely any waney edge on it is left.

Rollers are then laid down from the trees or group of trees gradually extending to the nearest stream, when 70 to 80 natives get a long rope and pull log after log to the water.

Tedious as it may seem, the ground is too soft for trolley and often on the small areas there is not enough timber to make it worth while to put down a light railway, although wages are not so low as to make manual hauling a very cheap operation (labour 9d. a day including food).

The bush labour is usually reckoned at 3 cents a foot B.M., though of course it varies. This is on an average of a mile from the waterside and with good trees. Add another 3 cents a foot for the rafting, freighting and selling expenses, and roughly the total cost is covered.

Prices in England have varied enormously, from $2.50 per foot to 2 cents, and sometimes no bids at all, though last year the average was 7·5 cents per foot all round from this part and a little higher from farther up the coast.

The rafts as they float down the placid rivers, shaded on either side by oil palms, mangroves or wine palms, look very picturesque, especially with little native huts in the centre.

The supervisor on the limit then feels his labour has not been in vain, even with his months of lonely living in his bush bungalow, with a canoe or a mail runner as his only connection with his fellow white men. Occasionally he will be visited by the Government forest officers, otherwise only by his firm's superintending representative.

Black clerks do the lining and only the marking and numbering of both stump and log is undertaken by the European. Another part of the latter's work is, however, the planting of seed and raising of seedlings to be planted to replace those cut down (under the old rules, 20 seedlings for each tree felled). A group

Hauling Timber in West Africa.

The Sturgeon Lake Lumber Co.'s Yard, North of Prince Albert. (See p. 175.)

Photo by W. J. James, Prince Albert

of young trees is made near and around the stump of the old tree and seedlings are also put in along the hauling roads. In this way a future growth is assured. In three years one of the plants has attained a height of 20 feet, and the average is even 15 feet.

Besides this the girth limit insures fresh supplies though the forest is a little abnormal in respect of small trees, but this may only be local, as by no means every portion has been visited.

It will thus be seen that a permanent supply of timber is aimed at and is no doubt secured. But it may be asked at what cost. Roughly, 50 small and 12 large areas have been and are being worked by several different firms paying royalty and export duty, in the aggregate about $15 per tree (not at all heavy with such valuable wood).

Recently, during 1904 and 1903, more than enough was raised in this way to pay for the Forestry Department (vote, 1904-1905, $50,000), which is all the more satisfactory as all the royalty goes to the native chiefs and not into the treasury, which reduces the total raised by quite a fifth.

In a further paper it may be of interest to follow the whole organization in detail.

Through the kindness of Mr. R. S. Cook, of Prince Albert, we are enabled to show in this issue two pictures of forest scenes in the district north of the Saskatchewan River. It will be somewhat of a surprise to those who have considered the western provinces as all prairie land to see the size of the timber that is being cut. The most important forest growth in that district is spruce, but some large aspen poplar may be observed among the standing timber in the photograph. Jack pine is also found on the lighter soil of this district.

A fact of special interest is the discovery by Mr. Wm. McInnes, of the Geological Survey staff, of a new species of birch in the district north of Lake Superior. Specimens of a black birch noted in the previous year were brought home and handed to Professor John Macoun, who submitted them to Dr. C. S. Sargent for determination. Dr. Sargent named this birch *Betula fontinalis*, Sargent, a species formerly confounded with *B. occidentalis*, Nutt. The range of this tree in the sub-arctic region is not yet known. Specimens of this birch were found last year as far north as latitude 53° 35′ north.

THE BALSAM POPLAR.

The Balsam Poplar (*Populus balsamifera*, Linn.), is found growing commonly throughout the Northern United States and Canada, but it reaches its greatest development in the north, especially along the Mackenzie River and its tributaries, where it often reaches a height of one hundred feet and more, with a diameter of six or seven feet. Professor Macoun states that this tree in habit differs very much from the aspen, but in its range it extends even farther north, and instead of being of little value, as the aspen is, it attains a great size and height as far north as the Arctic Circle on the Mackenzie River. West of Manitoba and northward it is usually found growing on alluvium in the river valleys, and in such situations it is often nearly 150 feet high and frequently over 7 feet in diameter. On the Peace River and all streams which unite to form the Mackenzie, it occupies all the islands and low alluvial banks. During the period of flood many trees fall into the rivers by the wearing away of the banks, and a great number of them in the course of time reach the Arctic Ocean. These are eventually cast on the islands and shores and become the chief source from which is derived the fuel supply of arctic travellers. The same may be said of the Yukon Valley, as it is this tree that occupies the valley and islands of that river on all newly formed lands, but in time gives place to spruce as the subsoil becomes cold and moist from the density of the poplar and willow growth. The Riviere aux Liards or Liard River (often erroneously called Laird River), a tributary of the Mackenzie, is named from this tree.

The leaves differ from those of the poplars previously mentioned, by being narrower in proportion to their length. They are ovate-lanceolate, acute or acuminate, dark green and lustrous on the upper surface, pale and often ferruginous on the lower. The usually broadened base is rounded or cordate. The color of the bark is chestnut brown. The aments or catkins appear in early spring, before the leaves, and the seeds are distributed about the end of May or early in June, covering the ground with their snow-white cottony envelope. The wood is light, soft and close-grained, but is not strong. The heart wood is light brown and the sapwood white. Its specific gravity is 0.3635, a cubic foot weighing 22.65 lbs. The leaf buds are saturated with a yellow, balsamic, sticky exudation, which gives the tree its specific name.

P. balsamifera, variety *candicans*, cultivated as a shade tree, differs from the common form in its more spreading branches, forming a broader and more open head, in its broader, heart shaped leaves, which are more closely serrate with gland-tipped teeth, more or less pubescent or hairy when young and at maturity paler on the lower surface. It seems to be still uncertain as to whether this is entirely an introduced variety or is indigenous.

The name Balm of Gilead often applied to this species is derived from the healing virtues ascribed to the balsam of its leaf buds. It was often planted for this express purpose, and was held in high esteem by the amateur physicians of older days. Various preparations of it were recommended by the recipe books, which had such vogue before the day of the doctor and patent medicines. One which lies before us at the present time gives a Balm of Gilead salve prepared with tallow, balm of gilead buds and other ingredients, which is stated to have been in use in this country about forty years with the greatest success.

Two other trees which have also borne the name *P. balsamifera* are western species, which are now generally known as *P. angustifolia*, James, the narrow-leaved poplar or black cottonwood, and *P. trichocarpa*, Hooker, also called black cottonwood or balsam cottonwood. The former is distinguished by its long narrow leaves, lanceolate or ovate-lanceolate and green on both sides. It is a small tree, not usually more than fifty or sixty feet in height, and rarely exceeding eighteen inches in diameter. The slender erect branches form a narrow and usually pyramidal head. The bark is light yellow green. The wood is light, soft and weak. Its range is from New Mexico to Southern Alberta, in which latter it is found along the Milk and Belly Rivers and their tributaries, and also along the Bow River.

P. trichocarpa is the most westerly species, being found on the Pacific coast from Alaska to California. In British Columbia it occurs in the valleys of the Columbia and Fraser Rivers. It is stated by Dr. Dawson, that this tree was used by the Indians of British Columbia for the manufacture of canoes, and the roots were formerly used by the Indians of Oregon and Northern California for making hats and baskets. The leaves are usually broadly ovate, acuminate, rounded or cordate at the broad base, dark green on the upper surface, pale, ferrugineous or silvery on the lower, while the seed pods are tomentose or woolly. This tree reaches 200 feet in height, with a diameter of seven or eight feet. The specific gravity of the wood is 0.3814, a cubic foot weighing 23.77 lbs.

FORESTRY IN ONTARIO.

The report of the Director of Forestry for Ontario for 1903, which was delayed on account of the fire having destroyed the printing office in which it was being set up, has recently been published. It contains a resumé of the situation in regard to the tenure of the timber lands of the Province.

The chief way in which timber lands are held by lumbermen in Ontario is by annual license, renewable from year to year. The lumbermen are allowed to remove the timber, paying dues therefor when cut. In the agricultural districts the lumberman has been the precursor of the settler, affording him employment in the winter and a market for the produce raised on his holding in the summer. As settlement advanced the land was turned over to the individual settlers in small holdings. As settlement progressed north, a portion of the country was reached, the lands in which were found to be little suited to farming, although a great many settlers, misled by the high prices received for produce during lumbering operations, were allowed to settle on these lands, finding when too late that the time had been wasted, and that the land was ill-suited for their purposes. Other areas under license were composed of land that was clearly unfit for farming, and on such territory the licenses have been renewed from year to year.

Although it is probable that the Crown possessed and still possesses the legal right to refuse to renew these licenses at any time, certainly at a period when it might reasonably be supposed that the original timber taken into account when the limit was first put under license had been cut off, yet the practice of renewing the license yearly, which had been in vogue for so many years, led to frequent transfers of these limits from one holder to another, and the cancellation or failure to renew the license would mean that the last purchaser of this limit would naturally be out of pocket on his investment. Hence the difficulty of cancelling these licenses except at a stated time, a long period in the future.

In 1896 a Forest Commission was appointed and in its report recommended the establishment of Forest Reserves, and in accordance with this recommendation, the Forest Reserves Act was passed, which authorizes the Lieutenant-Governor in Council to set aside from time to time such areas of land as are unsuited for agricultural settlement, to be kept perpetually in Forest Reserves. Under this Act there have been set apart

areas aggregating seven million acres, including both forested and burnt over lands.

In regard to the term of tenure of lands under license a change was made in 1901, when the renewal of licenses was restricted to a period of ten years. It was found however that the necessity on the part of the lumbermen, who had paid a large sum in advance on this timber, of taking his timber off in so short a time caused rather reckless cutting, and the term in the sale held in 1903, was extended to fifteen years. While in the case of agricultural lands destined to be ultimately settled, and from which the pine timber is required to be sold for public revenue, this plan is probably as good as could be devised, it can readily be understood that the practice that will inevitably be followed by the license holder of taking all the timber off this territory that is big enough to cut at the end of the fifteen year period, will not conduce to the largest revenue to the Crown that could be derived.

The timber lands in Ontario therefore include permanent Forest Reserves, lands under license for an indefinite period, and lands under license for fixed terms.

The reserves so far created lie at the head waters of streams, and the larger forest area will doubtless include the Laurentian country, separating the clay lands of the north from the settled areas of the south, forming the watershed of the rivers flowing north and south, and will probably eventually include forty or fifty millions of acres. What this immense territory kept permanently under forest and operated in a scientific manner will mean in the future of the Province it is hard to estimate. The effect of this large forest on the water supply will be of incomparable benefit to future generations, and the revenue from it under any proper system of management, will be such that the people of Ontario need have no fear of direct taxation until the public expenditures of the Province are enormously in excess of the amount now annually expended.

In this report Mr. C. W. Nash deals in a suggestive way with the question of municipal forest reserves. In the report of 1900-01, an exhaustive statement, compiled from the returns of township assessors, was given from which it appeared that the proportion of woodland to total area in 36 counties was less than twenty per cent. While in many counties the lands are almost all suited for agricultural purposes and the wood lot will be about the only form of forest growth, there are large districts in the Province in which a large proportion of the lands are strictly non-agricultural, but where the title to the lands has all but entirely passed from the Crown to private hands. In these districts there are large contiguous areas which are either entirely unfit for the production of any other crop than wood,

or are, at least, much better adapted to being used for wood crops than for other crops. Their present condition is that they are lying almost wholly unproductive and their owners have neither the knowledge of how to again restore them to production by afforestation, nor the capital with which to do it. Nor would they have the power to protect the growing crop were both the skill and capital available to make the start.

The districts of Muskoka, Haliburton and others furnish striking examples of the results of throwing open for settlement territory largely unadapted for agriculture. The settlers upon many of the lots being unable to live solely by cultivating their land have in many cases, when the timber has been removed, abandoned their farms. Much of this land, if managed upon forestry principles, would continue a permanent source of wealth; but under the present system it is simply despoiled of its growth and partly farmed under very disadvantageous conditions, and partly allowed to remain waste, the second growth not being protected. A large proportion of the lots after being denuded of saleable timber are of so little value that the owners allow them to be sold for municipal taxes, and are frequently bought in by the municipalities. Were the townships permitted to retain the ownership of the lots which thus fall into their hands, the nucleus might in this way be established of a system of municipal forest reserves, which would not only supply the public requirements for timber for bridges, culverts, piles and other construction works, but would in time become a considerable source of revenue. As the law stands, however, municipalities can only buy lots offered at tax sales on the condition that they are re-sold within seven years, so that the only result is that the old chaotic and wasteful process of exploitation is again put into operation.

A suggestion is made that in the opening up of new districts, before any new township is thrown open for settlement, the surveyors be instructed to report as to rough and non-agricultural land embraced within its boundaries, with a view to withdrawing such areas from settlement and retaining them as timber reserves.

The question of municipal reserves is certainly one well worthy of consideration. In Germany the communal forests make many of the towns which are fortunate enough to own them, independent of taxation altogether. When money is required for any purpose the town forest is ready to supply the need, and in some cases instead of taxation there is a bonus for the citizens.

Mr. Nash also contributes a paper on the farm wood lot, so that the whole question of forestry in Ontario is fully covered in the report. One of the greatest conveniences a farmer can

have upon his property is a wood lot, well stocked with a variety of thrifty well grown trees, upon which he can draw, as occasion requires, for such wood material as he needs for his own use, with some to spare at times for the market. The uses to which farm grown timber can be put are almost incalculable and the demand is continuous. The wood lot should occupy the poorer parts of the farm, rocky or stony land, the thin-soiled ridges, very dry sand tracts and such wet swampy places as are not well fitted for agricultural purposes.

Various systems of managing a wood lot may be adopted, both to ensure permanence and profit. Where only firewood, fencing, hop poles, box lumber or such small stuff is required, and the wood lot is composed of deciduous trees only, the copse or coppice method, viz., growing from sprouts, will do very well, but if dimension timber is desired, or a growth of pine, spruce, hemlock or other coniferous trees is the object to be attained, the coppice system is not available; in such cases natural seeding or replanting are the only sources to be relied on to keep up the supply. Planting is always troublesome and more or less expensive, but may under certain circumstances, become absolutely necessary. Natural seeding costs nothing, is no trouble and is the most certain and in every way the most satisfactory method of keeping the wood lot up to its best standard of production. A proper proportion of seed bearing trees should therefore be retained in such positions over the whole lot as to ensure their furnishing sufficient seed to replant each portion of the wood lot as the timber is taken off it. This does not mean the maintenance of a lot of old trees upon the land until they shall have lost their usefulness as timber, but merely until such time as the cleared area surrounding them produces a strong growth of saplings from the seed which they have dropped. Provision for this can best be made by doing the annual cutting on a regular system under which the young growth outside the area to be cut over will be safe from injury, and the cleared portion will be at once seeded by the seed-bearing trees left for that purpose. In some parts of the country there are still wood lots in the possession of farmers, which have been regularly and systematically cut over for thirty or forty years, but which show no signs of deterioration, simply because the work has always been properly done with a view to reproduction of the trees, and care has been exercised at all times to avoid the destruction of the saplings.

Included with the report are the series of lectures on Forestry, delivered by Dr. B. E. Fernow at Queen's University in January, 1903.

RECLAIMING SAND DUNES.

In the report for 1904 of Dr. Jas. Fletcher, Dominion Entomologist, occurs the following interesting report in regard to efforts made to reclaim sand dunes in the Province of Quebec:—

A visit was paid to the large tract of shifting sand near Lachute, Que., locally known as the Argenteuil Sand Hill. This is estimated as now covering nearly one thousand acres, stretching along the Ottawa River in an elongated patch about four miles long by half a mile to one mile in width, for the most part entirely destitute of vegetation, but bearing in places clumps of spruce trees, maples, tamaracks and willows. As is usually the case on such areas, the surface is very dry; but a few inches below this there is an abundance of moisture available for the support of any plants which can be protected against the drifting sand.

At the request of Mr. Thomas Christie, M. P., I called upon the various farmers living around this sand hill and examined the work they had been doing in their efforts to control the sand. I found, without exception, that every one of them had taken a keen interest in fighting against the common enemy, and much good work had been done in the way of holding back the drift by planting trees and other vegetation. Since 1898 the attention of the Division has been directed to this tract of land, and a few hundreds of plants of the Beach Grass, and also of Norway and White Spruce trees, have been sent to different farmers to be planted on the sand as an experiment; but no extensive work has been carried on by the department. I was much pleased to see the success which had attended the efforts to grow trees on this apparently barren sand hill. The kinds of trees which were noticed growing wild in the scattered clumps which here and there appear, were White Pine, Tamarack, Canada Balsam, White Spruce, White Cedar, Balm of Gilead, Aspen Poplar and White Birch; and round the edges all the ordinary forest trees of the region are represented. In low spots two or three kinds of willows and the Gray Alder flourish.

Of shrubs which attracted attention by their vigour and the extent to which they had spread out in every direction, special mention may be made of the following kinds which doubtless can be made use of in prosecuting this work. The Willow-leaved Meadowsweet (*Spiræa salicifolia*, L.).—This free-growing bush, which not only produces large numbers of running roots or stolons, but also ripens much seed, was found to be cov-

ering many acres and spreading rapidly over some low spots in the central portion of the sand hill. This is a native shrub, common in all swamps and low lands. The Red Raspberry (*Rubus strigosus*, Mx.).—A form of this common shrub was seen covering a large area on the farm of Mr. Thomas McGregor, who has encouraged its growth, as well as some other native plants which occur with it. The common Blackberry (*Rubus villosus*, Ait.).—Even more luxuriant than the Red Raspberry was the Common High Blackberry, which rooted freely through the sand and threw up many stems. Both of these berry-bearing plants produce heavy crops of excellent fruit, and it seems as though they might prove a valuable resource to farmers, while at the same time performing the important office of providing a barrier against the encroachments of the sand or as a temporary shelter, while more valuable trees are being grown. Roses.—At various places old and vigorous clumps of Sweetbriar, which were evidently many years old, were seen, as well as of the little old-fashioned semi-double Cinnamon Rose. The Smooth Meadow Rose (*Rosa blanda*, Ait.) was found in spots, covering several yards in diameter and showing an unexpected power to grow up and keep its head above the drifting sand. Shrubs which also showed great vigour and which occured in many parts of the sand hill, where evidently they had sprung up spontaneously, were the Red Osier Dogwood (*Cornus stolonifera*, Mx.) and the Beaked Hazel (*Corylus rostrata*, Ait.).

Of the wild herbaceous perennials growing naturally on the sand, and the growth of which had to some extent been encouraged, the most noticeable were the Common Milkweed (*Asclepias cornuti*, Decne.), the Canada Thistle (*Cnicus arvensis*, Scop.), and Couch or Quack grass (*Agropyrum repens*, L.). There were also seen in some places a few plants of the Strawy Sedge (*Carex straminea*, Schk.), the Ox-eye Daisy and the Dandelion.

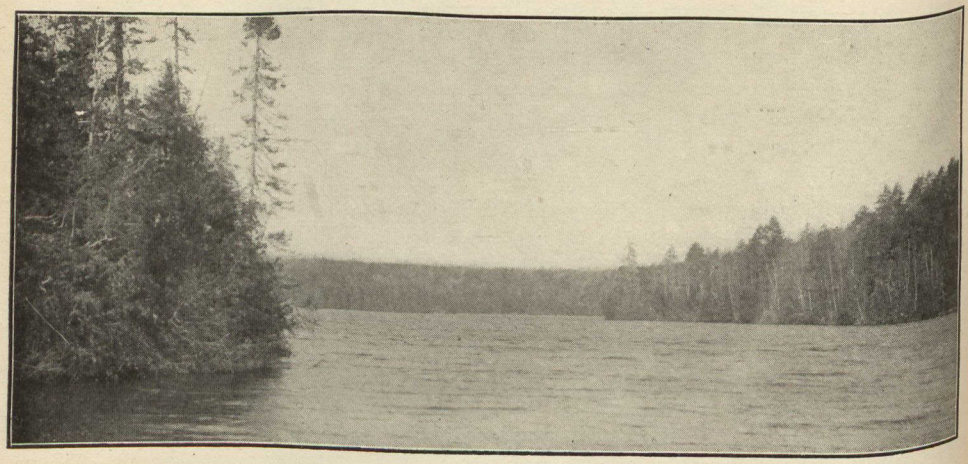
The trees which have been experimented with to the largest extent by farmers living in the locality are the White Pine, Canada Balsam Fir, the Norway Spruce, the White Spruce and the Tamarack or American Larch. Of these, the last-named has made the most rapid growth, but seems to require more protection than the sturdy spruces. The Balsam Fir has succeeded as well as the spruces, but is a less valuable tree. The Norway Spruce has been planted only to a small extent, a few hundred trees having been sent from this department three years ago. These were planted carefully, and doubtless will succeed; but it is too early as yet to compare them for this purpose with the White Spruce, which is the favorite conifer and is transplanted from the woods in the neighborhood. The greatest satisfaction is expressed by all at the way in which willows have succeeded. The kind used for the most part is the large European Tree-

Willow (*Salix alba*, L.) known mostly in this country under the name of French Willow. Large numbers of these trees have been started from cuttings and have in a single year made a remarkable growth, even from small cuttings put in with little labour in a furrow made by a plough. Such plantations were seen on the farms of Mr. John Doig and Mr. Walter Smith. On the edge of one of Mr. Doig's plantations the sand had been drifted away by the wind so as to expose the roots of one of his trees. These, by actual measurement, extended for forty feet from the central point, showing the great value of the willow as a sand binder, both from its rapid growth and from its great root production.

An observation of much interest, as showing the power of the Canada Balsam to resist destruction by sand, was that this tree, when covered up to a certain extent with sand, threw out large numbers of roots from the branches which were partially submerged. Many samples of such branches were found upon trees which had their roots and trunks covered up with from six to ten feet of sand.

Experiments with Beach Grass and the Sea Lyme Grass have been very satisfactory, particularly where the former has been planted on exposed banks. In low, undisturbed spots the Sea Lyme Grass has succeeded rather better than the Beach Grass. Tufts of both of these grasses were found in some places to have extended four feet in each direction by the end of the second year, and on Mr. Walter Smith's land one clump was found which had a thick growth four feet across in the centre, with five smaller shoots around it and eighteen shoots just showing through the sand, which will produce tufts of leaves next spring at a radius of twelve feet from the centre.

The Canadian Forestry Association owes a great deal to the active work done on its behalf by Mr. William Little, of Westmount and a still further evidence of this is shown in the fact that he has recently induced the Bank of Montreal to make the managers of its offices, numbering some eighty-seven, members of the Association. The thanks of the Association are due to Mr. Little and also to the management of the bank for their public-spirited action.



Trout Lake, Northern Ontario.

Vicinity of Trout Lake after the Fire.

FOREST FIRES IN NORTHERN ONTARIO

IN "CANADA FIRST" FOR AUGUST.

It was about three o'clock in the afternoon, and I was some two miles back in the bush, when a man came down the trail at breakneck speed, "Get out quick," he yelled, and then for the first time that day I smelled smoke. I admit I ran, and it was well I did so, for a roaring, crackling, veritable hell of flame was at my heels in as few moments as it takes me to pen these words.

After as short a time as ever that trail was travelled on, I struck one of the mines, and there all was commotion. Every available pail and receptacle which was water-tight had been pressed into service, and all hands were at work, some felling trees, tops outwards, some going out to meet the fire, cutting down all the birch to keep the inflammable bark from flying and carrying the fire onward, while others patrolled the road, water pail in hand. We met and fought the fire by fire, and for a few moments saved the camps.

Night fell on a scene which beggared description. The whole country seemed on fire. The atmosphere was filled with smoke and ashes, some of the latter burning us as they fell. Our eyes ached, our breath came in gasps from our charcoal charged lungs, and sleep, or even rest, we dare not. The heavens were brilliant with the reflection of the lurid flames, while the forest,—or what was left of it,—was a scorching mass of fire. Devouring tongues of the flame licked the cedars and balsams clean and clear of all foliage, leaving them like ghastly skeletons, and then sprang twenty feet above the highest forest tree, as if to seek others upon which to wreak their wicked vengeance. From tree top to tree top sprang these pillars of flame, until our fire met the main body, and then with a fearful roar, amid which the crash of falling trees could be heard, the fiend swung off to the south, and for the time being we were safe.

But what of the others in the track of the fire? It was the following day before we heard all the news, as blistered and worn out we walked over the still smoking ashes to see how our neighbors had fared. Not a vestige of green caught our eyes; ashes, ashes, that was all, save for the dead skeletons of forest giants—not a bird could be heard, even the rabbits and chipmunks had fled, or had perished. The forest, of a truth, was dead.

Beyond a few isolated tents, we found that all was safe. Fortunately a warning had been sounded in time, and where camps were not on well cleared ground, the flames had been fought with success. In more than one instance, prospectors had to take to their canoes, after dumping their tents and outfits in whichever of the lakes they were camped on, for there was no time to pack, the fire travelled too fast.

One amusing incident occurred. Two fire-rangers, whose names need not be mentioned, left us early in the morning after the fire to return to their own camp. After travelling about a mile on the trail they were met at a turn by a bear, who promptly disputed the right of way with them. Bruin sat down on his haunches, and evidently studied the situation as well as his smoke-filled eyes and brain would let him, and the result of his calculations caused him to stick to his position. There was no way round, and as the rangers were armed only with their axes, they decided to leave him the undisputed possession. Fighting fire was one thing, but fighting a well developed specimen of a bear with axes was quite another, and no doubt, after some forty-eight hours' strenuous labor, discretion in this instance was the better part of valor. The rangers retired disconsolately, resuming their journey later in the day, when Bruin had retired to his native fastness to sleep off his involuntary feed of smoke and ashes.

Unfortunately all practical exploration and prospecting are at an end for some time to come over the burnt area, for the ground is many inches deep in ashes, which rise and fill the lungs at each step; besides covering as with a pall the rocks which it is necessary to search.

How this great fire originated in several places at the same time will never be known, and it would perhaps be unfair to hazard a decided opinion. Suffice it to say that carelessness, at least, on the part of some individuals has resulted in the destruction of vast quantities of valuable timber.

Perhaps the object lesson now brought home will be taken to heart by some of those more ignorant prospectors who have openly prayed for fire, "To make the job more easy, by clearing out the undergrowth." That wicked fallacy has been exposed, at a great cost, but if the lesson has been properly learnt, it will be cheap at the price paid, for it will remove a menace to the valuable timber reserves, which are one of New Ontario's greatest assets.

NOTES.

A meeting of the National Wholesale Lumber Dealers' Association was held in Ottawa, on the 16th, 17th and 18th August. The Convention was more in the nature of a pleasure trip than a business meeting. The two chief questions discussed were insurance and car equipment. On the latter it was decided that joint action should be taken to compel the railway companies to furnish proper equipment as for other industries and shippers. In shipping, the lumbermen have to construct their own racks and stakes on flat cars, such costing about $6 per car, while no allowance is made in freight rates to offset this expenditure.

The meeting was addressed by Mr. E. Stewart, Dominion Superintendent of Forestry, who spoke on the question of the management of pine limits such as are found in Ontario. He urged the desirability of preserving the small timber and of a careful examination and survey of limits to ascertain their condition in respect to the stand and new growth. He concluded as follows:—

Considering all these facts, it seems to me certain that not the least valuable part of many limits is the younger growth, which at present, as I have endeavored to show clearly, does not pay the cost of cutting, and that the owners of timber, especially of white pine, would only be acting with the foresight they show in other matters connected with their business if they gave greater attention to this matter than heretofore. The time has arrived when the man who directs the lumbermen's operations in the woods should have, in addition to his practical knowledge of how to cut and take out logs to the best advantage, also some knowledge of the tree itself; the manner or rate of its growth and how to cut other timber so as to foster that growth. In other words he should be a forester, as well as a practical log man, and it is fortunate that many young men, most of whom have been brought up in our rural districts, are now studying forestry in the colleges of the United States and spending their vacations in our lumber woods, studying the practical part of the business; and I would strongly advise our lumbermen to avail themselves of the services of these young men, rather than import professionals from Europe, who are necessarily less familiar with conditions.

Some of the old enactments in regard to forest protection are both quaint and interesting. Attention is called to one such instance in a recent work on Alfred the Great. The Law-book in use previous to that issued by Alfred was that of King Ina (688-726).

In the case of damage to a wood, this old law drew a distinction between injury by fire and injury by the axe, and that by fire was punished far more heavily than the other, for this assigned reason—that fire is a thief and works silently, whereas the axe announces itself.

"In case anyone burn a tree in a wood, and it come to light who did it let him pay full penalty, let him give sixty shillings, because fire is a thief. If one fell in a wood ever so many trees and it be found out afterwards, let him pay for three trees, each with thirty shillings. He is not required to pay for more of them, however many they might be, because the axe is a reporter and not a thief."

"This contrast could be retorted: for it might be urged that if fire is a thief relatively to the owner of a wood, so is it also relatively to the defendant, for it had started up afresh when he had left the place thinking that all was safe. The worst that could be proved on him was the want of sufficient caution. In fact the law is only good as against arson, wanton or malicious; and for that case it is not severe enough. It may be assumed that in the bulk of cases damage by fire would be undesigned and accidental.

"But where the axe is used there can be no doubt about the motive. The man who fells another man's timber does so plainly with intent to steal, and the noise of the axe is not extenuating but rather aggravating by reason of its audacity.

"In Ina's law all such considerations were prevented by two venerable maxims which said, 'Fire is a thief but the axe is outspoken.' Moreover, as an indication of the national instinct which is favorable to whatever is open and straightforward, it may be interesting; but the distinction was bad as law, and it was abolished by King Alfred. His new law equalized the penalty thus: 'If a man burn or hew another man's wood without leave, let him pay for every great tree with five shillings, and afterwards for each, let there be ever so many, with five pence; and a fine of thirty shillings.' "

The following extracts from an official report of the United States Bureau of Forestry on Forest Conditions in Northern New Hampshire are of interest to Canada:—

The total amount of wood consumed by the mills in this region (310,795,000 ft. B.M.) exceeds the total cut by over

37,000,000 board feet. Moreover, a large part—over 24,000,000 board feet—of the wood cut goes to outside mills; therefore, the actual excess of wood consumed over the amount received from this region is over 61,000,000 board feet, and constitutes nearly 20 per cent, of the wood consumed in Northern New Hampshire. This is explained by the fact that most of the pulp companies are preserving their own supply of timber, preferring to draw upon an outside source, *chiefly Canada*, and that the demand for wood, especially spruce, is greatly in excess of the supply.

The wood consumed by pulp mills in Northern New Hampshire from 1st July, 1902, to 30th June, 1903, was 271,604 cords, 138,131 cords or 50.9 per cent. being from that district, 101,911 cords or 37.5 per cent. from Canada, and 31,562 cords or 11.6 per cent. from Maine.

The combined holdings of timberland by pulp and paper mills in Northern New Hampshire are 488,290 acres. This acreage includes the great bulk of virgin timberland in the region. The owners are thoroughly alive to the importance and farsightedness of a policy of perpetuating their supply of timber and, as a means to this end, with a view to cutting as little as possible from their own land at present, they are getting a large part of their supply from farmers' wood lots and Canada.

The question was asked the various pulp mill owners as to the length of time the present supply of spruce might be expected to last, and also as to the substitution of another species for pulp when the supply should have been exhausted. Their replies certainly indicate that they are not anticipating a spruce famine in the near future, and that they will not worry over a substitute for spruce until the available supply of spruce in Canada is exhausted.

Forest fires have done considerable damage in different localities during the late summer.

As the result of bush fires in Nova Scotia the village of Belmont was almost wiped out of existence in the latter part of August. Newspaper reports give the damage at $35,000, and it was also stated that there would no doubt be considerable distress amongst a number of the losers, some of them having nothing left but the clothing they wore. There had been no rain for some time, and everything was dry enough to burn easily. High winds caused the fires to spread and considerable damage was done in other localities. One fire is stated to have been caused by the gross carelessness of one person, who was trying to clear some land and fired it when the wind was blowing a gale.

In the vicinity of Moncton in New Brunswick, serious fires occurred at the same time, and there has probably been considerable loss of standing timber. Mill property was in great danger and it required the exertions of a large number of men to keep the fire in check. Farm buildings were destroyed in several cases. In Moncton the fire brigade was kept in readiness as the burning leaves and twigs were falling in the town, but fortunately its services were not required. The dry season resulted in a great many fires, most of which probably did not reach large dimensions.

Reports from British Columbia are to the effect that there were large and destructive fires along the coast from Alaska, southward, particularly along the White Pass and Yukon Railway, where they are ascribed to fires carelessly left by campers, and on Vancouver Island.

A despatch from Rossland, of the 4th September, gives a description of what is stated to be the most extensive and destructive forest fire since the founding of the town. It swept a distance of six miles, and its path was a mile wide. It destroyed the standing timber on over 5,000 acres, and it is stated that 32,000,000 feet of timber was burned. The property of several mining companies was threatened and in some cases partially destroyed.

On the question of adulteration of maple sugar, Mr. Madden gave the following testimony before a Committee of the House of Representatives of the United States, which we leave to the discretion of our readers to accept or reject:—

"Now we have found by experience—not by chemical analysis, but by experience—that the maple sugar made from the sap of the maple tree in Ohio is not so strong as the maple sugar made from the sap of the maple tree in Vermont, and that the maple sugar made from the sap of the maple tree in Vermont is not so strong in flavor as that which is made in Canada, in Quebec Province, because it seems that the colder the climate the stronger in flavor the maple sap is.

"Now, we buy these various sugars and reduce them to a liquor to make maple syrup, and I will give you my word, gentleman, if we take a Canadian sugar, which is the highest priced maple sugar we have, it being worth at the present time 12 cents a pound, while Vermont is worth only 8 cents a pound —I give you my word that if we make a liquor by melting that Canadian sugar, without the addition of sugar to reduce the strength of the flavor, it is so strong you could not use it."

REVIEWS.

Report of Dominion Experimental Farms for 1904: *Dr. Wm Saunders, Director. Pp.* 509.

This report comprises, in addition to the general survey by the Director, the reports of the officers having charge of special departments, and of the experimental farms in the different provinces. The report of Mr. W. T. Macoun, the Horticulturist at the Central Experimental Farm, gives some interesting information in regard to the forest belts, as follows:—

"It has been found that the trees which were planted 5 by 5 feet apart, the closest distance used at first, are making the best trees from a forestry standpoint as the side branches are killed much sooner. The trees planted 5 by 5 feet apart are more protected from storms than those farther apart and hence the tops are less injured. They are also a little taller in most cases, but are not so great in diameter as those 10 by 10 feet apart. During the first years of growth there is a great advantage in having the trees close as in order to get thrifty growth the soil should not become hard, nor should the trees be almost smothered with weeds or grass, and to get these good conditions it is necessary to cultivate at first, and the farther the trees are apart the longer one will have to cultivate, thus making the expense greater.

"Until the last three years the trees in the mixed plantation were making the most satisfactory growth, and are yet making better growth than some of the clumps composed of single species, but the rapid growing kinds are developing so fast in the mixed belt that they are overshadowing some of the more valuable trees, and those which cannot endure much shade are being killed. To some extent this overshadowing is prevented by shearing the side branches and letting in more light.

"In some of the clumps of single species the disadvantage of not having two or more kinds mixed is quite as apparent as the disadvantage of having so many kinds mixed in the mixed belt. Ash, Butternut, Black Walnut and Elm, which have thin foliage, do not kill the sod, and the growth on this account is checked. If other heavy foliaged kinds, such as Larch, Spruce, Pine or Box Elder, had been mixed with these the results would have been, almost certainly, much better."

Dr. Jas. Fletcher, the Entomologist, gives descriptions of the principal forest insects observed to have been destructive during the year. The Ash Leaved or Manitoba Maple appears to have had the largest number of enemies. They include the Basswood Looper, which destroys the leaves, the Negundo Twig-borer, which the name sufficiently describes, and the Negundo Plant Louse. In regard to the last, Dr. Fletcher states that when not controlled by spraying with kerosene emulsion or whale oil soap solution, these plant lice do serious injury to the trees they infest; and they are so persistent in their attacks that many lovers of trees in the West have given up the cultivation of the desirable and quick growing Negundo for other trees less subject to insect attack.

Summary Report of the Geological Survey for 1904; *Dr. Robert Bell, Director. Pp.* 392.

This report contains the accounts by the different officers of the survey, of the explorations and surveys made throughout the Dominion during the season. While they relate mainly to the geological features of the country there are some notes in regard to forests and timber that are of interest.

The district at the headwaters of the Albany and Severn Rivers, which will be near the line of the new transcontinental railway, presents some interesting features in tree distribution. Spruce, poplar, banksian pine and birch are found everywhere over the whole district. White and red pine were noted only at the southern part of Lac Seul. One solitary white pine tree occurs on Slate lake, and this appears to be the northern limit of the tree in this district. Ash trees were observed here also for the last time on the way north. The white cedar is a rare tree; and this is its northern limit.

Large areas have been burnt along the route of the Wenasaga river, notably at Wenasaga lake, ten or twelve years ago, and at Big Portage lake, about five years ago: also on Gull lake. North of Cat lake, we enter, at the lower end of Cedar (Kishikas) lake, an area that has been burnt probably eight or nine years ago, and this extends to a few miles below the mouth of the Francis river, or a distance of over thirty-five miles. Eastward it extends at least to Windigo lake, ten or twelve miles to the right of the river, and westward as far as could be seen from the tops of the highest hills. This is generally being reforested with a second growth of banksian pine and poplar.

In very few places, either on the north or the south sides of the height-of-land, do the spruce and tamarack attain such a size as to make them economically important to the lumbering

industry. On the shores and islands of Birch lake the best timber occurs; that on the branches of the Severn river is generally small.

At Fort Hope fairly clear nine-inch lumber was being sawn from trees cut near the shores of Eabamet lake. One tree was felled that gave a log over two feet thick at the butt and 100 feet long. The greater part of the forest is about eighty years old, though in places trees reaching 140 years were found. These old trees were on low-lying areas, that had escaped where the higher and dryer parts were burned, and were not generally large. Their growth-rings showed a rapid increase in size for the first fifteen years and afterwards an extremely slow growth. The large sandy tracts are now, for the most part, covered with an open growth of banksian pine, a tree of small commercial value. When the day comes in Canada for reforesting, these districts might be replanted with pines commercially valuable. Over large areas the spruces would, apparently, if more accessible, be available for wood pulp.

It was thought that the larch saw-fly, which destroyed so much of the tamarack of our northern forests, had ceased its depredations, but Mr. McInnes found it still active in this district. He states that the depredations of the larch saw-fly upon the tamaracks along the Winisk river were noted in the previous year's report. Since that time the ground covered by this insect has been extensive, and some idea of the damage it has done may be given. Last season all trees along the Winisk river, from a point near the mouth to a point within a few miles of the Weibikwei lake, were stripped; south of that area they were untouched. During the present spring and early summer their ravages extended southward to the Albany river and westwards for sixty miles up the Winisk river and to about midway between Eabamet lake and Lake St. Joseph, on the Albany, an area of about 14,000 square miles.

Forest Conditions of Northern New Hampshire, by Alfred K. Chittenden, M.F.; Bulletin No. 55 of the U. S. Bureau of Forestry. Pp. 100.

This is the report of an investigation of the forests of Northern New Hampshire, made under instructions of the U. S. Bureau of Forestry. The territory included in the investigation embraces a total of 1,951,977 acres or 32 per cent. of the entire State. It contains the entire White Mountain region and is drained by four large river systems, the Connecticut, the Penigewasset, the Saco and the Androscoggin, all of which have their origin within this region. The White Mountains occupy

the southern and larger portion of this area, and here the country is very rough and rugged, broken up as it is into many short mountain ranges and deep narrow valleys. The northern part of the area is flatter and contains many lakes and mountains with wide, rolling valleys between. The entire region is essentially a forest country. That the land is, for the most part, better suited to forest production than to agricultural use is evidenced by the thousands of acres of once cultivated land, which have now largely come up to dense forests of second growth spruce and pine. 900,000 acres of the tract are held by large lumber and pulp companies; 756,000 acres by small holders of forest lands, and 244,000 acres are in small agricultural holdings. These lands were sold by the State in years past. The best spruce land brings from $20 to $30 per acre. Second growth spruce land is rapidly increasing in value, and is being bought up by the large lumber and pulp companies. Of the virgin merchantable forest there are only 200,000 acres remaining, out of a total forest land area of 1,684,206 acres, the remainder being cut-over or waste land. The stand of softwoods is estimated at 4,764,000,000 board feet.

The conclusions reached by the investigation are as follows:—

(1) Unless the forests are effectively protected from fire, the value of Northern New Hampshire as a summer resort, now the source of an annual revenue of approximately $8,000,000, and as a source of timber supply, will be seriously affected. The extension from year to year of the total area which has been burned, together with the facts that the great bulk of this land has failed to develop a valuable forest growth, that indeed much of it remains an absolute waste, and that the forest resources of the State are being rapidly depleted, has forced on all thoughtful persons interested, financially or otherwise, the recognition of the fire question, as the question of first importance to the forests of the State.

(2) Safety from forest fires is impossible without the organization of a fire service, and it is suggested that the State should organize such a service, raising the necessary revenue by a tax on the timber lands.

(3) Conservative lumbering under the supervision of trained foresters would pay the large lumber and pulp companies operating in Northern New Hampshire better than the present method. The principal sources of waste at present are in cutting high stumps, in leaving good lumber in the tops, in leaving logs and lodged trees in the woods, in the failure to utilize wind-thrown and dead timber which is still merchantable, in leaving standing merchantable trees which are sure to be wind-thrown,

in the failure to leave seed trees in favorable localities, and in lack of protection of young growth in logging operations.

(4) The conservative management of farm wood lots is practicable and greatly to be desired.

(5) Forest planting upon denuded lands unsuited for agriculture promises good returns.

(6) There should be a chief fire warden, who should also be State forester, who should maintain a State forest nursery, for the distribution at cost of forest seeds and seedlings, and should bring about by lectures and instruction on the ground a better management of forest lands within the State.

(7) Since an excellent opening exists for the creation of a forest revenue by the purchase of cut-over lands in the mountains, the adoption of a policy looking to this end is recommended. Such lands are for sale at from $1 to $3 per acre.

Future Forest Trees: A. Harold Unwin, D. Oec. Publ. (Munich). T. Fisher Unwin, Publisher. Pp. 108.

This volume by Dr. Unwin, formerly of the Forestry Branch of the Department of the Interior, is issued with the object of presenting in a concise manner the results of numerous experiments, made chiefly in Germany, with some American trees in order to show their forestal value in Europe. The papers of which this book are composed, appeared first in German, but it was considered advisable to make the information available for English readers. Tables are given of the imports of timber into Germany from the United States and Canada, and are followed by a list of the different species of American trees which have been tried in Germany, with a statement of the results of the experiments in each case.

The Selkirk Range; A. O. Wheeler, F.R.G.S. Government Printing Bureau. Pp. 459.

This is a description of the Selkirk Mountains of British Columbia, which are becoming a favorite resort for the traveller who desires also to be a mountaineer. It is narrative in form so as to be easily readable, but gives a mass of valuable and reliable information in regard to the history, topography and natural features of the district. The illustrations include views of the beautiful mountain scenery and of the game and other products of the country, which add much to its handsome appearance.

The Determination of Timber Values, by Edward A. Braniff, Forest Assistant, U. S. Bureau of Forestry. Reprint from Year Book of Department of Agriculture, 1904. *Pp.* 7.

This pamphlet gives the results of experiments made with yellow birch, sugar maple and beech, in the hardwoods, and long leaf pine in the coniferous woods, to ascertain exactly how much more valuable is a particular kind of a tree of a certain size, than another tree of the same kind and smaller size. Trees were followed accurately from the mill to the lumber yard, and the ultimate result of the calculation was that cutting birch and maple trees 17 inches and over, the profit per thousand would be $5.64; trees 8 inches and over, $6.04; trees 19 inches and over, $6.46; 20 inches and over, $6.91. Tables are given of the contents, values, &c., of the trees at the different diameters. The experiments will be continued with other trees. The results of this work will be useful to lumbermen in calculating the value of their hardwoods.

The Maple Sugar Industry, by Wm. F. Fox and W. F. Hubbard, and The Adulterations of Maple Products, by H. W. Wiley. Bulletin No. No. 59, *U. S. Bureau of Forestry.*

This is an interesting sketch of the history and present conditions of the maple sugar industry in the United States. New York, Vermont and Ohio are the great producing States, as they are the chief home of the hard maple (*Acer Saccharinum*) which is the main source of the supply. The black variety has the highest reputation as a sugar producer. Sap is also obtained from the red and silver maples, but is not considered of as high value. The management of a maple sugar wood presents different problems from a lumber forest as the object is not to produce long, straight trunks but to develop good heads of foliage, as the quantity and richness of the sap depend largely on this being provided for. At the same time forest conditions must be maintained. The bulletin gives instructions as to the best methods of treating different kinds of groves so as to bring them into the proper condition to furnish the largest product.

Adulteration appears to be a common practice with maple products, as it is stated that the greater quantity of maple molasses or syrup on the market is adulterated in the true sense of the word. One of the most common adulterants is glucose, but sorghum or sugar cane is also often mixed with it. None of these mixtures are necessarily harmful, but the great objection is that the makers of the genuine article are forced into competition with these extensive adulterations, thus lowering the legitimate price. Every grove of maple trees would be

worth a great deal more to its owner if the laws should be so framed as to eradicate the evil. Such laws would permit the sale of the mixed goods under their proper names, and thus protect both the manufacturer and the consumer. It may be added as an interesting item that chemists have not yet been able to determine the exact chemical composition of the peculiar flavoring of the maple.

Report of an Examination of a Forest Tract in Western North Carolina, by Franklin W. Reed. Bulletin No. 60, *U. S. Bureau of Forestry.*

This is a report of an examination of a forest tract of about 16,000 acres belonging to the Linville Improvement Company, whose main purpose is to develop it as a summer resort. The report suggests plans for deriving a revenue from the timber on the tract, and at the same time preserving and even increasing its beauty.

REPORTS RECEIVED.

The Red Gum, by Alfred K. Chittenden, M.F. Bulletin No. 58, *U. S. Bureau of Forestry.*

Progress of Forestry in 1904, *by Quincy R. Croft, and The Attitude of Lumbermen towards Forest Fires, by E. A. Sterling. Reprinted from the Year Book of the U. S. Department of Agriculture,* 1904.

Terms used in Forestry and Logging. Bulletin No. 61, *U.S. Bureau of Forestry.*

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CANADIAN FORESTRY CONVENTION.
OTTAWA, ONT.

JANUARY 10th, 11th and 12th, 1906.

A Canadian Forestry Convention has been called by Sir Wilfrid Laurier, Premier of the Dominion, to meet in Ottawa on the 10th, 11th and 12th January, 1906, to consider the forests of Canada and means for their preservation and reproduction.

His Excellency Earl Grey, Governor-General of Canada, has been pleased to accept the position of Honorary President of the Convention and in doing so expressed his interest in its objects and his best wishes for its success. Sir Wilfrid Laurier has consented to act as President and the Vice-Presidents will be His Honour Sir Henri Joly de Lotbiniere, Lieutenant-Governor of British Columbia, and Mr. R. L. Borden, M.P. This official list shows that the Convention has the support of the leaders of the Dominion in national affairs and demonstrates clearly its national character.

Fuller details of the organization will be given at a later date. Its *personnel* will include all citizens interested in forestry and specially members of legislative bodies in the Dominion, members of the Canadian Forestry Association, Forestry Officials, representatives of Lumbermen's Associations, Farmers' Institutes, Educational Institutions, Mining and Engineering Societies, Fish and Game Associations. Forestry Bureaus and Associations in the United States will also be asked to send representatives.

The Convention will be under the auspices of the Canadian Forestry Association and the carrying out of the arrangements will be in the Association's charge. The Secretary of the Forestry Association will be Secretary for the Convention and further information may be obtained from him. In the next issue of the Forestry Journal announcement will be made in regard to railway arrangements, programme and other details.

It must be gratifying to the members of the Canadian Forestry Association and the friends of the forestry movement in general to see this public recognition of its importance. The opportunity for advancing the cause in which they are engaged and the interests of the country is invaluable. It is to be hoped that all will unite to make this Convention a success in numbers and in every other respect.