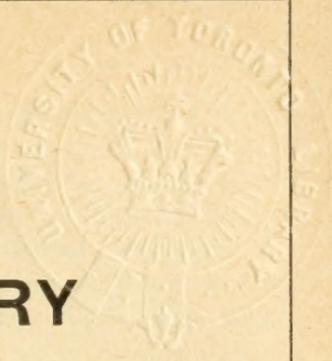


UNIV. OF
TORONTO

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CANADIAN FORESTRY JOURNAL

VOL. V.



1909

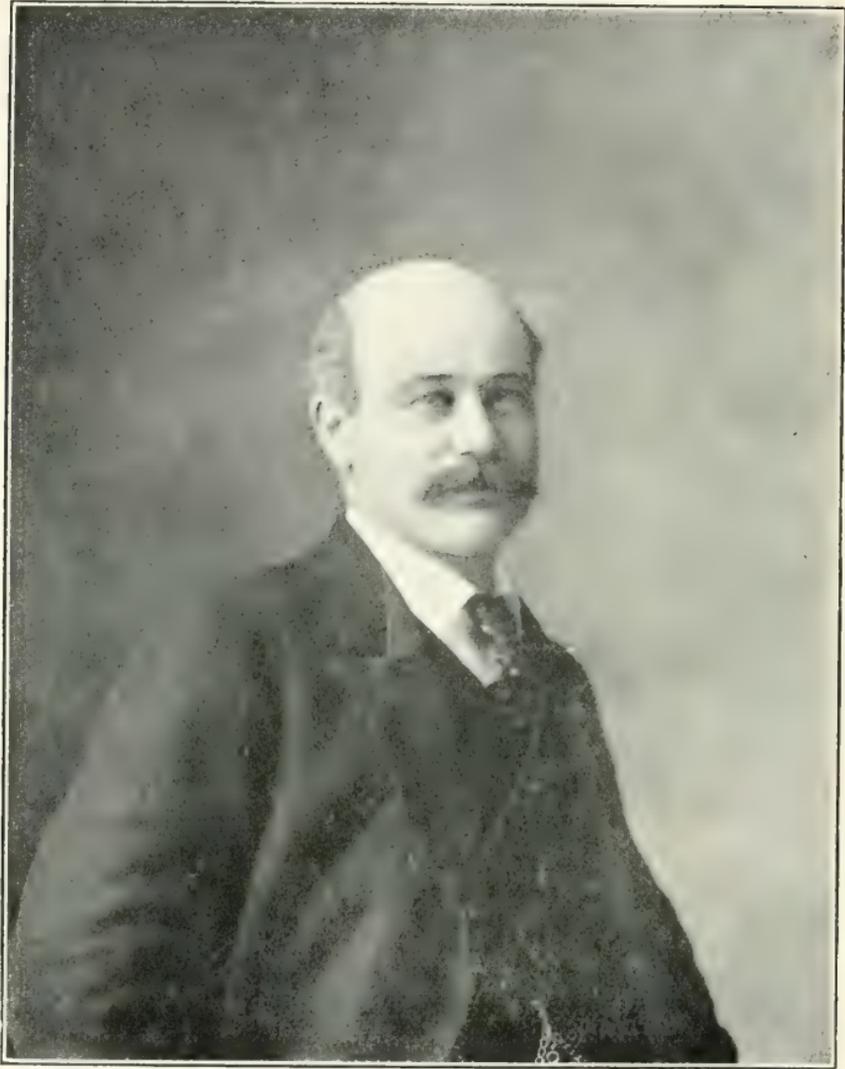
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PUBLISHED AT OTTAWA
BY THE
CANADIAN FORESTRY ASSOCIATION.

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Mr. W. B. Snowball, Pres. Can. For. Assn., 1908-1909.

Canadian Forestry Journal.

VOL. V.

MARCH, 1909.

No.1

THE TORONTO 1909 CONVENTION.

A special meeting of the Canadian Forestry Association was held in Toronto on Thursday and Friday, February 11th and 12th. The President of the Association, Mr. W. B. Snowball, occupied the chair at all the meetings, which were held in the Convocation Hall of the University of Toronto.

The outstanding features of the meeting were the report of progress made by the representatives of the Province of New Brunswick, (Hon. W. C. H. Grimmer, Surveyor-General, and Mr. R. B. Miller, Professor of Forestry in the Provincial University), and the speeches of Hon. Frank Cochrane, Minister of Mines and Lands for the Province of Ontario, who invited criticism of the forest administration such as would show points where the administration might be improved, and, at the banquet given by the Board of Trade on Friday evening, announced the Government's plans for the regaining by the Crown of much of the territory now under license. Mr. Aubrey White's paper on the "Forest Resources of Ontario" was also a valuable feature of the programme.

THE OPENING SESSION.

The first session opened at ten o'clock on Thursday morning, February 11th. His Excellency Earl Grey, Governor-General of Canada, occupied a seat on the stage to the right of the President, and with him on the stage were His Honor J. M. Gibson, Lieut.-Governor of Ontario, and Hon. Sidney Fisher, Dominion Minister of Agriculture.

His Excellency opened the meeting. In his address he referred to the intimate bearing which the scientific management of the forests had on the industrial and agricultural interests of the nation, and generally on its health and happiness. The President of the United States had called the attention of that nation to the fact of a timber famine being imminent, owing to their reckless exploitation of their forests, and had called together a conference to consider the question of the conservation, not only of their forests, but also of their other natural resources. The published reports of this conference had done much to convince the people of the republic that there was a direct relation between the forests and the flow of the streams on which

both agriculture and navigation depended, and they were standing nearly a unit for forest protection. His Excellency spoke of the President's message lately published, where the awful consequences of deforestation in China were described and illustrated, and suggested the publication of these pictures, especially for use in the schools. "The teaching of the people how to care for their forests is becoming the first object of the American Government," concluded His Excellency. "I hope it will also become the first object of the Canadian people. The forest area in the Dominion is 354,000,000 acres. By far the greater part of this is still Crown land, or in other words, belongs to the people. The question for you to determine appears to me to be this: Shall this great inheritance, of which you are the trustees, be handed over to uncontrolled individuals to be misused, without regard to the interests of posterity, or shall it be managed under careful and well considered regulations on lines which will increase the public revenues, at the same time that they will ensure a steady advance in capital value?"

His Honor Lieut.-Governor Gibson followed briefly, welcoming the Association, especially the visitors from the other provinces. He recalled the fact that it was under his regime that the forest reserve policy of the Province of Ontario had been inaugurated and the Eastern and Sibley Forest Reserves set aside. A start had also been made toward setting aside the Temagami Reserve.

President Watson, of the Toronto Board of Trade, then welcomed the Association on behalf of the Board of Trade, of whose sympathy and co-operation he assured them for their meeting.

Hon. Sidney Fisher then was called upon. He referred to the necessity of the conservation of forests as the basis of all other resources. While Canada had not been so wasteful of her resources as the United States had, it still had followed that country's example to a large extent. Canadians had been in the habit of trading too much on their supposed forest wealth; but their estimate of their timberland—three hundred and fifty million acres—was too large. It must be remembered that a large proportion of this land was far to the north and the timber thereon was of far less value, of lower quality and at present almost inaccessible; it was not to be compared with the valuable pine limits of Ontario and Quebec. Hon. Mr. Fisher went on to show the importance of the preservation of the forests to the navigation of the Great Lakes and the St. Lawrence River. He concluded with a reference to the International Conservation Conference which was to take place in Washington in the following week.

NEW BRUNSWICK'S POSITION.

Hon. W. C. H. Grimmer, Surveyor-General of New Brunswick, was the next speaker, and in the course of his address made a pretty thorough review of forestry matters in his province. In regard to present conditions he noted that 10,000 square miles of the province were now under timber license, while 1,000,000 acres of Crown lands were not yet applied for. The province's annual cut was about 150,000,000 superficial feet, and the upset price of timber limits per mile was \$20; the stumpage dues varied from 40 cents per thousand feet for hemlock to \$1.25 per thousand feet for spruce, pine and cedar. The Crown lands had greatly increased in value during the past few years, land that in 1893 and 1898 was worth \$8 per mile being now worth \$200 to \$500 per mile. After a dull year in 1908 the lumber business was reviving. He briefly reviewed the changes in the regulations made during the year, and noted the improved fire protection system which had met with marked success. He spoke in favor of natural reforestation and raised the question of the reforestation of the chair of forestry in the University of New Brunswick and spoke favorably of the scheme of a topographical survey of the province and classification of the public lands.

DELEGATES FROM OTHER ORGANIZATIONS.

Mr. Frank Hawkins, speaking on behalf of the Canadian Lumbermen's Association, expressed the good wishes of that organization to the Canadian Forestry Association. Apropos of the connection between the forests and the streams, he noted that this year Lake Temiscaming was 19 feet below its level at any previous time, while at the same time the St. Lawrence was higher than ever before—striking proof of the effect of denudation on the water flow.

Prof. W. T. McClement, of Queen's University, expressed the sympathy of that institution with all movements to promote the conservation of the forests and other natural resources of the country.

Mr. Achille Bergevin, of Montreal, spoke as the representative of the Province of Quebec Association for the Protection of Fish and Game. He noted the close connection between the preservation of the forest and that of the fish and game. In addition to recent laws much remained to be done in Quebec in the direction of better classification of lands, regulation of cutting, more careful collection of dues and prevention of fire. No fire should be allowed for clearing land and no more timberlands should be sold. The speaker favored the appointment of a Royal Commission to investigate the whole question of the export of pulpwood. Other suggestions made by him were the appoint-

ment of a non-political commission to supervise forest lands, increases in the technical staff and in the number of forest and fire wardens and greater attention to popular education in forestry.

Mr. J. Kelly Evans on behalf of the Forest, Fish and Game Protective Association of Ontario, urged continued and more extended propaganda work through the press and by the medium of public lectures and talks, illustrated where possible. The apathy of the people he regarded as the worst enemy of the cause.

Mr. John B. Laidlaw, speaking for the Fire Underwriters' Association, told of the waste of wood and other structural material through fire; the loss of property in Canada and the United States through fire was ten times what it was in European countries. He mentioned some of the great forest fires in Canada, advocated the burning of slash and referred to the necessity of preserving the forests in order to protect the streams.

The Canadian Society of Forest Engineers was represented by its President, Dr. Fernow. He referred to the advance of forestry knowledge, and especially the increase in the number of technically trained men. The Society he represented now numbered about twenty men, almost all trained foresters, and he had had part in educating nearly fifty per cent. of these. He emphasized the fact that forestry was a patriotic subject and that the forester, cut off as he was from society much of his time, must be a man of high morals.

The session was then adjourned.

THURSDAY AFTERNOON.

At Thursday afternoon's session the first item was the reading by the President of his address. After returning thanks for his election to the office of president and welcoming those present in the name of the Canadian Forestry Association, he referred to the establishment of the Faculty of Forestry in the University of Toronto and the chair of forestry at the University of New Brunswick. He advocated also the sending out by the Governments of lecturers throughout the country to give popular talks on such subjects as "fire fighting and precautions against fire, economical methods of cutting and logging, the building of roads, bridges and dams, the value of forest cover in regulating stream flow, the advantage of trees to the farm, methods of raising trees from seed and planting them at the least cost, how to combat the diseases of trees, with some practical instruction in forest mensuration methods, how thinnings should be made, etc." He was also in favor of each province having a proper survey made of its wooded area, and suggested that the

University professors and students should be employed for the purpose in their vacations, having associated with them surveyors, practical lumbermen and land cruisers. More stringent laws regarding the setting of forest fires were needed, and there should be permanent fire guardians, whose beat should not exceed one hundred square miles. Forest reserves should be maintained at the headwaters of all the principal streams. After referring to the export of Christmas trees, he took up at some length the question of the export of pulpwood. "The Americans want our pulpwood to save their own. We want their mills, not only to increase our industrial employment, but so that they will have a large investment depending on our forests and thus give them an interest with us in conserving our forests." He quoted at length from the statements made by the International Paper Company to the Ways and Means Committee of the Congress of the United States in the tariff investigations and also from Dun's Bulletin, with the object of bringing before the minds of his hearers the value of the Canadian forest product and also to show that the people of the United States wanted Canadian wood in order to save their own. He concluded by urging his hearers to take a practical interest in forestry questions.

DR. A. T. DRUMMOND.

A paper by Dr. A. T. Drummond was then read by Mr. R. H. Campbell. Mr. Drummond treated a number of the practical questions confronting Canada, in respect to her forests, at the present time, and concluded by summarizing his points as follows:—

The Governments of Ontario and Quebec should each establish a Bureau of Forestry.

Trained foresters should be permanently employed in the supervision of the forests with a view to the protection, the methodical cutting and the continuity of these forests.

Holders of licenses should be compelled to cut their timber on some approved forestry plan, to leave standing a certain number of pine and spruce trees on every square mile for the purpose of natural seeding, and should be required to plant annually and protect several pine and spruce seedlings for every tree of these species which they cut down.

Holders of timber licenses should be required, before the close of each winter, to effectually dispose of all debris arising from the cutting down and trimming of their trees.

Railway companies and mill owners operating within the forest areas should, during the summer and autumn months, be under strict obligation to protect, by night as well as by day, from fire, a defined area or strip on each side of the railway or mill, with a large penalty for failure to do so.

A penalty of two years' imprisonment, without option of a fine, should be imposed on all campers, hunters, settlers and others who, during the summer months, neglect to effectually guard their camp clearing and other fires during the time they are burning, and to put them completely out when they are done with them.

PRESIDENT FALCONER.

President Falconer, of the University of Toronto, was then introduced and briefly welcomed those present in the name of the University of Toronto. The University had a Faculty of Forestry which had trebled during the year and which lent strength to the University. The people must be trained to look upon their country not merely as a possession for a generation, but as something which future generations had to share and on the better informed portion of the community rested a large measure of responsibility for impressing this on the public mind.

ONTARIO'S FOREST RESOURCES.

Mr. Aubrey White, Deputy Minister of Lands and Forests for Ontario, then described at length "The Forest Resources of Ontario." Mr. White outlined the position of affairs in regard to the provincial timberlands at Confederation, and traced the subsequent history of the public lands through the sales of 1871, 1872 and on through 1887, 1894 and up to 1904. Since Confederation 12,000 square miles had been sold, and a total of fifty and a quarter million dollars realized from these; of this nine and a quarter millions were from lands and mines, the rest from bonus, ground rent and stumpage dues. The average annual cut for the last ten years had been 673,000,000 feet, and for the last two years 710,000,000 feet. There were still standing, on licensed lands, seven billion feet of white and red pine, besides hemlock, spruce and jack pine. Speaking with respect to the unlicensed lands, Mr. White took these up by districts; district No. 1 comprising that part of the province east of Port Arthur and south of the Height of Land; district No. 2 comprising the country east of Port Arthur and north of the Height of Land, and district No. 3 took in all the country west of Port Arthur to the boundary. This whole territory gave a total of thirteen and a half billion feet. The total amount of Ontario's standing timber was thus twenty and a half billion feet, and the estimate of the pulpwood was two hundred and fifty million cords. The present timber resources were estimated to be worth \$370,000,000. For the protection of the forests from fire there had been spent last year \$140,000. Next year a great

danger would arise from the building of the Transcontinental railway, some six hundred miles of which would be under construction.

Mr. Southworth thought it would be a mistake to include the pulpwood growing on agricultural land as a provincial resource; that would become the property of the settlers. Mr. White thought that even in this case the money would mean wealth to the settler and so to the province.

Dr. Fernow pointed out that, even if the present supply of timber would last for thirty years, after that time there would be people who would have to have timber. While Mr. White's estimate of twenty and a half billion feet sounded large, it would last the United States for only half a year.

CONDITIONS IN THE MARITIME PROVINCES.

Mr. F. C. Whitman, President of the Western Nova Scotia Lumbermen's Association, then read a paper on "Forest Conditions in Nova Scotia." In a few words he summed up the conditions of forestry and lumbering in Nova Scotia as follows: "The cutting of timber and the output of lumber have reached the limit of reasonable production, and the increasing value of lumber has a tendency to draw altogether too heavily upon our diminishing timber reserves. The axe has struck into trees that a few years ago were considered either inaccessible or unmerchantable. In former years lumbering depended almost entirely upon the rivers and streams, but the building of new railways and steam logging roads have widened the field of operations and added the menace of fire, which is too well known to require comment." He laid particular stress upon the difficulties presented by the tenure of land in Nova Scotia at present. The Crown land acreage amounted to 1,500,000 acres, holdings by large lumber concerns to 1,000,000 acres and there were 2,500,000 acres held in lots of 500 acres or less. "The difficulty of administering these lands," he said, "will be appreciated when it is remembered that in a single square mile there is often a bit of Crown land, a timber lot and a settler's holding." "We have in Nova Scotia," he remarked again, "a fire fighting force, organized on preventive principles, that is both effective and efficient." The scheme of fire protection had been evolved, in the face of much discouragement, by the leading lumber firms of western Nova Scotia. In this connection he paid a tribute to the law-abiding character of the people, who recognized others' property rights and were willing to do their part for the public welfare. The Government was now projecting a plan for a descriptive survey of the provincial forest lands. The most difficult matters to be dealt with were those involving conflicts of private interest with the public interest.

"General Forestry Conditions and Forestry Education in New Brunswick," was the title of a paper by Mr. R. B. Miller, M.A., M.F., Professor of Forestry in the University of New Brunswick. The first part of the paper was composed of a description of the province as to geology, topography, climate and precipitation with a consideration of the effect of these on growth. The interrelation of the forest types with the soil and other physical factors was also described. "The forest is, on the whole, with the exception of white pine and larch, composed of tolerant, rapidly growing species, with great reproductive power," the paper stated, and the different forest types were described, such as the northern hardwoods, the spruce flats, slopes and swamps, even-aged stands of fir or arbor-vitæ and the growth on barren lands. Prof. Miller then went on to sketch the course in forestry under his direction, explaining the necessity for the forester's study of each subject. He explained also the necessity for practical work; part of this would be given on a tract of six square miles of forest land adjacent to the University and belonging to it. The study of sawmill work would be made in the sawmills of Fredericton, while for the "woods end" of the work the students would be sent to the lumber camps. A summer school might also be established for short courses.

FRIDAY MORNING.

On Friday morning the first paper presented was that by Dr. B. E. Fernow on "What we Want." The wants of forestry advocates were briefly summed up by Dr. Fernow as follows: "It is, then, simply these three things in one that we want: a management of the public forest property for continuity, which involves protection against destruction of the young growth and cut-over lands from fire; segregation of agricultural lands before cutting begins; and a change of methods of disposal which will give control to the Government over the manner of cutting and of leaving the timber limits." Dr. Fernow briefly referred to what had already been done in the direction of meeting these demands. He noted the steps taken by the Dominion Government and that of the Province of Quebec. The present method of appointing fire rangers came in for severe treatment. "It is not likely that a large army of incompetent, inexperienced men, recruited afresh every year and appointed through political influence, even if a sprinkling of competent woodsmen is added, will successfully cope with the evil. Thorough organization of smaller groups of continuously employed, experienced men, which may be assisted by some less experienced during the dangerous season, and thorough continuous inspection while they are at work is necessary.

This nucleus of permanent foresters should be directed by active superiors in charge of this special service and in sympathy with the broader policies which are to follow the effective fire protection." The paper then treated the area of timberland of the Dominion of Canada and the present stand of timber, and noted the uncertainty of the estimates in both of these cases and the absolute need of a descriptive forest survey of the timberlands. The reasons for the slow progress of the propaganda on behalf of conservative forest management were stated, the last and most potent, in the author's judgment, being "the momentum of existing methods of disposal of the timber which benefit an influential class of citizens namely, the timber limit holders, who will naturally battle for their continuance, and the natural unwillingness of governments to make radical changes." The paper concluded with the suggestion of the appointment of permanent provincial legislative committees composed of influential members of the Association to study local conditions, formulate and secure a hearing for propositions to the Government and push them to realization, employ all local means for educating and arousing the public and altogether be in charge of the work of the Association between meetings."

Dr. Fernow's paper gave rise to a discussion of some length. The most important contribution was made by Hon. Frank Cochrane, who said that the Association ought to criticize; he welcomed criticism and would try to improve the administration of the forests accordingly. He gave credit to his predecessors for starting the fire protective service, which was being improved. Provincial patrol was better than, or at least as good as, private patrol. He noted also the forward step the province was taking in waste land planting.

Others who took part in the discussion were Prof. McClement, of Queen's University, who urged the importance of popular instruction by means of addresses, illustrations, etc.; Mr. R. H. Campbell, who spoke of the interest in forestry that was being aroused by the Association, especially by the publication of the FORESTRY JOURNAL and of newspaper bulletins and occasional lectures; Mr. J. M. Macoun, who discussed the JOURNAL and its policy; Mr. Geo. Y. Chown, who suggested the appointment of a paid secretary; Mr. E. Stewart, who emphasized the educational aim of the Association, and Rev. Dr. A. E. Burke who spoke as the representative of Prince Edward Island

The last item on the morning's programme was the paper by Mr. A. Knechtel, Inspector of Dominion Forest Reserves, which is published in full elsewhere in this issue.

FRIDAY AFTERNOON.

At the opening of Friday afternoon's session Mr. J. B. Miller, Vice-President of the Ontario Lumbermen's Association, was called on, and spoke briefly, favoring the appointment of a Royal Commission for the investigation of forestry questions. He congratulated Mr. White on his presentation of Ontario's case, and expressed gratification at the figures presented.

Prof. W. Mulford was then introduced and heartily received. He represented, he said, three bodies, namely, the Michigan Forestry Association, the Michigan University Foresters' Club and the Michigan Forestry Commission. He considered that the most pressing problems before governments and foresters to-day were those of protection, taxation and devising of satisfactory cutting methods. The problem of protection was pressing. The problem of taxation was to devise some scheme of taxation which should be equitable to all parties represented, particularly to the private owner. In the U. S. National Forests ten per cent. of the gross receipts from timber sales were handed over to the counties in which the National Forests were located. The reason for this was that the counties should not suffer from having these reserves made; otherwise, the reserving of these lands would impose a burden on the counties which would lose the taxes on the lands reserved and so throw additional burdens on the remaining lands. The problem in regard to the cutting methods was to devise methods of cutting which should result in natural reproduction and avoid the necessity of the expensive operation of planting.

Hon. W. C. Edwards was then introduced and spoke briefly. After references to some of the papers and discussions, he went on to speak particularly of the Rivers and Harbors Conference and the Conservation Congress in Washington in December last, which he had attended as the representative of the Canadian Government, and read the letter which he had addressed to Sir Wilfrid Laurier as his report on these. He spoke strongly of the necessity of exploration and the estimating of timber on lands about which no definite information was on record. The problems of reforestation and of location of settlers on timber limits were calling for solution. He believed that the forests could be so managed that they would reproduce satisfactorily and be all the better for cutting.

ONTARIO'S WASTE LAND.

The first paper presented at the session was that by Mr. E. J. Zavitz on "Waste Land Planting in Ontario." Mr. Zavitz estimated the aggregate area of woodlots in Ontario at 8,500



“Pine plains” in Simcoe county. There are about 50,000 acres of this type of land in this county. It is covered chiefly with Red Pine and scattering White Pine.

[Photo by E. J. Zavitz

square miles, while waste land (sand, gravel and rock formations and steep hillsides) would total another 8,000 square miles, so that it was safe to estimate eight million acres as the amount of private land in older Ontario which should be managed for forest crops. Estimating the annual increment at half a cord per acre, this, at a stumpage value of \$2.00 per thousand board feet, would mean an annual resource of \$8,000,000. In its work of assisting private woodland owners in planting, the Ontario Department of Agriculture had distributed 400,000 trees in 1908. The Department of Agriculture were also making a start at the work of reclaiming the waste areas of the province by tree planting. Of sandy land, unfit for agriculture, Norfolk County had 10,000 acres, Lambton 40,000 acres, Bruce 30,000 acres, Simcoe 60,000 acres and Northumberland and Durham 15,000 acres. Large portions of these were not entirely cleared, but were covered with a scrub growth. Frequent fires killed out the young White Pine, which, if protected, would soon cover much of these waste areas. In calculating the cost of planting such lands, estimates were made as follows: rate of interest, $3\frac{1}{2}$ per cent; cost of land, \$2 to \$5 per acre; cost of plant material, \$5 per acre; cost of labor for planting, \$5 per acre; cost of management and protection, 15c. per acre per year; rate of taxes, 17 mills on the dollar per year. An acre of White Pine, at the end of sixty years, would thus cost \$165.34; this amount was made up as follows: Cost land (\$5) at $3\frac{1}{2}$ per cent. for sixty years, \$39.39; cost of plants and planting (\$10) at $3\frac{1}{2}$ per cent. for sixty years, \$78.78; management and protection, 15c. per year, at $3\frac{1}{2}$ per cent. for sixty years, \$29.48; taxes, 9c. per year, at $3\frac{1}{2}$ per cent. for sixty years, \$17.69. Assuming (on the basis of various studies made in the Lake States and elsewhere) that at the end of sixty years there would be left on the acre two hundred trees of an average diameter of eighteen inches (each of which trees would yield at least 300 ft. b.m.) we get a yield of 60,000 board feet, which, at \$10.00 per M stumpage would be worth \$600.00. The net profit was thus \$439.66, equivalent to an annual rental of \$2.25 during the sixty years. Mr. Zavitz concluded his paper with a short review of the work in replanting carried on in Prussia, France, Japan, the United States, the states of New York and Wisconsin and by the Pennsylvania Railway.

THE PAPER MANUFACTURER AND THE FOREST.

Mr. Carl Riordon, General Manager of the Riordon Paper Mills, followed with a paper entitled "The Attitude of the Paper Manufacturer towards Conservative Forestry Methods." In summing up his paper Mr. Riordon said:

"I think, then, that the pulp and paper industry has most at stake in the forest and is likely to adopt conservative methods in the use of it in so far as cost and profit will

permit, and that they will do this even more than our Governments because the people are indifferent about conservation. Our pulp and paper industry is now carefully studying forestry and has already applied more conservative methods, and a good many firms will soon have adopted thorough going systems and will be applying them as far as the regulations will permit and where they are sure of retaining their timber. The Canadian Pulp and Paper Manufacturers think that the exportation of pulp wood fosters a careless use of the forests and that Canada has not enough pulp wood to afford this and that the Government should find out what we have and adopt a well-founded policy rather than let matters drift, as at present."

Speaking at greater length in regard to the management by the paper companies of their woodlands, he said: In Canada there has been almost a revolution in the last few years among the pulp and paper firms operating timber limits, in the direction of conservation. We are all taking a much greater quantity of timber per tree; taking the tops down to four inches diameter under the bark, and taking dry trees dosy butts, and bark-rotted logs. We are limiting our cuts to annual growth where possible. We have evolved fire patrol systems that have prevented serious fires in our timber. The Laurentide Paper Co., the Union Bag & Paper Co., and the Riordon Paper Mills, are all employing trained foresters and spending considerable money in thoroughly investigating their timber resources and everything to do with their development, and in studying timber growth and methods of manufacturing logs. They are inaugurating the policy of marking the trees that shall be cut, and are adopting rules for jobbers and foremen that are eliminating the waste of anything they can possibly use. This means making use of a great deal more of the product of the forest than any other industry does.

Mr. Riordon thought that present Government regulations in Quebec rather discouraged the putting in operation of thorough systems of forest management. He complained especially of timber thieving under pretence of settlement, also of the restrictions as to diameter limit. In regard to the former he stated that, out of 7,000,000 acres granted to settlers in recent years in Quebec, 2,000,000 acres were already stripped and abandoned.

CONDITIONS IN QUEBEC.

The last paper of the afternoon was given by Mr. Ellwood Wilson, Forester of the Laurentide Paper Co., of Grand Mere, P.Q., and was entitled "Lumbering in Northern Quebec." North of the St. Lawrence, Mr. Wilson said, the province was essentially forest land. Natural reproduction was good on cut

and burned-over areas; but, owing to the present rule of cutting to a diameter limit, balsam reproduction was crowding out the spruce. Sixteen per cent. of the land was brute, burnt for the most part from twelve to thirty years ago, the fires being started largely by river-drivers. The present Government system of selling timber had two main defects. First, the Government has a right at any time to open up lands under license for settlement without in any way compensating the licensee for the loss of his timber (a proceeding which often amounted to confiscation). Secondly, there was no guarantee that a change in administration might not result in an increase in ground rent and stumpage dues that would take away entirely the margin of profit.

Mr. Wilson described the method of cutting timber, by letting the work to a "jobber," who let it out again to "sub-jobbers," and pointed out its defects. Only the timber easiest to get at was taken under this system, and the timber left will be harder to get at and harder to cut when it comes to be taken. Much timber was left in the woods, and burnt-over territory was seldom cut. A number of improvements were suggested. Ground rents should be fixed for a term of years, with at least two years' notice of any intended change. A definite colonization policy should be pursued. The licensee should be given a year's notice to remove his timber from lands to be taken up. Lots should be taken up in a definite order. The settlement conditions should be enforced, with cancellation as the penalty for non-compliance. Settlers should be required to prove that they were bona fide settlers, not mere speculators, should not be allowed to burn up the timber in clearing the land and should be required to leave one quarter of their land in permanent woodlots. The fire protection laws should be made easier to enforce and should be rigidly enforced and the rangers should be given authority of arrest without reporting to the Government. The laws should be so amended that a conviction could be obtained by proving that a fire started from a camp fire or settler's clearing, set by him or his employees, without its being necessary to actually see the man light it. A force of competent and reliable rangers should be established to enforce the Government stumpage and waste regulations.

Some spirited discussion followed Mr. Wilson's paper, after which the convention closed.

THE RESOLUTIONS.

In the course of the afternoon the Committee on Resolutions presented its report, which was adopted.

The following are the resolutions adopted:—

RESOLVED,—That this Association desires to place on record its deep appreciation of the intense interest which His Excellency Earl Grey, Governor General of Canada, has always

taken in its work. We recall with pleasure and gratification the keen interest which he took in the deliberations of the Convention held in Ottawa in 1906, his constant attendance at all its sessions, and his ready participation in the programme. This year His Excellency graciously consented to journey to Toronto for the express purpose of opening this convention, and has shown a very real interest in its proceedings. For these and many other tokens of interest in the work we have so much at heart we desire to tender His Excellency our sincere thanks.

RESOLVED,—That the thanks of this Association be extended also to His Honor, J. M. Gibson, Lieutenant-Governor of Ontario, for the honor he has conferred upon it by his presence and the active part he has taken in its deliberations.

RESOLVED,—That this Association express its pleasure and satisfaction at being again favored by the presence of the Honorable Sydney Fisher, Dominion Minister of Agriculture, who has always been a source of inspiration to us in the work we are endeavoring to accomplish.

RESOLVED,—That the thanks of this Association be tendered the Honourable W. C. H. Grimmer, Surveyor-General of New Brunswick, for attending this Convention and contributing a very able paper on the forest resources of his own province.

RESOLVED,—That this Association notes with interest that the Dominion Government proposes to appoint a Parliamentary Committee to investigate the condition of our forests. Having regard, however, to the complexity of the questions involved, the necessity of securing a correct estimate of our timber resources, the conservation of our water supply and the importance of international trade in forest products; this Association desires to urge upon the Federal Government the advisability of appointing a Royal Commission with authority to summon witnesses, take evidence in different parts of Canada, and investigate the whole subject of our forest wealth and methods of forest conservation, and to report to Parliament with a view to future joint action by the Federal and the various Provincial Governments.

RESOLVED,—That this Association desires to impress upon the Federal Government and the Governments of the several Provinces the urgent necessity of placing in permanent forest reserves all non-agricultural lands at the head waters of streams.

RESOLVED,—That the Provincial Government controlling Crown Lands be requested to permanently withdraw from location all townships under timber license, and at present open for settlement, which upon examination are found to contain less than fifty per cent. of arable land; and that no township that shall be found on inspection to contain less than fifty per cent. of agricultural land shall hereafter be opened for settlement or

location; and that in the case of townships now under license which are found to contain more than fifty per cent. of land suitable for agriculture, the licensee be given a reasonable time in which to remove the merchantable timber before the land is opened for settlement.

RESOLVED,—That this Association views with satisfaction the improvements made in the forest fire protective services of the Provinces of New Brunswick, Nova Scotia, Quebec, Ontario and British Columbia.

RESOLVED,—That a Committee be appointed by the President of this Association to consider the following methods of advancing popular forestry education: (1) The preparation and distribution of forestry bulletins suitable for use in both country and city schools; (2) The inclusion of elementary forestry instruction in the text-books on Agriculture and Nature Study now in use in the public and high schools; (3) The preparation and distribution of maps and lantern slides suitable for addresses on forestry topics to be delivered in schools and at Farmers' Institute meetings.

RESOLVED,—That a text-book on forestry should be compiled from the reports and other literature published by this Association, and distributed for use in our schools and colleges.

Moved by Mr. Achille Bergevin, seconded by the Hon. Mr. Grimmer, and RESOLVED.—That Mr. Wm. Little's eulogy of the service rendered this Association by the late Sir Henri Joly de Lotbiniere be published in the report of this Convention.

Resolutions were also passed thanking the Board of Governors of the University for the use of Convocation Hall; to the Toronto Board of Trade for their invitation to the Association to hold their convention and for the banquet; to the press throughout the Dominion for publishing the Association's bulletins and the accounts of the Convention and to the railways for granting the reduced fares.

THOSE IN ATTENDANCE.

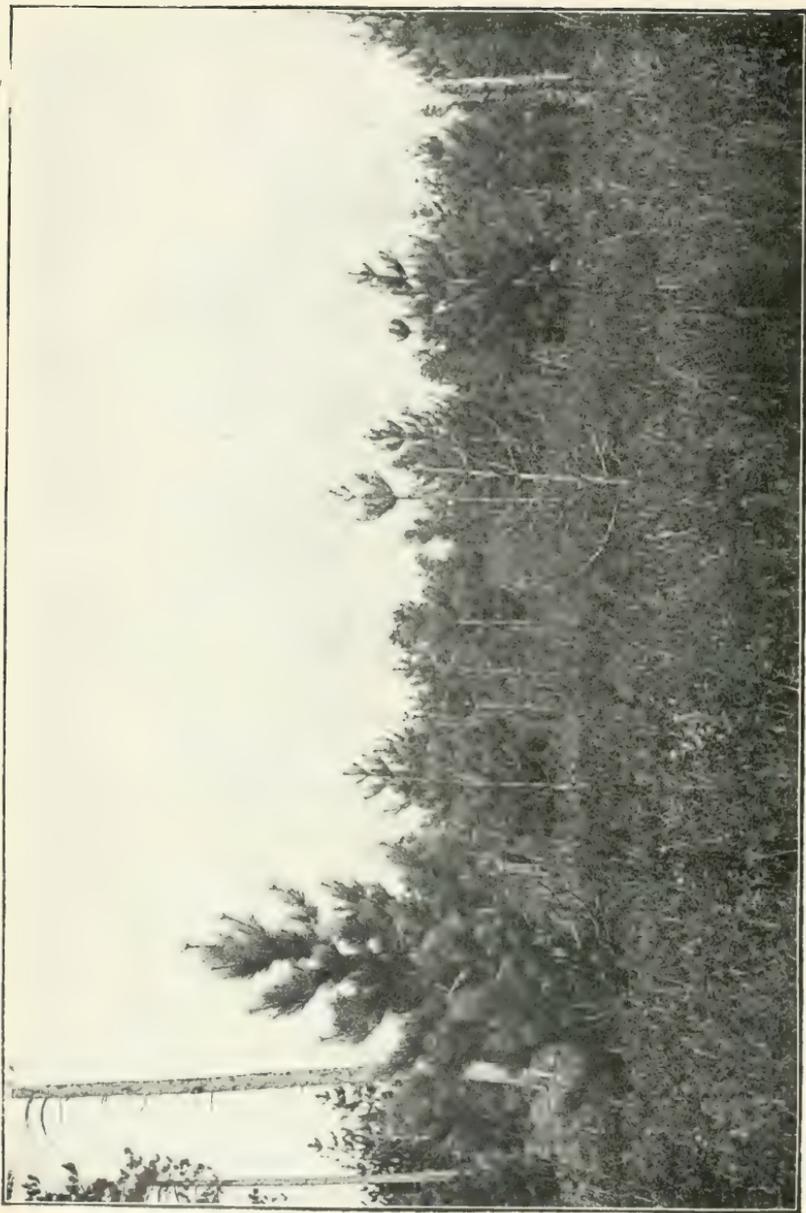
Among those present at the various sessions of the Convention were His Excellency the Governor-General; His Honor J. M. Gibson, Lieut.-Governor of Ontario; Hon. W. C. Edwards, Ottawa; Hon. Frank Cochrane, Minister of Mines and Lands for Ontario; Hon. W. C. H. Grimmer, Surveyor-General of New Brunswick; Messrs. Wm. Little, Montreal, Que.; H. M. Price, Quebec, Que., and Aubrey White, Toronto, ex-Presidents of the Association; T. Southworth, Toronto, Vice-President; R. H. Campbell, Ottawa, Dominion Superintendent of Forestry; Dr. B. E. Fernow, Dean, Faculty of Forestry, University of Toronto; Prof. Walter Mulford, of the Department of Forestry of the University of Michigan; Rev. Dr. A. E. Burke, of Toronto.

Prof. W. T. McClement and Registrar Geo. Y. Chown, of Queen's University, Kingston, Ont.; Prof. R. B. Miller, of the Department of Forestry, University of New Brunswick, Fredericton, N. B.; Messrs. F. C. Whitman, Annapolis Royal, N.S.; Edw. G. Stairs, Halifax, N.S.; G. H. Edgecombe, St. John, N.B.; E. Hutcheson, Douglstown, N.B.; F. Schafheitlin, Montreal, Que.; A. Bergevin, Montreal, Que.; Dr. C. D. Howe and Mr. J. H. White, of the Faculty of Forestry, University of Toronto; W. G. A. Lambe, John B. Laidlaw, J. B. Miller, J. O. Thom, F. Page Wilson (Pulp and Paper Magazine), Geo. Hunter Robinson, J. E. Murphy, W. W. Firstbrook, E. S. Caswell, T. A. Gibson, Thos. Jenkins, Peter I. Bryce, F. H. Wood, R. L. Campbell, A. E. Rau, Toronto; Frank Hawkins, A. Knechtel, J. M. Macoun, A. C. Campbell, H. R. MacMillan, J. R. Dickson, F. W. H. Jacombe, Ottawa; D. McCrae, J. Hutcheon, W. T. Cockburn, Guelph; W. T. Scandrett, London, Ont.; T. H. Chapman, Baltimore, Ont.; D. James, Thornhill; W. T. C. Boyd, Bobcaygeon; Thos. Stewart, Lindsay; E. Hawthorne, Warsaw; A. L. Lovering, Coldwater; C. P. Stocking, Wau-bashene; Frank S. Pearce, Marmora; L. M. Ellis, West Toronto; A. McPherson, Longford Mills; W. H. Callum, Shelburne; W. B. Snowball, Chatham, N.B., President, and A. H. D. Ross, Faculty of Forestry, University of Toronto, Secretary.

THE BANQUET.

On Friday evening a banquet was tendered to the Governor-General and the officers of the Association by the Toronto Board of Trade at the National Club. Mr. J. P. Watson, President of the Board of Trade, occupied the chair, and those seated at the guest table were: His Excellency the Governor-General of Canada, His Honor the Lieutenant-Governor of Ontario, Sir James P. Whitney, President Falconer, Mr. Leveson-Gower, Hon. Frank Cochrane, Hon. W. C. H. Grimmer, Mr. J. B. Miller, Major James Fraser Macdonald, Mr. W. J. Gage, Mr. W. B. Snowball, Hon. J. S. Duff, Mayor Oliver, Dr. B. E. Fernow, Mr. R. H. Campbell, Mr. Thomas Southworth, Mr. A. H. D. Ross, Mr. R. S. Gourlay, Hon. A. J. Matheson, Provincial Treasurer was also present. The guests numbered nearly two hundred.

The toast list was as follows: "His Excellency the Governor-General of Canada," proposed by Mr. J. P. Watson and responded to by Earl Grey; "The Lieutenant-Governor of Ontario," proposed by Mr. W. J. Gage and responded to by His Honor J. M. Gibson; "Canada," proposed by Mr. R. S. Gourlay and replied to by Sir James P. Whitney; "The Canadian Forestry Association," introduced by Mr. John F. Ellis, Vice-President of the Ontario Forest, Fish and Game Protective Association, to which



Near view of Red Pine reproduction on the pine plains. Note the dead pine in the foreground. These plains periodically burn over, killing the young growth. If this area were protected from fire it would soon reproduce with Red Pine. Fire protection, again, is a greater problem than reforestation.

(Photo by E. J. Zavitz)

replies were made by Messrs. W. B. Snowball and H. M. Price; "Toronto," proposed by Mr. J. B. Miller and replied to by Mayor Oliver.

Earl Grey, in his speech, laid special stress on the instruction of the young in the importance of the forests and their right use. Among other things he said, "What we have to do (I have been so long among you that I say 'we') is to teach the children of Canada to have patriotic regard to the conservation of the wealth of Canada."

Hon. Frank Cochrane's speech foreshadowed reforms of much importance in dealing with Ontario's forest lands. The Government, he announced, was preparing to attempt the reforestation of considerable areas of lands now under timber license, having due regard to the rights of the licensees, to whom he appealed for cordial co-operation in carrying out the scheme.

FOREST ENGINEERS' REUNION.

The members of the Canadian Society of Forest Engineers who were present at the recent special meeting of the Canadian Forestry Association in Toronto were the guests of Dr. B. E. Fernow, the President of the Society, at luncheon in the Faculty Union on Friday, February 12th. Twelve members of the Society were able to accept the hospitality of their President and Prof. Walter Mulford, who represented the University of Michigan at the Convention, was also a welcome guest. The Secretary reported that the number of active members of the Society was now eighteen, with several others in prospect, and that the financial standing of the Society was good. Prof. Mulford spoke briefly to his Canadian confreres, and gave some good hints along the line of the development of the Society. Among matters brought up for informal discussion were the publishing of professional papers and other matter and the uniting with foresters of other countries and nationalities for the discussion of professional topics, using Esperanto as the medium of communication.

DOMINION FORESTRY CONVENTION.

The estimates for the Dominion, now before Parliament, contain an item of \$5,000 for the purpose of holding a Forestry Convention next fall. No details have yet been settled.

A WESTERN PROBLEM.

BY R. H. CAMPBELL

In the southern portion of the Provinces of Alberta and Saskatchewan is a large extent of prairie country, aggregating 45,000,000 acres, which has been the ranching district of the West and, owing to its generally treeless condition and moderate rainfall, the supply of wood and water are two questions of great importance. The annual precipitation in the district will average between fifteen and twenty inches, though in some years and some parts it may be more or less.

The most striking physical features of the district are the Rocky Mountains, forming the western boundary, and the Cypress Hills, which rise from the centre to a height of between three and four thousand feet above the sea. The principal rivers rising in the Rocky Mountains which flow through this territory are the Red Deer, Bow, Little Bow, Oldman, Waterton, Belly and St. Mary's, all of which unite finally to form the South Saskatchewan. The headwaters of St. Mary's River are in the United States and are the subject at present of international consideration. The Milk River, which flows for two hundred miles through Canadian territory just north of the international boundary, also has its source in the United States and finally returns there, pouring its waters into the Missouri drainage. These streams are fed from the rainfall and snowfall of the lower foothills and wooded slopes, and have their final sources in the perennial glaciers that form in the high mountain valleys above the timber line. In the mountains these streams flow through deep valleys, sometimes narrowing so as to leave little more than room for the stream, sometimes widening out so that the river wanders through the valley a narrow ribbon of lighter color among the dark green of the forest, again closed in by some bar of rock or gravel so as to hold back the waters and form the beautiful lakes of translucent green which with their varying hue form one of the most beautiful features of Rocky Mountain scenery.

As these streams flow out through the plains they groove for themselves deep channels till they are flowing two to three hundred feet below the level of the remainder of the country. It thus follows that on the upper courses of the stream, where the fall is steep, water may be taken out easily by small ditches for irrigation or other purposes while in the lower courses it is impossible to do so except by long and expensive canals of large capacity demanding large capital and engineering skill of a high order.

In the western part of the district, bordering on the foothills, which was at one time considered useless for agriculture without irrigation, winter wheat is now being grown successfully, yielding forty and more bushels to the acre. In the plains several large irrigation projects have been undertaken, such as that of the Canadian Pacific Railway Company, who are constructing works for the irrigation of a tract of three million acres from the Bow River; the Southern Alberta Company, who propose to irrigate between three and four hundred thousand acres from the same stream; and the Alberta Railway and Irrigation Company, who hold about a million acres, a considerable proportion of which they will irrigate from the St. Mary's River.

The flow of the streams is of a somewhat irregular character. The usual course is an increased flow in the spring from the melting of the snow on the lower levels, culminating with the highest flow in June when the mountain drifts and glaciers add their contribution to the runoff. From this time the flow gradually diminishes until in September and October it reaches a minimum. Sudden floods occur unexpectedly owing to heavy rains in the mountains or to a succession of hot days greatly increasing the flow from the glaciers. Such a flood occurred on the Waterton, St. Mary's and Oldman Rivers during the spring of 1908, owing to heavy rains, and immense damage was done along their course. Bridges were carried away, other property destroyed and human life was endangered. The conditions of the flow of these streams, while thus definitely stated, are not a matter of accurate knowledge and patient investigation is required before they can be stated with clearness and certainty.

The streams flowing from the Cypress Hills are of the usual character of those starting in the foothills. They are none of them large streams, and, after a short period of high water in the spring, the flow is small, and in a dry season may finally, in some streams, disappear altogether. The precipitation on these hills is greater than on the plains below, as attested by the growth of timber and hay. During the past season when the hay crop was a failure on the plains below there was a good supply on the hills that proved of the greatest assistance to many a rancher. The district watered from the Cypress Hills, though it may in years grow crops, cannot be considered as an agricultural district. The development of that district will be in the direction of establishing small grazing ranches, the stock being run on the natural grazing grounds in the summer, while, with the assistance of irrigation, feed for the winter is grown on a small area. The store of wood, hay and water from

the Cypress Hills is an absolute necessity, and such an elevation existing in the midst of a prairie country is one of its most important assets.

The growth of population in the district in question will show the increasing necessity for supplies of wood and water. At the time the census of 1901 was taken the whole population of this district was given as 32,542, while the census of 1906 showed a population of 93,330. The population of some of the principal towns is given as follows by the census of 1906:—Calgary, 11,967; High River, 1,018; Macleod, 1,144; Lethbridge, 2,313; Cardston, 1,001; Raymond, 1,568; Medicine Hat, 3,020; Maple Creek, 687; Swift Current, 554; Moose Jaw 6,249. Most of these towns have municipal water supplies. Other and newer towns and villages are growing up and will require similar systems.

The wood reported as having been cut on the eastern slopes of the Rocky Mountains last year was 31,600,000 feet board measure, 28,037 cords of wood, 336,860 fence posts, 1,336,700 fence rails. This was all for local consumption. The increase of population will increase the demand, and, while the fuel supply may be largely provided for from the coal mines, their development will necessitate the use of large quantities of timber.

These are the general conditions of the district and they present a variety of problems for solution that are of great practical and scientific interest. The following is an outline of the investigations which are considered necessary to a thorough understanding of these conditions and a clear grasp of the principles of their administration.

1. The protection and proper management of the forests on the eastern slope of the Rocky Mountains and the Cypress Hills is a necessary part of any such policy. Since the year 1903 fire rangers have been appointed and have been patrolling the eastern slopes of the Rocky Mountains, and no destructive fires have since occurred. It is proposed to strengthen the system of rangers and possibly a chain of posts may be established along the lower timber line between which a constant patrol will be kept up during the danger season. In addition to protection a study should be made of the forest covering, its effect on precipitation and runoff, its condition, the results of its removal and the improvement of methods so as to prevent damaging consequences, and methods of reproduction and reforestation. A trained forester has been appointed and a beginning has been made towards a study of this extensive tract. During the past year a fire ranging service has been established on the Cypress Hills and a thorough inspection has been made of them with the object of establishing a forest reserve.

2. In order to obtain a thorough knowledge of the flow and general characteristics of the streams and rivers of this region a complete system of stream measurements is required. It is generally considered that it takes a series of measurements for eight or ten years to give reliable data in regard to stream conditions. A hydrographic survey in connection with the irrigation administration has been carried on for some years past, but it has not been done in a thorough and systematic way, so that the results are scattered and unrelated and give but an uncertain basis on which to decide whether water is available or not. The requirements of irrigation, the necessities of growing towns and villages, and the construction of railways and industrial development will make ever increasing demands on the water supply and accurate information in regard to it will be essential. A reorganization and enlargement of the staff to carry on such a hydrographic survey must be made, it must be equipped with the most improved and accurate instruments for gauging and measuring streams, and regular gauging stations must be established on all the principal streams and measurements taken regularly. Only by such methods systematically carried on through a series of years can accurate results be obtained.

3. The observations of the forest service, the hydrographic survey and the meteorological service should be related. Data in regard to stages of water in the streams in the plains should be supplemented by synchronous information as to precipitation and weather conditions in the mountains, the special sources of the flood discharge, and the effects of the forest cover upon the runoff. This should be obtained particularly when unusual conditions of either drought or flood occur. It could be determined then with some degree of certainty what the causes of such unusual conditions are and so much progress could be made towards the solution of the question as to whether or to what extent they can be controlled.

4. Control of stream flow by artificial structures is now receiving a great deal of consideration in America and elsewhere. The Assouan dam, a mile and a quarter in length, controlling the waters of the Nile and making productive by irrigation thousands of additional acres of the Egyptian desert, is a triumph of engineering and a tribute to the beneficence of British rule in Egypt. In Russia the navigation of the Volga is controlled to a large extent by dams at the headwaters. Reservoirs have been created at the headwaters of the Mississippi to assist in the controlling of the floods and an active discussion is now being carried on in regard to the possibility of further control of the Mississippi flow at the headwaters of the Ohio River. The United States Reclamation Service are constructing dams

of large dimensions throughout the arid west to control the stream flow. It is therefore worthy of investigation by Canada as to what are the possibilities of controlling the streams of the drier belt, which show such great and uncertain fluctuations, and in which a certain and sustained flow is a matter of the greatest importance. There are in the mountains reservoir sites which, improved by dams, might be made to control the flood waters, prevent damage in the lower valleys, conserve the flood waters for use at low water periods and improve the rivers and the supply of water for all purposes. It will take some time to investigate such a question as this and the work cannot be undertaken too early, so that when the time comes for the construction of reservoirs, whether by the Government or by private enterprise, the data necessary for a proper consideration of the question may be available.

For the dry belt in the central part of British Columbia the conditions are very similar and the necessity for investigations and observations such as proposed in Alberta and Saskatchewan is equally as patent and pressing in that section of British Columbia.

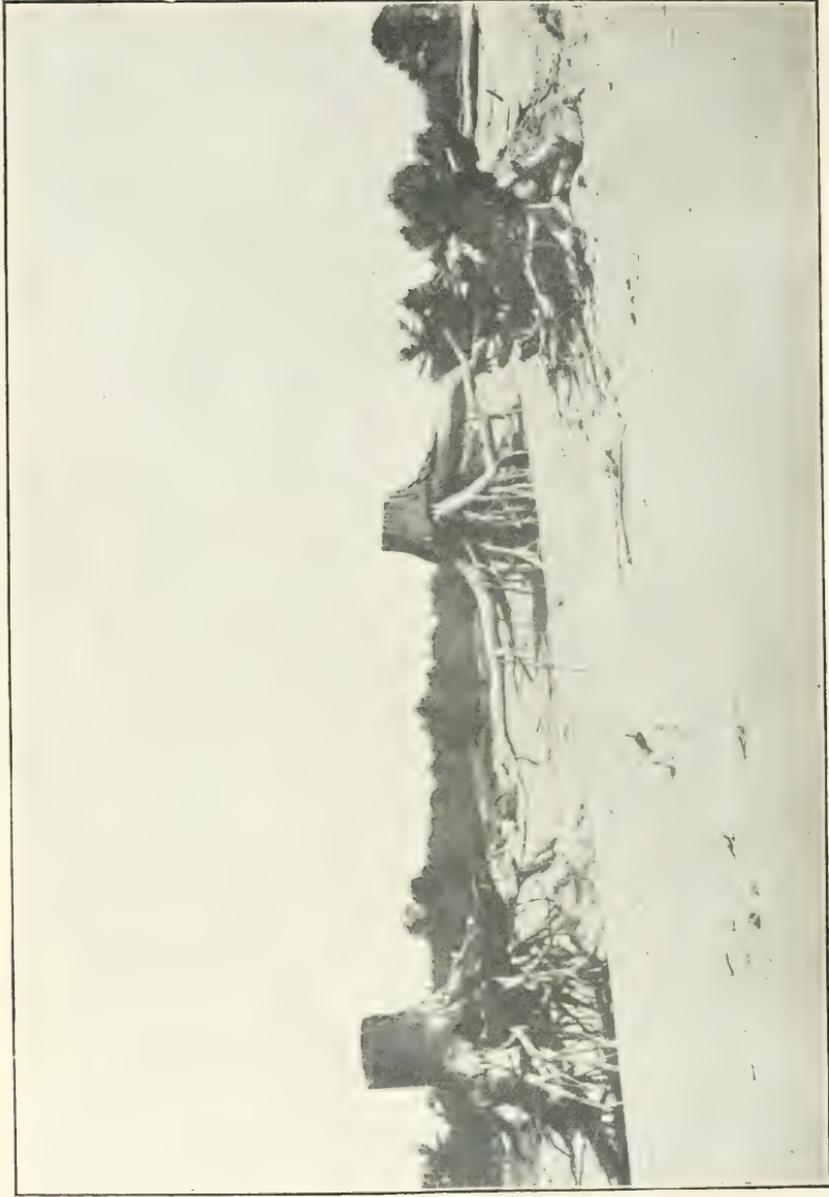
The problem of wood and water supply is one with which the future development of the portions of the West indicated is closely bound up, and the policy outlined above is submitted as one of not merely theoretical importance, though the scientific results would be great and interesting, but of the most direct practical bearing on the material development and prosperity of the West.

ANNUAL MEETING.

As provided for in the constitution of the Canadian Forestry Association, the annual meeting for the election of officers and other business will be held at Ottawa on Thursday, March 11th.

FORESTRY PERIODICALS.

In the issue of *Revue des Eaux et Forêts* for November 1st, 1908, the paper read by Mr. G. C. Piché at the 1908 annual meeting of the Canadian Forestry Association is published in full.



[Photo by E. J. Zavitz

White pine stumps on a sand dune in Norfolk County. Note the depth to which the roots penetrate. On such soil annual shallow-rooted crops have little chance as compared to the deep-rooted trees.

SOME NOTES ON FORESTRY IN ONTARIO.

The Department of Agriculture of Ontario in 1908 took a step in advance when the sum of five thousand dollars was granted for special reclamation work in Norfolk County. The Department five years ago began giving farmers assistance in waste land planting on the farm. This year the policy of acquiring non-agricultural lands where such exist in large contiguous areas has been adopted.

The first land purchased was a one hundred acre farm, south half of Lot 24, Con. 5, in Walsingham Township, Norfolk County. It is two miles from St. Williams, on the G. T. R., and is situated on the border of a sand formation some 3,000 acres in extent. In the adjoining Township of Charlotteville there is another contiguous area of about 3,000 acres. It is safe to say that in South Norfolk there exist 10,000 acres which eventually must be used for forest production. This does not include the numerous small parcels scattered throughout otherwise good agricultural soils, and which would not be included under provincial management.

The illustration on the opposite page shows one type of this Norfolk county waste land. The knoll is gradually being blown away and a few white pine stumps still stand to prove what could be originally grown in this soil. The forester must remember, however, that it was a different soil which produced these stumps. It was sand with a large admixture of humus.

The prevailing type of forest growth in this area, where cultivation has not been attempted, is composed of oaks of various species, namely, Dwarf Chinquapin, white, yellow and red (*Quercus prinoides*, *alba*, *velutina* and *rubra*) with white pine. In low situations where fires have been especially bad the poplars are prevalent. Less common species found are clack gum, (*Nyssa silvatica*), chestnut, butternut, black walnut, white ash, black ash, bitter and shagbark hickory.

It is interesting to note that the above farm which left the possession of the Crown in 1804 returned to the Crown in 1908 and has been settled over 100 years. It comes back much the worse for wear as may be seen in the illustration.

Probably about one-quarter of this non-agricultural belt in Walsingham township has been cleared and attempts made at cultivation. It was originally a white pine type, but cutting and continual burning has gradually changed it into a scrub oak type with scattered white pine. The scrub oak and older white pines withstand the ground fires, but the young pine seedlings are burned out at regular intervals. Last summer upon

arrival at St. Williams, I found that there was a fire fighting experience to be had. There is in this district one owner who has some good second growth white pine and he knows the value of it. The scrub oak lands above his were burning, and he was out fighting fire with some local assistance. I had an interesting conversation with one of his men as we were working along the fire line. This man informed me that it was a good thing to burn the area over often as the fire did no injury to the oak, and it would always be easy to control if too much stuff was not allowed to collect. I said that the fire was right now destroying lots of white pine and, of course, received his pity as a poor ignorant city chap. From where we stood I commenced pointing out pine seedlings from two to five years old which were being burned. He did not recognize them before, because previous to this he had imagined that a white pine was only a log and until he could see a log he could not see a white pine. It is safe to say that a large proportion of these scrub oak lands would in a few years be well stocked with white pine if fire were kept out. It is high time that the people of such districts should realize the potential value of cut-over lands where tree growth of any nature is being reproduced.

The scrub oak is a most valuable asset to these lands. It gives the soil protection and the leaves are continually adding humus to the soil. There is market for oak as fuel wood at a small profit. The larger butts of these scrub oaks are being marketed for turnery work, such as wheel hubs. A wood preservation plant will be installed and suitable fence post material will be treated. It is desired not only to make this a source of revenue from the scrub oak, but also to make it of use from an experimental standpoint.

On the better sites management will aim to leave the best quality of oak as standards, but on the high, poor sites white pine reproduction will be favored. Where natural reproduction is working in, the oak or other hardwoods will be removed as fast as marketable; the remaining material on these soils offers but little obstruction to the young pines, and is most valuable as a soil improver and protector.

Artificial planting will be carried on in open fields where there is no possibility of reproduction. In these situations experimental work with mixtures and species will be commenced. Experiments on areas covered with scrub growth will be made with seed, seedlings and transplants of white pine.

The Government Nursery at Guelph is being moved to this district and co-operative work with private land owners will be carried on from this point. The location of the nursery at the border of this waste land makes nursery management less difficult. A more permanent staff may be employed in the

nursery and utilized in various ways in protecting and managing the larger area.

Throughout the older parts of the province, there exist many similar bodies of waste lands which have been cleared for agricultural purposes or denuded by the lumberman. These areas, being sand or rock formation, will never be suited to agricultural development. The policy of the Department is to gradually segregate these lands and place them under provincial forestry management, a policy the advisability of which may be shown by many sound arguments. Such a policy will eventually release many struggling farmers who are fighting losing battles with a soil which was never intended for cultivation. Every year there are farms being abandoned in Norfolk which should never have been cleared.

A brief consideration of the figures given below will show that there is good reason for leaving the sand-farm in the hands of a loan company for mortgage or of the township for taxes. The figures have been collected from typical cases, and can be vouched for as correct.

There are two supposed sources of revenue on these lands, viz., the growing of rye and of buckwheat. On such land rye produces an average of ten bushels to the acre; this, at seventy five cents per bushel, a good price, gives a gross revenue of \$7.50 for the acre. Taking the cost of a man and a team at \$2.50 per day (not an excessive figure), plowing the acre, which will take the man and team about half a day, will cost \$1.25. Harrowing and rolling (at the rate of ten acres per day) will cost 25 cents, and seeding (at the same rate) 25 cents more. The seed ($1\frac{1}{2}$ bushels to the acre) will cost \$1.12. Cutting with the binder will cost another 75 cents, and threshing, at two cents per bushel, 20 cents.

The account for the acre will then stand as follows:—

| | |
|----------------------------|--------|
| Proceeds of crop..... | \$7.50 |
| Cost of crop— | |
| Ploughing..... | \$1.25 |
| Harrowing and rolling..... | .25 |
| Seeding..... | .25 |
| Seed..... | 1.12 |
| Cutting..... | .75 |
| Threshing..... | .20 |
| | 3.82 |
| Net proceeds..... | \$3.68 |

This shows an annual revenue of \$3.68 per acre, but does not take into consideration taxes, etc., which should also be charged against the crop. This argument need not be carried further to show that farming is a very poor proposition on such

soil. The economic feature is not the most serious, for along with it goes a moral or social problem which should be given attention by the state. The family placed on such lands and remaining there must in the end develop an undesirable type of citizen. It is impossible to secure the social advantages of school, church, etc., which may be had in better organized communities.

FORESTRY PERIODICALS.

The Journal of the Board of Agriculture (England) for December, 1908, contains an article on "The Large Larch Saw-fly" (*Nematus erichsonii*), by C. Gordon Hewitt, M.Sc., F.E.S., giving the result of the author's study of the insect. The article is supplementary to the accounts of A. S. Packard and R. S. MacDougall, the latter of which was published in the same magazine for October, 1906. The male insect is described at some length; these are somewhat rare, reproduction being almost entirely by parthenogenesis. Out of 300 cocoons observed, 298 females and only two males emerged. The life history of the insect is given in detail; Mr. Hewitt found five moults (hence six larval stages) usual in the larvae he observed, instead of the three moults mentioned by Packard. A general description of the attack and its effects is given, together with a scheme of its occurrence in the Lake district (with map). Means of detecting an attack by the insect, its natural enemies (the small field vole, *Microtus agrestis*, is one of the most active of these), its insect parasites and remedial and preventive methods are discussed at length. Four good illustrations accompany the article.

The British Columbia Lumber, Logging and Forestry Association has recently been formed, absorbing the British Columbia Chamber of Commerce and Forestry. A. B. McRae, of the Fraser River Saw Mills, Limited, is President.

A bill has been introduced in the Maine Legislature providing for a state forest commission, consisting of a state forester at a salary of \$2,500 per year, and six assistant foresters at \$1,500 per year.

GAME AND FORESTRY IN CANADA.

By J. R. DICKSON.

Canadians are beginning to "take stock." Literally every day we find new proof that our splendid young commonwealth is a vast storehouse of undeveloped resources. And even were we still indisposed to claim the twentieth century as ours, the eager investors and homeseekers of the mother country and other lands will not be denied. The hands of that conservative element in our eastern provinces are being forced to grasp a new rung on the ladder of progress by the pulsing life of "The West." Nation-building is great fun, and Johnnie Canuck is into the game.

Now, nation-building implies the creation of permanent industries, among a contented people; hence, if "forestry is the parent of industries," what step more natural than to find out as quickly as possible our forest areas and their condition and environment, in order that a rational policy of development for this generation and unselfish conservation for coming generations may be adopted? At present all our federal reserves lie beyond the Great Lakes. The Westerner, brimfull of energy as he is, is still an opportunist and thinks only of the present. Few look ahead even five years, and much the same fight on behalf of future citizens that has been waged and won in the western states of the great American republic must here, too, become a function and duty of good government.

Forestry costs money on the start, and costs a good deal; and the returns, though fairly opulent, are long delayed. Hence the good forester seizes every legitimate source of current revenue, in order to neutralize, as much as may be, the running expenses of protection and administration. Canada is to-day par excellence the land of game, both big and small; and, provided only that the Canadian people awake to their opportunity, is bound in the future to hold its own, and even increase its lead, in this regard. It has always seemed to me, therefore, that this question of possible game revenue merits a great deal of study from our Canadian foresters.

Of course, this feature of game preservation bulks larger in private forestry than in Government management, for the simple reason that the former owner regards it as truly a valuable asset and acts accordingly. Take the case, for instance, of the Vanderbilt estate at Biltmore, where Dr. Schenck offsets the entire cost of forest protection by the return from hunting permits. Nor has he the moose and elk—not to speak of goat, grizzly and cariboo—of our latitudes. What matter if the timber

does grow more slowly in our northland than in the "Sunny South?" By catering to the wants of tourist and hunter we need suffer no pecuniary handicap. The Land of Evangeline, the Laurentian continent and the Rockies are rapidly assuming the role of summer playgrounds to this continent and beyond. It is for the forester to take every advantage of this fact. The fishing, hunting, trapping and camping facilities must be perfected, the supply guaranteed and, in short, every effort made to place the game and fish, as well as the forest that shelters them, on a *permanent paying basis*.

It is a big question, and, much as we may wish it, can hardly be kept out of politics, unless, indeed, as in New York State, the whole oversight of the forest and its creatures be placed in the hands of a strong and independent commission. Meantime, let us study ways and means to secure the cheapest and most efficient protection, wise legislation, and, above all, a public opinion sympathetic and appreciative, because more intelligent. It is high time that sentiment, which has so long been the false guide and basis of opinion in all matters affecting game and forestry, should be exorcized. Canadians generally must waken up to the fact that our game preservation and exploitation stands, a business proposition, four-square to every argument. Exactly as in the case of timber, it rests on permanent and profitable use, based on adequate protection and reproduction.

On the Riding Mountain reserve in Manitoba is one of the finest herds of elk on the continent. During the past three summers I have had the pleasure of travelling through all parts of this, the largest and most important of our federal forest reserves. One may meet the wapiti almost anywhere, but they seem to prefer the large brule and semi-prairie tracts of the upper plateau, especially in the west end. The moose, on the other hand, enjoy shelter and prefer the more heavily timbered east end, or the Duck Mountains to the north. Sad to say, the elk are dwindling. The greatest danger to the future of this herd is probably not the settler, with his occasional victim throughout the year, but rather the horde of outsiders who scour the woods in the open season, shooting at everything that moves (and even at the stumps!)

What, then, it will be asked, is the simplest step that can be taken to overcome this danger? The suggestion is made that the policy be adopted—both on this reserve and on others—that has proved so successful in the case of Algonquin Park in Ontario. There the deer have come to appreciate the situation, and, as the rangers will testify, from the surrounding highlands of Ontario they make for its friendly shelter every fall when the open season begins. British Columbia, too, has seen the value and wisdom of this step; her excellent game guardian

reports most favorably as to its operation and calls for an extension of the scheme into a regular system of game havens. Make an adequate and inviolate retreat in the heart of each reserve, where no shooting or trapping is tolerated the year around. A good trail must be cut out all around, in order that patrol may be easy and ample; the whole value of the protective measures depends on the efficiency of this factor, especially during that crucial period, the open season.

I am well aware that this is exactly the object now being sought by the Manitoba Game Protective Association, and their Secretary-Treasurer deserves a hearty vote of thanks from every lover of wild life for his constant and untiring efforts in behalf of our vanishing game. I am only desirous of helping on the good work, and in this connection would also say that every settler and sportsman interviewed along the Riding Mountain this season was heartily in favor of this scheme.

We had two camps within the nine townships proposed to be set apart, spending a month there, and the area is exactly suited to the purpose. It includes open meadows for the elk, deer and chicken, scrub for the moose and a number of streams for the fur-bearers—not to mention Clear Lake for whitefish, Shoal Lake for ducks, and others filled with pickerel. To the beaver it would mean salvation. But, were it only for the sake of the elk, the step is imperative. Every sportsman should bestir himself in their behalf and bring pressure to bear on the powers that be. These words of Mr. Bryan Williams are not more true in British Columbia than in Manitoba: "The elk is about the easiest of all game animals to kill, and thus is in need of the greatest protection. On the mainland, where it was at one time found in large numbers it is almost extinct, and the same fate must await it on Vancouver Island. . . . There is no nobler game animal on the face of the earth, and for this reason, apart from its great value as an asset, every means should be taken and no expense spared to save it from extinction." The immediate setting aside of this proposed area in the Riding Mountains would appear, therefore, very desirable, especially as the game preservation will in no way conflict with the uses of forestry.

Apropos of game revenue on this reserve arises another interesting question. Why should the provincial government enjoy the hunting-license revenue, while the Dominion Government is at all the expense of protecting and administering the reserve? This seems an anomaly and scarcely fair to the Dominion Government. Federal jurisdiction is recognized in all other products of the reserve; why make an exception of the game? It may be urged that this source of revenue would be relatively trivial. This is not the case. The current expenditure on this reserve runs about \$10,000, while last year the

return (solely from timber and hay permits) was only some \$7000. The \$3,000 of hunting-license revenue would therefore have exactly balanced the account. Nor would the game be so ill-protected as many seem to fear, for this work would no longer be everybody's business, and hence, perforce, nobody's.

Good as our Canadian game laws are on the whole, there are still a few loopholes to fill and improvements to make. Take, for instance, the case of the trappers on this reserve. As early as September we found these men building shacks and preparing to stay all winter; yet they had paid no license and were not even required to take out a permit. Is this not a mistake? Even if the revenue were overlooked, the mere fact of taking out a permit and resultant affidavit would give the game warden a valuable check on their movements and go far to prevent the illicit killing and sale of big game which, I am credibly informed, is the common practice of these gentlemen.

As to the vexed question of game control, it seems hard to hit on the right solution. The western people claim Ottawa is too far away to keep in close touch and sympathy with the needs of their game, and point in alleged proof to the case of the fish. To a disinterested observer it must appear that there are, under present conditions, too many sets of underpaid officials, all taking a hand at the game. One well-paid man who does not have to farm or buy cattle, or run hotel most of the time in order to make ends meet can actually *do* the work that a dozen average deputy game wardens are supposed to do. British Columbia has proved that. The moral, then, is to concentrate. Wherever possible, place forest, fish and game under one strong commission (to exclude politics) and let their basic axiom be "Good work, good pay."

In her countless delightful nooks from ocean to ocean, in her rich and varied fauna, in her magnificent scenery, in her glorious summer season, Canada has a resource which, though it will cost us but little to maintain, yet promises untold millions of wealth. If Canadians will exert themselves only a little, our country will be the Mecca for wealthy fun-seekers and sportsmen from all lands; and exchanging fun for money is more profitable than gold mining, or even growing "Alaska" wheat. Shall we not do this? In that case, our forests, besides supporting a great lumber industry, will, with all they imply, be the chief cornerstone also of this rich auxiliary resource. In conclusion, therefore, we naturally appeal once more to the forester—and that with confidence—as the man whose efforts and enthusiasm for this ideal must win and inspire Jack Canuck to "organize and advertise and realize."



[Photo by N. M. Ross,

White Spruce Seeding the Prairie, Sprucewoods Reserve, Manitoba.

THE DOMINION FOREST RESERVES.

BY A. KNECHTEL.

INTRODUCTORY.

It would almost seem as if the white race had begun wrong on this continent. Needing cleared land for agriculture we started in the woods, and now when we need woods we start on the cleared land. The arrangement was not an economic one. The prairie should have been located near the Atlantic and the woodland in the Northwest. Arranged as it was, with the forest on the land that was close to the market for its products, forest destruction was at first a necessity, and later became a habit. Fire, the good servant in clearing the land, ran rampant carrying forest devastation far beyond the necessities of the people.

The earliest settlers, coming from Europe were used to forest conservation. They had practised it in the countries from which they came. Forest destruction was to them a new thing; but the forests were so vast that they thought there could never be a scarcity of wood, and they reasoned that the more the forest was destroyed, the more the agricultural interests of the country would be advanced. But the modern settler sees the forest in a different light, especially so in the great Northwest where on the wide prairie wood is a luxury. To him forest conservation is the necessity, not forest destruction. He has no delight in the devastation of the woods by fire, and he hails with hope legislation and management tending to improve the condition of the forest. He sees clearly that his comfort and his agricultural interests are closely dependent upon a plentiful supply of wood.

The country is so vast and the demand for wood so great, it is a tremendous problem to so manage the forests that this demand may be met continuously. Hope seems to lie in the creation of forest reserves, and the policy of setting aside land to be used as forest reserves is now pretty well established by the Dominion Government.

The Dominion Forest Reserves are intended to preserve and produce a perpetual supply of timber for the people of the prairie, the homesteaders' needs being considered of first importance. They are not intended to furnish wood for the lumber trade. Hence the policy of the Department is favorable to small mills rather than to large ones which need large tracts of forest and

manufacture lumber beyond the needs of the settlers. To furnish wood is primarily the purpose of Parliament in the creation of the reserves. To be sure, our legislators are not unmindful of other blessings of the forest. They are well aware that forests feed springs, prevent floods, hinder erosion, shelter from storms, give health and recreation, protect game and fish, and give the country aesthetic features. However, the Dominion Forest Reserve policy has for its motto, "Seek ye first the production of wood and its right use and all these other things will be added unto it."

LOCATION AND AREA.

The Dominion Forest Reserves all lie in the northwestern provinces. They are twenty-six in number, including the parks whose timber is managed in precisely the same way as that of the timber reserves proper. The number twenty-six does not include the eastern slope of the Rockies, however, although it also is under management similar to that of the forest reserves. Manitoba has six reserves, namely:

| | | | |
|-------------------------------------|--------------------|-----|--------|
| Riding Mountain Reserve, containing | 1535 | sq. | miles. |
| Duck Mountain | 1251 | " | " |
| Porcupine No. 1 | 322 | " | " |
| Lake Manitoba West | 248 | " | " |
| Spruce Woods | 110 | " | " |
| Turtle Mountain | 109 $\frac{1}{4}$ | " | " |
| Total..... | 3575 $\frac{1}{4}$ | " | " |

Saskatchewan has four, namely:

| | | | |
|-------------------------------------|-----|-----|--------|
| Porcupine No. 2 Reserve, containing | 360 | sq. | miles. |
| Moose Mountain | 163 | " | " |
| The Pines | 145 | " | " |
| Beaver Hills | 72 | " | " |
| Total..... | 740 | " | " |

Alberta has six, namely:

| | | | |
|---------------------------------|------|-----|--------|
| Jasper Park Reserve, containing | 5000 | sq. | miles. |
| Rocky Mountain Park Res." | 4500 | " | " |
| Cooking Lake Reserve, | 114 | " | " |
| Kootenay Lakes, | 54 | " | " |
| Cypress Hills | 18 | " | " |
| Elk Island | 16 | " | " |
| Total..... | 9702 | " | " |

British Columbia has ten, namely:

| | | | |
|-------------------------------|------|-----|--------|
| Yoho Park Reserve, containing | 828½ | sq. | miles. |
| Glacier Park | 576 | " | " |
| Hat Creek | 208 | " | " |
| Long Lake | 190 | " | " |
| Tranquille | 149 | " | " |
| Niskonlith | 124½ | " | " |
| Monte Hills | 106 | " | " |
| Donald | 72 | " | " |
| Larch Hills | 25 | " | " |
| Martin Mountain | 18 | " | " |

Total..... 2295 " "

Summarizing:

| | | | | |
|--------------|--------|-----------|-----------|--------|
| Manitoba has | 3,575¼ | sq. miles | 2,288,160 | acres. |
| Saskatchewan | 740 | " " | 473,600 | " |
| Alberta | 9,702 | " " | 6,209,280 | " |
| B. C. | 2,295 | " " | 1,467,800 | " |

Grand Total 16312¼ 10,438,840 "

DATES OF FORMATION.

The Dominion Government awoke to the necessity of forming forest reserves in 1887, and has been constantly moving forward in that direction, thus conserving the timber, ever since that date, as appears from the following table which gives the dates when the reserves were set aside.

- 1887, June 23.—Rocky Mountain Park Reserve, by Act of Parliament.
- 1888, Oct. 11.—Glacier Park Reserve, by Order in Council.
- 1894, Dec. 29.—Moose Mountain Reserve, by Departmental Order.
- 1895, May 30.—The Kootenay Lakes Reserve, by Order in Council.
- 1895, July 13,—Riding Mountain Reserve, by Departmental Order.
- 1895, July 13,—Lake Manitoba West Reserve, by Departmental Order.
- 1895, July 13,—Spruce Woods Reserve, by Departmental Order.
- 1895, July 13,—Turtle Mountain Reserve, by Departmental Order.
- 1899, June 5,—Cooking Lake Reserve, by Departmental Order.
- 1901, Dec. 14,—Yoho Park Reserve, by Order in Council.
- 1901, Aug. 29.—Beaver Hills Reserve, by Departmental Order.
- 1902, Nov. 3 —Long Lake Reserve, by Departmental Order.



[Photo by S. Witten

Grazing, Riding Mountain Reserve, Manitoba.



[Photo by S. Witten

Forest Survey Party, Summer 1908.
Riding Mountain Reserve, Manitoba.

the people; then why should good grass be allowed to go to waste if it can be utilized? The grazing may be desirable also as a protection to the woods. In some places the ground is covered with a dense growth of long grass and peavine. This, when dry, offers much fuel for fire; and when the fire once gets into it, it is almost impossible to check the flames. Cattle on the prairie have much the same habit as the buffalo. In going to water they follow one another and make paths which they follow day after day. These paths are fire lines where the fire may be checked, small to be sure, but there are many of them, and they give lines from which to back-fire.

Perhaps it will be objected that grazing prohibits the reproduction of timber. It seems to me, however, that the interference with reproduction from this cause is much overestimated. I know in the West many fields grazed constantly that have come into timber. There is danger from overgrazing, but from judicious grazing there is much less danger than from long grass and peavine.

PROTECTION AGAINST FIRE.

The problem of protecting the forest reserves against fire is the most difficult one we have. The fire problem is difficult even in the eastern provinces; but the conditions for fighting fire here are very favorable as compared with those prevailing in Manitoba, Saskatchewan, Alberta, and eastern British Columbia. Compare, for instance, the number of rainy days for the summer months at Calgary, Alberta; Qu'Appelle, Saskatchewan; Winnipeg, Manitoba; and Toronto, Ontario. In our comparison, however, we must not only consider the number of rainy days but also the quantity of rain falling on those days; because, although a day may be considered rainy, there may not be precipitation enough to count much towards putting out a forest fire. The following table is a comparison for the four places mentioned, showing the average number of rainy days in each of the summer months, and the average quantity of rain falling in those months. It is compiled from statistics furnished by the Meteorological Service published in a volume entitled "Rain and Snow-Fall of Canada."

TABLE OF RAINY DAYS.
(AVERAGE 1883 TO 1902—20 YEARS.)

| | Jan. | Feb. | Mar. | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Totals. |
|----------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|---------|
| Calgary, Alta..... | 0.20 | 0.06 | 0.33 | 2.93 | 9.40 | 12.93 | 12.00 | 8.66 | 6.93 | 2.79 | 2.66 | 0.26 | 59.15 |
| Qu'Appelle, Sask.... | 0.25 | 0.30 | 0.40 | 4.00 | 8.80 | 12.65 | 11.90 | 8.35 | 8.15 | 4.70 | 0.90 | 0.30 | 60.70 |
| Winnipeg, Man..... | 0.45 | 0.25 | 1.20 | 6.80 | 9.15 | 13.40 | 12.25 | 12.25 | 11.05 | 8.45 | 1.60 | 0.07 | 76.92 |
| Toronto, Ont..... | 5.30 | 5.75 | 6.70 | 9.30 | 13.30 | 11.35 | 11.95 | 10.35 | 11.05 | 13.20 | 11.15 | 7.45 | 116.85 |

TABLE OF RAINFALL IN INCHES.
(AVERAGE 1883 TO 1907—25 YEARS.)

| | Jan. | Feb. | Mar. | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Totals. |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Calgary, Alta..... | 0.013 | 0.016 | 0.024 | 0.262 | 2.010 | 3.060 | 2.630 | 2.490 | 0.991 | 0.191 | 0.004 | 0.005 | 11.696 |
| Qu'Appelle, Sask.... | 0.002 | 0.085 | 0.036 | 0.356 | 1.785 | 3.580 | 2.594 | 1.750 | 1.446 | 0.463 | 0.400 | 0.072 | 13.336 |
| Winnipeg, Man..... | 0.005 | 0.003 | 0.160 | 1.142 | 1.858 | 3.319 | 3.003 | 2.209 | 1.253 | 1.290 | 0.728 | 0.013 | 14.983 |
| Toronto, Ont..... | 1.128 | 0.954 | 1.360 | 1.467 | 2.754 | 2.844 | 2.856 | 2.624 | 2.855 | 2.532 | 2.104 | 1.563 | 25.041 |

It would appear from these tables that Toronto is at a slight disadvantage in the month of June. But of all the summer months, June, July and August offer the least danger to the forest. In these months the grass is green, the leaves are out on the shrubs and trees, the sap is in the bark, and the ground is moist from the shade of the trees. The chief danger periods are in the spring before June, and in the fall after September, when the woods are dry. The Ontario fire law is constructed upon the idea that the most dangerous period is from May 1st, to October 1st. My own observations in Ontario have led me to doubt the wisdom of that law in this particular.

The eastern provinces have a great advantage also in regard to the wind. The average hourly velocity of the wind at Winnipeg for the eight summer months of 1905, as stated by the Meteorological Service, was 14.87 miles per hour, while at Toronto it was only 7.36 miles per hour; just twice as great at Winnipeg as at Toronto. The people of the East were fortunate in that respect last summer. Had the wind here been as high as in the West, quite likely there would have been twice the quantity of timber destroyed. Then, in the East the winds are moist; there is no dry chinook.

Again, in respect to population the East has the advantage. When a forest fire starts in Ontario or Quebec, you can just

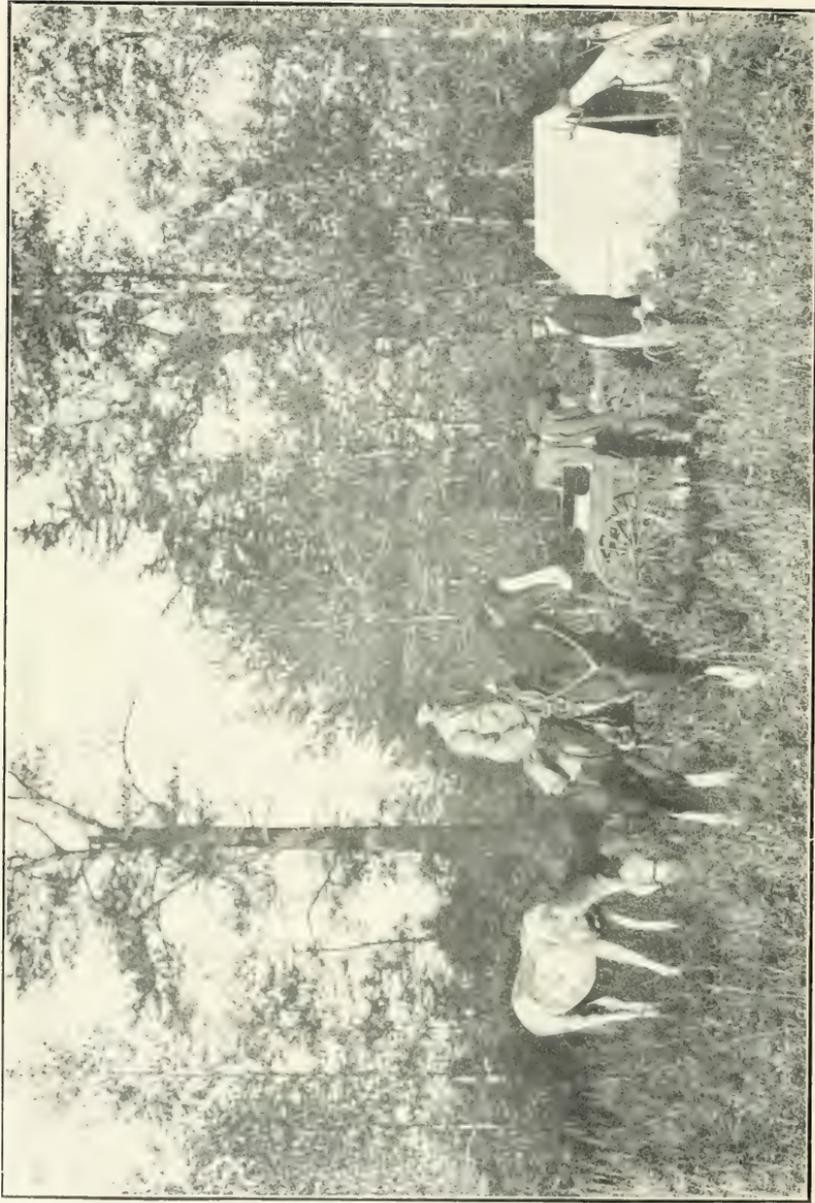


Photo by A. Knechtel

Forest Ranger Interviewing Campers, Cypress Hills Reserve, Alberta.

go out to the 100-acre farms, and to the numerous small villages and soon have a force of men to put it under control. But in the Northwest the population is scarce, railroads are not so numerous, and telephonic communication is not so good. In that country we cannot count much on putting out forest fires and so we have to be all the more diligent to see that fires do not get started.

The reserves are under constant patrol, summer and winter. During the danger periods the rangers lay aside all other duties and guard the forest against fire. In 1908, we had only two fires of any consequence, one in the Pines Reserve which burned over 22 square miles destroying no merchantable timber, and one in the Turtle Mountains, extending over 28 square miles, mostly covered with grass. In each of these fires, however, large areas of young reproduction growth was destroyed.

Last year we began a practice which we know saved the reserves several fires. It is a well known fact that, in the early spring, the fields become bare and the grass dry before the snow is all gone from the woods. While such conditions existed the forest rangers burned the meadows along the reserve boundaries. Fires, coming in from the prairie, met this wide fire line and died out for want of fuel. Around the Riding Mountains the meadows were burned for ninety miles, around the Duck Mountains for forty-two miles, and around the Porcupine Mountains for thirty miles, all these in the most dangerous places. It is the intention to extend this practice to all the reserves wherever it is practicable, and to carry it out upon an extensive scale.

Plowed fire guards also will be made around and across some of the reserves. The forest ranger on the Cypress Hills has instructions to plow a guard of four furrows entirely around the reserve, and outside of this four rods distant from it a second guard. Then, on calm days, with the help of two or three men he is to burn the grass between the two guards. On the Spruce Woods Reserve several guards will be plowed, one of which will run along each side of the Canadian Northern Railway which crosses the reserve.

Roads along the boundaries and through the reserves are being constructed to aid in fighting fire. One hundred and fifty miles was made this year. In certain places these roads are very much needed. For instance, I noticed in my inspection of the Turtle Mountain Reserve that the roads all run north and south. There is no way of going promptly and conveniently east and west. The fires mostly come in from Dakota which lies to the south. Therefore, to facilitate the fighting of fire the forest ranger was instructed to make a road follow-

ing the southern boundary. This will not only make it easier to move about on the reserve but it will serve as a fire line from which back-firing may be done.

REFORESTING.

The Department is making an attempt to reforest some of the areas denuded by fire. From some experiments made last spring, it would appear that this might be accomplishable by putting down a few seeds with a handful of sand over them at each place where we wish to have a forest tree. This was tried on the Turtle Mountains and on the Spruce Woods Reserve. In the former it was successful, in the latter unsuccessful. On the Turtle Mountains the seed was thus placed under poplars and among long grass. The following species were planted: White Pine, Norway Pine, Jack Pine, Bull Pine, White Spruce, Red Spruce, Colorado Blue Spruce, Engelmann Spruce and Balsam. Among the poplars the seed was evidently taken by birds, rodents or insects; but in the long grass every species germinated, and just before snow-fall the trees were alive and looking well.

It is intended to carry on a variety of such experiments next summer. For this purpose the forest ranger on the Spruce Woods Reserve collected last fall 40 bushels of Spruce cones, the ranger on the Cypress Hills 40 bushels of Lodgepole Pine, and a party of foresters working on the Pines Reserve 50 bushels of Jack Pine. These are the species with which we hope to achieve success as they are the ones likely to prove hardy.

We shall do our best to win along this line, because the method of raising trees in nurseries until they are three or four years old and then setting them out into the field is far too slow and too expensive a method to count much towards meeting the demand for wood that will develop on this continent during the next hundred years. The nursery method is simply gardening. It is a good method for the farmer's wood-lot. Foresters should, however, seek for a method commensurate to the needs of the Government lands. In the meantime, however, we are not despising the gardening method even on the reserves. We may be forced to use it, and next spring we shall start some seed beds. In fact 35,000 trees have already been planted on the Spruce Woods Reserve, from stock raised at the Forestry Farm at Indian Head.

REMOVAL OF SQUATTERS.

A large number of people, mostly foreigners, had located and started farming operations upon the reserves, expecting some time in some way, political or otherwise, they would be permitted to make entry for the places they occupied. The

Department determined upon their removal. They numbered one hundred and twenty-six on the Riding Mountain, and twenty-five on the Turtle Mountain Reserve. The task of removing these people was a delicate one and required great judgment and courage on the part of the forest rangers. The chief ranger of the Riding Mountains, W. A. Davis, devoted the entire summer to the work. All the squatters have been removed except three on the Riding Mountains and two on the Turtle Mountains. These remaining ones will move early next spring.

In this work the Department followed a lenient policy. The squatters were taken to look over lands in wagons furnished to them free of charge. They got free entry for the lands they selected, and they received compensation for improvements they had on the forest reserves. The total cost of removing all these people was only \$6,000. They have all made affidavits stating that they have been well treated and are pleased with the change.

MARKING RESERVE BOUNDARIES.

In order that the public may not unintentionally trespass upon the forest reserves thinking themselves on private property, or on other Dominion lands, the Department began last year to mark the boundaries with iron posts. These are three-cornered and hence differ in shape from the regular Dominion survey posts. They are marked with the letters "D. F. R." (Dominion Forest Reserve) and the part that projects out of the ground is painted red so that it will be readily observable, summer and winter.

Considerable work was done in this direction last year. Mr. David Beatty, a Dominion Land Surveyor, was at work with a party of men on the unsurveyed portion of the boundary of the Porcupine Reserve and ran fifty-one miles of the line. The forest rangers are working on the boundaries that have been surveyed and have located 140 miles.

This work was in many places difficult of accomplishment. It was about thirty years since the lines had been surveyed and some of them having been burned over, the wooden posts had been destroyed and the mounds almost obliterated. People familiar with the West know, also, that mosquitoes and flies are numerous and troublesome in the summer months. As it is the intention to have the boundary line a road from which fire can be fought it was cut out from six to eight feet wide.

Much more of this work would have been done if the rangers could have begun early in the spring. But during the early part of the summer they were all busy with the removal of squatters.

FOREST SURVEY.

In order that the Department may have a thorough knowledge of the reserves and become able to form judgment as to how the tree growth thereon should be managed, a timber and topographic survey is being conducted. Last summer Assistant Inspector MacMillan with a party of five forestry students conducted such survey of the Pines Reserve. Assistant Inspector Dickson did similar work with a party of thirteen in the Riding Mountains. It is the intention to have four such parties on the reserves next summer. This survey serves a double good purpose. It gives the Department the knowledge it desires and gives the students the practical side of their forestry course.

The timber survey makes a thorough study of the tree growth. It gives the areas covered with mature timber and with younger timber and states the quantity of each. It considers the accretion and the reproduction of timber in the forest and discovers means for their encouragement in quantity and quality. It examines areas having no tree growth, and recommends methods by which they may be afforested. It studies the effect of past management upon the forest, and advises improvements for the future. It suggests means by which dangers to the forest from fire, storms, fungi and insects may be reduced. It investigates the utilization of the forest, and seeks new uses for forest products.

The topographic survey describes the hills and valleys, the lakes, streams and trails. It studies the best routes for the removal of the mature timber and locates trails for protecting the forest against fire.

KINDS OF TIMBER.

The following species of trees exist in commercial quantity on the forest reserves:—

Poplar (*Populus tremuloides* Michx.) and Balm of Gilead (*Populus balsamifera* Linn.) exist on all reserves east of the Rockies. Poplar reaches a maximum size of 32 inches at breast height. Fifteen inches, however, is the largest common size for sound trees. Balm of Gilead reaches a maximum of 34 inches, with a common large size, sound, of 18 inches.

White Spruce (*Picea canadensis* [Mill.] B.S.P.) and Black Spruce (*Picea mariana* [Mill.] B.S.P.) exist on all reserves east of the Rockies except Turtle Mountain, Moose Mountain, Beaver Hills, Cooking Lake, Elk Island and Buffalo Park reserves. Maximum 48 inches; common large, sound, 18 inches.

Engelmann Spruce (*Picea engelmanni* Engelm.) exists on the Kootenay Lakes, Jasper Park, Rocky Mountain Park and



[Photo by J. F. Clark

Western Cedar and Black Pine,
Rocky Mountain Park Reserve, Alberta.

all British Columbia reserves. Maximum 30 inches; common large, sound, 16 inches.

Jack Pine (*Pinus banksiana* Lamb.) exists on all Manitoba reserves except the Spruce Woods and Turtle Mountain. In Saskatchewan it appears in the Porcupine and the Pines reserves. Maximum 20 inches; common large, sound, 12 inches.

Lodgepole Pine (*Pinus contorta*, var. *Murryana* [Engelm.] B.&W.) exists on the Cypress Hills, Kootenay Lakes, Jasper Park, Rocky Mountain Park and all British Columbia reserves. Maximum 20 inches; common large, sound, 14 inches.

Bull Pine (*Pinus ponderosa* Laws.) exists on all British Columbia reserves. Maximum 36 inches; common large, sound, 26 inches.

Western White Pine (*Pinus monticola* Dougl.) exists on all British Columbia reserves. Maximum 32 inches; common large, sound, 24 inches.

Tamarack (*Larix americana* Michx.) exists on all the Manitoba reserves except Turtle Mountain. It occurs on the Pines and Porcupine reserves in Saskatchewan, and on the Jasper Park in Alberta. Maximum 24 inches; common large, sound, 14 inches.

Western Larch (*Larix occidentalis* Nutt.) exists on all the British Columbia reserves. Maximum 30 inches; common large, sound, 24 inches.

Douglas Fir (*Pseudotsuga mucronata* Sudw.) exists on the Kootenay Lakes, Jasper Park, Rocky Mountain Park and all British Columbia reserves. Maximum 36 inches; common large, sound, 24 inches.

Balsam (*Abies balsamea* [Linn.] Mill.) exists on Riding Mountain, Duck Mountain, Porcupine and Lake Manitoba West reserves. Maximum 17 inches; common large, sound, 10 inches.

Western Cedar (*Thuja plicata* Don.) exists on all British Columbia reserves. Maximum 84 inches; common large, sound, 40 inches.

Western Hemlock (*Tsuga mertensiana*, authors) exists on the British Columbia reserves. Maximum 35 inches; common large, sound, 10 inches.

White Birch (*Betula papyrifera* Marsh.) exists on the Manitoba reserves. Maximum 26 inches; common large, sound, 14 inches.

There are also on the Manitoba reserves small quantities of merchantable Green Ash (*Fraxinus lanceolata* Borkh.). Maximum 12 inches; common large, sound, 8 inches. Bur Oak (*Quercus macrocarpa* Michx.). Maximum 27 inches; common large, sound, 10 inches. Manitoba Maple (*Acer negundo* Linn.). Maximum 11 inches; common large, sound, 7 inches.

TIMBER ESTIMATES.

As has been previously stated, the Department is making a forest survey of the reserves which should give a close estimate of the timber thereon. Such estimate has been made for the Riding Mountain Turtle Mountain, Moose Mountain and the Pines reserves, and for these the following figures are probably close to the actual quantities on those reserves. For all other reserves the estimates are only tentative:—

MANITOBA RESERVES.

| | Saw Timber. | Fuel Wood. |
|-------------------------|---------------------|------------------|
| Duck Mountain..... | 300,000,000 bd. ft. | 3,000,000 cords. |
| Riding Mountain..... | 250,000,000 " | 2,500,000 " |
| Porcupine No. 1..... | 50,000,000 " | 750,000 " |
| Turtle Mountain..... | 1,333,000 " | 135,000 " |
| Spruce Woods..... | 1,000,000 " | 30,000 " |
| Lake Manitoba West..... | 600,000 " | 40,000 " |
| Total..... | 602,933,000 " | 6,250,000 " |

SASKATCHEWAN RESERVES.

| | Saw Timber. | Fuel Wood. |
|----------------------|--------------------|----------------|
| Porcupine No. 2..... | 50,000,000 bd. ft. | 500,000 cords. |
| Moose Mountain..... | 5,000,000 " | 130,000 " |
| The Pines..... | | 50,000 " |
| Beaver Hills..... | | 10,000 " |
| Total..... | 55,000,000 " | 690,000 " |

ALBERTA RESERVES.

| | Saw Timber. | Fuel Wood. |
|------------------------|-----------------------|-------------------|
| Eastern Slope..... | 3,000,000,000 bd. ft. | 50,000,000 cords. |
| Rocky Mountain Park... | 300,000,000 " | 3,000,000 " |
| Jasper Park..... | 100,000,000 " | 1,000,000 " |
| Cypress Hills..... | 2,000,000 " | 100,000 " |
| Cooking Lake..... | | 100,000 " |
| Kootenay Lakes..... | | 10,000 " |
| Elk Island Park..... | | 10,000 " |
| Total..... | 3,402,000,000 " | 54,220,000 " |

BRITISH COLUMBIA RESERVES.

| | Saw Timber. | Fuel Wood. |
|--------------------------|---------------------|------------------|
| Railway Belt & Yoho Park | 600,000,000 bd. ft. | 6,000,000 cords. |

SUMMARY.

| | Saw Timber. | Fuel Wood. |
|------------------------|---------------------|------------------|
| Manitoba Res..... | 602,933,000 bd. ft. | 6,250,000 cords. |
| Saskatchewan Res..... | 55,000,000 " | 690,000 " |
| Alberta Res..... | 3,402,000,000 " | 54,220,000 " |
| British Columbia Res.. | 600,000,000 " | 6,000,000 " |
| Total..... | 4,659,933,000 " | 67,160,000 " |

ESTIMATE OF ANNUAL OUTPUT.

The following table showing the quantities and kinds of timber taken from the reserves is also tentative as it is only an estimate. Heretofore, the quantities of timber cut on permits granted for the reserves have not been kept separate in the records from those granted for timber on other Dominion lands. It is the intention that in future forest reserve matters shall be kept by themselves so that accurate data in regard to them can be obtained. The receipts, however, as stated in the table, may be considered as correct. The figures may seem small considering the quantities of timber removed; but it should be borne in mind that every homesteader is entitled to one free permit.

TIMBER CUT DURING YEAR ENDING MARCH 31ST, 1908.

| DISTRICT. | Lumber. Ft. B.M. | Logs. Lineal ft. | Cordwood. Cords. | Fence Posts. No. | Fence Rails. No. | Poles. No. | Receipts |
|--|---------------------|---------------------|---------------------|------------------------|------------------------|---------------|-------------|
| Manitoba Reserves..... | 3,789,180 | 17,134 | 3,647 | 31,100 | 22,650 | 8,250 | \$ 7,044.41 |
| Saskatchewan Reserves | 343,435 | 464,110 | 9,029 | 117,140 | 106,510 | 102,414 | 535.35 |
| Alberta Reserves | 1,400 | 332,612 | 1,280 | 52,080 | 247,155 | 48,265 | 56.75 |
| British Columbia Reserves... | 8,338,000 | | 2,500 | | | | 4,794.00 |
| Eastern slope, North as far as Brazeau River..... | 31,651,610 | | 56,037 | 336,860 | 1,336,700 | | 19,325.00 |
| Totals..... | 44,123,625 | 813,856 | 72,493 | 537,180 | 1,713,015 | 158,929 | \$31,755.51 |

Throwing these different kinds of material into saw timber and cordwood we have saw timber about 45,751,325 board feet; cordwood 105,943 cords. Dividing these quantities into the quantities estimated as standing on the reserves and we perceive that the saw timber should last for one hundred years, and the cordwood for six hundred and thirty-four years, practically forever, providing that the rate of consumption remains the same and that no timber be destroyed by fires or other causes. To be sure the growth has not been taken into account, but it is reasonable to suppose that fires will at least offset the growth, be we ever so vigilant.

THE REMOVAL OF TIMBER.

The cutting of timber on the forest reserves is under the control of the Superintendent of Forestry. In the Moose Mountain, Turtle Mountain, Spruce Woods and Cypress Hills Reserves no wood except dry or fallen timber is allowed to be cut. On these reserves there is no mature timber and the restriction is necessary to save the young trees which would otherwise be cut as soon as they would become usable. On all other reserves both dry and green timber may be cut.

Permits to cut dry wood up to twenty-five cords are granted free of dues, only a small office fee of twenty-five cents being required as on all permits. Permits are granted to cut dry wood for sale or barter up to one hundred cords at the rate of twenty-five cents a cord.

A homesteader is allowed one free permit and only one, to cut either dry or green timber if he has no timber suitable for his purposes on his own place. A free permit may be issued for the following quantities:—

(a) 3,000 lineal feet of building timber, no log to be over 12 inches in diameter at the butt end, unless the timber is cut from dry trees, in which case timber of any diameter may be taken. If the building timber is to be sawn at the mill the permittee is entitled to receive free of dues enough timber for 9,250 feet of lumber, and no more.

(b) 400 roof poles to be used for such purpose.

(c) 500 fence posts, 7 feet long, and not to exceed 5 inches at the small end.

(d) 2,000 fence rails.

In Manitoba, Saskatchewan, or Alberta, a settler who loses his dwelling or other building by fire not due to his own carelessness, is entitled to a free permit for timber to replace it. The quantity, however, must not exceed the amounts stated above.

Any bona fide settler who has not a sufficient supply on his own farm may be granted each year a permit for the following quantities of timber at the prices here stated:—

10,000 feet board measure of building logs for lumber, no tree to be cut which is of less diameter than ten inches at breast height, or at four and one-half feet from the ground:

Poplar..... @ \$1.50 per thousand feet.

Other Species..... @ 3.00 " "

500 fence posts, seven feet long, not to exceed five inches in diameter at the top:

Poplar and Willow..... @ 2c. each.

Other Species..... @ 5c. " "

500 fence rails or roof poles, not to exceed six inches in diameter at the butt:

- Poplar only..... @ 2c. each.
- 1,000 lineal feet of round building material, no log to exceed twelve inches in diameter at the butt:
- Any Species..... @ 1c. per lineal ft.
- 15 cords of fuel: \$1
- Poplar only..... @ \$1.00 per cord.

Timber cut without permit in the reserves is seized by the forest rangers, and double dues are charged upon it. If the dues are not paid the timber is disposed of at public auction. If no bid is received equal to the amount due the Government the wood may be disposed of by private sale. During 1908 the rangers seized 190,626 feet, board measure, 900 fence posts and 16 loads of cordwood, and collected as dues \$1,101.61 with some seizures still unsettled.

Up to the present time permits have been granted only to actual settlers living within fifty miles of the nearest boundary of any reserve. This limitation is under consideration. There is very little wood in southern Manitoba and scarcely any in Saskatchewan, and it is a question if the people all over these provinces should not be allowed the use of the mature wood of the forest reserves. It may not be quite justice to allow only the people living in the immediate vicinity of the reserves to have all the blessings.

It is a question also, if it is wise to allow only settlers to cut the timber. The average settler in taking out timber has little care for the future of the forest. His only object is to get out the timber he needs as easily as possible. If one tree has all the timber he requires, but if two will furnish it more easily, he will cut the two trees. Moreover, the settlers cut high stumps leave large tops, and make no disposal of the brush. Millmen, knowing the loss in cutting high stumps and leaving large tops, and having regard for the future growth, treat the forest with much greater care. It therefore seems to me that mills should be permitted to enter the reserves, but they should enter under certain restrictions:—

- (1) Only portable mills should be permitted.
- (2) Mills should locate where the Forestry Branch directs.
- (3) Permits should be granted for a definite tract not more than one mile square.
- (4) Permits should be granted for one year only, but should be renewable at the discretion of the Superintendent of Forestry and should be cancellable at any time for violation of the regulations.
- (5) Only such timber should be cut as is marked previously by the Department for removal, and no cutting should begin before the marking is completed.

- (6) In cutting down the trees the stumps left should not be more than 18 inches high.
- (7) The trees should be cut down with a saw.
- (8) All parts exceeding 4 inches in diameter of trees cut down should be removed by the permittee, and this should be done as the cutting progresses.
- (9) Brush should be cut so as to lie flat on the ground excepting along the roads where it should be piled and burned under the immediate supervision of the Department.
- (10) Any unmarked trees cut down on account of the lodging of the larger trees in felling should be piled by themselves separately from the other logs, and should be considered the property of the Department to be afterwards disposed of, either to the permittee or others as considered best.
- (11) The dues on timber removed should be the same as those demanded of settlers.
- (12) Lumber should be sold only to bona fide occupants of homesteads, or for the purpose of erecting churches and schools in rural districts.
- (13) Any lumber obtained from a permittee and afterwards sold or offered for sale should be seized by the Department.
- (14) No settler should be permitted to receive from the mill in any one year more than 10,000 feet of lumber.
- (15) The price of lumber at the mill should be fixed periodically by the Department.
- (16) Settlers should be permitted to draw out their lumber with their own teams.
- (17) Permittees should be required to keep a mill book in which should be recorded all sales, to whom made, quantity sold, and price charged.

The Department has this scheme of treating the forest already under operation. A sawmill operating in the Cypress Hills was last fall put under such restrictions, partly as an experiment, and I am glad to be able to report that the experiment is apparently a success. The owner of this mill had applied for a tract of spruce timber three-fourths of a mile square. The Department stated the restrictions. They were accepted. Assistant Inspector Dickson marked the trees to be cut, and the work of cutting began. The forest ranger of the Cypress Hills Reserve, who has the work under his supervision, writing on January 22, 1909, reports as follows: "I have been down to the Grayburn mill for a few days and was all through the bush where they are cutting. They are keeping very close to the marked trees. I told them to get the brush piled along the trails and to

get the poles out and they promised to do so. I will go down again soon and burn it."

THE RESERVES AS PLEASURE RESORTS.

There are many beautiful lakes on the forest reserves and some of these are being now freely used as summer resorts. It seems to me that this should be encouraged. The campers are not a menace to the forest, in fact they are a protection, as they have personal interest in guarding the forest against fire. Besides, with campers on the lakes when a fire occurs there are people at hand to help to extinguish it. Therefore, the Department has under consideration the advisability of renting camp sites on the shores of these lakes, the leases to be made out for ten years, renewable at the discretion of the Superintendent of Forestry and cancellable at any time for any misuse or menace to the forest reserve.

The University of New Brunswick Forestry Department has issued an eight page pamphlet entitled "Forestry: the new Profession." The training required for forestry work and the opportunities afforded in government employ, work with private companies, teaching and other lines are described at length.

The West Northumberland (Ont.) Farmers' Institute at a late meeting made a formal request of the Provincial Government for the establishment of a forest reserve in that riding.

The properties of the Alfred Dickie Lumber Company in Nova Scotia have been disposed of to an English syndicate. The properties include 405,000 acres of timberlands and eight mills. The price paid was \$1,567,500.

The Committee on Forestry of the Ontario Experimental Union for 1909 is composed of Messrs. E. J. Zavitz, Director; H. R. MacMillan and E. C. Drury. Mr. E. J. Zavitz is also a member of the Schools Committee, representing the forestry interest.

During 1908 some 55,000 cords of pulpwood were shipped from Chatham, N.B., to Rumford Falls, Me., and 15,000 cords from the lower Androscoggin river to Bath, Me.

GREAT BRITAIN'S AFFORESTATION SCHEME.

Great Britain has frequently been pointed out as one of the few examples of European countries that do not practice forestry. That unenviable reputation, however, bids fair to be removed if the scheme lately recommended by the Royal Commission on Coast Erosion is put into operation.

It will be remembered that enquiry into the possibilities of afforestation and its bearing on the "unemployed" was referred to the Royal Commission on Coast Erosion in March of last year, six members being then added to the original Board. A great deal of evidence has been brought together from landowners, land agents, forestry experts, head foresters, labour representatives, and other duly qualified witnesses. A well-considered report strongly advocating afforestation on a large scale is the result.

FORESTRY WILL PAY IN BRITAIN.

The first part of the report deals with the present unsatisfactory condition of British woodlands. The circumstances that have caused the defects are described, it being shown that the difficulties are not natural or inherent, but are due to mistaken treatment or to a system of forestry having objects other than economic timber production.

The Commissioners find that "The natural conditions of soil and climate in the United Kingdom are favourable to the production of high-class commercial timber, such as is annually imported into the country in very large quantities," and that "the afforestation of suitable lands in the United Kingdom, if undertaken on an adequate scale and in accordance with well-recognized scientific principles, should prove at present prices a sound and remunerative investment."

In support of this contention a mass of expert evidence is forthcoming, and examples are given of British woodlands which have proved profitable, in spite of very indifferent management.

STATE MANAGEMENT ESSENTIAL.

As the Commissioners point out, afforestation is pre-eminently a task for the State; continuity of ownership and management are assured, and the resources of the country allow of expenditure upon a scheme which, though it yields no immediate return, is ultimately distinctly remunerative. Considerations such as those affecting the preservation of game vitiate most attempts at private afforestation, but State forestry can be carried out with the single view to the production of revenue. State forestry on the Continent has long been practised

with marked success, and there seems to be no reason why trees should not be grown as well and profitably in Britain as, for example, in Germany. The trees that are grown are of the same species, climatic and other conditions are not less favourable, and prices are actually higher in Britain. The main cause is the difference in the efficiency of management and the thoroughness of technical forestry education in Germany. Until recently satisfactory facilities for forestry instruction did not exist in Britain, and so British methods are not exactly all that they should be.

TIMBER FAMINE THREATENED.

For some time past it has been realized that foreign timber supplies, upon which Britain is dependent to the extent of over £30,000,000 annually, are becoming exhausted. The Commission's investigation confirms this opinion, proving beyond doubt that the outlook is extremely grave.

A constantly increasing demand for timber, together with reckless exploitation and destruction of forests by fire and other agencies, is reducing the timber resources of Canada, the United States and Northern Europe to an extent which "threatens the maintenance of supplies." In addition to this fact, the use of timber is increasing, no satisfactory substitutes being available for many of its uses.

In addition to the serious effect which the shortage of a material generally regarded as indispensable would have upon trade, there is the universal inconvenience which its absence would occasion. The only satisfaction to be gained from the point of view of those concerned in the production of timber is that prices are bound to rise. The value of imported wood has increased markedly within the last twenty years, and there is every indication that there will be a very material advance before plantations now established can yield marketable produce. The calculations of the Commission regarding the profits resulting from afforestation are not, however, based on this probable rise, but only upon present prices.

THE LABOR PROBLEM.

According to its terms of reference, the Commission was required to consider the suitability or otherwise of unemployed labor for forestry work. This is admittedly a difficult question, for there is on the one hand the desire to help a depressed class by engaging them upon productive labor, and on the other hand the fear that their services would frustrate the objects of economic forestry and endanger the whole scheme. The Commissioners have, therefore, gone thoroughly into the matter, and have examined a very large number of witnesses. Their general

finding is that much the greater proportion of the urban unemployed are unfit to undertake planting work. However, as the total number who would receive temporary employment would be only about 18,000 at the most, the Commissioners consider that a sufficient number of unemployed persons might be found "willing to submit to and able to satisfy ordinary labor tests." In addition, much permanent employment would be afforded. This would gradually increase as the area of afforestation was extended, until ultimately about 90,000 men would find occupation in the national forests. The Commission supports the view of the Departmental Committee of 1902 that permanent employment would be provided for about ten times the population at present engaged on pastoral land of the kind that is suitable for afforestation.

Another outlet for labor would eventually be found in industries such as wood pulp manufacture, and the conversion of timber-works which at present are mainly performed abroad. The permanent laborers would be mainly, if not entirely, drawn from rural districts, where, in winter at least, a good deal of unemployment exists. The occupiers of small holdings and crofters would also benefit, as forestry work is carried out precisely at the season of the year when there is little to do on the farm.

The Commissioners clearly state that they have "in contemplation a scheme of national afforestation on economic lines." They do not advise that forestry be made an instrument of charity for the employment of those out of work in cities. Even representatives of the Labor party, when giving evidence, insisted that forestry should not be treated as a "relief" work, but should be conducted on thoroughly sound business principles.

ACQUIRING THE LAND.

According to the recommendations embodied in the report, the administration would be entrusted to a special "Board of Commissioners." It would first be necessary for this Board to ascertain the exact location of the silvicultural areas and to prepare schemes of afforestation for each scheduled district. It is proposed, moreover, to grant the Forest Commissioners powers for the compulsory acquisition of land, "on the precedent of the Small Holdings Act, 1907, so far as applicable, subject to the reservation of certain rights to private owners." This conclusion was arrived at owing to the necessity of silviculture being carried out on large compact areas, and it did not appear to the Commissioners "probable that all owners of suitable land would be ready voluntarily to sell on reasonable terms." In default of purchase by agreement, they therefore recommend that compulsory powers be obtained by legislative enactment.

The Commissioners have not overlooked the fact that an extensive area of land could not be transferred from pastoral to forestry occupation without some gradual curtailment of food supplies and displacement of labour. They calculate, however, that the production of meat (principally mutton) would only be diminished to the extent of barely 5 per cent., while much of the labour employed in the tending of sheep could be diverted to forestry operations.

FINANCING THE PROJECT.

In Part V. of the report the Commissioners deal with the finance of the subject, and give estimates showing the detailed working of two alternative schemes of planting, together with the monetary results which may be anticipated. Taking the larger of these schemes, it is proposed that 9,000,000 acres of land be brought under forest. Evidence was taken regarding the area suitable for afforestation, and it was found that such an area could be made available without materially encroaching upon agricultural land. The Commissioners consider that no less than 6,000,000 acres could be found in Scotland alone.

Assuming that the forests be established gradually during the next sixty years, 150,000 acres would be planted annually. In the early years the expenditure would be £90,000. This would increase gradually until at the maximum it would amount to about £3,000,000. After the fortieth year, however, the forest would become self-supporting, and at maturity a net revenue of over £17,000,000 may be anticipated. At the same time the State would be in possession of property worth £562,000,000, or after allowing for compound interest at 3 per cent., about £107,000,000 in excess of the total cost involved in its creation.

The smaller scheme involves the afforestation of 6,000,000 acres—75,000 acres to be planted annually for eighty years.

The investment would be financed by a loan, the interest on which would be defrayed out of taxation. No scheme of the kind can, of course, be inaugurated without sacrifice on the part of the present day tax payer, but as a set-off against this, there is the consideration that employment is being given to a certain number of persons who might otherwise be a burden on the rates. Furthermore, afforestation is a productive investment, creates a new industry, does not compete with private enterprise, and "more than any other apparent remedy will stem the tide of rural depopulation."

THE COMMISSION'S CONCLUSIONS.

The following is a synopsis of the principal conclusions reached in the report:—

1. Afforestation is practicable and desirable.
2. Approximate available area in the United Kingdom without material encroachment upon agricultural land is 9,000,000 acres.
3. Best rotation to secure sustained timber yield requires 150,000 acres to be afforested annually.
4. Employment.
 - (a) Temporary—Temporary employment is afforded annually to 18,000 men during the winter months. Further, an almost equal number would indirectly derive employment in the incidental and subsidiary occupations connected with forestry. This figure might be increased in any year to meet exceptional pressure of unemployment.
 - (b) Permanent—Permanent employment is afforded to one man per 100 acres afforested, rising to 90,000 men when the whole area has been dealt with.
 - (c) Ultimate—The employment connected with subsidiary industries—conversion and manipulation, etc., of the timber crop, would afford occupation for a still larger population.
5. Any scheme of national afforestation should be on an economic basis.
6. Labour—There are sufficient unemployed persons willing to submit to and able to satisfy ordinary labour tests, who could advantageously be employed without a period of special training.
7. Finance—Afforestation represents a productive investment, and should be financed by a loan. The annual sum required for the full scheme is £2,000,000. The interest on the loan should be defrayed out of taxation. The net deficit will be £90,000 in the first year, and will rise progressively to £3,131,250 in the fortieth year, after which period the forest becomes more than self-supporting.
8. Profits—After eighty years the net revenue from the forest at present prices—which promise to be materially enhanced—should be seventeen and a half millions. This represents 3 $\frac{3}{4}$ per cent. on the net cost, calculated at accumulated compound interest of 3 per cent. Looked at from another point of view the State will then be in possession of property worth £562,000,000, or about £107,000,000 in excess of the total cost involved in its creation, calculated at 3 per cent. compound interest.
9. Administration and control—The afforestation scheme to be entrusted to a special Board of Commissioners. In default of purchase by agreement, land to be acquired if necessary under compulsory powers.
10. Disturbance—The acquisition of grazing areas for silviculture might necessitate a modification of the existing agricultural system on certain farms. There is no reason to

suppose that the remaining lowland areas on such farms could not either be adapted to other forms of agriculture, or could not in many cases be profitably utilized for small holdings. The acquisition of grazing areas, private or common, should present no difficulty which cannot be satisfied by arbitration and reasonable compensation.

11. *Incidental*—Afforestation creates a new industry. It does not compete with private enterprise. The conversion of comparatively unprofitable lands into forests enhances the productiveness of the adjacent areas, and should promote the development of the small holdings movement. More than any other apparent remedy, afforestation will stem the tide of rural depopulation.

RECOMMENDATIONS OF THE COMMISSION.

In view of the foregoing conclusions, the Commissioners recommend that:—

1. Parliamentary powers be obtained to—

(a) Appoint Commissioners charged with the duty of carrying out a national scheme of afforestation.

(b) Vest in them power to survey and determine what land falls under a statutory definition of "suitability," and to acquire such land as from time to time may be required for afforestation or purposes incidental thereto.

(c) Equip the Commissioners with compulsory powers for the acquisition of such land on the precedent of the Small Holding Act, 1907, so far as applicable, subject to the reservation of certain rights to private owners.

(d) Authorize the Treasury to grant the Commissioners an annual free loan for the necessary period.

2. (a) The Commissioners should prepare a general scheme of afforestation for the whole of the contemplated area, extending over the entire period of rotation.

(b) An actuarial statement should be supplied by them to the Treasury indicating when and in what manner the loan and interest would be repaid.

(c) The afforestable area should be divided into convenient sub-districts.

(d) Work should be commenced in each or as many as convenient of the districts in such a way as to provide that the earlier operations, which may be regarded as experimental, should be capable of determination or of forming part of the complete forest scheme for each district.

The signatures appended are those of all the members of the Royal Commission, namely:—

The Hon. Ivor C. Guest, M.P. (Chariman).

Sir Wm. H. Browne Ffolkes, Bart.

Sir Leonard Lyell, Bart.

Sir Wm. Matthews, K.C., M.P.

Mr. E. Stafford Howard, C.B.

Mr. H. C. Monro, C.B.

Mr. W. Phipson Beale, K.C., M.P.

Commander G. C. Frederick, R.N.

Mr. John Galvin.

Mr. H. Rider Haggard.

Dr. T. J. Jehu.

Mr. A. Levy Lever, M.P.

Mr. R. Beattie Nicholson (Town Clerk of Lowestoft).

Mr. Patrick O'Brien, M.P.

Professor Wm. Somerville.

Mr. Fraser Story, F.R.S.E.

Mr. Thomas Summerbell, M.P.

Mr. John Ward, M.P.

Mr. A. Stanley Wilson, M.P.

The signature of the last-mentioned is made with a reservation, which forms an appendix to the report.

Between fifteen and sixteen million feet of pulpwood will be shipped in the spring from New Brunswick by the Bay Shore Lumber Company, St. John, N.B., to their mills in Maine.

The sum of \$350,000 will, it is said, be spent by English capitalists in establishing a pulp mill at Powell River, B.C.

The British Columbia provincial estimates include an item of \$37,000 for fighting forest fires, and for the services of log scalers.

THE CONSERVATION CONFERENCE.

The United States now has 550,000,000 acres of forested lands, or about one-fourth of the total land area of the continental United States. The original forests covered not less than 850,000,000 acres. Publicly owned forests cover one-fourth of the total and contain one-fifth of the timber standing; privately owned forests cover the remaining area and contain the remainder of the timber standing. Scientific forestry is now practiced on seventy per cent. of the publicly owned forests and on less than one per cent. of the privately owned forests. The total yearly growth of the forests of the United States is less than seven billion cubic feet; there are taken from the forests each year, including waste in logging and manufacture, 23,000,000,000 cubic feet, or more than three times the annual production. The United States uses annually 100,000,000 cords of firewood; 40,000,000,000 feet of lumber; more than 1,000,000,000 posts, poles and fence rails; 118,000,000 hewn ties; 1,500,000,000 staves; 113,000,000 sets of headings; 500,000,000 barrel hoops; 3,000,000 cords of native pulpwood; 165,000,000 cubic feet of round mine timbers, and 1,250,000 cords of wood for distillation. Not less than 50,000,000 acres of forest land are burned over annually, and since 1870 forest fires have destroyed each year an average of fifty lives and \$50,000,000 worth of timber. One-fourth of the standing timber is left or otherwise lost in logging; the boxing of long-leaf pine for turpentine has destroyed one-fifth of the forests worked; the loss in the mill is from one-third to two-thirds of the timber sawed, and the loss in the mill product, from seasoning and fitting for use, is from one-seventh to one-fourth. In other words, only 320 feet of lumber is used for every 1,000 feet that stood in the forests. The lumber cut has increased less than fifteen per cent. in the last years, but the average price at the mill, for all kinds of lumber, has risen forty-nine per cent., and the rise continues. Misuse of the forests is invited by over-taxation and in one year fire destroys timber enough to supply the whole country for three months. To protect farms from wind and to make stripped and treeless lands productive, there should be planted an area larger than that of the states of Pennsylvania, Ohio and West Virginia combined; so far, lands planted to trees make a total area smaller than that of Rhode Island. By reasonable thrift the country can produce a constant timber supply beyond the present needs and with it conserve the usefulness of our streams for navigation, power, irrigation and water supply. The conservation of public forests is the smaller task before the nation and the states; the larger task

is to induce private owners, to the number of three millions, to take care of what they have, and to teach woodusers how not to waste. Forest fires must be stopped; by careful logging and other methods, waste must be reduced and cut-over lands left productive; by preservative treatment, the timber logged must be made to go further; needless waste in the mill, the factory and in use must be avoided. The lands, now treeless, which will be most useful under forests, must be planted up; taxes must be so adjusted that cut-over lands can be held for a second timber crop, and the fact must be recognized that timber costs no less to grow than to log and saw. The nation and the individual states must continue and perfect the preservation by wise use of the forests already publicly owned, and the same treatment must be extended to other mountain forests more valuable for the permanent benefit of the many than for the profit of the few.

The above is a summary, taken largely from "Conservation's" excellent account, of the report of the Section on Forests of the National Conservation Commission, given at the Conservation Conference which convened in Washington, D.C., on December 9th and 10th last.

The session of Thursday morning, December 10th, was devoted to the consideration of forest preservation. The chief speakers of the morning were Senator Reed Smoot, of Utah, Chairman of the section; Hon. W. C. Edwards, who represented the Canadian Government; Mr. Andrew Carnegie and State Forest Commissioner Whipple, of New York State.

Senator Smoot, after referring to the very complete report that had been presented, spoke of three great conclusions which sprang from the commission's report: first, the forest problem before the nation, the state and the individual was grave and urgent; second, they could solve this problem if they would act unitedly, vigorously and immediately; third, if they failed to act, the possibility of a satisfactory solution would be rendered doubtful, or even wholly removed. No nation had a more wholesome and enthusiastic sentiment for the right use of the forests than had the people of the United States, but no nation took poorer care of its private forests than they. The time had passed when the preservation of the forests was merely a debt they owed posterity. For their own immediate welfare the conservation of the forests, public and private, was absolutely essential and imperative for their industrial and commercial welfare.

Hon. Mr. Smoot then went over, with suitable comment and illustration, a number of the points of the report and went on to speak of some action that must be taken. Private owners must have impressed upon them the need of practicing reasonable economy in the woods, in logging, in milling and in the use of

lumber, and, above all, the need of protecting their forests from fire, of protecting the young growth and of replanting denuded areas of absolute forest soil. Upon the states was imposed the necessity of immediately passing tax laws which would enable private owners "to protect and keep productive under forest those lands suited only for forest growth." He did not believe that such a policy would have the effect of enabling great monopolies to secure more land and hold it where the timber would not be taxed. His study of the question in foreign lands, particularly in Germany and Switzerland, showed him that the result had been rather the opposite.

The speaker was strongly in favor of a "produce tax." "Taxes on the forest land should be levied on the crop when cut, not on the basis of a general property tax." Another task binding on the states was the passage and actual enforcement of adequate fire laws, a matter which entailed the employment of a trained force whose first duty was fire patrol. Upon the Federal Government lay the task of adequately protecting and conservatively using the whole of the public forest lands. Touching on the question of the Appalachian Forest Reserve, Senator Smoot spoke strongly of the urgent necessity of speedy action in carrying out that scheme. In regard to the country's timber supply, he believed that if action were taken at once, they had still forest enough to supply, under right management, the timber the nation needed.

After short addresses by Messrs. Page, of Virginia, and Howell, of Wyoming, Senator Edwards was called on for a short address. After giving expression to the feelings of good-will which existed between the United States and Canada, he conveyed special messages from His Excellency the Governor-General and Sir Wilfrid Laurier, the former one of cordial agreement with Mr. Pinchot's policies, the latter suggesting more stringent laws in regard to the prevention of forest fires originating from the railways. In regard to the conservation of their forest resources, the situations of the United States and Canada were very similar. The most essential measure for forest preservation was the prevention of forest fires. Canada, he believed, if she acted promptly, could always supply her own timber needs. He had been especially impressed through the conference in learning of the part water would take in conserving the supplies of coal and iron, in the one case through the use of water for power, in the other by the use of the water courses for transportation. He believed the use of cement would also have its part in conserving the iron supply. He concluded by speaking of the import of lumber into Canada from the United States and hoped it would continue, for it would conserve Canadian timber.

Mr. Andrew Carnegie also made a very brief address,

speaking of the relation between the federal government and the state governments and the bearing of this on the conservation of natural resources, and added a few words, in a humorous vein, regarding the relations of Canada and the United States and their ultimate union.

State Forest Commissioner J. S. Whipple, of New York State, gave an address that was one of the features of the morning session. He emphasized the enormous destruction of the forest and the need for reproduction. "In twenty years, at the rate we are going, not one sawing stick will stand in the State of New York, and we are even now getting eighty-eight per cent. of our pulpwood from Canada." He insisted on the need of planting as a remedy for this state of affairs. His advice to the governors was "Go home and establish a Commission . . . and put a Pinchot at the head of it. Then furnish it money and don't . . . implore the National Government to set aside some state land as a National Forest; do it yourself." Coniferous trees had to be planted, though hardwood trees would attend to their own reproduction. Millions of pine trees should be planted every year. A vigorous propaganda was the next essential; in New York it had taken them twenty years to do the preliminary work, and only within the last three years had they got the people of the state roused. Mr. Whipple spoke of the people of the City of New York expending \$150,000,000 to build a reservoir in order to ensure a water supply for the city; but that expenditure would be useless unless they protected the forests of the Catskills, whence the water came. The Commissioner then spoke of the necessity of forests for water, and hence for agriculture, especially in the East. In New York they were spending \$500,000 to \$1,000,000 per year in buying land for their forest reserves, and that expenditure they intended to keep up. The speaker concluded by strongly exhorting the representatives of other states to have their states make forest reserves and start planting them up.

At the conclusion of Mr. Whipple's address Governor Johnson, of Minnesota, rose and asked Mr. Whipple to give some practical scheme, and an interesting discussion took place between the two.

Other speakers during the session were Mr. Lathrop, representing the Alabama State Conservation Commission; Dr. Geo. C. Pardee, formerly Governor of California; President Evans, of the American Automobile Association, who is a member of the Pennsylvania State Conservation Commission; Governor Blanchard, of Louisiana, and Prof. Rane, of the Massachusetts State Conservation Commission.

THE PUBLIC MEETING.

The Conference was opened by a great mass meeting at

the Belasco Theatre. This was presided over by President-elect W. H. Taft, who was introduced by Mr. Gifford Pinchot, the temporary Chairman.

The speakers of the evening were President Roosevelt and Governor Chamberlain, of Oregon. President Roosevelt spoke of the need for conservation of the national resources. He sketched the constitution and work of the Conservation Commission. Three things there were that should be done without delay: first, to provide for a comprehensive plan of waterway development; second, to begin at once on work already planned that would fit into the larger plan; third, to provide amply for forest protection against fire, reckless cutting and wanton or reckless destruction of all kinds, and to secure the Appalachian and White Mountain National Forest. If current revenues did not provide sufficient money to carry out this programme, he favored the issue of bonds for the purpose.

Governor Chamberlain then addressed the meeting, treating especially of waters and waterways and the difficulties in the way of establishing a just and equitable *modus vivendi* between the national and the state governments for their control.

SECTION OF MINES.

The sessions of the Conference proper began on Wednesday morning, December 8th, in the Red Room of the New Willard Hotel.

The first item of the programme was the reading of the report of the National Conservation Commission. The report of the Section of Mines was then read by Senator Flint. Among the startling statements in the report were the following: the gas now escaping, unhindered, from the oil and gas wells of the United States is sufficient to light all the cities in that country of over 100,000 inhabitants; the known coal fields of the country contain only enough unmined coal to last until the middle of next century; the high-grade iron will last only till the middle of this century; of all the minerals produced in the United States one-sixth is wasted and the loss of life in mining operations is far greater than in any other country in the world.

Addresses were also given by Prof. J. M. Bogert, President of the American Chemical Society; Mr. A. W. Damon, Vice-President of the National Board of Fire Underwriters; Hon. Thos. Walsh, of Washington and Colorado; Governor Johnson, of Minnesota, and Governor Hoke Smith, of Georgia.

SECTION OF LANDS.

On Wednesday afternoon the report of the Section of Lands was considered.

The first speech of the afternoon was given by Senator

Knute Nelson, of Minnesota, Chairman of the Section. His speech related almost entirely to the conservation of public lands still under the control of the Federal Government. He sketched the land policy of the Federal Government and the different acts sanctioning disposal of the public lands. In regard to timberlands he favored the Government's retaining them and selling only the mature timber off them. Protection of the privately-owned forests was the duty of the state, and it was within their power to require the destruction of brush.

Governor Noel, of Mississippi, followed. He spoke at length of the problem of stream control, particularly as affecting the Mississippi River. In connection with his own state he reviewed the work of the Federal Government in assisting to build levees and in drainage.

Mr. W. P. Lay presented the report of the Alabama State Conservation Commission, dealing especially with the streams of the state.

Dr. Chas. R. Van Hise, of the University of Wisconsin, as the representative of the Wisconsin Conservation Commission, read the report of that Commission on the subject of lands. It treated particularly of the necessity of phosphates in soils and the loss of these under present conditions.

Mr. J. N. Teal, Chairman of the Oregon State Conservation Commission, then spoke as the representative of that Commission. He suggested making the Conservation Commission a legalized body and putting it on the same plane as any of the other great departments of the Government.

Other speakers of the session were Governor Ansell, of South Carolina; Governor Broward, of Florida; Senator Newlands, of Nevada; Mr. R. H. Richards, President of the American Mining Congress; Governor Blanchard, of Louisiana; G. E. Condra, of Nebraska, representing the Governor of Nebraska; Dr. Rothrock, of the Pennsylvania State Conservation Commission, and others.

SECTION OF WATERS.

At the session on Thursday afternoon, December 10th, the report of the Section of Waters was read by Dr. W. J. McGee, Secretary of the Inland Waterways Commission. Dr. McGee emphasized the idea of the water being a resource; the supply of water was not unlimited, there was just so much water and no more. The sole source of water was the rain, and on one-sixth of this (in the last analysis) depended the habitability and the productivity of the country. Each average adult man took into his system, in the course of a year, at least one ton of water, and each bushel of corn required in its making about fifteen to twenty tons of water. The important part of the

water of precipitation was that which seeped into the earth and became ground water. The amount of ground water in the top hundred feet of soil was equivalent to a layer of water sixteen or seventeen feet in depth spread over the entire surface of the country.

Governor Hoggett, of Alaska, gave a brief talk on the resources of that territory, and was followed by Governor-elect Stubbs, of Kansas. The latter emphasized the need of some action and favored the issue of bonds for financing the work.

Addresses were also given by Governor Deneen, of Illinois; Governor Broward, of Florida; Governor Woodruff, of Connecticut; ex-Governor Van Sant, of Minnesota, and Governor Ansell, of South Carolina. Mr. Edward G. Acheson, President of the American Electro-Chemical Society, read a paper and Mr. E. E. Wickley, representing the Farmers' National Congress, made a brief address.

Resolutions were adopted at the session, endorsing the report of the National Conservation Commission and approving the principle of co-operation between the Federal Government and those of the states; urging the adoption of the policy of separate disposal of the surface, mineral and timber rights; favoring the maintenance of Conservation Commissions in every state; urging on Congress the advisability of maintaining a National Conservation Commission and suggesting legislation and action by Federal and State Governments along various lines suggested in the report.

The Conference then adjourned.

The maps shown at the International Conservation Conference at Washington by the Canadian representatives aroused very favorable comment, despatches state a number of these were the work of the draughting department of the Forestry Branch. It is probable these maps will be taken to the general conference at The Hague.

MINNESOTA STATE HORTICULTURAL SOCIETY.

The annual meeting of this Society was held in the First Unitarian Church, Minneapolis, on December 1st to 4th, 1908. The President, Prof. Samuel B. Green, of the State University, was often in the chair, and proved a model Chairman, both in his grasp of the subjects under discussion and in the courteous but firm handling of the time and speakers. Western Canada was represented by Dr. H. M. Speechly, of Pilot Mound, Man., who contributed to the programme an address on "The Gardening of Perennials in Manitoba." The programme of the meeting was of a very varied nature, including, in addition to forestry topics, papers and discussions on gardening, the culture of fruit trees and bush fruits, beekeeping and landscape work. "Evergreens" was the subject of a question exercise on the first afternoon of the Convention by Mr. Clarence Wedge, of Albert Lea, who had an exhibit of many varieties.

Thursday afternoon was devoted particularly to forestry. The President, Prof. Green, gave an admirable address in which he pointed out the urgent need of careful forestry and the value of the new Forestry School at Itasca Park. Minnesota now has 395,000 acres of State Forest Reserves. The Forestry School at Itasca aims to turning out practical foresters and is equipped after camp fashion with the necessities and not with the luxuries of life. Open air talks often take the place of formal lectures. The students are sent out in fours, each man having his own particular duties.

This address was followed by two excellent addresses, one on "Fire Fighting in our National Forests," by Mr. G. E. Marshall, the other on "Prairie Plantations," by Prof. Wentling. Mr. Marshall spoke on very practical lines, being Supervisor of the Cass Lake Reserve, and stated emphatically that four years' experience of destroying slashings by the modern method showed that the cost instead of being as high as two dollars per thousand feet of lumber was much lower and varied between twelve and twenty-five cents per thousand feet. On the Minnesota Reserves they compel lumbermen to cut the trees to a height corresponding to the diameter at point of cutting. All tops are cleared of brush and made as much use of as possible.

Too little time was given here for discussion, probably because the series of four short talks by Forestry Students, which were excellent in quality, had to be crowded in too. Carl Hamilton read a paper on "Summer Work in Itasca Park;" Clarence French on "Afforestation in the Nebraska Sand Hills;" Raymond Orr on "In a Washington Lumber Camp," and Jas. Gilles on "In a Montana National Forest." Immediately after

the paper on the "Nebraska Sand Hills," Dr. Speechly was able to interpolate the whole of Monsignor Bruchesi's account of Pere Le Febvre's victory over the Oka sands, which was very well received. These students of the State Agriculture College are a fine well-set up bunch of young men, fine representatives of the 800 students in this, the largest Faculty of the State University.

The JOURNAL is indebted to Dr. Speechly for an excellent account of the meeting. This has, owing to the press of other material, had to be condensed.

FORESTRY LEGISLATION IN 1909.

During 1908 New Brunswick made several important changes in her regulations regarding cutting, fire protection, etc., which Lt.-Col. Loggie outlines as follows:—

"The regulations governing the terms and conditions of timber licenses require the licensees to cut down only spruce and pine trees that would make a log 16 feet long and 9 inches at the small end. During the year we have had a number of applications to cut undersized lumber, and where the same has been examined by competent persons and found to be a stunted growth, or thickets, we have given permission to cut below the above standard, but only where the trees would not mature to saw-logs in seventy-five years growth. The thickets are allowed to be thinned out under the supervision of a selected overseer. A great advance has been made in fire protection during the year. We have appointed upwards of one hundred permanent Fire Rangers, with four chief rangers, and these men are in the constant employ of the Government, their duties being to protect the forest from fire, to protect the game, and to see that the fishery regulations are carried out. With reference to settlements on timber lands, the department in every case where persons apply has a report as to the capabilities of the land for farming purposes and acts accordingly. The Government are grappling with the forest problem, and are determined to have such regulations made as will protect the growth of undersized lumber, and the forest from fire. I may say that the work of your Forestry Association has been the means of assisting the Government in this forestry problem."

No changes of importance have been made in the other provinces.

THE NORTH AMERICAN CONSERVATION CONGRESS.

Following upon the National Conservation Conference held in Washington, D.C., in December last, President Roosevelt determined to invite representatives of Canada and Mexico to meet representatives of the United States in a North American Conservation Congress.

The invitation of President Roosevelt was conveyed to Ottawa by Mr. Gifford Pinchot, Chairman of the National Conservation Commission at the end of December last and accepted by the Canadian Government who appointed, as its delegates to the conference, Hon. Sydney Fisher, Minister of Agriculture; Hon. Clifford Sifton, and Dr. H. S. Beland, M.P.

The conference convened in the diplomatic room of the State Department, Washington, D.C., on Thursday, February 18th, and continued in session for two days. Mr. Gifford Pinchot, Forester of the United States, was elected Chairman. Each country represented made a statement as to its own resources. Mr. Pinchot speaking for the United States, Romulo Escobar for Mexico, and Hon. Sydney Fisher for Canada.

Senator Reed Smoot, who was the head of the Section on Forests at the National Conservation Commission, and Dr. W. T. Hornaday, Director of the New York Zoological Garden, were among the other speakers.

On February 26th the report of the Canadian delegates was presented to the House of Commons.

The following are extracts from the report of the Conference:—

THE GENERAL PRINCIPLES.

“We recognize the mutual interests of the nations which occupy the Continent of North America and the dependence of the welfare of each upon its natural resources. We agree that the conservation of these resources is indispensable for the continued prosperity of each nation.

“We recognize that the protection of mutual interests related to natural resources by concerted action, without in any way interfering with the authority of each nation within its own sphere, will result in mutual benefits, and tend to draw still closer the bonds of existing good-will, confidence and respect. Natural resources are not confined by the boundary lines that separate nations. We agree that no nation acting alone can adequately conserve them, and we recommend the adoption of concurrent measures for conserving the material foundations of the welfare of all the nations concerned, and for ascertaining their location and extent.

"We recognize as natural resources all materials available for the use of man as means of life and welfare, including those on the surface of the earth, like the soil and the waters; those below the surface, like the minerals; and those above the surface, like the forests. We agree that these resources should be developed, used and conserved for the future in the interests of mankind, whose rights and duties to guard and control the natural sources of life and welfare are inherent, perpetual, and indefeasible. We agree that those resources which are necessities of life should be regarded as public utilities, that their ownership entails specific duties to the public, and that as far as possible effective measures should be adopted to guard against monopoly.

USE AND MANAGEMENT OF FORESTS.

"We recognize that the forests are indispensable to civilization and public welfare. They furnish material for construction and manufacture, and promote the habitability of the earth. We regard the wise use, effective protection, especially from fire, and prompt renewal of the forests on land best adapted to such use, as a public necessity and hence a public duty devolving upon all forest owners alike, whether public, corporate or individual.

FOREST RESERVES.

"We consider the creation of many and large forest reservations and their permanent maintenance under Government control absolutely essential to the public welfare.

FOREST INVENTORIES.

"We favor the early completion of inventories of forest resources, in order to ascertain the available supply and the rate of consumption and reproduction.

FORESTRY EDUCATION.

"We recommend the extension of technical education and practical field instruction in forest conservation, afforestation, and reforestation, so as to provide efficient forest officers whose knowledge will be available for necessary public information on these subjects.

FOREST TAXATION.

"Believing that excessive taxation on standing timber privately owned is a potent cause of forest destruction by increasing the cost of maintaining growing forests, we agree in the wisdom and justice of separating the taxation of timber land from the taxation of the timber growing upon it, and adjusting

both in such a manner as to encourage forest conservation and forest growing.

PROTECTION OF FORESTS.

“We agree that the ownership of forest lands, either at the headwaters of streams or upon areas better suited for forest growth than for other purposes, entails duties to the public, and that such lands should be protected with equal effectiveness, whether under public or private ownership.

“Forests are necessary to protect the sources of streams, moderate floods, and equalize the flow of waters, temper the climate, and protect the soil; and we agree that all forests necessary for these purposes should be amply safeguarded. We affirm the absolute need of holding for forests or reforestation, all lands supplying the headwaters of streams, and we therefore favor the control or acquisition of such lands for the public.

INDUCEMENTS TO REFORESTATION.

“The private owners of lands unsuited to agriculture, once forested and now impoverished, or denuded, should be encouraged by practical instruction, adjustment of taxation, and in other proper ways, to undertake the reforestation thereof.

FOREST FIRES.

“Notwithstanding an increasing public interest in forestry, the calamitous and far-reaching destruction of forests by fire still continues, and demands immediate and decisive action. We believe that systems of fire guardianship and patrol afford the best means of dealing adequately with fires which occur, whether from natural causes, such as lightning, or in other ways; but we affirm that in addition thereto effective laws are urgently needed to reduce the vast damage from preventable causes.

REGULATING CUTTING.

“Apart from fire, the principal cause of forest destruction is unwise and improvident cutting, which, in many cases has resulted in widespread injury to the climate and the streams. It is therefore of the first importance that all lumbering operations should be carried on under a system of rigid regulation.

FORESTS ON WATERSHEDS.

“The first requisite for forest or other covering which will conserve the rainfall and promote regularity of water flow is the retention of the soil upon watersheds. We therefore favor the construction of such artificial works as may effect this

purpose and the encouragement thereof by remission of taxes, Government co-operation, or other suitable means.

GAME PROTECTION.

"We recognize that game preservation and the protection of bird life are intimately associated with the conservation of natural resources. We therefore favor game protection under regulation, the creation of extensive game preserves, and special protection for such birds as are useful to agriculture.

CONSERVATION COMMISSIONS.

"The action of the President of the United States in calling this first conference to consider the conservation of the natural resources of North America was in the highest degree opportune, and the proceedings which have followed, and the information mutually communicated by the representatives assembled, have, we believe, been conducive to the best interests of the countries participating. To derive the greatest possible benefit from the work which has already been done, and to provide proper and effective machinery for future work, there should be established in each country a permanent Conservation Commission.

EXCHANGE OF INFORMATION.

"When such conservation commissions have been established, a system of inter-communication should be inaugurated, whereby, at stated intervals, all discoveries, inventions, processes, inventories of natural resources, information of a new and specially important character, and seeds, seedlings, new or improved varieties, and other productions which are of value in conserving or improving any natural resource, shall be transmitted by each commission to all of the others, to the end that they may be adopted and utilized as widely as possible.

WORLD-WIDE CONSERVATION.

"The conference of delegates, representatives of the United States, Mexico, Canada and Newfoundland, having exchanged views and considered the information supplied from the respective countries, is convinced of the importance of the movement for the conservation of natural resources on the Continent of North America, and believes that it is of such a nature and of such general importance that it should become world-wide in its scope, and therefore suggests to the President of the United States of America that all nations should be invited to join together in conference on the subject of world resources and their inventory, conservation and wise utilization."

Signed: Gifford Pinchot, Sydney Fisher, Clifford Sifton, Robert Bacon, Romulo Escobar, Migual A. de Quevedo, Henri S. Beland, James Rudolph Garfield, Carlos Sellerier, E. H. Outerbridge.

UNITED STATES TARIFF ON PULP AND PAPER.

The committee of the United States House of Representatives which has for months had under investigation the question of the duty on pulpwood and paper, reported to the House on Friday, February 19th. As a result of their investigations they recommend that mechanically ground pulp wood be admitted free of duty "from any country, dependency, province or other subdivision of government which does not forbid or restrict the exportation of or impose any export duty, export license fee or other export charge of any kind whatsoever, either directly or indirectly" upon ground wood or pulpwood; in all other cases they recommend that the duty be one-twelfth of one cent per pound. They further recommend that the duty on chemical wood pulp, unbleached, be one-sixth of one cent per pound dry weight, and on the bleached pulp one-fourth of one cent per pound, dry weight. If any country charge an export duty on pulpwood, the amount of such charge is recommended to be added to the other duties. Print paper, valued at not more than two and a quarter cents per pound, is recommended to be taxed one-tenth of a cent per pound, and paper worth from two and a quarter to two and a half cents per pound, four tenths of one cent per pound. The present tariff is three-tenths of a cent per pound on paper valued at two cents per pound or less, and four-tenths of a cent per pound on paper worth from two to two and a half cents per pound. "This, in the main," say the committee, "is a reduction in the tariff on ordinary newsprint paper from \$6 a ton to \$2 a ton." Further investigations by the Bureau of Plant Industry to procure some plant which will yield a fibre suitable to substitute for spruce in the manufacture of paper and by the Forest Service in their endeavor to find woods which can be used in the manufacture of wood are urged.

Mr. Norman M. Ross, Chief of the tree-planting division of the Forestry Branch, represented the forestry interests at the recent meeting of the Western Horticultural Society, giving an address, illustrated with stereopticon views, of the work done at the nursery station at Indian Head.

NOTES.

WISCONSIN'S 1908 FIRE LOSS. "This year the forest fires in Wisconsin have burned over 1,200,000 acres of land, and have caused \$9,000,000 worth of damage," said State Forester E. M. Griffith, of Wisconsin, recently. "This large loss is due primarily to the burning of large tops and limbs, called slash, left in logging operations."

PROPOSED WISCONSIN LEGISLATION. The Wisconsin Legislature will this year have before it some legislation of great importance in regard to the disposal of brush. The legislation is being asked for by lumbermen themselves, organized as the "Wisconsin Timberland Owners' Association," and there is every reason to hope that their requests will be acceded to. Some of the legislation asked for, as embodied in a resolution of the body named above, is as follows:—

Sec. 1. Any person who shall cut, or cause to be cut, any logs, bolts, pulp wood, ties, poles, posts, or other forest products, in any of the counties designated in Section 4 of this Act, shall pile the tops and refuse as the cutting proceeds, and shall, within one year from such cutting and felling, burn all such piles of refuse and tops, and in such burning all reasonable care shall be taken not to damage standing timber or adjoining property. The term "burning" shall be construed to mean the destruction by fire of so much of such slashings as would become easily combustible material and dangerous in event they were not so destroyed, but no burning shall be done during dangerously dry weather.

Sec. 2. Any person who violates any of the provisions in regard to the burning of slashings, refuse, etc., shall be guilty of a misdemeanor and shall, on conviction therefore, be punished by a fine of not less than fifty (50) cents, nor more than two dollars (\$2.00) per thousand feet, log scale for all timber; not less than twenty-five (25) cents, nor more than one dollar (\$1.00) per cord for all bolts, pulpwood, cord wood or bark; and not less than ten (10) per cent. nor more than fifty (50) per cent. of the full cash value of other forest products cut and removed from such land.

Sec. 3. In case any person fails to properly pile and burn the tops and refuse, the state board of forestry may, in its discretion, cause the same to be done, and the expense thereof shall be a lien on the timber or other forest product cut from the land on which the tops and refuse are situated or cut, and

shall also be a lien upon the land itself. Proceedings for the enforcement of such lien shall be instituted by the district attorney of the country in which the cutting was done, at the request of the state board of forestry and in the name of the State of Wisconsin as claimant; and costs shall be recovered in the usual manner. The claim for any lien shall be filed by the state fire warden, or under his direction by any of his assistants, inspectors, assistant inspectors, patrol or fire wardens, in the district in which the expense occurred, in the office of the clerk of the district court, in the county in which the claim arose.

The State Forest Fire Warden is to be given power to modify the provisions of the Act in individual cases, where he considers it advisable.

LUMBERMEN
VALUE
FORESTERS'
WORK.

As was noted in the issue of the JOURNAL for October last (p. 122), Messrs. White, Mitchell and Dwight, of the senior class in forestry in the University of Toronto, spent the summer vacation in forest work on the limits of the Turner Lumber Company. The character of the work done and the value which the company places on it is well shown by the following letter recently received by Dean Fernow, of the Faculty of Forestry:—

Dr. Fernow,
Dean, Faculty of Forestry,
University of Toronto,
Toronto, Ont.

Dear Sir:—

We have received a topographical map of lots 1 to 12, concessions 5 to 9, of the township of Wilson, which was made by students of your department after they had made an examination of the territory. This map shows accurately the character of the country, the location of roads, streams and lakes, and also the timber, with the kind designated.

We do not believe that we could hire a timber cruiser or an engineer in Canada who could get up a map as valuable to us for the purpose for which it will be used.

We sincerely hope that next summer you will be able to recommend to us students from your department who can do similar work for us on this township and others, as we are anxious to have all our holdings examined and maps made of them in the same accurate and intelligent manner as the work performed by Messrs. White, Dwight and Mitchell.

Yours truly,
(SGD.) DWIGHT J. TURNER,
President.

TIMBER IN NEW SOUTH WALES. According to the recently published report of the Royal Commission appointed to inquire into the timber resources of New South Wales, the total quantity of commercial timber at present standing in the state, excluding timber growing on private lands, is estimated at 23,116,000,000 superficial feet, consisting of: Hardwoods: ironbark, 1,355,000,000 superficial feet; other hardwoods for milling, 8,668,000,000 superficial feet; for other purposes, 11,788,000,000 superficial feet; total, 21,811,000,000 superficial feet. Softwoods: cedar, 5,000,000 superficial feet; hoop pine, 230,000,000 superficial feet; other brushwoods, 150,000,000 superficial feet; cypress pine, 920,000,000 superficial feet; total, 1,305,000,000 superficial feet.

The commissioners state that, at the present rate of consumption, the quantity of hardwood timber suitable for commercial purposes, estimated to be at present standing on the forest reserves and other Crown lands of the state, will not last more than about thirty-six years, and that the supply of softwoods will be consumed in a little more than twenty years. Amongst other things the commissioners recommend that the present royalties on certain timber should be increased, and that the export of ironbark and tallowwood beyond the Commonwealth should be prohibited for a period of ten years. Recommendations are also made for the replanting of the most valuable timbers and for the protection of timbers at present standing.

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For further information address

HENRY. S. GRAVES, DIRECTOR,
NEW HAVEN, CONNECTICUT.

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REGISTRAR,
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or

B. E. FERNOW, LL.D., DEAN,
Faculty of Forestry, University of Toronto,
TORONTO, CANADA.

UNIVERSITY OF NEW BRUNSWICK

FREDERICTON, N.B.

DEPARTMENT OF FORESTRY

ESTABLISHED IN 1903

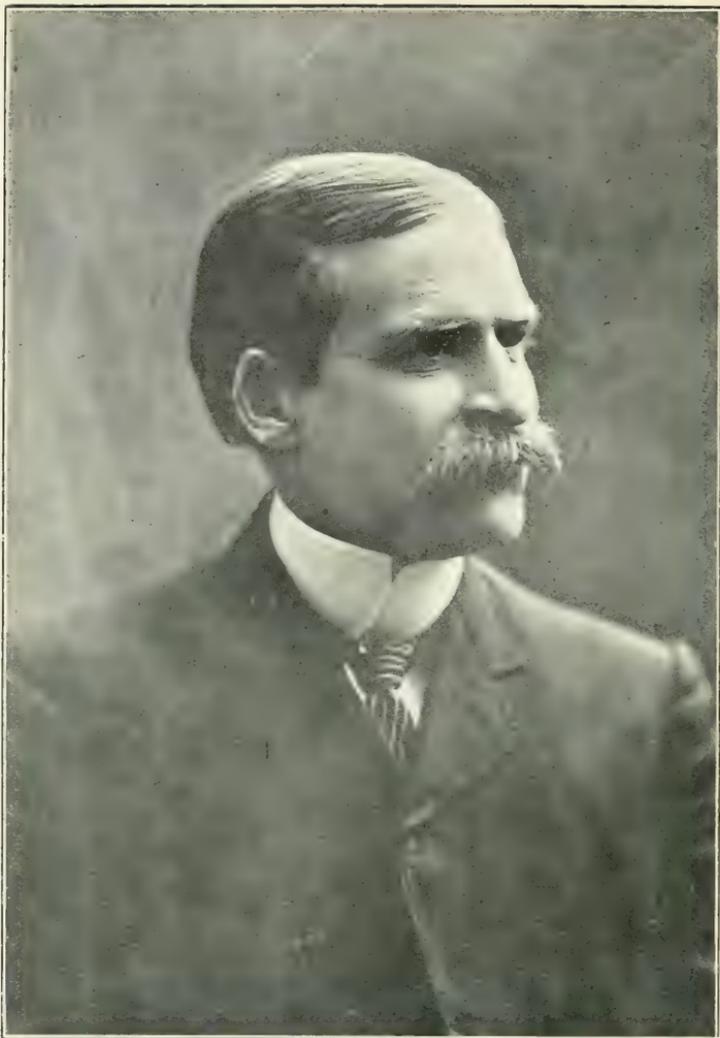
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C. C. JONES, Chancellor.



THOS. SOUTHWORTH, Esq.

PRESIDENT CANADIAN FORESTRY ASSOCIATION, 1909-1910.

Born in Leeds county, Ontario, Mr. Southworth early entered journalism, and for several years was connected with the Brockville Recorder—part of the time as sole proprietor and part of the time in association with Hon. Geo. P. Graham. Appointed Director of Forestry for Ontario in 1895, he became in 1897 a member of the special commission appointed to examine and report upon the forest wealth of Ontario. In both positions he attained great success. His enthusiasm and knowledge of affairs brought his office hitherto chiefly educational, into touch with practical affairs and practical men, and as a result of his work much more is known of the extent and value of Ontario's forests and many important progressive measures have been enacted. As Director of Colonization, also, he did much to make known the agricultural possibilities of the "clay belt". Resigning his position early this year, Mr. Southworth is now Secretary-Treasurer of the King Radiator Co., Toronto. He retains his interest in forestry, and especially in the Canadian Forestry Association, and a very successful year is expected under his presidency.

Canadian Forestry Journal

VOL. V.

JUNE, 1909.

No. 2

The Regina Meeting.

Upon invitation of the Regina City Council and Board of Trade it has been decided to hold a special meeting of the Canadian Forestry Association in Regina on Sept. 3rd and 4th. A good program of papers and addresses is being arranged dealing particularly with western conditions. There will be special railway rates from east to west because of the meeting of the British Association in Winnipeg, Aug. 25th to Sept. 1st,

and it is expected there will be special local rates. Those taking in the Seattle Exhibition will also be able to stop at Regina either going or coming. All members of the Association and the friends of forestry generally are invited to attend this meeting. Those who intend to be present, especially those living in the east, would confer a favor by communicating this fact to the secretary.

Appointment of Permanent Secretary

At the tenth annual meeting of the Canadian Forestry Association held in Ottawa on March 11th, it was decided that the time had come to carry out a more active propaganda in connection with the work of the Association. The directors were instructed to secure the services of a competent man to act as permanent and paid secretary, who would give his whole time to the work of educating the public to the importance of the forestry movement and the work done by the Association.

A special committee composed of Dr. Fernow, Dean of the Faculty of Forestry of the University of Toronto, Mr. G. Y. Chown, Registrar of Queen's University, Kingston, and Mr. R. H. Campbell, Dominion Superintendent of Forestry, Ottawa, was appointed to make a recommendation to the board of directors. This committee considered a number of names and finally reported, recommending Mr. James Lawler, a journalist, as the most suitable man for the position.

A meeting of the directors was held in Toronto on April 20th to consider the

report of the special committee. At this meeting Mr. A. H. D. Ross, who had acted as the very efficient secretary of the Association for the preceding year, but who, because of his position as lecturer in the faculty of forestry of the University of Toronto was unable to give his whole time to the work, tendered his resignation. This was accepted with complimentary references to Mr. Ross's work and Mr. Lawler was appointed and instructed to begin work on May 1st.

Mr. Lawler comes highly recommended. He has had newspaper experience in Winnipeg, Toronto and Ottawa, and has for some years made a study of forestry, particularly on its economic side. In addition to attending to the correspondence of the Association and taking part in the preparation and dissemination of its literature he will also conduct a campaign to extend the membership.

Part of the propaganda work of the Association will take the form of lectures, illustrated by lantern slides, to be delivered by the secretary before clubs,

commercial organizations, schools, literary societies, etc. Wherever possible, these will be taken in series, so as to effect a saving in time and traveling expenses. Members who know of opportunities for delivering such lectures should communicate with the secretary as early as possible, so that details may be arranged. It is hoped by this means

during the coming autumn and winter to greatly increase the interest in the work of the Association and to add largely to its membership.

An office has been secured at 11 Queen's Park, Toronto, and to this office all correspondence should be addressed.

Growing Trees for Fuel.

BY NORMAN M. ROSS, CHIEF OF TREE PLANTING DIVISION, FORESTRY BRANCH.

The question of a home-grown supply of fuel is one worthy of serious consideration on the part of every farmer living more than a few miles from natural timber. The planting of trees for this purpose, however, has not heretofore received any general attention. There have been reasons for this. In the first place, the average farmer, in developing a new home, has not much inclination to devote any time and labor to undertakings not calculated to bring in immediate returns; secondly, the general idea prevails that it takes too long for a tree to grow to make it worth while; again, it has not always been possible to secure cheap and suitable nursery stock for general planting, and finally, the farmer has had no available data to fall back upon to warrant his expending much money along this line of work.

At the present these conditions are somewhat different. Though many settlers may not be in a position to set out plantations there are many more in the older districts who can, and who certainly should, direct some of their energies in this direction. We are now in a position to state definitely that fair fuel can be grown on a prairie farm in from six to eight years, not, of course, of best quality, but sufficiently good for summer cooking. Each year after this adds to the quality of the wood grown. There is now no difficulty in securing suitable nursery stock at a moderate cost. Though even yet we have not much available data regarding the growth of cultivated varieties in close plantations, we shall have a sufficient number of examples of comparatively old planting to prove conclusively that fuel may be grown within a very few years.

THE BEST VARIETIES.

The question naturally arises: what varieties are likely to be the most profitable for the farmer to plant? This is a point which can be definitely decided only after several years of testing. We can at present merely base our suggestions upon observation and not upon accurate measurements.

The following are points to be considered:—

1. The variety must be a rapid grower so as to give returns at an early date, and it must also produce wood of a fair fuel value.

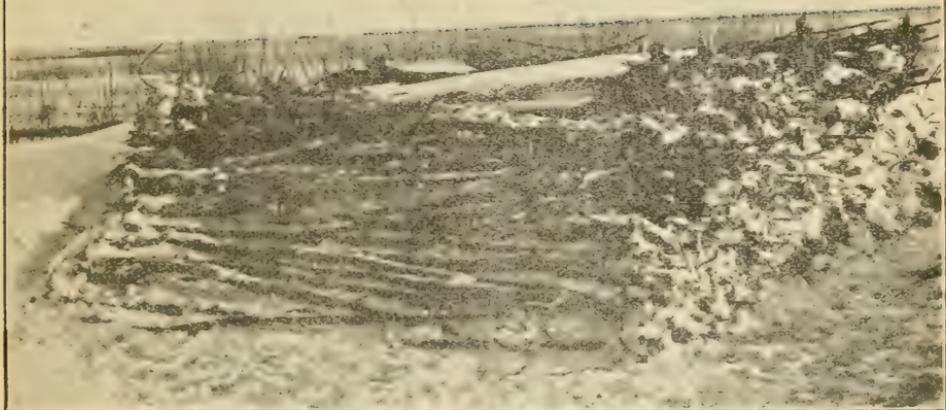
2. The varieties must be easily propagated in order that planting stock may be fairly cheap.

3. The varieties should make a second growth readily from the root when the tops are cut down.

4. The plantation must be established at the least cost consistent with the results desired.

Now, as to varieties we would suggest the cottonwood and willow as best for Manitoba, Saskatchewan and North and South Alberta. In the central districts of Alberta the Russian poplar may have to take the place of the cottonwood. Of the willows the acute-leafed variety (*salix acutifolia*) would seem one of the best. Of course we must admit that poplar and willow are not likely to produce as good a *quality* of fuel as maple, ash or elm; but it must be realized that they will produce a far larger *volume* of wood on a given area, which will be large enough for fuel in a shorter time.

The common wood fuel of the country is poplar wood. The cottonwood, Russian poplar and willow will produce



[PHOTO BY N. M. ROSS

3½ cords of Cottonwood and Russian poplar poles, cut from trees planted four years. Trees planted on Experimental Farm, Indian Head, Sask., in Spring of 1903, and cut in autumn of 1906.

wood of a very similar quality. As regards ease of propagation these three varieties have a great advantage over other kinds, as they are all readily grown from cuttings. The advantage to the farmer on this score is very evident; for, once having got a few trees of any of these kinds on his place, he can increase his plantation as much as he pleases without expending a cent more on nursery stock.

A mixture of cottonwood and willow would be preferable to a pure plantation of either variety, as temporary conditions frequently are more favorable, in certain seasons, to one kind than another. As to method of planting a spacing of four feet apart each way is probably the best distance. If the trees are set in rows both ways so that a scuffer can be used in any direction very little hand hoeing will be needed. In a plantation of any size it will always pay to mark out the ground before planting in order to get the cross rows even.

COST OF THE PLANTATION.

In regard to the actual cost of establishing such a plantation we have the figures from our work on the Nursery Station. Last spring (1908) 25 acres of plantation were set out for test purposes. Five acres of this area were planted with spades at a cost of \$9.99 per acre, and 20 acres were put in with a plough at a cost of only \$6.00 per acre. This, then, shows greatly in favor of using a plough in setting the young trees.

We consider that three years are necessary to establish a plantation of the rapid growing varieties. From actual records kept on the nursery the cost is about as follows per acre:—

1st Year.—Planting, \$6.00; hoeing, \$4.97; horse scuffling, \$1.11. Total, \$12.08.

2nd Season.—Hoeing, \$5.00; horse cultivation, \$1.11. Total, \$6.11.

3rd Season.—Hoeing, \$6.00; horse cultivation, 50 cents. Total, \$6.50.

Grand total for three years, \$24.69.

This sum of \$24.69, then represents,

probably three or four days' labor a year being all that is required. A good plantation of willow, cottonwood or Russian poplar should require no further attention after the third season.

RATES OF GROWTH.

In 1905 and 1906 there were set out on the Nursery several acres of plantation, the varieties being the common hardy kinds suitable for prairie growth. Measurements are taken in these plantations annually in order to compare the rates of growth of the different varieties, and also that we may establish the exact cost of a plantation, as this will vary according to the varieties, method of mixing, and planting distance. As soon as large enough the trees will be cut for fuel and in this way it is hoped to arrive at definite conclusions as to the most profitable varieties for a farmer to grow.

The following measurements taken in these plantations last fall (1908) may be of interest as showing the comparative rates of growth during the early years. The measurements represent averages of hundreds of trees selected as being about average trees in the plan-

tations, though we naturally find many individuals far larger than these average figures would indicate.

| Variety. | Year planted | Average height, | Average new growth, |
|-------------------------|--------------|-------------------|---------------------|
| | | fall, 1908 | 1908 |
| | | ft. in. | ft. in. |
| Cottonwood. | 1904 | 12 4 | 1 9 |
| " | 1906 | 9 2 | 2 5 $\frac{1}{2}$ |
| Willow. | 1904 | 10 5 | 1 6 |
| Russian poplar. | 1906 | 10 0 | 3 7 |
| Ash. | 1906 | 3 8 | 1 2 |
| Elm. | 1906 | 3 6 | 1 8 |
| Man maple. | 1904 | 9 2 | 1 4 |
| " | 1906 | 7 5 $\frac{1}{2}$ | 2 5 $\frac{3}{4}$ |
| White birch. | 1906 | 5 9 | 2 3 |
| Scotch pine. | 1905 | 2 5 $\frac{1}{2}$ | 1 0 $\frac{3}{4}$ |
| " | 1906 | 2 0 | 1 7 |
| Tamarac. | 1904 | 9 1 $\frac{1}{2}$ | 2 0 $\frac{1}{2}$ |
| " | 1905 | 7 9 | 2 1 |
| White spruce | 1905 | 2 9 $\frac{1}{2}$ | 0 11 $\frac{1}{2}$ |

the actual cash expenses for three years in establishing a plantation at our Nursery Station. On an average farm there need be no actual cash expense,



[PHOTO BY N. M. ROSS
Nursery beds of conifers shaded, at Forest Nursery Station, Indian Head, Sask., in spring of 1908.

At the time of planting all of the above varieties were about 18 inches high except spruce and pines, which would not average more than 9 inches. The trees were planted 3 feet by 3 feet in the case of evergreens, and 4 feet by 4 feet in other varieties.

This table is of value only as showing the relative growth of the varieties for the first three or four seasons. The cottonwood, willow and Russian poplar make the greatest growth in these early years, while the ash, elm, spruce and pine do not grow so fast at the start, but later on make a larger annual growth.

The chief point is this, that the varieties making a rapid growth in the early years can be established in plantations far more cheaply than those of slower growth. For example, our plots of cottonwood, cottonwood and maple and Russian poplar set out in 1906 now require no further hoeing or cultivation; whereas the ash and elm planted in the same year will require cultivation for probably two seasons yet. This is a very important point in determining what varieties to plant.

All we can be absolutely sure of, then, from our present results is that a farmer can establish a thriving plantation of cottonwood, maple, willow, Russian

poplar, or any mixture of these four at a labor outlay, extending over a period of three years, equivalent to \$24.00 per acre. At the end of the third season he should have a plantation averaging from 7 to 10 feet high and likely to make an annual growth of from 18 inches to two feet for the next few years.

Such a plantation properly situated on the farm could be made to serve the dual purpose of shelter and fuel supply. There is no investment that can be made on a farm that is likely to prove so profitable as the setting out of a well-arranged plantation. Buildings cost large sums and deteriorate in value. Plantations cost comparatively little and increase in value at a surprising rate. On the prairies we must take into consideration not only the actual value of the wood produced—which in Europe is all that really counts in a commercial plantation—but also the added home comforts and the very materially increased sale value a good plantation means on any western farm.

Every prairie farm should have from ten to twenty acres planted to trees. Do not try to do too much in one season. One or two acres well planted and properly cultivated will be worth more than twice the area carelessly looked after.

Service des Agents Forestiers de la Province de Quebec.

PAR G. C. PICHÉ, INGENIEUR FORESTIER, DEPT. DES TERRES
ET FORÊTS DE QUEBEC.

Dans le numéro de décembre dernier de ce journal, j'ai publié une courte notice détaillant le travail commencé par les premiers agents forestiers de la Province de Québec. J'esquissais également le programme des travaux de l'hiver qui commençait; il sera peut-être intéressant aux lecteurs du Journal forestier de savoir les résultats que nous avons obtenus de nos agents, et cela d'autant plus qu'il a paru dans le Forestry Quarterly de mars 1909, sous la signature de Mr. Ellwood Wilson, un article critiquant le Service extérieur de la Province de Québec.

Ainsi que je l'écrivais en décembre dernier, les trois élèves que l'on m'avait confiés reçurent des instructions très sévères concernant la surveillance des exploitations confiées à leur charge. Ils

devaient faire observer à la lettre les règlements de la Branche des Bois et Forêts. De plus, pour forcer les exploitants à exercer plus de vigilance sur leurs hommes, j'avais réussi à faire émettre la circulaire suivante par le Département des Terres et Forêts:

CIRCULAIRE AUX PORTEURS DE LICENCES
L 16761-'08.

MINISTÈRE DES TERRES ET FORÊTS

Comme on rapporte à ce Département de nombreuses infractions aux règlements des bois, quant à la manière d'exploiter la forêt sur les Terres de la Couronne, j'ai l'honneur d'attirer votre attention sur la présente circulaire et de vous prier de vous y conformer. vous-mêmes et vos employés.

Règlements des Coupes de Bois sur les Terres de la Couronne. Il est défendu, sous peine d'une amende de \$3.00 par souche, de couper aucun pin de moins de 12 pouces de diamètre, aucune épinette de moins de 11 pouces de diamètre, et aucun autre arbre de moins de 9 pouces de diamètre, sur la souche, mesuré, dans chaque cas, à 3 pieds du sol. Il est cependant permis de couper l'épinette de savanne jusqu'à 7 pouces de diamètre, sur la souche, mesuré aussi à 3 pieds du sol.

Le droit de coupe sera prélevé sur:—

1° Les souches mesurant plus d'un pied de hauteur, au-dessus de la naissance des racines.

2° Tout le bois ayant plus de 6 pouces de diamètre, laissé dans les têtes ou houppiers.

3° Tout le bois marchands employé comme skid, ou longeron, et non sorti de la forêt.

4° Tous les arbres laissés accrochés (lodged trees).

5° Tout les bois marchand employé pour la construction des ponts ou des chemins dits en "corduroy" (chemins paillés).

6° Tout billot laissé dans le bois.

Les exploitants sont priés d'apporter la plus stricte économie dans toutes leurs exploitations forestières, et de veiller à la protection des bois contre le feu.

(S.) ADELARD TURGEON,
Ministre.

Je dois dire tout d'abord que nos agents sont arrivés un mois trop tard, étant donné que les exploitations étaient commencées du mois d'octobre et qu'ils n'ont débuté dans leurs inspections respectives qu'en novembre. Néanmoins, ils se mirent à l'œuvre bravement. Le premier travail était de prévenir tous les entrepreneurs; car dans la vallée de la rivière Assomption ainsi que dans celle de la rivière Mastigoche, tout est fait à l'entreprise; nous avions commencé, mais pour être justes, il fallait prévenir tout le monde. Ils furent bien reçus à certains endroits mais à beaucoup d'autres, on les accueillit moins bien, ces réformateurs: "On ferait comme avant."

Une fois chacun averti, nos agents recommencèrent leur tournée et en une semaine, sur la seule rivière Assomption l'agent Boisvert imposa pour \$156

d'amendes pour diverses infractions à la circulaire ci-dessus citée. Il n'y a rien de tel avec nos "canayens" que de tâter leur gousset; lorsqu'ils virent que le jeu était sérieux, ils obéirent tout en maugréant et bientôt tous reconnurent le bien fondé de nos demandes.

Comme il s'est coupé dans ce district au-delà de 35,000,000 de pieds mesure de planche, et que, de l'aveu même de plusieurs contre-maîtres et entrepreneurs, l'économie réalisée cette année a été d'au moins 20% du bois coupé, notre inspection a donné un gain de plus de 7,000,000 de pieds de bois. En calculant ce gain au tarif actuel du plus bas droit de coupe, soit 65c. les mille pieds, nos agents forestiers auraient fait gagné à la province et au licencié, \$4,550.00 au bas mot.

Il convient de féliciter le porteur de licence, Mr. A. MacLaurin, pour l'aide éclairé qu'il a donné à nos agents. Tous ses employés ont également contribué à rendre notre travail effectif.

De sorte que l'on peut compter que dans cette région, au moins, l'exploitation forestière n'est pas destructive, mais tend plutôt à conserver la forêt et lorsqu'on y abat un arbre, on utilise tout le bois que cet arbre peut donner.

Il serait à souhaiter que nos pères eussent été aussi conservateurs de notre richesse forestière, mais nous ne devons pas imiter leurs erreurs et chercher plutôt à les réparer.

Ces deux vallées renferment encore beaucoup de forêts. Les principales essences sont l'épinette et le pin mélangés à un peu de cèdre et beaucoup de sapin, généralement de pauvre qualité. La majeure partie de cette région est franchement impropre à l'agriculture et si l'on veut continuer et améliorer les méthodes inaugurées cette année, ce sera une des principales sources de bois des environs de Montréal.

Quelques chiffres permettront de voir combien l'utilisation est devenue intense dans cette région. Il y a 10 ans, la limite au petit bout des billots était de 10 pcs.; tout le reste était laissé en forêt à pourrir ou bien à alimenter les feux qui parcoururent trop fréquemment notre pays.

On a fait l'hiver dernier 158,313 billots sur la rivière Assomption de ce on comptait:—

| | | |
|--------|---------------------|---------------|
| 4,455 | billots de 5 pouces | |
| 13,830 | " | 6 |
| 23,287 | " | 7 |
| 30,350 | " | 8 |
| 29,956 | " | 9 |
| 22,137 | " | 10 |
| 13,761 | " | 11 etc., etc. |

Comme on peut voir, on a pris dans les têtes jusqu'à 5 pouces au petit bout. De ce total, on aurait autrefois négligé tous les billots en bas de 10 pcs. et on aurait ainsi laissé en forêt 101,892 billots, ou 64% du total!

Par suite du marché déplorable du bois, les exploitations n'ont pas été aussi considérables que dans le passé et les coupes s'arrêtèrent dans ce district vers la Noël. A ce sujet, je crois que l'on devrait cesser les coupes dans cette province vers ce temps-là car durant le mois de janvier surviennent de grandes tempêtes de neige empêchant complètement l'abatage à la hauteur normale. C'est notre intention de punir sans pitié tous ceux qui abattront les arbres à une hauteur dépassant celle spécifiée par la loi. Ce sera d'ailleurs dans leur propre intérêt pour éviter la punition, ils prendront leurs précautions et au Jour de l'an, tous les entrepreneurs auront bien rempli leurs contrats.

MESURAGES.

Une fois l'abatage terminé, on commence à amener les bois coupés aux dépôts de charroyage. L'habitude est consacrée dans cette province de ne mesurer le bois que lorsqu'il est amené soit sur la glace ou sur le bord des cours d'eau. Cette règle a été imposée par les porteurs de licence à leurs mesureurs et aux entrepreneurs. De sorte, que le gouvernement ne touche des droits de coupe que sur le bois charroyé et non sur tout le bois abattu—à moins que celui-ci ne soit entièrement charroyé. C'est l'intérêt des compagnies et non pas celui du gouvernement, aussi avons-nous stipulé dans notre circulaire que les droits de coupe seraient collectés non-seulement sur les bois charroyés mais encore sur tous les billots laissés en forêts. Cet mesure a eu son bon effet et il n'est demeuré en forêt que 125 billots . . . dans ce district.

Voici d'ailleurs le résumé des divers délits constatés par nos trois agents durant leurs tournées cet hiver:—
 Souches en bas du diamètre légal. . . 90
 Souches dépassant un pied, en hauteur. 3150
 Bois laissé dans les houppiers. . . . 4050
 morceaux ayant plus de 4 pieds de longueur-bois perdu ainsi 10,000 pieds environ.

| | |
|---|------|
| Longerons non charroyés. | 11 |
| Arbres laissés accrochés. | 8 |
| Bois marchand employé dans les chemins. | nil. |
| Billots non charroyés. | 125 |

J'ajouterai à ce sujet que nos agents avaient des ordres stricts de patrouiller leur cantonnement, et de ne rien renseigner sans spécifier l'endroit exact du délit. Je ne veux point d'à-peu-près; point d'estimation à tant pour cent; il me faut un comptage exact des billots ou houppiers, ou autres choses faisant le corps du délit. De cette façon, nous pouvons soutenir nos chiffres envers et contre tous.

Le contrôle des billots a toujours créé beaucoup de mécontentement. Les entrepreneurs se plaignent souvent à tort ou à raison qu'on les vole. De leur côté, les licenciés assurent qu'ils reçoivent juste le bois renseigné par leurs mesureurs, etc. Nos agents forestiers ont reçu instruction de contrôler rigoureusement les mesurages des "cullers" par des mesurages partiels pris ça et là. Ils devaient chaque fois qu'on leur rapportait une différence dans l'estimation des bois, faire rendre justice à qui de droit. Ce travail demandait beaucoup de tact et de diligence; nos agents se sont acquittés de leur besogne à souhait. Nous n'avons reçu que cinq plaintes durant toute cette inspection et on y a fait droit rapidement.

Sans vouloir dire que les mesureurs ont dans notre district fait un mesurage plus "serré" que dans le passé, je crois que chacun a eu son dû et que la présence et le travail de nos agents ont eu aussi leur bon effet de ce côté.

Je crois donc que nous sommes en droit de dire que la surveillance des coupes dans ce district a été efficace. Elle a donné de brillants résultats et amené une économie plus comprise dans l'abatage et l'utilisation des arbres. C'est un premier acheminement vers l'exploitation raisonnée, j'allais écrire scientifique de la forêt. Les concessionnaires réalisent l'importance des mesures que nous préconisons et Mr. MacLaurin, le directeur de la Société qui exploite ces deux vallées, est venu à la tête d'une importante délégation, demander au gouvernement de Québec que le système de surveillance inauguré chez lui soit étendu à toute la province.

Nota.—Dans un prochain article, nous discuterons le travail fait par nos agents forestiers à la pépinière de Berthierville, ou ils sont venus depuis le premier mai dernier.

Reforestation of Waste Lands.

IMPORTANT MEETING IN THE UNITED COUNTIES OF NORTHUMBERLAND
AND DURHAM, ONTARIO.

A significant meeting—the first of the kind in Ontario—was held at Cobourg on June 9th, when the subject of the reforestation of waste lands was discussed. The counties of Northumberland and Durham, which are united for municipal purposes, have within their bounds about fifteen thousand acres of sand lands lying along the ridge which is the watershed between Lake Ontario and the Trent Valley. The ridge extends from Burketon Station, on the Canadian Pacific Railway, easterly to Rice Lake, a distance of about thirty miles, and varies from half a mile to four miles in width. A magnificent growth of pine was cut or burned off this ridge and for a good many years fairly profitable farming operations were carried on upon

it; but latterly the soil has been growing poorer from year to year until very few farmers are left on the ridge, and these are struggling against adverse conditions which are making them poorer every day. Buildings and fences have very generally disappeared and areas of "blow" sand have developed which are in some cases encroaching on the good land adjoining. The source of the streams flowing into Lake Ontario and the Trent River has been affected so that nearly every spring there is great destruction to bridges and other property by floods, followed by drought in midsummer and autumn.

The council of the united counties of Northumberland and Durham took the initiative in calling a meeting of re-



[Photo by courtesy Farm and Dairy, Peterboro

Drifting Sand in Durham county, Ontario. The hill shown in the cut is being blown away since the trees were removed. The road is blocked, and the sand is destroying orchards and fields beyond.

representative men to discuss the situation at the June meeting of the county council at Cobourg. The meeting was held in the Opera House, about seventy-five representative men being present from different parts of the counties. The chair was occupied by Lt.-Col. John Hughes, chairman of the finance committee. Warden A. A. Powers opened the meeting with a brief description of a drive he had taken through part of the district a few days before with Mr. C. C. Nixon, one of the editors of *Farm and Dairy*, who also spoke later. Both these gentlemen said it was scarcely possible to exaggerate the evils of the present condition of affairs. The few farmers who were left were eking out an existence trying to grow rye, with some buckwheat and potatoes. The poverty of the land was being reflected in the poverty and hopelessness of the inhabitants. Blow sand was appearing everywhere, roads and fences were being covered up, great hollows were appearing in the middle of once fertile fields and farmers on adjoining lands were endeavoring, in most cases ineffectively, to stop the encroachments of the sand. Great stumps and young timber were to be seen everywhere, showing the suitability of the soil to grow trees, but it was evident that as soon as trees got big enough for fuel they were slaughtered.

This, with pasturing and fires, prevented the re-growth of the forest which alone was the remedy for this state of affairs. A good deal of the land was abandoned and the rest of it, it was held, could be purchased at from one to six dollars per acre.

Selected speakers from various districts and representing different points of view followed. All agreed as to the urgency of the need for a remedy; the only question which seemed to give ground for discussion was whether the work should be undertaken by the municipality, the provincial government or by both of them in co-operation.

The speakers in this part of the meeting included Mr. C. J. Thornton, M.P., Durham, Mr. William Rickard, Ex-M.P.P., Mr. Sam. Clarke, M.P.P. for East Northumberland, Mr. J. J. Preston, M.P.P. for East Durham, Mr. Sam. Nesbitt, M.P.P. for West Northumberland, Mr. C. L. Owen, M.P. for East Northumberland, and Mr. John Miller, ex-warden of the counties.

Among the points brought out by these speakers were: that the government should take means to induce farmers to preserve and properly care for their woodlots; that land unsuited to agriculture should be kept in timber; that the timber taken off these lands if standing to-day would be worth ten to twenty times the present land value; and that, since trees grew rapidly even in apparently the most discouraging situations, reforestation should be at once encouraged; otherwise there would be thousands of acres now covered with vegetation which in a few years will be blow sand.

Prof. E. J. Zavitz, of the Ontario Agricultural College, who is in charge of the reforestation of the waste lands in Norfolk county, told of the work going on there. By the end of this year the department expects to own one thousand acres in Norfolk. Sixty per cent. of this land will re-forest itself without expense for re-planting. All that will be necessary will be to keep out fires, cattle and trespassers. The rest will require re-planting at a cost of approximately ten dollars per acre. In 1905 he had planted Scotch pine in sand lands in Durham. It was said that it would be impossible to grow anything in such soil, but it was now a thrifty plantation. His experience led him to say that it was possible to re-forest any lands we have in Ontario, and that the ridges could be readily re-forested.

Mr. Thomas Southworth, President of the Canadian Forestry Association and formerly Director of Forestry in Ontario, pointed out that it was now becoming seen that old Ontario had too little forest for the best results in agriculture, for proper stream flow, navigation, water-power, etc. He had hoped the establishment of a nursery at Guelph, where forest trees could be obtained free by the farmers, would solve the difficulty, but the results had been disappointing and this year only 400,000 trees were applied for. The provincial government had begun to buy up lands in the sand area in Norfolk. This was a good move; but the method, from the nature of things, was so slow, and the area of such lands in Ontario so large, that it would be many years before the whole province could be gone over. He suggested as a solution co-operation between the municipalities and the

provincial government. The municipalities might be given power to acquire lands for forestry purposes and such lands might be worked under the direction of the Provincial Bureau of Forestry. By this means efficient expert management could be secured at low cost. The municipalities would bear the cost of management, but as soon as there were profits above the cost of management these would be returned to the municipalities. He anticipated that these municipal forest reserves would prove very profitable in time to come. In the counties of Northumberland and Durham there were 15,000 acres of sand lands which it had been estimated could be secured at an average of \$5 per acre, a total of \$75,000. This on a four per cent. basis would require about \$4,500 per year to pay off interest and principal in thirty years. This was not a large sum for a municipality which had an assessment of \$25,000,000. Stress had been laid upon the fact that this was a work for the good of posterity, but he pointed out that in a very few years the first good effects would be felt in more regular stream flow and in the stopping of drifting sand.

Dr. B. E. Fernow, Dean of the Faculty of Forestry of the University of Toronto, laid down the general proposition that governments should re-forest waste land just as they assisted railways or undertook any other internal improvement on wide lines. In support of this he gave three reasons: (1) it was improper public policy to allow waste lands to remain so if they could be made of profit to the community; (2) our timber resources are not inexhaustible, but relatively small, hence the wood grown on these wastes would be needed when ready for harvest; (3) tree growing is too slow a business for individuals to undertake. On this latter point he gave the figures worked out by professors and students of the forestry course of the University of Toronto in their woods camp on the south shore of Lake Nipissing this spring. These showed that in the forest it took from 180 to 200 years to grow on good soils a twenty-inch red pine tree—a species specially adapted to these sand soils—such as lumbermen require. On poorer soils it took from 250 to 260 years to attain this growth. White pine, under the same conditions on good soils, attained a diameter of 18 inches in 100



[Photo by courtesy Farm and Dairy, Peterboro
Land which should be in timber still. This picture of a field in Clarke township, Durham county, Ontario, shows that land which once grew magnificent timber is now a waste of blowing sand. Timber would grow again if given a chance.

years, 20 inches in 110 years, and after that grew at the rate of one inch in thirty years.

France had done more than any other country in the way of reclaiming waste lands. In south-western France by 1865, 200,000 acres of shifting sands, much like those under discussion, were planted at a cost of \$2,625,000. The government then sold not quite half the lands for a little more than the cost of the whole, and the remainder was now valued at \$10,000,000 on the basis of cutting returns. In the desert of Landes 1,750,000 acres had been reclaimed at a cost of \$10,500,000. It was now valued at \$96,000,000, with an annual revenue of \$8,000,000. Two hundred thousand acres of limestone lands had been reclaimed and reforested at a cost of \$2,000,000 and were now worth \$10,000,000. Altogether, about 2,300,000 acres had been reclaimed at a cost of \$15,000,000, and these lands to-day were considered worth \$135,000,000, yielding a revenue of about 7 per cent.

German forests were also referred to as producing a revenue of \$2 to \$5 net per acre per year. Prussia had a revenue of \$18,000,000 from its 7,000,000 acres of state forests. For the last forty years it had followed a policy of waste-land planting, acquiring the lands by purchase or exchange. The average cost of these lands had been \$17 per acre, and the cost of planting was about the same. By 1902 \$6,000,000 had been spent for this purpose and then another appropriation of \$25,000,000 was made to continue the policy. Dr. Fernow pointed out that what made the profits of such an undertaking still more sure was the steady increase in the price of lumber. In Germany the average annual increase in the price of lumber for the last one hundred years was $1\frac{1}{2}$ per cent. and for the last ten years 2 to 3 per cent. This was the rule all over the world. While the reclamation of waste lands was a good proposition, a still saner one was to abstain from creating waste lands. Five thousand acres of naturally grown young timber could be guarded by two men employed all the year round for \$1,000 per year, or a

total with interest of \$112,797 in fifty years; while to plant the same at \$10 per acre and guard it would cost over \$200,000 in fifty years. This emphasized the fact that young trees have value, a fact that was too often overlooked in the forest fire service by individuals and by governments.

All the addresses were listened to with deep attention, and Dr. Fernow's figures aroused a deep interest. Mr. James Lawler, Secretary of the Canadian Forestry Association, spoke briefly on the advantages of organization in this work and explained the functions of the Association. The closing business of the meeting was the passing of a number of resolutions. These affirmed that there was a large area of waste land in the counties dangerous to surrounding lands and that this should be taken over and re-forested; that efforts should be made by the council of the counties to secure the co-operation of the provincial government in working out a policy of reforestation; and appointing a committee to arrange for a series of meetings next autumn to inform the ratepayers on this subject, the series concluding with a monster meeting at the December meeting of the council of the counties when definite action is to be taken.

ANOTHER FOREST RESERVE IN ONTARIO.

A tract of one million acres in the Rainy River district has been set apart by the Ontario Government by Order-in-Council, on the recommendation of Hon. Frank Cochrane, Minister of Lands, Forests and Mines. The tract is situated between Fort Frances and Port Arthur, and half of the area is comprised in Hunter's Island. The name chosen for the reserve is the "Quetigo Forest Reserve." The tract contains a large quantity of pine land, and will be a fish and game reserve as well as a forest reserve. The Minnesota state government has a large reserve just across the boundary. The total area of Ontario reserves will now be about 12,700,000 acres.

Shade Trees for Prairie Cities.

By A. KNECHTEL, INSPECTOR DOMINION FOREST RESERVES.

A city may have its public buildings, hotels, churches and residences as magnificent as possible, and yet it will never be truly attractive unless made so by parks, boulevards, streets and lawns properly planted with trees.

City adornment does not come about haphazard. It needs strenuous effort, well directed, and artistic sense of a high order. Many cities appoint a commission whose sole duty it is to improve the city from an æsthetic point of view. They lay out new parks and boulevards and improve those that already exist. In the newer parts of the city they determine the width that streets shall have and the portion of those streets that must be reserved for the planting of trees. They decide the species of trees to be set, and give attention to the manner of planting, guarding and caring for them.

For the purpose of planting the city with trees, each city supports a tree nursery. In some places property owners are furnished trees free of charge, in others a price is fixed which covers merely the cost of raising the trees. Parks, boulevards and streets are considered public property and are planted at public expense. Bulletins No. 1 and 2 of the Forestry Branch, Department of the Interior, Ottawa, give details regarding the making and care of such a nursery. A competent man should be employed to manage it, however.

In the Canadian prairie provinces the following trees are suitable for planting:

Broadleaf trees—Canoe birch, European white birch, cut-leaf birch, green ash, mountain ash, American elm, cottonwood, hackberry, Manitoba maple, Russian poplar, balm of Gilead, silver-leaf poplar, golden willow, sharp-leaf willow, and laurel leaf willow. (The Ontario white maple might also be grown).

Evergreens—Lodgepole pine, Scotch pine, jack pine, white spruce, Colorado blue spruce, Engelmann spruce, Norway spruce. (Western white pine might possibly do well).

Deciduous Conifers — Tamarack, western larch, European larch.

Shrubs — Caragana, red dogwood, buffalo berry, black-berried elder, flowering currant, Tartarian honeysuckle, mountain or Ginnala maple, purple lilac, white lilac, Persian lilac, Jasikea lilac, Van Houtte's spirea, Reeves' spirea, snowball, Russian choke cherry, sumach, service crab, Rugosa rose, Ayrshire rose, Carmen rose.

Climbers—Virginia creeper, panicked clematis, hops.

BIRCH, ASH AND MAPLE.

Considering the hardiness of the white birch and the rapidity with which it grows, I wonder that the tree has not been planted more in these provinces. It extends northward to the Arctic circle. The color of the bark, the hardiness of the wood, and the toughness and gracefulness of the branches make it a much more desirable tree than the poplar. In the winter, when the leaves are off, the dark branches contrast most charmingly with the white trunks. Of the European white birch there are three main varieties. The ordinary tree of the woods has branches quite similar to those of the Canadian tree. The weeping variety has very long slender branches that hang down almost vertically. Then there is a cut-leaf variety, the leaves deeply intersected. All three varieties should be hardy in the Northwest.

The green ash is by some botanists considered only a variety of the Ontario white ash. It is native to Manitoba and Saskatchewan. An interesting thing about the ash and Manitoba maple is that the leaves are compound and the fruit has long wings. It grows rather slowly in this country but is quite hardy.

The Manitoba maple or box elder has been planted more extensively in the northwest than any other tree. The attractiveness of the streets of Portage la Prairie is due to this tree. It is a mistake, however, to continue to plant the tree to the exclusion of better species. Winnipeg, when about the size of Portage la Prairie, had little else than Manitoba maple, but now there are many streets planted with elm, ash and birch.

The box elder is a shrub, which by trimming has been forced to take the form of a standard tree.

ELM AND HACKBERRY.

Have you ever noticed that the trunk of an American elm divides into two branches and these again into two and so on down to the smallest branches? This habit, though interesting, is sometimes ruinous to the tree since the weight of each half causes the tree to split. To prevent this a bolt is sometimes run through the two main branches. The elm grows slowly in this region but is hardy and likely to be long lived.

The hackberry is not native to the Canadian Northwest, but in North Dakota it is perfectly hardy. It has a leaf formed much like an elm leaf, but it is very rough to the touch. The branches are quite like those of the elm. The outer bark when the tree is about six inches in diameter breaks into small blocks resembling warts. The fruit is a berry. The tree, which is a native of the United States, is often called the Lost Elm, as it grows very sporadically in the northern states. In New York, however, I have seen large groves of this species.

MOUNTAIN ASH.

The mountain ash is a beautiful tree. The dark green foliage of summer and the red berries of autumn are a delight to the eye. The smooth bark, too, with its long lenticels is very attractive. There is no other tree native to the prairie provinces that has such beautifully colored foliage in autumn.

Many people have an idea that the autumn colors are due to the frost. Such is not the case. In the fall of 1902 I collected autumn leaves in New York City for five weeks before the frost came and for one week after the frost. I observed that the colors were rather injured by the frost.

Nor do the leaves fall on account of the frost. A corky, brittle layer of cells forms at the base of the leaves, and the wind breaks off the leaves. The hickory usually sheds its leaves before there is any frost.

POPLARS AND WILLOWS.

Many people object to the cottonwood because it throws off so much

down in the spring. Cottonwood, balm of Gilead, poplar and willow trees are said to be dioecious, that is, some trees are male and others female. It is only the female trees that are so troublesome in this respect. If the trees were raised from cuttings and cuttings from male trees only were planted, the cottonwood as an ornamental or shade tree would be quite desirable. The tree is native to these provinces. The cottonwood is a kind of poplar and like all poplars the branches are somewhat brittle. This brittleness probably accounts in part for the distribution of the poplars along the streams. The twigs break off easily, float down the stream, stick into the banks and begin to grow. Willows are much propagated in the same manner.

The Russian poplar is an introduced tree. It seems to be doing quite well in some western cities. In some parts of the country, especially in Alberta, it rots early and is very subject to insect attack.

The balm of Gilead is native. It is a good tree to plant in this climate but many people object to it on account of the roots spreading so widely and sending up suckers.

The silver-leaf poplar is by many people called the silver maple, probably on account of the leaves being shaped quite like the maple. The poplars can easily be distinguished from the maples, as the former have their leaves and twigs arranged alternately on the branch; the latter opposite. The leaves of this tree have the lower side covered with a thick, white down, which is quite striking as the leaves flash in the sunlight. The leaves are the chief beauty of the tree. The branches are inclined to spread much, which gives the tree an unshapely appearance. The species was introduced from Europe.

The willows are likely to be used in this country, as in the east, chiefly for hedges and wind-breaks. The evergreens contrast beautifully with the broadleaf trees in summer and lend a charm to the city in the winter, and should be encouraged as much as possible, especially in the parks and private lawns.

EVERGREENS.

The white spruce is native to the province and is perfectly hardy when



Windbreak of Golden Willow. Planted as two-year-old rooted cuttings in spring of 1905, photographed in autumn of 1908. Forest Nursery Station, Indian Head, Sask.

planted in the city. It prefers a sandy loam.

The Colorado blue spruce is a beautiful tree to plant on lawns. There are two distinct varieties of this tree; one has green foliage, the foliage of the other is decidedly blue. The blue variety is the one to plant. This tree is a native of the Rocky Mountains. Many individuals of this species have a most delightful fragrance.

The Engelmann spruce is also a tree of the Rocky Mountains. It has blue-green foliage and is very handsome.

The Norway spruce is a European tree with cones four or five inches long. It has been widely distributed by the nurserymen, but is no better than our native species. This is sometimes called the weeping spruce, as the long slender twigs of many individuals hang down almost vertically. This is an excellent tree for planting in cemeteries.

The Lodgepole pine is a very desirable tree for planting in the northwest. It clothes the whole eastern slope of the

Rockies and comes east as far as the Cypress Hills in southern Alberta. The trees bear cones very early. I have seen trees not more than two feet high with several cones. No evergreen restores itself better after fire than the Lodgepole pine. The cones hang on the trees many years without opening. Fire comes along and kills the trees; but, the heat opening the cones, the seed falls to the ground uninjured, and there comes up an impenetrable thicket of young pine. The tree is straight and tall and the foliage is a beautiful green. It is a much handsomer tree than the jack pine of the east.

Scotch pine has been distributed widely in this country by the nurserymen. As its name implies, it is a European species, but it is not indigenous to Scotland alone. The Germans call it the "Common Pine," as it covers the sandy land of that country. It is distributed all over northern Europe. It is no more hardy in this country than the lodgepole pine and is not so handsome.

WHEN TO PLANT.

Trees should be planted in the spring as soon as the ground is thawed out. At this time the sap will just have begun to flow and the tree will immediately send out new roots. Moreover this is about the time when the rainy season begins and the trees are likely to be sufficiently watered. There is very good reason why trees set in the fall do not live through the winter. When a tree is transplanted the roots cannot be put into such close contact with the soil as they had before the tree is lifted, and the wind blowing the tree back and forth all winter tends constantly to loosen the roots. Hence the tree cannot take moisture from the soil. In prairie regions the air in the winter is very dry, and much moisture is evaporated from the trees. This moisture not being replaced through the roots, the tree dies.

HOW TO PLANT.

Trees should be planted in well drained soil. They cannot thrive in land constantly saturated in stagnant water. The hole for the tree should be dug much wider and much deeper than just sufficient to take in the roots. The soil with which such hole is afterwards filled will conserve moisture better and allow the roots to spread better than the hard unbroken ground. In this dry climate the hole should be filled with water two or three times, the water being allowed to soak into the ground.

Enough good rich earth should be brought to the side of the hole to fill it in setting the tree. Any good farm soil is sufficiently fertile for trees. Soil brought from a field where a good crop of wheat has been raised will serve the purpose.

In setting the tree fill up the hole with good earth sufficiently so that the tree will stand about two inches lower than in the nursery. Then set in the tree, throw some earth over the roots. Shake the tree up and down. Work the soil carefully under and around the roots with the hand. Throw in a little more earth and tramp it down. Then take a good pounder, and, as the hole is being filled up, pound the earth most thoroughly. About a foot and a half away from the tree leave a depression

to hold water. Do not throw water into the hole while filling it in, but after the tree is set water thoroughly. In a dry time water thoroughly every three or four days after sundown.

WHERE TO GET TREES.

Native trees can, of course, be obtained from the woods, though such trees are likely to be costly as they require much time to get them, and they do not live so well as nursery grown stock. Forest grown trees are likely to have a few long slender roots, each with a bunch of fibrous roots at the end which will probably be cut off in lifting the tree. Nursery stock is transplanted in the nursery and this transplanting causes the roots of a tree to become a compact mass of fibres. Nursery stock obtained from the United States is likely to be tender. If trees are obtained from a nursery they should be purchased from the Canadian Northwest.

In getting a tree from the woods, it is advisable to take along a piece of burlap. This should be dipped in water in the woods and as soon as the tree is lifted it should immediately be placed upon the burlap and the burlap wound carefully about the roots. Whether trees are obtained from the woods or the nursery, the roots should not be allowed to become dry for a single moment. It is better to select a tree grown in the open. Trees much shaded in the woods are likely to prove tender when planted in the city. Before the tree is lifted it is well to mark it on the north or south side so that it can be placed in the same position with regard to the points of the compass as it held in the field or woods.

Broadleaf trees should be trimmed. It is not necessary to cut the tree down to a pole. Parts of the larger branches should be left to give the tree a shapely head. Branches removed entirely should be cut close to the trunk or the branch on which they are borne. Wounds should be made vertically or so that they will face the ground. They should be left as smooth as possible and should be covered with lead paint.

SUBSEQUENT TREATMENT.

Constantly cultivate the soil around the tree until the end of August. Do not cultivate after that time, as the

tree must be allowed to stop growing so that it will harden for the winter.

In the fall just before the ground freezes the soil should be thoroughly saturated with water.

Trees should be protected from dogs and other animals by placing guards around them.

Trees can be protected against insect attack by spraying with London Purple or Paris Green or a mixture of these. A first spraying should be done about the middle of June. Then in two weeks the trees should be sprayed again and in two weeks more they should have a third spraying.

Forestry in Canada.

(A paper read by Mr. R. H. Campbell, Superintendent of Forestry, before the Dominion Land Surveyors' Association.)

Forestry is an art long practised and now has reached the position of a science with defined principles and with many well determined results of scientific investigation. The beginning of forestry was the protection of woodlands for the preservation of game for the king's sport and the forester was the king's huntsman. A forest at that time was not necessarily covered with trees; it was merely a hunting ground. Later the supply of wood became the chief purpose of the forest and from that time dates the inception of scientific forest management. To produce the best wood and the most wood was the problem. Then began the enquiry into the productiveness of different tree species; the relation of soil and climate to their growth and development, their relative vigor of growth and fitness to survive in the struggle for existence which characterises tree life as all other, the enemies, insect, fungal or other, which prey upon them. In short, man's intelligence had placed before it for solution one of the greatest and most interesting problems of nature and economics, the study of a life, varied, multifiform, fascinating to the eye and to the mind, and the directing of that living force to meet the needs and increase the happiness of mankind.

The forest has always had its mystery and its magic, whether it towered in sombre grandeur over the rites of some heathen or Druidic festival, whether it was woven into the canoe of some Indian Hiawatha, or uttered its voiceless but irresistible call to the coureurs du bois and the backwoodsmen, and the call of the wild is still strong enough to draw men from ease and comfort to thread the mazes and tangles of its

forests and brulés and to brave the danger and discomfort of isolation, exposure—and even mosquitoes. From the days of the French pioneer and of the hardy woodsman who cleared the fertile acres of the Province of Ontario, the forest has been inwoven with the history of Canada and nature proclaims by the vast areas of rocky and sterile land and the great watersheds they dominate that if the Dominion is to attain its highest prosperity and best development, the forest must be preserved and perpetuated.

THE REPRODUCTION OF THE TREES.

What does the forester enquire into? First is the life history of the tree. Where does that begin? You have seen sprouting from the stump of an elm, or chestnut, or maple, shoots which finally develop into trees; you have seen the poplar sending up suckers through your lawn, but the normal method of reproduction, and, in the case of practically all the coniferous trees the only one, is from seed. The processes of nature are patient and sure, but never hurried. The tree must begin with the seed. The crop that we are reaping now was mostly sown a century or two ago, the half mature crop we may yet see harvested, but the crop that is now being sown none of us shall live to see gathered in in its maturity. The first fact for the forester is that he must have a seed supply.

In looking for it he learns something more. Poplar and birch and cherry and hardwoods generally have a crop of seed every year, but pine and spruce and tamarack only every three or four years. So when land is denuded of forest by

cutting or fire, poplar, birch and cherry first fill up the ground, though later they may be followed by pine and spruce if there is any seed left uninjured in the ground, or if there are any seed trees to furnish a supply. If the heavier canopied hardwoods, such as maple, beech, etc., are left, the chances of the coniferous forest are poor, as the sprouting qualities and frequent seed supply give the hardwoods the advantage. If, however, the first growth is only poplar, cherry and white birch, the conifers will in time overtop them and re-establish their supremacy. Recurring fires, however, will destroy this young growth and leave the case for the coniferous forest hopeless by natural processes. Such a condition exists over the greater portion of the Riding Mountain Forest Reserve which has been carefully examined by the Forestry Branch. Spruce has, through frequent fires, been replaced by poplar, and there is not now sufficient of the former tree to provide a seed supply for reproduction, and, as a matter of fact, over the greater part of the reserve there is practically no new growth of spruce. Similar conditions exist and no doubt have been noticed by many of you in other parts of the Dominion.

The sowing of the seed is provided for by two methods, the natural and the artificial. These have been worked out thoroughly in European countries—with the greatest thoroughness in Germany, but also in Austria, France, Italy, Norway, Sweden and Switzerland. The natural method provides for the leaving of seed trees (mature trees from which the seed may scatter), either by selection or strip cutting. In the selection method the trees are gradually thinned out, there generally being two thinnings before the final cut. The second thinnings open the ground to the light and the seed which then falls has an opportunity to germinate and finally, when the last stand is removed, there is a good growth of seedlings coming on. In the strip method the forest is divided into strips corresponding in number to the age of maturity of the forest. The first strip is cut clean and seeds in from the second. Next the second is cut and seeds in from the third, and so the cycle goes on until at the final cutting of the last strip the first strip is again ready for cutting. But these methods imply that the seed years must be watched and the

cutting made to correspond. This is the easiest and the cheapest method, and it is to natural methods we must look for the reforesting of the greater part of Canada, as the cost of any other method would make it impracticable.

Artificial methods are planting and sowing. Both involve the gathering of seed, which is extracted from the cones in a drying house such as has been established by the Forestry Branch at Indian Head, where the cones are spread on trays in a warm temperature which causes them to open and shed the seed. This is afterwards winnowed and cleared of its wings. In the planting method, which is adopted largely in Germany, the seed is sown in beds in a nursery and, after one transplanting, the trees are, at three or four years of age, finally set out in the forest. This is, however, a slow process. A German forester who plants forty acres in a year is doing well, but it would take a long time at that rate to make an impression on Canada's vast areas. It is also expensive, even with the Germans using female labor at $37\frac{1}{2}$ cents per day, and in Canada would be much more so. Considerable planting has been done in New York State at $\frac{1}{2}$ cent per tree, or about \$6 per acre. Fancy replanting Northern Ontario or Quebec at this rate per acre!

Sowing may be done by broadcast seeding or by the seed-spot method. Broadcast seeding is the cheapest, but is wasteful of seed, as it is most like natural seeding which "of fifty seeds brings but one to bear." It is best done on the snow in spring. In the seed-spot method the mineral earth is stirred up by a hoe in spots a few feet apart by one man, while another follows dropping a few seeds into the prepared place and pressing the earth down on them with his feet; or the seeds may be dropped on the surface of the ground and covered with a handful of sand. Trial of this method was made last year on the Forest Reserves in the West with fair results. A good supply of seed was obtained last fall and it is proposed to extend the experiment during the present year.

FACTORS IN TREE GROWTH.

When the seed germinates it first strikes downward, forming a root to give the seedling a firm hold on the ground and supply it with moisture. Pushing



[PHOTO BY A. KNECHTEL

Planting on Dominion Forest Reserve.

its way through the soil partly by chemical action at the root tips and partly by the force of the growth and development behind, the root system must develop in proportion to the tree crown. If the root is too small it will fail to support the tree and to supply adequate moisture to make up for the transpiration from the crown. So the cutting back of the roots when transplanting trees necessitates the cutting back of the crown. And it may be mentioned that the small root hairs are the organs of absorption, and, as these are quickly dried out and killed in the sun and air, the roots of trees which are being transplanted should be carefully protected from exposure and be kept moist.

While the chief function of the root is to supply moisture, they require air. Even the bald cypress of the southern swamps must push up its great root knees above water to get an opportunity to breathe. The effect of lack of aeration of the roots is noticeable in the fringe of dead trees which surrounds many of the lakes in the lumbering region where the waters have been raised for any length of time above their

normal height by lumbermen's dams. Trees accustomed to grow in wet and swampy places develop a spreading and shallow root so as to keep in reach of an air supply. The knowledge of the root structure is important to the forester. Some of the most beautiful theoretical plans for the management of spruce forests in the Eastern United States by cutting by the selection method were spoiled by failing to remember that the spruce is a shallow rooted tree, and the pleasing stand of seed trees left to provide for reproduction were levelled to the earth by the first windstorm.

By what force the water is drawn up through the root and elevated one hundred, two hundred, three hundred feet or more in the air is one of the mysteries of vegetable physics. Atmospheric pressure is not capable of raising water above forty feet. Root pressure, whatever that may be, or, if it is only osmosis, that force by which one liquid is absorbed through a membrane by a stronger chemical solution, is inadequate. The pressure of the air bubbles in the cells of the tree trunk, the chemical or physical activity of the living cells, the pull exerted by the osmotic action of

the leaves—all these have been put forward in explanation and probably each has an influence, but we are still face to face with one of the most interesting unexplained problems of nature. The quiet, forceful and economical way in which nature elevates her water supply is no less a locked secret to the scientist than it is to the city engineer and the plumber.

The leaf, the great digestive apparatus of the tree, is not less important than the root. Requiring sunlight to carry on the process of disintegration of the substances on which it feeds, it spreads out its canopy of leaves arranged ingeniously and methodically in such a way as to present the largest surface to the light. Coniferous trees make up for the narrowness of their leaves by their greater number. Carbon derived from the air is the main food of the tree, so that it requires little but moisture from the soil and can therefore live on poor soils, lands useless for agriculture. The Norway pine and jack pine flourish on sandy soil useless for other vegetation. The white pine, the spruce, the maple, may be found grasping the almost bare rock with their roots and finding a livelihood where other vegetation would fail.

The influence of light on tree growth is one of the most important factors the forester has to consider and the trees have been classified as tolerant and intolerant according to their ability to grow in the shade. For Canadian species the list might run as follows, commencing with those most tolerant of shade: hard maple, beech, hemlock, spruce, balsam, soft maple, birch, white pine, black cherry, ash, bird cherry, poplar, tamarack, jackpine, red pine. This knowledge is important, for the forester must give the degree of light which will favor the species he wishes to bring in. Spruce and pine will not flourish under the heavy crowns of the hardwoods, and spruce would have the advantage over pine in heavy shade.

The water, with traces of mineral salts, coming from the roots, and the carbon compounds from the leaves are built up into wood cells, the active work of tree building going on in the cambium or outer cells of the wood next to what is termed in general phrase the bark. These active cells are large and thin-walled and form the sapwood of the

tree. The heartwood is formed of such cells which have gradually thickened their walls and contracted their apertures and which are to all intents and purposes dead. In the earlier years most of the wood is sapwood, in the later years the heartwood is the greater; and as this latter is much more valuable for lumber a strong argument is found in this fact for allowing trees to grow to a mature age. The annual rings, so characteristic a feature and one which enables the forester to determine the age of trees, are the result of the difference between the active spring growth of cells with thin walls and large apertures contrasted with the wood of the later summer with contracted thick-walled cells.

When does the tree reach its best development? With spruce and pine the rotation adopted in Germany is from sixty to eighty years, though trees required for special purposes may be left longer. Trees which are now being cut in the mills at Ottawa for lumber will run between one hundred and two hundred years of age. A growth under forest conditions of an inch in diameter in five or six years on an average is the best that can be expected.

“For Nature, also, cold and warm,
And moist and dry, devising long,
Thro’ many agents making strong,
Matures the individual form.”

Examples of individual trees grown on open lawns or other favored places in short periods are not a criterion for forest conditions any more than are trees grown in wind-swept or other unfavorable conditions. Growth will vary under conditions of moisture, soil, etc., but anyone who expects the renewal of a spruce or pine forest in thirty years or any such period is hugging a delusion, a general acceptance of which would be disastrous.

ENEMIES OF THE FOREST.

The forest has many enemies. Wounds caused by fire or other agency give entrance to fungi, which finally work through the tree, breaking down its structure and destroying its usefulness, as has occurred with a large extent of poplar on the Riding Mountain Forest Reserve. Insects have done a like service for one of the few remaining patches of spruce on that reserve.

Storms break the trees, avalanches of snow overwhelm them. But the greatest agent of destruction, the one which has left its mark broad and deep over the forests from the Atlantic to the Pacific, is the forest fire. The scene of towering rampike and tangled brûlé, of barren rock and dreary sand waste, which characterises so much of our forest districts, is a sad commentary on the wastefulness and prodigality with which we deal with the resources nature has supplied to us. The trail of the prospector, the advance of the settler, the construction of the railway, all have been the precursor of the fire, and, even with the greater interest awakened at the present day, it is doubtful if the destruction will be permanently and effectively stayed.

All the provinces, as well as the Dominion, now have fire patrol systems which have done good work, but the public are still careless, the railways are a serious danger, and the fire ranger, even if he be honest and capable, has generally too large a territory to cover. Besides, it is impossible to supervise effectively the work of the fire ranger, and naturally the work is not always done thoroughly and honestly.

In the prevention of fires, you, gentlemen, going out into, or into the neighborhood of, the forested districts of Dominion territory can be of assistance by impressing the fire danger on those you meet and by giving us information as to the working of the protective system in the districts through which you travel. I have to acknowledge valuable information and suggestions already received from members of your profession and will be glad to receive such in future. We have not by any means attained perfection and we welcome any fair suggestion or criticism.

In return let me give a hint from an experience of one of our fire rangers. He discovered a fire one day a little off a survey line, and, on extinguishing the fire and making a careful examination, he found that it had eaten along a bog underground from a fire on the survey line. The surveyor in charge was a careful man and had given strict instruction about extinguishing fires, and it was thought that this fire was extinguished. It shows the need of constant watchfulness and thorough measures for extinguishing fires.

Another respect in which the members of your Association may be of assistance to the Forestry Branch is by their reports on the timber in the districts surveyed by them. Valuable reports are being furnished by some surveyors and these reports are being plotted on sectional sheets. Such reports accompanying returns of survey would in time give a good idea of the timber in the districts covered.

HOW MUCH WOOD DO WE USE?

But why should the public take an interest in the preservation and propagation of the forests? What purpose do they serve?

In the first place they supply wood material. And wood is useful for so many purposes that it would be idle to attempt to enumerate them. The floors we tread, the seats we sit upon, the finishing of our houses, the newspapers we read, and a thousand and one conveniences come from the forest. And in spite of all the substitutes that have been found for wood the total quantity used is steadily increasing as well as the total per head of population.

The figures of consumption in Canada are not very reliable or complete, but taking the total of the last census, 1901, the product was about nine billion feet board measure and the annual consumption now is probably near to double that quantity. Of this quantity about four billion feet board measure was for sawing into lumber and therefore from trees of a size suitable for that purpose.

In the United States the consumption for the year 1907 was forty billion feet board measure of sawn lumber and the total of all forest products would bring the figures up to probably five times that amount. It is considered by the United States Forest Service that that country has reached its maximum of production and each year hereafter will see a decline, the deficiency resulting from which must be supplied elsewhere.

Europe as a whole is an importing continent. I am not able to give the present quantities, but for the period from 1895 to 1899 the total net imports of European countries were 12,012,500,000 feet board measure, Great Britain leading with more than half and Germany coming second with over one-

fourth. The total net exports were 11,347,500,000 feet board measure. Most of this was from Russia, Sweden, Austria-Hungary, Norway and Roumania. Russia was expected to increase its export and probably also Sweden, but the others were expected to decline, and I understand that Sweden has not kept up the promise of that time. The net deficit in the European supply was at that time, therefore, close to two billion feet and it is certainly now much greater.

FUTURE PROSPECTS.

If Canada is called on to supply any great share of the deficiency of the product in the United States and Europe—and there is no place else to look—how are we prepared to do it?

The quantity of pine estimated as standing in the Province of Ontario is twenty billion feet and in the Province of Quebec forty billion feet, the latter probably an over-estimate when compared with that of Ontario. The pine cut of the United States last year was 4,192,708,000 feet board measure. The pine cut of Michigan, Wisconsin and Minnesota in 1892 was eight billion feet board measure and is now two and a half billion feet. To make up even the shortage in the product of these States would mean that our supply of pine would last ten years.

Outside of yellow and white birch, maple and some red and burr oak, our hardwood supply is gone and would probably not total more than twenty billion feet board measure.

Of spruce, balsam and hemlock suitable for lumber we may have a stand of three hundred billion feet and the British Columbia forests of fir, cedar, spruce, pine and other western conifers have been put at 320,000,000,000 feet.

If the Dominion, including quantities exported, reaches even half of the production of the United States, the supply of trees for lumber is far from inexhaustible, and in fact the supply of virgin forest could not last much over fifty years, making no allowance for growth in the meantime.

There are large quantities of spruce, balsam, and poplar in the northern forests suitable for pulpwood but to what extent they can be saved from fire is uncertain. The distances are great and the lands not easily accessible.

The species in question are easily injured by fire and in a dry year the present methods of handling the situation are inadequate.

Our great hope, however, for the immediate future is in the saving of the young trees now well established or half grown. If this is not done Canada cannot retain supremacy as a forest country.

HOW FORESTS INFLUENCE WATER SUPPLY.

Another great purpose for which the forests should be preserved is for their influence on the water supply. What degree of influence the forests have on the water supply is not determined. Experiments to determine whether they have any effect on precipitation have been made in Europe with conflicting results. German experiments leave the question uncertain or decide it negatively. French experimenters decide that the forests do exert an influence. One of the great difficulties in obtaining accurate results is the defectiveness of the rain gauges and the varying influences of the winds and other forces on the quantities of water reaching them. My own opinion is that considerable areas of forest in a level country have an influence, though slight, due probably to the cooler atmosphere over them in summer.

Their sheltering effect on the snowfall in the spring and the mechanical obstruction which the trees, roots and cover of the forest floor present to the run-off of water is undoubted, though not unquestioned, and, thus assisting towards the regularity of the stream flow, present a strong argument for their preservation. The use of water for irrigation, domestic and municipal purposes, and power plants is increasing rapidly, and on the regularity of the water supply the future prosperity of many communities and the development of industries largely depend. In the irrigation district of southern Alberta and Saskatchewan I hope that the observations of stream flow and water supply which are being carried on by the irrigation service, and which are now being arranged on a somewhat adequate basis, will be carried on co-ordinately with the observations of the forest officers on the eastern slope of the Rocky Mountains and in the Cypress

Hills, and that as a result definite data as to the influence of the forests on stream flow may be obtained. Such observation may give us information as to how the disastrous floods from the eastern slope of the Rocky Mountains may be prevented, or, at least, may enable us to give warning of their coming and prevent some of the great loss which frequently occurs.

OTHER USES OF TREES.

Forests protect the soil from erosion, provide a shelter for game, and pleasant resorts for summer outings, and so in various ways minister to the good and increase the happiness of the people.

Woodlands also protect the farms from wind and the Dominion Forestry Branch have assisted the prairie farmers by furnishing them with trees to form shelter belts and wood lots. Thirteen million trees have so far been distributed from the nursery station at Indian Head and two million and a half are ready for distribution this spring. The comfort and beauty and homelikeness resulting from the planting of trees around the homestead can only be appreciated by those who have been able to contrast the attractive tree-sheltered cottage with the house set bleak and bare and unadorned upon the windswept prairie.

FOREST POLICY IN CANADA.

What are the main lines that should be followed in the forest policy of Canada?

First comes a fire patrol system. The patrol system has been instrumental in reducing the loss by fire, and, even with the large districts to be covered and the lack of supervision, has been of great benefit. I fear, however, that in dry seasons it will only be the blessing of Providence that will prevent fires of serious proportions. A patrol is the only measure that can be taken in our large and difficult forest tracts and the proper policy to follow is to take every measure to make it as effective as possible. On Dominion territory it has been extended as far north as the Peace, Great Slave and Churchill Rivers. The fire notices have also been prepared in the Indian syllabic in Cree and Chipewyan for posting in the northern districts.

But railways are being built, settlement is crowding in, and if the forests

are to be preserved it will be necessary to have inspections made in advance and such lands as are unsuitable for agriculture set apart as forest reserves. On the reserves already set apart we find that it is largely a case of locking the door after the horse is stolen, for many of them have suffered so severely by fire that the timber on them is now of little value either as to size or species. The same story will be repeated over the rest of the great northern forest unless such reserves are set apart and guarded by an adequate and reliable staff of rangers under efficient supervision. Exploration of lands before settlement and the creation of forest reserves would therefore be the second item in a Canadian forest policy.

And as a part of, and a framework for, the policy of exploration I would like to see, in so far as Dominion territory is concerned, meridian lines extended northward well in advance of settlement, with base lines run out at suitable intervals. Any further inspections made could then relate themselves to some fixed locations and the division between agricultural and non-agricultural lands could be made with greater facility and the position of the tracts so differentiated could be determined with some definiteness.

A timber survey should be made on the forest reserves and the timbered lands in general to determine with some degree of accuracy the quantity of timber available, its condition and the outlook for the reproduction of the supply. In the United States the forest reserves under charge of the federal government have been so surveyed. Such surveys have been completed in twenty-one states and are being carried on in thirteen more. In Canada a million and a quarter acres of the ten million acres in Dominion forest reserves and parks have been so examined. Ontario in 1899 sent out a number of exploratory parties to make an effort to determine the wood available in northern Ontario. Outside of these no systematic and sustained effort has been made by any government, Dominion or provincial, to find out the condition of its forests or where Canada stands in regard to this great resource. Geological survey officials, lumbermen, foresters, every body who has ever travelled through the woods, even if

it is only on the railway or on the map, may hazard a guess and establish a reputation as an expert by speaking learnedly and definitely of that of which he knows little or nothing. As a distinguished gentleman, sometime deceased, used to remark, "The public like to be fooled," and they illustrate it by willingly accepting the statements in regard to the forest resources of Canada of any person who claims or does not claim to be an expert instead of demanding that the Government should do the only right and natural and effective thing, and that is to go and get the information where it is to be found, that is, not in the office or on the street, but in the forest, and to get it by a method intelligent, effective and comprehensive enough to be adequate to the position and dimensions of the great Dominion of which we are all so proud and know so little.

An adequate forest policy would demand the spending of more money. From all sides we hear expressions of admiration of the work done by the Federal Forest Service of the United States and they are fully deserved. But it must not be overlooked that that service has a permanent staff of over two thousand, temporary assistants numbering eight hundred, and an annual appropriation of over four million dollars, and the United States is not greater in extent than the Dominion. Besides this there are numerous state forest services assisting the work and increasing the total of forest service expenditure. If the Canadian people wish a service equal in all respects to that in the United States they can have it by paying the price, and I feel sure that Canadians, whether in the forest service or any other service of the Government, are capable of carrying out a public policy as broadly, as comprehensively and as intelligently as any other nation on the face of the earth.

European experience is to the effect that a thorough management of forests, even at an increased expense, gives the best net results. The forests of Saxony, which have been under scientific forest

management for a century have a net expenditure of \$2.30 per acre and a net revenue of \$4.37 per acre. At first the expenditure per acre was eighty cents and the net revenue ninety-five cents. Later the figures were \$1.15 expenditure and \$2.39 net revenue, and now the figures first quoted have been reached.

With increase of population, with greatly enlarging necessities, with expanding industries, with increasing complexity of life, the time arrives in the history of every nation when haphazard methods of administration will no longer suffice, when wasteful and destructive dealing with the great resources of the country must end, and when, if that country is to retain its place among prosperous nations and maintain its population in comfort and happiness, scientific and economical methods of dealing with the resources of the country must be adopted, intelligence and skill must work together to prepare them best for the needs of man and bring them most conveniently to his hand, and the public service must be not only honest and loyal but far-sighted and progressive. Canada has reached the place where her own necessities and her position as one of the possible great factors in the future history of the world make it imperative that, learning from past civilizations and the history of other nations, she should ensure that prodigality and wastefulness such as have stopped the progress and crippled the strength of other countries, and in the path of which, in so far as her forest resources are concerned, the Dominion has followed far and long, should not be a reproach of future generations against her, but that gathering wisdom from out the storied past, used within the present and transfused through future time by power of thought, she may have a history greater and grander in the future, worthy of the great inheritance with which she has been endowed by a bounteous Providence, worthy of the race from which she has sprung, and worthy of the great destiny which lies in her hands to accomplish.

Report of Forests and Waterpowers Committee.

Immediately following upon the International Conservation Conference the House of Commons took up the question of the investigation of the natural resources of Canada, and appointed three committees for this purpose, to which were assigned respectively the duties of reporting on (1) the Forests, Waterways and Waterpowers; (2) Mines and Minerals, and (3) Marine and Fisheries.

On Feby. 26th the members of the Committee on Forests, Waterways and Waterpowers were named as follows:—Hon. Clifford Sifton, Hon. Sydney Fisher, Hon. J. G. Haggart, Messrs. Jas. Arthurs, H. S. Beland, Glen L. Campbell, F. B. Carvell, M. Chew, M. Currie, J. W. Edwards, F. L. Fowke, George Gordon, T. Macnutt, H. H. McLean, C. A. Magrath, J. P. Molloy, F. D. Monk, G. H. Perley, S. W. W. Pickup, W. Price, J. W. Richards, E. W. Tobin, G. V. White, W. H. White and C. A. Wilson; to these Mr. F. T. Savoie was subsequently added.

The committee met for organization on March 31st, when Hon. C. Sifton was elected chairman. Several meetings of the committee were held, at which evidence was given by Messrs. R. E. Young, R. H. Campbell and P. E. Ryan.

On May 17th the final report of the committee was presented by Dr. Beland, and on May 18th, on motion of Hon. C. Sifton, was concurred in by the House.

THE COMMITTEE'S REPORT.

After a brief reference to the appointment of the committee late in the session and the consequent incompleteness of the report by reason of the short time allowed for investigation, the committee recommended as follows:—

1st. It has been shown that the officers of the Transcontinental Railway have framed and promulgated excellent regulations for the protection of forests along the line of the Transcontinental Railway and that various plans are being adopted in the Provinces of New Brunswick, Quebec and Ontario for enforcing these regulations. It is quite apparent that the result of the attention which has been given to the subject has been to very largely reduce the destruc-

tion of forests by fire which has heretofore almost always characterized the construction of railways through forest territory. Your Committee, however, are impressed with the belief that a great amount of additional attention should be given to the enforcement of the regulations and believes that the Commissioners would feel that their hands were strengthened in the work if they were supported by specific action on the part of the House of Commons. It is therefore recommended that the Commissioners be asked to devote special attention to the enforcement of the fire regulations and to provide any additional staff necessary for that purpose; also that power be given to the Commissioners to expropriate additional width of right of way where necessary to provide adequate protection against fire.

2nd. Your Committee desires to call attention to the need for immediate action in regard to the conservation of the forests on the eastern slope of the Rocky Mountains. This territory, once heavily timbered, is no longer in that condition, although it contains a considerable quantity of merchantable timber. There has been very great destruction by fire, even in recent years. The importance of preserving the forests on the tract in question cannot possibly be exaggerated. The rivers which flow down through Saskatchewan and Alberta, upon which, almost exclusively, the whole water supply for domestic, municipal and irrigation purposes of the population of these provinces depends, have their sources between the foothills and summit of the Rocky Mountains. Apart from the question of actual water supply, other matters of far-reaching importance are involved, such as the continued fertility of the soil, the regularity of the rainfall and the moderation of the climate. These all depend upon the continuation of the flow of the rivers in question. When these rivers are used to their utmost limit as at present distributed, the quantity of water there, leaving aside domestic and municipal supply, is sufficient to irrigate about two per cent. of the irrigable land,

while, if properly regulated and conserved, it would suffice to irrigate from sixteen to twenty per cent. Instead of moving toward a system of proper regulation of increasing the amount and efficiency of the water flow, the forest land, which alone can sustain the supply, is being rapidly destroyed by fire owing to the insufficiency of the protection which is accorded. The officers of the Department of the Interior who are employed in connection with this work are believed to be active and efficient, but a larger and better organization and a much more extensive staff is required in order to cope effectively with the evil.

Not only the water supply but the fuel supply is involved in the effective handling of this question. Western Alberta is very rich in coal, and the mining industry has passed the initial stages and is no doubt upon the eve of great development. A supply of timber at reasonable cost is essential for economical coal mining and this timber should be procurable from the territory in the neighbourhood of the location of the mines. If such a timber supply cannot be procured it will add most materially to the cost of mining and therefore to the cost of fuel. It is safe to say that unless very decisive measures are taken the supply of timber for mining purposes will very soon disappear.

In view of these facts, therefore, your committee begs to recommend that immediate action be taken to enlarge the boundaries of the National Parks or Forest reserves, and that a single continuous forest reserve be created from the international boundary line to the northern watershed of the Peace River.

It is recommended that a competent warden, with an efficient staff be placed in charge of the reserve above indicated, and that stringent regulations be provided for the purpose of as far as possible absolutely preventing the destruction of timber by fire, and for the further purpose of carrying on a system of reforestation whenever possible.

It is further recommended that an accurate forest survey of the territory included in the reserve, commencing at the southern and more immediately important portion, be carried on with all convenient speed, and that it be a portion of the allotted work of such survey to locate and determine upon possible

reservoirs for the storage of waters within limits of the reserve.

If it be regarded as too late in the session to introduce legislation for the purpose of giving effect to the recommendations above set forth, your committee would suggest that by executive action the reserve should, as far as possible, be constituted, defined and put into effect looking to the introduction of the necessary legislation at the next session of Parliament.

THE EVIDENCE.

Mr. R. E. Young, first taking up the question of waterways, spoke favorably of the possibility of a waterway from Lake Superior to Winnipeg, and thence to Edmonton, either by way of the Red River and Lake Winnipeg and the Saskatchewan, or by way of the Assiniboine and Lakes Manitoba and Winnipegosis to Lake Bourbon and thence via the Saskatchewan. The recent progress in settlement in the West and its vast possibilities made the question of waterways one of great moment and also gave great importance to the natural waterways in the north country which led to the Arctic Ocean, two of which—that to the Arctic Ocean by way of the Athabasca, Peace, Slave and Mackenzie rivers and that from Fort Churchill to Baker Lake and into the Thelon river—he took up at length. He gave the following figures, compiled by the Railway Lands Branch of the Department of the Interior, in regard to the water powers of Canada: Yukon, 470,000 horse power; British Columbia, 2,065,500 h.p.; Alberta, 1,144,000 h.p.; Saskatchewan, 500,000 h.p.; Manitoba, 504,000 h.p.; Northwest Territories, 600,000 h.p.; Ontario, 3,129,168 h.p.; Quebec, 17,075,939 h.p.; New Brunswick, 150,000 h.p.; Nova Scotia, 54,300 h.p. To these, water powers on the proposed Georgian Bay Canal would add 1,176,310 h.p., making the total 25,692,907 h.p. Of the Quebec water powers the Grand Falls on the Hamilton river gave at least 9,000,000 h.p. Of all this energy only 486,887 h.p. were at present in use. The unused 25,206,000 h.p. (assuming that 5 lb. of coal per hour were needed to generate one horse power of energy) would be equivalent to 552,011,800 tons of coal per annum.

Mr. Young believed the merchantable forest area of Canada to be much less

than that of the United States. Estimates of the extent of Canada's forests varied from 800,000,000 acres down to 100,000,000 acres. In the north country timber was largely confined to the banks and immediate vicinity of rivers. In northern British Columbia, owing to the ravages of fire, the areas of good timber were limited.

Mr. Young concluded by urging the need of protection of the forests from fire, especially in the northern districts.

Mr. R. H. Campbell, Superintendent of Forestry, twice appeared before the committee. On the first occasion Mr. Campbell prefaced his evidence by briefly reviewing the history of the Forestry Branch of the Department of the Interior and comparing it with the U. S. Forest Service in respect to the number of employees (in the U. S. service, over 2,000; in Canada, 40), and annual appropriation (in the U. S., \$4,640,000; in Canada, \$100,000). He then outlined the organization of the fire ranging staff and the working of the patrol system, especially along the railways. In 1908, out of 251 fires reported on Dominion territory, the great majority were put out without loss; the most serious had been one in the Spray River Valley, Alberta, where four million feet B. M. of timber were destroyed. The need of more money for fire protection was emphasized and ways of fighting fires discussed. An inspector of rangers was needed for the northern district of British Columbia. In the construction of the Grand Trunk Pacific Railway much stricter regulations were being enforced than in former railway construction and these were well observed. The patrol system should be extended and on all railways passing through forested territory an inspector, with authority from the Railway Commissioners, should be kept at divisional points to watch the equipment of locomotives with spark arresters.

The question of jurisdiction in the case of railways operating under Dominion charters and running through provincial territory was discussed at some length by the committee.

Mr. Campbell, resuming, spoke of the present area of the Dominion forest reserves and proposed extensions. The purpose of setting aside a wooded tract as a forest reserve, he stated, was to regulate and administer it for wise use,

not to close it altogether; and he gave, in detail, reasons for so reserving such an area. The work on the Dominion forest reserves and the staff in charge of it was outlined and regulations regarding the cutting of timber and of hay were sketched, also regulations for the use of the reserves by campers. Experiments in reforestation on some of the reserves were referred to, and the provincial reserves and their areas were given.

The question of forming a forest reserve on the eastern slope of the Rocky Mountains was then taken up. Title to the land included in such a reserve, examination of the land, protection of the woodland from fire, the relation of the reserve to the water supply of the plains, the stream measurements and existing irrigation schemes were discussed.

At Mr. Campbell's second hearing the question of the forest reserve on the eastern slope of the Rocky Mountains was investigated in considerable detail. The districts already reserved (as National Parks) were described, and also land already examined and recommended to be included in the reserve. The question of a supply of timber for the mines, especially in the Crow's Nest district, was given special consideration, and the advantage to the mines and mining industry of the proposed reserve brought out. The areas under grazing leases and timber licenses were also given. The present administration of the territory and the need for an increased staff were dwelt upon, and the varieties of timber growing on the area and their use and value were also discussed.

The causes of forest fires, especially the danger from railways, were next spoken of and the best width for the right of way and the burning of all debris along the railway were discussed.

Some discussion also took place with regard to the country north of Jasper Park, but it was pointed out that knowledge of that country was very limited.

Mr. P. E. Ryan, Secretary of the National Transcontinental Railway Commission, gave evidence in regard to fire patrol and other fire-preventive measures along the line of that railway. At the very beginning of their work, he said, the engineers had been instructed in regard to the forest fire laws of the country through which the railway would pass. Contractors were com-

pelled, at their own expense, to adopt precautionary measures. Mr. Ryan outlined the scheme of patrol along the lines of the railway in New Brunswick, where it was carried out entirely at the Commission's expense; in Quebec, where the provincial government, the limit-holders and the railway each bore one-third of the expense, and in Ontario, where the provincial government had undertaken all the work and had billed the commission for the expense, which the commission did not acknowledge their liability for. On the whole eastern section, from Winnipeg to Moncton, the

patrol had been successful, and any fires originating on the right of way had been put out by their own men. Reports of extensive destruction of the forest by fires originating along the line of the N. T. Ry's line of surveys east of Lake Nipigon last summer had not been confirmed by their engineer. Mr. Ryan read the regulation regarding the clearing of debris from the right of way by the contractors and explained what information was contained in the reports of the commission's engineers regarding the forests and waterpowers along the route.

Canadian Conservation Commission.

Falling into line with the movement for conservation of natural resources, the Parliament of Canada at its last session, made provision for the appointment of a "Commission on Conservation," the bill being finally approved by the Governor-General on May 19th last.

The duties of the Commission are defined by the act to be "to take into consideration all questions which may be brought to its notice relating to the conservation and better utilization of the natural resources of Canada, to make such inventories, collect and disseminate such information, conduct such investigations, inside and outside of Canada, and frame such recommendations as seem conducive to the accomplishment of that end."

The Ministers of Agriculture, of Mines and of the Interior are to be, ex-officio, members of the commission, as are also the members of each provincial govern-

ment who are "charged with the administration of the natural resources of the province."

Besides the ex-officio members there are to be twenty members appointed by the Governor-General-in-Council, to hold office during pleasure. Of these at least one member appointed from each province must be a member of the faculty of a university within that province.

The Commission is to meet annually on the third Tuesday in January in Ottawa or such other place as has been decided on by the Commission. The members are to be allowed their expenses, but will receive no salary for their services.

The chairman may be appointed by the Governor-General-in-Council.

Provision is made for the appointment of a secretary and other officers and clerks.

Survey of Nova Scotia Forests.

The Province of Nova Scotia, which two years ago under the influence of the Western Nova Scotia Lumbermen's Association organized an efficient fire patrol service, will this year, stimulated by the same agency, and especially by its active president, Mr. F. C. Whitman, undertake a forest survey of the province, such forest survey to form the basis of further development of a forest policy.

Dr. Fernow has been invited to organize this reconnaissance or stock-taking, which will probably require two seasons. The survey is to be made thorough, so as to bring out precise information as to the extent, character and condition of the forest area of the province. The total forest area, it is believed, comprises about six million acres, about 50 per cent. of the total land area. The Government, having

in former years sold the fee simple on such lands as were disposed of, retains ownership to only one and one-half million acres, most of it probably of inferior character, while lumber concerns control about two million acres.

The information obtained will be laid down on the Land Office survey plats, drawn to the scale of two inches to the mile, insuring tolerably accurate location.

Dr. Fernow will have four assistants, namely, Dr. C. D. Howe, Lecturer in the Faculty of Forestry; Mr. J. H. White, M.A., B.S.F., who has just graduated from the Faculty; Mr. H. B. Ayres, one of Dr. Fernow's former assistants in Washington, who has wide

experience in this class of work, and the Chief Ranger of the province; all fire rangers and deputy surveyors will aid the party in the field in their respective districts.

It is hoped that this work will prove so valuable as to stimulate other provinces to follow the example.

Hon. W. T. Pipes, Attorney-General and Commissioner of Lands for Nova Scotia, visited Toronto on June 7th and arranged the details of the survey with Dr. Fernow. While in Toronto Mr. Pipes met Hon. Frank Cochrane, Minister of Lands, Forests and Mines, and compared notes with him as to forestry problems in the two provinces.

Forest Fires of May and June.

The forest's arch-enemy, fire, has been much in evidence during the spring months of 1909. From nearly all the provinces of the Dominion come reports of large fires and much loss, the most serious of these coming from New Brunswick, though Nova Scotia and British Columbia were the first to report fires.

Despatches of May 5th report the first serious fire of the season; these were from Kamloops, B.C. The area burned over extended from Notch Hill east to Three Valley and from Sicamous south to Vernon. "It is the old story," remarks a British Columbia paper, commenting on the occurrence, "a few bush fires smoulder for days unheeded by anyone, and a fierce wind fans them into a flame that gets beyond control." Three large fires had been burning for days and a strong wind fanned the flames and united the three fires into one. Newspaper estimates put the loss at about \$500,000. In the destruction of the Carlin mill, near Notch Hill, was involved the loss of \$75,000, and \$35,000 loss was caused by the burning of the Carrigan mill on Salmon River. Scores of settlers and ranchers were burned out. In the White Valley, around Lumby and Blue Springs, there was also a serious fire which burned out several ranchers.

On May 14th a fire, supposed to have started from a fire left by a party of campers in brush land, began at Four

Mile Lake, twenty-five miles east of Annapolis Royal, N.S., and, fanned by a stiff westerly wind, burned over hundreds of acres of timberlands, valued at many thousand dollars. The burned district was between four and five miles in length and varied in width from a quarter of a mile to over a mile. Some of the finest young timber in Annapolis County is said to have been destroyed. The fire ranging system of Nova Scotia proved its worth in coping with this fire.

At Lac Brochet, Que., \$25,000 damage was done by a fire which started a few feet from the right of way of the National Transcontinental Railway and had its origin, it was thought, in a camp-fire left unextinguished by a party of Italians in search of work on the railway. The fire extended for about two miles and several camps were burned up. The Leroux saw-mill and several millions of feet of lumber were saved only after hard work.

The town of Dalton, Mich., was reported to be destroyed by a fire, and near Aurora and Calumet, in that state, fires were raging.

During the early part of June the chief centre of forest fires was the Province of New Brunswick. Even during the last few days of May a number of fires had been reported to the Crown Lands Office, most of which had not assumed serious proportions.

On May 31st a serious fire was reported near Nappadogan Lake. On June 4th it was reported that near Waweig (Charlotte County) a tract of heavily timbered land two miles long by a mile to a mile and a half wide had been swept. The fire was first noticed shortly after a C.P.R. train had passed. Hartland also reported forest fires on the same date.

Fires continued to be reported from various widely separated parts of the province. Carleton County was the chief sufferer; the village of Coldstream was in great danger, but a fortunate change of wind saved it, while at Carlisle several buildings were destroyed. The forests at the headwaters of the Miramichi were in great danger. From Tapley Mills to Woodstock a stretch of eight miles was burned over. Fires were also reported in St. John County. Along the Keswick stream fifty square miles of fine timberland were said to have been burned over. On June 7th and for several days thereafter the atmosphere at Fredericton was heavy with smoke. In the Grand Falls district—at Grand Falls and on Miramichi Lake—contractors on the N.T.R. were having a hard fight with the fires, while the C.P.R. had large gangs of men fighting fire along the Gibson branch from Fredericton to Woodstock. The N.B. Railway Company and the Miramichi Lumber Company had considerable timber destroyed by fire.

About the tenth of June the fires, which had somewhat abated, were again stirred up by high winds. On the Miramichi River the fires were especially serious. A large saw-mill near Campbellton, with a large quantity of lumber and shingles, were destroyed, and the staff, with their families, forced to flee for their lives. Fires were also raging at Renous River, in Rogerville parish and at Lockstead, Busby siding and Taxis River. Rains coming on about the middle of the month aided in extinguishing the fires. According to information received at the Crown Lands Office three-fourths of the fires were caused by farmers burning brush.

In Nova Scotia severe fires were reported in Guysborough County and near Port Morien Junction, C.B.

In Quebec a fire about a mile in length was reported from St. Romuald. At St. Francis, D. Fraser & Son's mill,

together with most of the dwellings in the village near-by, was destroyed. Much damage was done to timber limits on the north and south shores of the St. Lawrence and along the line of the Quebec and Lake St. John Railway. In Bonaventure County hundreds of thousands of dollars' worth of loss is said to have been caused by the fires.

Forest fires were reported from Elk Lake, Ont., on June 3rd, on J. R. Booth's limits and the Big Six Mining Company's property. On the line of the Algoma Central Railway, a few days later, the fire covered a stretch of country some six miles long by six miles wide (three miles on each side of the railway). A couple of camps were destroyed and others were threatened. Shortly afterwards serious fires were reported from near Kenora and large fires also near Port Arthur.

A very serious fire raged along the Prince Albert branch of the C.N.R.; the burned district was said to be almost 100 miles long. A large saw-mill and a four-span bridge on the C.N.R. were among the property destroyed; the losses totalled \$75,000.

Many forest fires were said to be raging during the first few days of the month in the interior of Newfoundland, and in Michigan there were many fires between Sault Ste. Marie and Ignace.

AN ONTARIO PROBLEM. In a pamphlet of some thirty pages, published by the Ontario Department of Agriculture, Mr. E. J. Zavitz, Forester to the Department, writes of the Reforestation of Waste Lands in Southern Ontario. The author outlines the extent of sand lands in the counties of Norfolk, Lambton, Simcoe, Northumberland and Durham, and discusses the cost of artificial reforestation under the headings of Cost of Land, Cost of Plants, Cost of Planting, Cost of Management and Protection. Rate of Interest, Taxation and Estimates of Investment. On an acre of white pine land, managed on a rotation of sixty years he figures a profit of \$639.66, equivalent to a yearly income of \$3.25. The total expense of management during the sixty years amount to \$165.34; the gross proceeds to \$800.00. The report is illustrated with a number of fine half-tones and two maps.

NOTES.

The greatest care is taken to have the list of members as nearly correct as possible. With a list as large as that of the membership of the Canadian Forestry Association now is, there will be a number of changes to be made and some mistakes to be rectified. If members whose names are incorrectly spelled or whose addresses are not properly given will kindly notify the secretary to this effect, it will be much appreciated.

STUDENTS IN THE FIELD.

The members of the senior and junior classes of the forestry course in the University of Toronto had a very successful woods session this spring. Last spring they got their practical work in the woods in Rondeau Park, Lake Erie, and Algonquin Park, Northern Ontario. This year they did their work on a limit of the Strong Lumber Company on the south shore of Lake Nipissing, about thirty-six miles west of Callander on the Canadian Pacific Railway. When they arrived in Callander they found that, owing to the ice still being in the bays, it was impossible for them to proceed to their destination, as they had expected, by steamer. They had consequently to make a detour by which they got as far as Nipissing village by wagons and then had to walk twenty-seven miles to the camp. Dr. Fernow, the dean of the faculty of forestry, and his assistants, Dr. C. D. Howe and Mr. A. H. D. Ross, tramped it out with the students. Supplies had to be borrowed from a camp about six miles away until their own supplies could be brought in. The camp was in a thick stand of virgin red pine which was about 175 years old and uninjured by either fire or axe. A growth of white pine about two thousand to the acre is coming up all over the limit. The adjoining limit was cut over about fifteen years ago, and, not having been injured by fire, gave a good opportunity to study how this area naturally reforests itself. The students had a very successful session. They made a reconnaissance survey of 6,000 acres and a close survey of 400 acres.

As part of their work they will bring in reports as to the quantity, species, and quality of timber on the tract surveyed, and also a report on the best methods for getting out the timber, the location of logging roads, whether the tract is suited for agriculture, and if not, how best to ensure its perpetuation as a timber forest. Owing to the difficulties which have been encountered in getting into the woods in the spring Dr. Fernow will suggest to the University of Toronto the advisability of changing the time of holding the wood sessions from spring to fall. It is expected the first of these held in the fall will be in October and November, 1910.

FORTHCOMING BULLETINS, ETC. There are now being printed, under direction of the Forestry Branch, a number of bulletins and other publications of interest to all students of forestry. In "Forest Conditions in the Crow's Nest Pass, Alberta," (Bulletin No. 5), Mr. H. R. MacMillan, B.S.A., M.F., describes at length his investigations pursued last autumn in the region named, a partial description of which was given in the issue of the Canadian Forestry Journal for December last. "Canadian Forest Fires of 1908", by the same author, outlines the extent of last year's forest fires in Canada and ventures an estimate of the loss, with suggestions for more efficient preventive work. In "The Riding Mountain Forest Reserve", (Bulletin No. 6), Mr. J. R. Dickson, B.S.A., M.S.F., gives a resume of the work done on this reserve during the summers of 1906, 1907 and 1908, describes conditions obtaining in the area and makes suggestions for the future management of the reserve. To obtain copies of any of the above, free of charge, application should be made to R. H. Campbell, Esq., Superintendent of Forestry, Ottawa.

It is said the Canadian Pacific Railway will this year begin the erection of several plants for creosoting ties.

FORESTRY LECTURES. Mr. A. Knechtel, Inspector of Dominion Forest Reserves, spent

some time during the months of March and April in visiting the chief cities and towns of Alberta, Saskatchewan and Manitoba, lecturing once or oftener at each place on forestry topics. The places visited, taken in their order, were as follows: Lacombe, Red Deer, Weta-skiwin, Edmonton, Calgary and Leth-bridge, in the Province of Alberta; Moose Jaw, Regina, Saskatoon and Prince Albert, in the Province of Saskat-chewan; and Dauphin, Brandon, Neep-awa, Winnipeg and Portage la Prairie, in the Province of Manitoba. The lectures and addresses were delivered under the auspices of various organiza-tions, among these being Boards of Trade, Canadian Clubs, Horticultural Societies and others. They were well attended and were very successful, and it is expected that a much greater in-terest in forestry will be awakened by them in the places visited and generally throughout the West. It is hoped to extend the work further next year.

POINTS FROM MR. PICHÉ'S ARTICLE. In this issue of the *JOURNAL* Mr. G. C. Piché, Forester for the

Department of Lands and Mines of Quebec, writes of the Forest Agents of that province. He answers Mr. Ellwood Wilson's criticism of the outside forest service of Quebec so far as it relates to the forest agents by showing that these were employed in districts outside of Mr. Wilson's sphere of work. He states, further-more, that this organization is totally different from the ordinary forest ranger service. These young men intend entering the forest school, when that shall be opened, and they are university gradu-ates. Mr. Piche goes on to show the nature of the new regulations they were to enforce. These prohibit under penalty of \$3 for each offence, the cutting of pine under twelve inches, white spruce under eleven inches, black spruce under seven inches or other trees under nine inches. Timber dues are to be collected on all stumps over one foot high, all tops more than six inches in diameter left in the woods, all mer-chantable wood used in building skids, bridges and corduroys, all lodged trees

and all logs left in the woods. Though the forest agents did not arrive at their posts in the valleys of the Assomption and Mastigoche Rivers until November (a month late), they at once set to work. Their close inspection resulted in an estimated saving of 20 per cent. of the cut, or of 7,000,000 feet for the district, which was so much gain for the limit holders, and which brought in, at 65 cents per thousand, an additional revenue of \$4,550 to the province. Mr. Piché pays a tribute to the license holder, Mr. A. MacLaurin, for his un-stinted aid in furthering the work of the agents. Mr. MacLaurin was satisfied with the work of the agents and ex-pressed the hope that the same system would be extended to all parts of the province. This is impossible now from the lack of the right men, but men will be forthcoming when the forest school is in operation.

TIMBER ALONG THE GRAND TRUNK PACIFIC RAILWAY. Mr. W. I. Margach, Chief Forest Ranger at Calgary, writes the *CANADIAN FOR-ESTRY JOURNAL* in

regard to Mr. Rau's article in the De-cember *JOURNAL*, which, he thinks, does not give a fair account of the timber along the G.T.P. Mr. Margach disagrees with Mr. Rau's statements that all the available timber in the region is covered by berths already granted and thinks that "there is yet vested in the Crown on the eastern slope of the Rockies a quantity of timber at least equal to what is under license", though the licences cover the timber that can be logged at least cost. "The records of the Depart-ment show," Mr. Margach also states, "that in the case of special permits granted to Messrs. D. R. Fraser & Co., the Edmonton Lumber Co., and John Walter, of Edmonton, the timber cut under these permits on an area of not more than eight square miles was over ten million feet, and, in my opinion, the same results can be obtained from all like areas."

In future every guide in Ontario must be licensed. Each guide will be held responsible for the extinguishing of all camp-fires set by the party of which he is in charge



[PHOTO BY N. M. ROSS

Sowing tree seed at Forest Nursery Station, Indian Head, Sask.

TREES FROM INDIAN HEAD. Fully two and a half million trees were sent out this spring from the Forestry Nursery Station at Indian Head in the course of the usual spring distribution. The total number of names on the inspectors' lists this year is 5,723, as compared with 3,948 last year. Of this 5,723, the number of new applicants this year is 2,298.

FOREST PRODUCTS OF CANADA. The above is the title given to Bulletin No. 4 of the Forestry Branch of the Department of the Interior. Mr. A. H. D. Ross, M.A., M.F., lecturer in forestry at the University of Toronto, is the author. His task has been to collect all available statistics on lumber production and use, showing what is being done (and, by inference, what is neglected) in the way of collecting infor-

mation on these subjects by the federal and provincial governments of the Dominion. Figures are given for the exports, imports and forest production of the Dominion and for the area of the forest reserves under the control of the Dominion and the different provinces. Figures are also given, as far as available, for the different provinces with respect to their timber production, their export trade, and their chief wood-working industries. Mr. Ross's work is the first attempt that has been made in Canada in the special line of forest statistics. The author has done his work well, but the unavoidable incompleteness of the book, contrasted with the complete returns furnished by the Forest Service and Census Bureau of the United States, goes to show the need of work in collecting and tabulating this information, a work which is now being undertaken by the Forestry Branch.

Canadian Forestry Journal

VOL. V.

OCTOBER, 1909.

No. 3

The Coming Convention.

Sir. Wilfrid Laurier, Premier of Canada and Honorary President of the Canadian Forestry Association, has announced that a convention in the interests of the conservation of the forests and other natural resources of the Dominion will shortly be held in Montreal. The date had not yet been fixed at the time of going to press.

Following the passage of the bill to provide for the formation of a Canadian

Conservation Commission and the subsequent appointment of the commission, as noticed elsewhere in this issue, this is an important advance in the direction of the formation of a policy of proper management and economical use of the resources of the Dominion, and as such the convention should receive the hearty support of the members of the Canadian Forestry Association. Further particulars will shortly be announced.

The Regina Meeting.

The special meeting of the Canadian Forestry Association which convened at Regina on Friday, Sept. 3rd, proved to be a thoroughly successful one. The highest officials of the province lent the weight of their presence and hearty commendation to the occasion, and at both the day and evening sessions on Friday large numbers of citizens also were present. The day sessions were held in the spacious Council Chamber of the Regina City Hall, and at the opening meeting on Friday morning this was well filled, about two hundred persons being present, many of whom were ladies. The attendance of a large number of the Normal School students was a much appreciated feature and one from which good results will no doubt follow. The lectures in the evening were given in the large auditorium of the same building and were also largely attended.

The excursion to Indian Head on the following day and the visits to the Forest Nursery Station and the Experimental Farm were well patronized and the wonderful progress made at each

of these places won high praise from the visitors. Especially was this the case at the Forest Nursery Station, where the beautiful grounds of the station and the various experimental plantations were viewed with intense interest. It was indeed hard to realize that five years ago there had been but bare prairie where now was to be seen beautiful lawns and flowers and a wealth of trees and shrubbery, and many were the words of praise uttered for Mr. N. M. Ross and his corps of helpers at the station.

THE OPENING SESSION.

The first session of the convention opened at ten o'clock on Friday morning, Sept. 3rd, in the Council Chamber of the City Hall, Regina, the chair being occupied by Hon. W. T. Pipes, Attorney-General and Commissioner of Crown Lands for Nova Scotia and Vice-President of the Association for that Province. The President, Mr. Thos. Southworth, of Toronto, had found it impossible to attend the convention owing to pressing business engagements in the East.

To the right of the chairman on the dais sat His Honor A. E. Forget, Lieut.-Governor of Saskatchewan and Vice-President of the Association for that Province. Hon. Walter Scott, Premier of the Province; Hon. W. R. Motherwell, Provincial Minister of Agriculture, and Messrs. R. H. Williams, Mayor of Regina, and P. McAra, jr., President of the Board of Trade of the City, also occupied seats on the dais.

Others present were:

Professor W. Somerville, Oxford University, England; Hon. W. R. Motherwell, Minister of Agriculture for Saskatchewan; R. H. Campbell, Dominion Superintendent of Forestry, Ottawa; Dr. Wm. Saunders, Superintendent Dominion Experimental Farms, Ottawa; N. M. Ross, Chief of Tree Planting Division of Forestry Branch, Indian Head, Sask.; Hon. J. A. Calder, Commissioner of Education for Saskatchewan; Hon. D. Laird, Indian Commissioner, Ottawa; F. C. Tate, M.L.A., Wascana, Sask.; R. D. Prettie, Forestry Inspector for C.P.R., Winnipeg; G. Spring-Rice, Pense, Sask.; G. A. Rimington, Penrith, England; A. F. Struthers, Bridgewater, N.S.; H. C. Lawson, Secretary Board of Trade, Regina; A. Knechtel, Inspector Dominion Forest Reserves, Ottawa; A. H. D. Ross, Lecturer in Forestry, University of Toronto, Toronto, Ont.; J. P. Turner, Secretary Manitoba Game Protective Association, Winnipeg; T. N. Willing, Chief Game Guardian for Saskatchewan, Regina; E. F. T. Brokovski, Battleford, Sask.; W. I. Margach, Chief Forest Ranger, Calgary, Alta.; D. S. McCannell, Regina; Jas. Cowie, Calgary, Alta.; Geo. A. Laird, Broadview, Sask.; H. L. Patmore, Brandon, Man.; A. Mitchell, Indian Head, Sask.; A. M. Fenwick, Regina, Sask.; A. P. Stevenson, Morden, Man.; John Caldwell, Virden, Man.; E. B. Andros, Tyvan, Sask.; A. H. Brown, Regina, Sask.; J. A. Killough, Pense, Sask.; Klaas Peters, Waldeck, Sask.; Wm. Gibson, Wolseley, Sask.; F. W. H. Jacombe, Ottawa; W. A. Davis, Dauphin, Man.; Wm. Sifton, Minitonas, Man.; Wm. Margach, Crown Timber Agent, Kenora, Ont.; C. S. Galbraith, Maple Creek, Sask.; D. McDonald, Virden, Man.; T. H. Tweltridge, Indian Head, Sask.; A. M. W. Patch, Wolseley, Sask.; G. A. B. Krook, Assistant Forester, C.P.R., and others.

THE OFFICIAL WELCOME.

The first item on the morning's programme was the address of welcome by Lieut.-Governor Forget, who spoke as follows:

Mr. Chairman and Gentlemen,—Those by whom I am best known will not be surprised to hear me say that I feel highly gratified in being given the privilege of formally opening this meeting, for I have always taken a lively interest in all efforts tending to promote the cultivation of trees. I have a firm hope that what will be done here to-day will not fail of practical results. In any event I am sure I am but faintly expressing the feelings of the community at large in saying that we highly appreciate the action of the Canadian Forestry Association in consenting to hold this special meeting in the capital of this province. We all know that it is difficult to find any very extensive district divided, in its virgin state, in due proportion between forest and plain. As a rule, it is all dense forest or all open country. From the point of view of the agriculturist, of these two conditions the latter is naturally preferred. This is practically the existing condition in this province. In fact the greatest attraction of Saskatchewan is its rich open plain, all ready for the plough, and capable, from the first, of yielding good returns to the settlers. This is so much the case that, although the oldest settlers have been on their lands only a few years, all have done well, and already a considerable number have actually enriched themselves.

However gratifying these results, the absence of trees on the most desirable homesteads was keenly felt from the very first, especially in the case of those who come from places where trees are in greater profusion; and it certainly delights one to see, here and there throughout the province, the efforts that have been made to change this condition. I was personally particularly struck, a couple of years ago, by what has already been done in the way of tree-planting by settlers, in the immediate vicinity of the progressive city of Saskatoon. While such improvements are not unknown on homesteads in various other parts of the province, it is, I believe, more noticeable in that district; and it gives me much pleasure to mention the



City Hall of Regina, in the auditorium of which the meetings of the convention were held.

fact before your association, knowing well that such examples will be duly appreciated by all present.

It is, also, for me a great pleasure to be able to draw your attention to the efforts made, on the same line, at various railway stations—in some cases by the railway companies themselves, in others by the local municipality and private citizens. The work done in this very city, by the corporation, and, in many instances, by the citizens themselves, deserves a particular mention. For some time past, what is known as the C. P. R. Garden at Moose Jaw has been greatly admired, and the example thus set was largely followed by the city itself and by the citizens, with the result that Moose Jaw has become a very charming place. The same can now be said of what the C. P. R. Co. has done around their station here. All these have done much to create and spread a taste for the embellishment of private homes. It is, of course, unnecessary for me to mention the Experimental Farm at Indian Head, as also the newly started Forest Farm at the same place. Both are well known, and have, in fact, become places of resort. Besides, you will be given the opportunity of visiting them both before you have ended your abors.

The many experiments which have thus been so successfully carried out, at various distant points throughout the province, by the settlers themselves,

will have done much towards testing and proving the kind of trees or shrubs best adapted to the country; and the experience acquired by the gentlemen whose names I see mentioned on the programme of this meeting cannot fail to be of still greater value to the people of the province who will have the privilege of being present here to-day, or who may read the report of your proceedings.

The chairman, after briefly outlining the aims of the association, then called on Premier Scott to address the convention.

HON. W. SCOTT.

Hon. Mr. Scott expressed his pleasure at welcoming the members of the association to the capital on behalf of the people of Saskatchewan and voiced the satisfaction it afforded the western men to have the association hold its meeting in their capital. While little forest was found in Saskatchewan, the people were coming to realize that they had a keen interest in forestry. Considerable educative and practical work had been done and in travelling through the province he noted many new groves on farms this year, and the number of these was continually increasing. At Regina, when first the railway came through, there was not a twig to be found. On one occasion a lady had been going east with her little son, born and bred on the

prairie, and when, in their progress eastward they came to standing trees, he had exclaimed in wonder, "Oh, mother, see all the wood standing up." But now-a-days the children in the west were getting better used to seeing standing trees than was that little fellow. Prominent among the objects of the association was that of tree and forest growing, and for that reason they were welcome. The people of Saskatchewan were coming to realize the value of the work of the association, and would value it more and more highly in future.

MAYOR WILLIAMS, OF REGINA.

Mayor Williams, of Regina, extended a cordial welcome to the convention on behalf of the citizens. He referred to the presence of the Normal School students, whose attendance, he was sure, would be appreciated. The city was working along similar lines with the association in regard to its proposed park system. A total of three hundred and seventy acres had been set apart for park purposes. Victoria Park, right in the centre of the city, covered about seven acres. Around the new Parliament Buildings was another area—about forty-seven acres in extent—which would be used as a park, while to the north of the city about two hundred acres had been set aside to be similarly used. In former days the people had been too busy to plant trees, but now that state of affairs was changing. The home of Commissioner Motherwell might well be taken as a model for prairie farms. Mayor Williams concluded by extending to the delegates a cordial invitation to participate in the luncheon tendered the visiting British Association delegates.

PRESIDENT McARA, OF THE BOARD OF TRADE.

President McAra, of the Regina Board of Trade, was the next speaker. He considered Regina a fitting place for the convention, inasmuch as at one time it had been supposed impossible to grow trees there, and people had even been warned not to break the original sod for fear nothing else would grow. They could see how mistaken those views had been. His Honor the Lieut.-Governor had led the way in the matter of tree culture and his old home was still an example

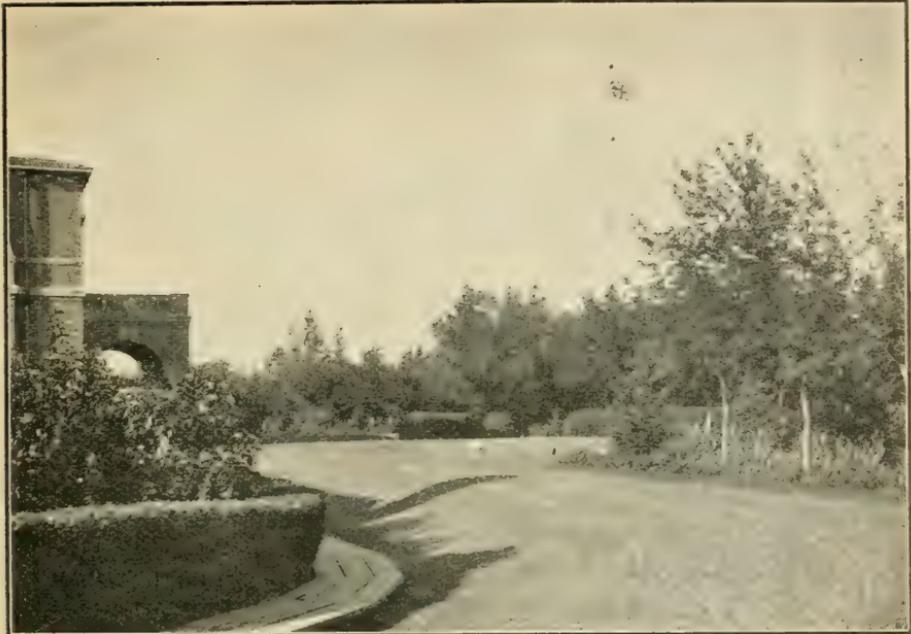
of what might be done in the way of tree culture. Planting trees was twice blessed, benefitting both the planter and the passer-by. He concluded by welcoming the delegates in the name of the Board of Trade and hoped the meeting would be productive of good results.

HON. W. R. MOTHERWELL.

Hon. W. R. Motherwell, Commissioner of Agriculture for Saskatchewan, said it was not often a purely educational association met with the appreciation of the public, and the association must feel gratified with the splendid audience of both sexes. If there was one place where such a convention was needed it was in Saskatchewan. He remembered the first efforts at tree planting by the settlers. Owing to lack of knowledge as to the necessity of cultivation these were largely futile and often the settler gave up in disgust. Since the establishment of the Dominion Experimental Farm and the Forest Nursery Station the efforts of farmers, because of the instruction they received, had been much more successful. Anything done to advance forestry must be done among young people, for when a man got past middle age without becoming interested there was not much hope that he ever would be. Because of this he favored the planting of trees about school grounds and the interesting of teachers in the subject. To this end he had encouraged the visit of Normal School pupils to Indian Head. At first about half the students attended, but now practically all the students were taking part in the excursion and were receiving much benefit therefrom. He contended that by studying the soils of various districts on the plains and the use of proper methods of cultivation trees could be got to grow as readily on the prairies as anywhere else.

HON. W. T. PIPES.

Hon. W. T. Pipes, chairman, replying to these addresses of welcome, said that with fine weather, good railways, good accommodation and cordial greetings he believed he was having a better time in the West than even Earl Grey or Lord Strathcona (laughter and applause). The preceding day he had had the pleasure of visiting Government House in Mayor Williams' motor car and



Residence of the Lieutenant-Governor, Regina, Sask.

had been greatly impressed by what he saw. His Honor had proved that trees would grow there, and, as for vegetables, they were the most magnificent he had ever seen. In the East the problem to be faced was that of tree preservation, here it was partly that, but chiefly tree planting. If the fire could be kept out of eastern forests they could be preserved and the streams would be kept in even flow, not becoming a succession of floods and low water, as was the case when the watersheds were denuded of their trees. He was particularly glad to see so many young people and teachers in the audience. He wanted to say what he had said to His Worship the Mayor when they were out driving the previous day. They passed a waggon in which were four fine healthy boys and he had told His Worship that that was the best crop raised on the plains (applause). He thanked them for their words of welcome.

TREE PLANTING ON THE PRAIRIES.

The morning session was devoted to papers and discussions on the planting of trees on the prairies, and the first

paper was given by Mr. Angus Mackay, superintendent of the Dominion Government's Experimental Farm at Indian Head. Mr. Mackay spoke in part as follows:

"When the Experimental Farm was started at Indian Head in 1888 tree growing was considered one of the most pressing experiments. The Farm at that time and up to 1905 served the then territories of Assiniboia, Saskatchewan and Alberta, and, as the greater part of the settled portion of this vast territory was a treeless plain, every effort was made to find suitable hardy varieties that would grow in any part thereof.

Over 39,000 trees of thirty different species were obtained and planted in 1889 and 1890. A large portion of these were dead in 1900. Those hardy enough to stand and still living were Scotch Pine, White and Norway Spruce, Cedar, American Elm, White Birch, White Ash, Native Maple, Ash, Elm, Poplar and Birch. Since then Russian Poplars, American Cottonwood, Willows, Mountain Ash, Larch, Balsam, Poplar and Oaks have been added.

In the spring of 1893 tree distribution commenced from the Experimental

Farm, and each year since from 75,000 to 100,000 trees have been sent out free to settlers. Last spring the distribution to Alberta was discontinued on account of that province having two Experimental Farms from which trees may be procured, as well as from the Forest Nursery Station situated at Indian Head.

As maple and ash seed could be obtained in large quantities in the early years, and as these species were found very suitable for windbreaks and plantations, they were used almost entirely for distribution, as well as for planting on the Farm; and to-day they constitute the great bulk of the trees sent out, chiefly from the ease with which they can be propagated and the small loss in transplanting.

The Native Maple is a very unsatisfactory tree in some respects; its propensity to send out suckers from all parts of the trunk is a constant cause of trouble when grown singly; when used for hedge purposes, however, the suckering is an advantage.

The Ash may be considered one of the best trees yet obtained for the prairies, its only fault being its lateness in leafing out in the spring, and earliness in losing the leaves in the fall.

Native or American Elm for street or avenue purposes is the most satisfactory yet secured, its only fault being the liability to have branches broken in heavy wind-storms.

Dakota Cottonwood has so far proved a good avenue or shade tree on the Experimental Farm. This species is easily propagated from cuttings and in growth surpasses all others except the Russian Poplar.

Russian Poplar, which at one time gave promise of being a valuable species for this country, has for some years been injured by a fungus disease which makes the trunk unsightly and eventually kills the tree.

The Native Birch, which grows in many sections of the prairie, is well worthy of extensive growth, both for ornamental and commercial purposes. This is propagated from seed which is usually abundant each year. The Cut-Leaf Birch is quite hardy and is the most beautiful tree to be found in all Canada.

Mountain Ash, which in the early years was extremely tender, is now quite

hardy and at all seasons one of the most beautiful trees that can be grown. In the summer with its white flowers, or in the fall with the large clusters of red berries, it is especially attractive.

In the Evergreen family, the Scotch, Jack and Stone Pines, Rocky Mountain, Norway and White Spruces, and Balsam Fir are quite hardy. Tamarack or Larch, both Native and European, is hardy, also nearly all the *Arbor Vitæ* (Cedar) family, but the latter are very slow growers.

In the twenty years of tree-growing on the Experimental Farm, cultivation has been the main reliance towards success. With a few exceptions water has never been used, even in the driest seasons. In all cases the land was prepared the year before planting—either by breaking and backsetting, if new, or by summer-fallow, if old. In no case has failure occurred with either of these preparations when the trees were in proper condition at time of planting.

The last week in April or the first two weeks in May have been found the best time to plant deciduous trees. Planting late in May has given better results with evergreen varieties, on account of the strong and warm winds prior to that time injuring the leaves or needles.

In propagating trees from seed, Maple, Ash, Elm and Birch are the only varieties attempted on a large scale. Elm ripens its seed early in June, and should be gathered at once and sown shallow as soon as dry. The other varieties come in about the time of wheat harvest, or early in September. Ash and Birch should be sown late in the fall or early in the spring, with no danger of being winter-killed. Maple can be sown in the fall with considerable risk of being killed, or can be sown early in May with safety. When fall sowing succeeds, as it has done for some years back, the growth of the young plants over the spring sown is very marked. A wise plan is to sow both in fall and spring."

Mr. Angus Mitchell, Assistant in the Tree Planting Division of the Forestry Branch, then read his paper on "Problems in Tree Growing in Southern Alberta and Western Saskatchewan," which is published in full elsewhere in this issue.

Mr. Mitchell's paper was followed by a brisk discussion, which was led by Mr.

G. B. Spring-Rice, of Pense, Sask., who took issue with Mr. Mitchell's theory regarding the chinooks and defended the older theory. Others who took part in the discussion were Messrs. A. Knechtel, A. P. Stevenson, H. L. Patmore (Brandon), A. Mackay, N. M. Ross and G. A. Rimington, of Penrith, Cumberland Co., England.

Mr. N. M. Ross gave some account of the experiments with different species of conifers at the Forest Nursery: They had found that Scotch pine were hardier than jack pine, the seed was cheaper and the tree stood transplanting well. The Norway pine had not been very successful. The Eastern jack pine was more easily handled than the Western. The main conifer for them was the white spruce. Asked to tamarack his experience with regard to tamarack, Mr. Ross spoke of having transplanted some of these trees from Sewell, Man., and having, after they had had one year in the nursery, planted them out on the bare prairie, without any protection. In 1904 they had been eight inches high; in 1909 they were twelve feet in height. Twenty per cent. were lost in transplanting from the swamp to the nursery, but the subsequent loss was slight.

During the morning a Resolution Committee was appointed, consisting of the following: R. H. Campbell, A. H. D. Ross, R. D. Prettie, J. P. Turner and T. N. Willing.

On the conclusion of the morning session the delegates adjourned to the auditorium of the City Hall and shared with the visiting British Association delegates the hospitality of the city at the luncheon.

FRIDAY AFTERNOON.

On the convention resuming in the afternoon the Secretary read telegrams expressing regret at inability to be present from His Excellency the Governor-General, Patron of the Association; Lord Strathcona; Rt. Hon. Sir Wilfrid Laurier, Hon. President of the Association; Hon. Frank Oliver, Minister of the Interior, and Hon. Clifford Sifton, chairman of the Conservation Commission. Letters of similar import were also received from Mr. Thos. Southworth, Toronto, President; Senator Edwards, Ottawa, Vice-President; Senator T. O. Davis, Prince Albert, Sask.; Hon. Jules Allard, Minister of Crown Lands, Quebec; Hon.

Frank Cochrane, Minister of Crown Lands for Ontario, Vice-President for Ontario; Hon. Sydney Fisher, Ottawa; His Grace Archbishop Bruchesi, Montreal, Vice-President for Ungava; Hon. R. P. Roblin, Winnipeg, Vice-President for Manitoba; Hon. W. C. H. Grimmer, Vice-President for New Brunswick; Mr. H. M. Price, Quebec, Past President; Mr. E. Stewart, Montreal, Past President; Mr. E. G. Joly de Lotbiniere, Quebec, Past President; Mr. W. B. Snowball, Chatham, N.B., Past President; Hon. W. A. Charlton, Toronto; Dr. B. E. Fernow, Dean of the Faculty of Forestry, University of Toronto; Mr. Gordon C. Edwards, Ottawa; Mr. Ellwood Wilson, Grand Mere, Quebec.

The first item on the programme was Mr. A. H. D. Ross's paper on "The Dominion Forest Reserves." He first noted the setting apart by the Forest Reserves Act in 1906 of the twenty-one reserves, of which six were in Manitoba, three in Saskatchewan, three in Alberta and nine in the strip forty miles wide in British Columbia, known as the Railway Belt. These areas were set aside (1) To provide lumber, fuel, ties, poles and other forest products required for the settlement of the country and the development of its resources; (2) To protect the headwaters of streams and regulate the flow of water in them for irrigation, transportation and industrial purposes; (3) To afford a natural shelter for the various kinds of birds, fish and game.

These reserves embraced areas as follows: Manitoba, 3,575 square miles; Saskatchewan, 740; Alberta, 185; British Columbia, 890; total, 5,391 square miles. It would require a special act of Parliament to withdraw any of the land from these reserves for settlement or other purposes, so that a great opportunity was afforded for the Government to protect and improve this property.

In the three prairie provinces the reserves were intended to supply homesteaders with building material, fencing and fuel, rather than to furnish wood for the lumber trade. In these three provinces there was a population of almost a million, and it would not be many years before it reached ten million. In the meantime the consumption of wood for building and industrial purposes would be enormous, and would require all the lumber at present grow-

ing on the reserves between Lake Winnipeg and the Rockies. There was not nearly enough timber land reserved to supply the needs of this great region. The obvious thing to do was to create more reserves and protect not merely the mature timber but also the young trees as carefully as if they were dollar bills. "If the floor of this room were covered with dollar bills," Mr. Ross went on, "he would be judged insane who would let a fire get started amongst them, yet this is the very kind of thing that is going on in the case of young tree growth." In Europe it was said "It is only Turks and Americans (including Canadians) who burn the forest." In the case of the Dominion Forest Reserves, however, it was the policy of the Forestry Branch of the Department of the Interior to do everything in its power to protect the timber from fire, to lessen the amount of waste incident to lumbering operations, to stop timber thieving, and so to manage the reserves as to secure continuous crops of timber from them. Other nations had been able not only to secure but actually to improve both the quantity and quality of the crop—so why not Canada? So far the great difficulty had been to secure men with the necessary technical training and administrative ability to take charge of the work. In the United States the technically trained men were snapped up by the Federal and State Governments and the lumber and pulp companies as soon as they graduated. With the recently established forest schools at the University of Toronto and the University of New Brunswick, it was hoped that men would soon be available for this work.

Mr. Ross then took up in detail the different reserves in the three provinces showing the location, size and character of each and mentioning the problems connected with them. He noted that, the rainfall being only about one-third that of Ontario and the average velocity of the wind almost exactly twice as great, it was a difficult matter to fight fire in the western reserves. The only way in which they could be protected was to patrol them summer and winter; to have efficient fireguards and have roads that would enable the rangers to get quickly from one part of the reserve to another. In 1908 one hundred and fifty miles of roads were made along the

boundaries and through different parts of the reserves. This work should be continued.

In 1908 twenty-five squatters were removed from the Turtle Mountain Reserve in Manitoba and given land elsewhere. The same was true of Riding Mountain Reserve from which one hundred and twenty-five squatters had been removed. The removal of these required great tact on the part of the officers of the Forestry Branch, but without their removal it would have been folly to attempt to place the reserves under management. The great thing to be done now was to protect the young growth, have the dead timber removed and get tree growth started on the open spots. Citing the case of the Turtle Mountain Reserve where there was a bare patch of fifty-five square miles, Mr. Ross pointed out that it would cost \$264,000 to plant this with nursery stock so that it will be necessary to let Nature do her own seeding or find some cheaper method than planting. In 1908 Mr. Knechtel tried the experiment of placing tree seeds in the long grass and covering them with sand. The experiment had so far been successful.

On the Spruce Woods Reserve east of Brandon, there had been planted 35,000 Scotch pine grown from seeds at Indian Head Nursery Station. From the swamps of the reserve thousands of young tamarack seedlings had been obtained and planted at Indian Head and were making remarkable growth. In 1908 forty bushels of spruce cones were collected there and used for planting on the different reserves.

The Duck Mountain and Riding Mountain Reserves were important as regulators of streams in Northern Manitoba and as game covers, being the home of elk, moose, black and cinnamon bears and smaller game.

Referring to the Saskatchewan reserves as a whole, Mr. Ross noted that the area was only 740 square miles, poorly timbered, containing less than 60,000,000 feet of saw timber and about 700,000 cords of wood. That was not much for a population of 350,000. He asked if the people should not begin to agitate for the creation of more forest reserves in the northern part of the province. To create timber land by planting nursery stock would cost a million dollars for six townships. If

Mr. Knechtel's experiments were successful it would cost a million dollars for twenty townships. Would it not be better to reserve the timber land now existing and spend the money in increasing the planting which nature has done?

Mr. Ross called attention to the watershed known as the Eastern Slope of the Rockies. This contained 8,224 square miles, most of which was wholly unsuited for agriculture. He quoted from a report of Inspector MacMillan, who asked if common lumber cost \$22 per M. in the prairies now with a million population, what would it cost when there is a population of ten million, when most of the forest land had been

paper, Mr. R. H. Campbell, Dominion Superintendent of Forestry, pointed out the importance of the reserves to the country and to every individual in it. Some people were apt to think of the reserves as an academic subject; but if it were considered seriously any one must come to the conclusion that the question of timber supply and forest reserves was one of great interest to all. There was no one who did not depend upon the products of the forest for conveniences and comforts of all kinds. In spite of all substitutes, more wood was being used to-day than ever before, and in spite of substitutes that necessity would be constantly increasing. When one came to look into the matter of wood



Photo by A. Knechtel

Picnic Party on shore of Fish Lake, Moose Mountain Forest Reserve, Sask. (August, 1909)

cut and burned over? The coal mining industry of Alberta would require forty-five billion feet of mine props, the product of nine million acres for sixty years. This said nothing of railways, settlers and other requirements. These facts, along with the need of irrigation, show the need for turning the Eastern Slope into a Forest Reserve before it was too late.

DISCUSSION OF PAPER OF MR.
A. H. D. ROSS.

In opening the discussion on the

supply the prospect was not reassuring. In Europe they were importing much more than they exported. Germany, the foremost country in the world in regard to forestry, in spite of what she produced, was an importing country. The same was true of France. In England the whole of the timber used was imported. Almost every country in Europe is an importing country. Sweden, Norway and Russia (including Finland) were the only exporting countries. The latter was the only one in which there was any possibility of increase of exports. Sweden and Norway were

reducing their exports and soon would have no timber to send out. There was a balance of from two to three billion feet per year which Europe must get from outside. The United States had a stand of about two thousand billion feet and was using up about one hundred million feet per year. Now, if one divided a hundred into two thousand, he would see that the United States would not travel very far before it came to a shortage. When that time came the demands in our country would also have greatly increased. Canada's present production of timber was not more than one-tenth that of the United States, but if she reached, as she would reach before long, a population such as the United States had, her forests would not last very long. Canada should begin at the present time to preserve what she had, and the establishment of forest reserves was a step in that direction.

Fire was the most serious menace to the forest; this year, however, but one serious fire, that at Ile la Crosse, had occurred. The forests were meant to be used, and would produce more if properly handled. "The Pines" reserve could, by proper management, be made to give again a supply of fuel to the surrounding country. The reserves were also a source of water supply, and, in the case of the Cypress Hills, of hay. Some, such as the Moose Mountain Reserve, were also valuable as pleasure resorts.

Mr. E. F. T. Brokovsky, of Battleford, noted the fact that along Turtle River and Lake, northwest of Battleford, a large area of timber existed, which ought to be reserved. Years ago he had got timber from there for bridge-building, and the C. N. R. were depending on the district for ties for their line to Jackfish Lake and beyond.

Mr. Knechtel gave a resume of the work done on the reserves this year. In the Turtle Mountain Reserve a road twenty-five miles long had been made along the southern boundary to serve as fire line and for transporting men, etc. In the Sprucewoods Reserve the C. N. R. had ploughed a fire guard on both sides of their right-of-way, and the C. P. R. on the south side of theirs. Fire protection was the great need on the reserves, planting being comparatively unimportant. A road was being made entirely round the Riding Mountain

Reserve, others around the Duck Mountain and Lake Manitoba West Reserves. Similar work was being done on the Cypress Hills Reserve. There was an immense amount of timber on the eastern slope of the Rocky Mountains to be protected. The forest should be cleared of all dead timber and debris. This would prevent fires almost entirely and could be done at a cost of \$5 per acre, while replanting would cost \$12 per acre. The settler's lumbering was the worst in the world. The speaker and Mr. W. I. Margach, of Calgary, were devising a scheme of cutting over a section under forestry methods—e.g., cutting low stumps, taking out tops, destroying debris and cutting only mature timber—and so ascertaining the actual cost.

Mr. W. A. Davis, of Dauphin, Man., Chief Forest Ranger for Manitoba, urged extensions to the Porcupine and Duck Lake Reserves. On the Riding Mountain Reserve, he remarked, 187 miles of road were cut in 1908 and 200 more would be completed this year.

Mr. Wm. Sifton, Ranger on the Porcupine Reserve, pointed out extensions which should be made to the Porcupine Reserve. He protested against allowing construction companies to cut timber, on account of the waste they made—a waste not made by the manufacturing lumbermen.

THE PROTECTION OF GAME.

Mr. J. P. Turner, Secretary of the Manitoba Fish and Game Protective Association, was then called on for the first paper on this subject. After speaking at some length of man's battle against primitive nature, his consequent destruction of the wild things, plant and animal, and the progress in civilization which followed this first stage, Mr. Turner alluded to the over-cutting of Canada's forests and the evil consequences that must ensue, and continued:—

Intimately associated with it (the forest) and only second in importance to the question of the perpetuation and reproduction of our forests stands the question of the preservation of wild life. It might be said that the most striking and melancholy feature in connection with the wild animals and birds of America is the rapidity with which they have vanished; and in view of the fact

that their disappearance would mean the loss to us of one of the most valuable and essential benefits provided by Nature their preservation becomes a duty requiring our every attention and effort. Sad to say, any energy put forth in the endeavor to protect wild life is too often looked upon as little more than the worthy agitation of a few biased enthusiasts; but the matter of the protection of game (and with it that of all beneficial species of animals) means far more to the state than the mere curtailing and lengthening of the open seasons for shooting, subject to the whims of a few present-day sportsmen.

VALUE OF GAME PRESERVATION TO AGRICULTURE.

In the United States the preservation of game is now being looked upon almost wholly from an agricultural point of view. Large appropriations of money have enabled the Department of Agriculture to make the fullest scientific enquiry as to the value of all wild life; and this has proven in the most conclusive manner that the whole question is one of the greatest economic value. The work achieved in their Bureau of Biological Survey has been of marked assistance in providing information that applies to this country also, and is well worthy of adoption by our own government. It has been shown that "weeds and insects cost the farmers of Canada millions of dollars annually, both in direct losses and in expenditures for labor and material necessary to protect their crops. Anything, therefore, which tends to reduce the number of weeds or to check the ravages of injurious insects is a direct benefit. Among the most useful natural agents in checking such losses are insectivorous and seed-eating birds (many of which are game birds); and the importance of their preservation, while difficult to measure in dollars and cents, is self-evident, since it may mean the difference between large profits and heavy losses." The fecundity of insect pests, to say nothing of rodents, is amazing and appalling; and it has been oft repeated by those who have given the subject the most earnest study, that without birds human life could not long exist upon the earth. An estimate of the present damage to agriculture in the United States from insects and rodents alone places the loss at

eight hundred millions of dollars. With such facts as these before us it is possible to grasp some idea of the importance to our national interests that birds should not be needlessly destroyed, and that they should be given every opportunity to remain and increase in our midst.

REVENUE TO THE STATE FROM GAME.

That the systematic protection of game may be the means, both directly and indirectly, of developing the pecuniary resources of a country is an assured fact. In our game supply we possess an asset of the greatest commercial value, and one from which a very considerable source of revenue may be derived. As an instance, not much more than a score of years ago, the wild game in the State of Maine had been depleted to an extent almost bordering on extermination. A few intelligent, far-seeing men took it upon themselves to reclaim this lost heritage, under government patronage, with the result that to-day the State possesses not only a bountiful supply of game, but derives therefrom one of its most substantial revenues. In 1904 the license fees from non-residents who visited the State to hunt game amounted to over \$25,000, and a fair estimate of the money spent in employing guides alone amounted to \$307,000. This revenue, which may safely be said to be a permanent one, has thus been summarized by Senator Frye: "In all times of business depression and distress, financial panics and consequent unemployment of labor, so seriously affecting the country, the State of Maine has suffered much less than any other state in the American Union; and this is mostly, if not entirely, due to the large amount of money left with us by the fishermen, the summer tourist, and the fall hunter—the seeker after change, rest and recreation."

NECESSITY FOR GAME REFUGES.

The question arises, how are we to solve the future preservation of our wild animals and birds? All expedients and devices of late years in the form of restrictive laws must in the end prove to be inadequate. Sooner or later the development of the country will reach a point when there will be no room, under existing conditions, for our larger mammals and many of our birds. How

is the present vandalism against Nature to be checked? There is but one final solution. As in the case of our timber supply, the wild life of this country can only be permanently handed down in refuges and protected areas established throughout the length and breadth of the land.

CANADA'S GAME PRESERVES.

Fortunately the Government of Canada has launched into the forestry question with energy and far-sighted intelligence; and fortunately the growth of sentiment in favor of providing more adequate protection for our game has already resulted in the establishment of several sanctuaries for wild life. In the United States fifty-one federal bird reservations and twelve state and national game preserves have been created. In Canada we have no reservations providing specially protected breeding-grounds for birds; but seven reserves exist for the protection of large game and incidentally smaller varieties; and three large tracts are now set aside for captive bison. Two areas of forest land will likely be set aside immediately, one in the Rainy River country bordering on the State of Minnesota, and one in the Moose Mountains of Southern Saskatchewan. No steps have yet been taken to provide a haven of refuge for the large herd of wapiti or elk in Northern Manitoba. In the district of the Riding Mountain Forest Reserve lingers the second largest herd of wapiti in the world; and only the establishment of a game refuge in that quarter will prevent the ultimate extinction of this magnificent deer in Canada.

Every territory and every province should have animal and bird refuges, and not till this has been accomplished can it be said that we have sufficiently guaranteed the perpetuation of animated Nature around us.

AGITATION NEEDED.

The grand object to which such organizations as the Canadian Forestry Association, the National Association of Audubon Societies, the National Conservation Commission and others have pledged themselves is the direct outcome of a desire, as yet all too limited, to insure the productive, commercial and æsthetic necessities of the future. The people must be further awakened

to the true state of affairs. A great warning must be uttered broadcast, and our legislatures given every assistance towards accomplishing the permanent preservation of our natural wealth. Above all, it must be forcibly brought to the minds of the people of this country, that if her citizens expect to enjoy the fruits of prosperity in the future, the laws of Nature, the laws of mankind and the laws of the state must be obeyed. And let us not forget that if the time should ever come when the wild creatures should be exterminated from our land it would exact a price which would be beyond the power of humanity to satisfy.

Notwithstanding the fact that Canada still possesses an enormous forest area, that the range of her cultivated lands increases annually and that thousands upon thousands of her rich acres have yet to know the plough, it seems all too evident that we have already arrived at the opening of a new period and that upon this generation must rest the responsibility of saying on what terms and in what localities that great natural heritage which has come down to us from the past shall be turned over to the generations to come after us.

Mr. T. N. Willing, Chief Game Guardian of Saskatchewan, also gave a paper which will be found on page 137 of this issue of the JOURNAL. Mr. Willing noted the decrease in the numbers of game animals in the province and the causes of this, also the reasons for the preservation of game. He advocated a close season for all birds in spring, the prohibition by land-owners of hunting on their enclosed or cultivated lands and the establishment of game reserves, especially on the forest reserves. The Government also, he thought, should conduct experiments in the propagation of game on the forest reserves. The killing of timber wolves, coyotes, weasels and other animals inimical to game should be encouraged and the question of preserving the beaver and the antelope should have special attention.

Some discussion then took place on the papers, a number of instances of the fecundity of the beavers and of groves cut down by them being cited.

Mr. H. L. Lovering, of Regina, speaking from the standpoint of the nurserymen, strongly commended the

Government tree-distribution scheme.

Mr. Jas. Lawler, Secretary of the Association, read a letter from Mr. F. C. Whitman, of Annapolis Royal, N.S., dealing with deforestation and its effect, the danger and damage to timber from fire, the survey of the Nova Scotia forests and other topics of interest.

RESOLUTIONS.

The Committee on Resolutions then presented its report, which was considered clause by clause and adopted. The resolutions were as follows:—

(1) Resolved, that this Convention call the attention of the governments and the public to the danger resulting from prairie and forest fires and would urge that the utmost care be exercised by every person handling fire in the open, and that the laws and regulations for the prevention of fire be strictly enforced; further, that the provisions of the Railway and Fire Acts and of the regulations of the Railway Commission in regard to the plowing of fire guards, the removal of inflammable material from the right of way and the proper equipment of locomotives with efficient appliances for the prevention of the escape of fire, be enforced by a thorough system of inspection; that the system of a patrol by a staff of fire rangers be extended to all the forested districts; that in the opening up of railroads or other roads or line through a forested district or the conduct of lumbering operations in the vicinity of such roads the clearing of debris should be made compulsory—Carried unanimously on motion of Messrs. W. Sifton and E. F. T. Brokovski.

(2) Resolved, that as the preservation of game birds, animals and fish throughout Canada as well as that of all beneficial species is intimately associated with the question of the conservation of forests, and that as the wild game of Canada is in danger of extermination in many localities where its preservation should be assured some further steps be adopted by the association towards furthering public sentiment in this respect by the formation of a game protective branch of the association or the election of a game protective committee.—Unanimously carried on motion of Mr. J. P. Turner, seconded by Mr. F. C. Tate, M.L.A.

(3) Resolved, that in view of the

diminution in numbers of game, both large and small, throughout Western Canada, this association approve of a policy of greater activity on the part of the Forestry Branch in availing themselves of the powers conferred on them for the protection of game on forest reserves and consider the advisability of setting aside additional lands to be utilized as game refuges in various sections of the prairie provinces.—Moved by Mr. T. N. Willing, seconded by Mr. J. P. Turner, and carried un-animously.

(4) Resolved, that this convention express their support of the policy of establishing forest reserves on watersheds and lands unsuitable for agriculture for the purpose of protecting the water supply, furnishing wood products and providing places of recreation for the public and would recommend that an examination of all public lands for the purpose of selecting such areas should be made as speedily as possible; that, while commending the adoption of this policy in so far as it has been carried out by the Dominion and Provincial authorities, this convention would urge that its operation be extended so as to embrace all lands which are suitable only for tree growth.—Moved by Mr. A. P. Stevenson, seconded by Mr. John Caldwell, and carried unanimously.

(5) Resolved, that this association tender its appreciation of the work being done in tree planting and horticulture by the Canadian Pacific Company at its station grounds in various places and the experiments being made in tree planting in those parts of the West where it is most needed and would direct the continued notice of the settlers and the travelling public to the future value of those experiments.—Unanimously carried on motion of Messrs. G. B. Spring-Rice and A. Mackay.

Mr. H. L. Patmore, of Brandon, brought before the convention a resolution proposing that the convention endorse a change in the provisions of the homestead law, so as to provide that a homesteader who should plant to forest trees an area of his farm should be entitled to his patent. In support of the resolution Mr. Patmore said that he thought the growing interest in tree-growing would make the change acceptable to intending homesteaders. Mr. N. M. Ross spoke in

opposition to the motion. Similar legislation in various states had failed to encourage tree-planting to any great extent, he said, while it gave great opportunities for attempts at fraudulent entry. A similar scheme had been tried in Canada, too, and had been unsuccessful. Few homesteaders, moreover, could or would take the time to plant up such an area during their first years on their farms. Hon. W. R. Motherwell endorsed what Mr. Ross said, and Mr. A. P. Stevenson also spoke against the motion, which was finally withdrawn.

A paper by Wm. Pearce, Esq., Calgary, Vice-President for Alberta, on "The Conservation of National Resources" was also put in, references to which will appear in future issues of *The Forestry Journal*.

Resolutions of thanks were also put and carried to the following: The Lieutenant-Governor, Regina City Council, Regina Board of Trade, Hon. Walter Scott, Hon. W. R. Motherwell, Hon. J. A. Calder, the Railway Companies and the Press.

Hon. W. T. Pipes was then asked to leave the chair, and Hon. W. R. Motherwell, seconded by Mr. A. P. Stevenson, moved a resolution of thanks to him for attending the convention (no doubt at some personal sacrifice) and for presiding. The motion was put by Mr. R. H. Campbell and unanimously carried amid hearty applause. Hon. Mr. Pipes made a brief reply, after which the session adjourned.

FRIDAY EVENING.

Friday evening was devoted to lectures by Messrs. N. M. Ross and A. Knechtel, each of which was profusely illustrated with lantern slides. The chair was occupied by His Worship Mayor Williams, and the auditorium, in which the lectures were held, was well filled with appreciative listeners.

Mr. Ross dealt with the work of the Forest Nursery Station. The growing of the deciduous trees was first taken up, and the various steps in their culture, including the sowing and cultivation, and the processes of digging, bundling, heeling-in, packing and sending out in the spring described. Views were shown of a homestead before planting and of the same place some years later, also of plantations of various ages, up to seven

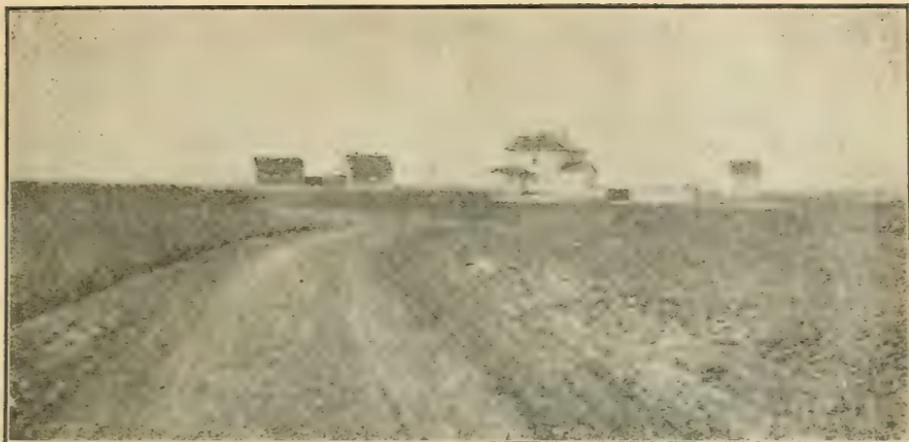
or eight years. The coniferous trees and their culture were then dealt with. Mr. Ross described at length the structure of the cones and of the seed, the extraction of the seed from the cones and the preparation and care of the seed-beds. The transplanting of the young conifers was described and the dangers to which they are subjected, e.g., sunscald, to prevent which large banks of snow must be held on the trees during winter. The tamarack was also spoken of, the lecturer commending it as the most valuable conifer for prairie planting, quickly attaining a size which made it valuable for fuel and posts and would ultimately make it of use in producing ties and poles. The development of the grounds at the Forest Nursery Station from bare prairie in 1905 to their present beautiful condition was also well illustrated.

Mr. Knechtel's lecture was of a more general nature. He dealt with the original forested state of the country and the dangers of over-clearing, and pointed out the uses of forests in preserving stream flow, retarding the evaporation of snow and retaining the moisture, and so lessening the danger from spring floods. Other uses of the forest were the preventing of erosion, the breaking of the force of the wind and their sanitary benefits. The danger to the forest from fire and the necessity of fire protection were enlarged on and the work of the forest rangers described. The necessity of reproduction and the destructive effect on it of fire were enlarged on. The planting of forest trees and the subsequent care, thinnings, etc., were described, and also the various parts of a lumbering operation. The lecture concluded with a number of scenes in European forests and of autumn leaves.

EXCURSION TO INDIAN HEAD.

The second day of the convention, Saturday, September 4th, was taken up with a visit to the Forest Nursery and Experimental Farm at Indian Head. About fifty took in the excursion. Ald. Sinton representing the Regina City Council and Messrs. P. McAra, President, and H. C. Lawson, Secretary, the Board of Trade.

On arrival at Indian Head the party was conveyed in carriages to the Forest Nursery Station, where they assembled in one of the large packing sheds, and



Forest Nursery Station, before planting, autumn, 1904.

Photo by N. M. Ross



Forest Nursery Station, autumn, 1908.

Photo by N. M. Ross

The photographs from which the above two cuts were made were taken from almost the same spot. The views are taken looking up the main drive toward the house and buildings, and show the wonderful progress that was made in four years of planting and management.

Mr. R. H. Campbell, Superintendent of Forestry, was asked to say a few words to the assembled guests.

Mr. Campbell said he supposed he had been called upon because he had general charge of the tree planting work and he gave them all a hearty welcome to the Nursery Station. This work of growing and sending out trees loomed large to those interested in the work of placing trees on the prairies. Perhaps it looked larger to those in the work than to the general public, yet there was no doubt the people were awakening to its importance, and the fact that the convention had come down to visit the Nurseries showed how much the members were interested. Tree planting was not solely the work of those directly engaged in it, but it was the work of the whole people for the benefit of the country at large. It was the people's work for the improvement of their conditions and surroundings, and its aim was the advantage of the Dominion of Canada. They would now pass through the grounds to see what was being done in the way of testing the different varieties, and in propagating and distributing those found suitable for the different sections of the west. Without flattering anybody he felt sure they would say when they had seen the Station that Mr. Norman Ross had carried on his work well, and that with the aid of his assistants the Nursery was doing a good work and was a credit to those in charge. (Applause).

Mr. Norman M. Ross was then called upon and explained briefly what the visitors would see. The Nursery Station was bare prairie in 1904 and everything they would see had been grown and developed since that time. In connection with the different branches of the work certain difficulties had arisen, difficulties that explained the conditions of the trees in some sections and in the conquering of which much valuable information was being gained for the guidance of those now planting trees on their own places. On a place like this the work, much of it, must necessarily be done by machinery and as yet there was no machinery that would do certain parts with full success. For instance, all knew how difficult certain tree seeds were to plant by machinery. No machine existed that would fill the bill, but they had met with fairly good

success by using an artificial manure spreader. Mr. Ross then ran over the different varieties growing in the nursery and explained briefly the characteristics of each and why it was suited or unsuited for certain conditions. He explained that in the first quarter-section where they stood there were the seed beds and nurseries and shipping sheds for sending out the stock to applicants. The quarter-section adjoining was being devoted to permanent plantations where exact record would be kept of the cost of planting and the rate of growth, so that settlers could be told exactly what it cost to raise the different kinds of trees per acre, and therefore the possibility shown of growing trees for fuel, fence-posts and the like.

The visitors were then conducted over the nursery and seed beds, seed house, garden, grounds and experimental plots were closely examined. The work done by Mr. Ross and his assistants was highly praised, as it has every reason to be.

At the conclusion of the visit to the Forest Nursery, the visitors were taken back to the Imperial Hotel, where they were entertained to luncheon as the guests of Regina's City Council and Board of Trade. After a very enjoyable luncheon had been partaken of Mr. A. H. D. Ross moved a vote of thanks to their hosts, not only for the luncheon and the enjoyable trip to Indian Head, but for all the courtesies extended to the delegates throughout their visit. This was duly seconded and carried amid applause.

Mr. P. McAra, in response, said that thanks were due in quite the other direction, and Regina thanked the association very sincerely for the honor conferred on the city by the association's meeting in it.

Mr. Ross also moved a vote of thanks to Messrs. N. M. Ross and A. Mackay for the courtesies extended to the party on the occasion of their visit to Indian Head. Mr. F. C. Tate, M.L.A., seconded the motion and paid special tribute to Mr. Mackay for his services to Western agriculture. Messrs. Ross and Mackay spoke briefly and fittingly in reply.

After luncheon the party was driven to the Experimental Farm, where the afternoon was pleasantly and profitably spent, Mr. Mackay and his assistants

looking after the visitors most hospitably.

With the return of the party to Regina in the evening concluded one of the most pleasant and successful conventions ever held by the association. Much of the credit for the success of the convention is due to the painstaking and

unremitting work of the Secretary, Mr. Jas. Lawler, whose initial effort in organizing the association's conventions has thus been crowned with success. A goodly share of the credit is due also to Mr. H. C. Lawson, Secretary of the Regina Board of Trade, who ably assisted Mr. Lawler in his work.

Hon. W. T. Pipes.

Despatches of October 8th announced the sudden death, in Cambridge, Mass., on the previous day, of Hon. W. T. Pipes, Attorney-General of Nova Scotia and Vice-President of the Association for that province. The announcement will be heard with regret by members of the Association, especially those who were in attendance at the Regina meeting, where Hon. Mr. Pipes made so acceptable a chairman. Hon. William Thomas Pipes was born April 15th,

bar in 1875, and practiced in Amherst, being created a Q.C. in 1890. First elected to the provincial legislature in 1882, in the fall of the year he became Premier and continued so until 1884, remaining in the legislature for some time longer. In 1898 he was called to the Legislative Council and became a member of the Murray administration in the same year. In 1905 he became commissioner of public works and in 1907 was appointed attorney-general. The forest survey of Nova Scotia, partially carried out this summer by Dr. B. E. Fernow and his associates, which is the first complete forest survey that any province of the Dominion has yet undertaken, lay within the sphere of Hon. Mr. Pipes' department and met with his cordial co-operation and support.



1850, at Amherst, N.S., and educated at Acadia College. After some years spent teaching school, he entered the legal profession and was called to the

On his way to the Regina meeting the Secretary delivered an illustrated lecture before the Board of Trade of Port Arthur, and on the way back delivered similar lectures before the Board of Trade of Kenora and in the Collegiate Institute at Fort William. A good deal of interest was aroused by these lectures and it is intended to hold a series of such meetings during the coming winter in different parts of Eastern Canada. Members who desire to make arrangements for lectures in their locality should communicate with the Secretary, 11 Queen's Park, Toronto, as early as possible.

Forestry at the British Association Meeting.

Before the Agriculture Section of the British Association for the Advancement of Science (which met in Winnipeg, Man., on Aug. 23rd to Sept. 1st), the morning of Aug. 31st was devoted to the reading and discussion of papers relating to forestry topics.

Of these Prof. Somerville's paper, of which it was remarked that "nothing more masterly, or showing a broader grasp of world conditions, has been presented to the Agriculture Section this year" is given in full elsewhere in this issue.

A paper on the insects affecting Canadian forests, prepared by Prof. W. Lochhead, of Macdonald College, Ste. Anne de Bellevue, P.Q., was read, in his absence, by Prof. Snell, of the same institution.

Prof. Lochhead deplored the fact that no comprehensive survey of Canada's timber resources had been undertaken by any of the governments, either Dominion or provincial, and that the matter was thus largely problematical and they had to rely for data as to the relative importance of insect pests upon data gathered by U. S. experts in the forests of that country and proceed by inference after allowing for differences of climate and conditions. The observations of forest rangers and timber cruisers were another source of information, but these were meagre and unreliable.

"The Forests of Canada" was the title of a paper written by Mr. R. H. Campbell, Superintendent of Forestry, and read by Mr. A. Knechtel. The writer divided the forests of Canada into five groups, namely: (1) those of southern Ontario; (2) the forests on the southern slope of the Laurentian watershed of Ontario and Quebec; (3) the forests of the Maritime Provinces; (4) the sub-arctic forests of the Hudson Bay and Arctic drainage basins, and (5) the British Columbia forests.

The first of these divisions had comprised an area of 12,000,000 acres; the hardwood forests that had covered it were now gone forever. The second

area, the great pine district, had comprised 100,000,000 acres of forest, sometimes of pure white pine, sometimes of white pine mixed with spruce, balsam, fir, hemlock and Norway and jack pine. In the province of Ontario it was estimated that twenty billion feet of this was left; this was the only official estimate of the region.

Of the Maritime forests the following was the estimate: Southern Quebec, 5,000,000 acres; New Brunswick, 8,000,000 acres; Nova Scotia, 4,000,000 acres. Most of the timber was coniferous.

The sub-arctic forest belt had a length of three thousand miles and an average breadth of two hundred miles. Eight species made up this forest, namely, white and black spruce, Banksian pine, tamarack, aspen and balsam poplar, paper birch and balsam fir. There was an enormous quantity of pulpwood in the district.

The forests of British Columbia were estimated to cover 182,000,000 acres, and contained, according to an unofficial estimate, three hundred billion feet of saw-timber and probably (together with the forests of the Yukon Territory) three hundred million cords of pulpwood. Many species found in British Columbia (e.g., Douglas fir, yellow cypress, Pacific yew and Sitka spruce) were not found elsewhere in the Dominion.

The present production of Canada annually was about ten billion feet board measure of all wood products, of which four billion would be timber of a size suitable for sawing into lumber, while the total area of merchantable timber probably had a stand of five hundred to six hundred billion feet board measure. The quantity of pulpwood was large and might equal one billion cords.

Mr. Campbell concluded by urging more care in the preservation of forests that remained and the afforestation of denuded areas.

The papers aroused considerable discussion, among those taking part being Mr. T. A. Burrows, who gave some interesting particulars as to Canadian methods of lumbering.

The Outlook for the World's Timber Supply.

By PROFESSOR W. SOMERVILLE, OXFORD UNIVERSITY, ENGLAND.

(Read at the meeting of the British Association for the Advancement of Science, Winnipeg, Man., Aug. 31st, and published by permission of the author).

During the past twenty years, but more particularly during the past ten or twelve, much attention has been given to the question of the world's timber supplies, and I think I may say all who have critically examined the position have come to the conclusion that the outlook is not reassuring.

The international trade in timber can only be described as colossal. Britain possesses a very small area of woodlands, and her structural timber is practically all imported. On the average of the five years ending with 1893 her bill for foreign wood was some eighteen millions sterling, while fifteen years later—namely, on the average of the five years ending with 1908—it exceeded twenty-seven millions, an increase of more than fifty per cent. To this must be added the imports of wood products (cork, caoutchouc, rosin, bark, turpentine, wood pulp, etc.), which fifteen years ago were valued at six and a half millions, but now total seventeen millions sterling. Germany possesses nearly thirty-five million acres of forests, as compared with Britain's three million acres, and yet she pays annually some twelve millions sterling for foreign timber. The combined imports of timber into France and Belgium also aggregate about twelve millions sterling, while Italy, Spain, Portugal, Denmark and Holland are also large importers.

In Europe the chief countries with surplus supplies are Sweden, with annual exports valued at about fourteen millions sterling; Russia and Austria-Hungary, each of which receives about eleven millions sterling per annum for exported wood, and Norway, whose timber-exports exceed four millions sterling.

Outside Europe the only two countries that export timber to a large extent are Canada and the United States; the annual exports of the former being valued at about eight millions, while those of the latter exceed twenty millions. Both countries are also large importers of wood, the United States

paying annually over twenty millions sterling for wood and wood products, the corresponding figure for Canada being not much short of two millions.

Notwithstanding the fact that iron, concrete and other substances are being largely used as substitutes for timber, the consumption of the latter is steadily and rapidly increasing, and the question comes to be: Can the supply be indefinitely maintained? In any particular area of woodland it is comparatively easy to estimate what the annual growth amounts to, and if no more is annually removed than is annually produced it is evident that the supply will be maintained in perpetuity. But it is impossible to apply any such simple method of estimation to the forests of the world, for the reason that their area, growing stock and productive capacity are not known with sufficient definiteness. The method can, however, be applied to single countries where systematic forestry has been practised for a long period. Anyone familiar with the conditions in France or Germany, for instance, knows that there will be no falling off in the output of timber of these countries. Their woodland areas have been long subjected to systematic management, and the crops that they bear are almost as much the result of human activity as a crop of wheat. A similar condition of things prevails in Austria-Hungary, Italy and Denmark, and is probably not materially different in Spain, Servia and Roumania.

The European countries regarding which much uncertainty prevails are exactly those on which the world's international market mainly depends for supplies, namely, Scandinavia and Russia. The timber exported from these countries is practically all supplied by natural or primeval forests, that is to say, it is not the result of cultural or administrative methods. It has cost nothing to produce, and is as much a free gift of nature as coal, iron or limestone. Such forests have been exploited

with prodigal activity, and, until comparatively recently, no steps have been taken in these countries to ensure the continuance of the forests on the denuded areas. When a coniferous forest is felled it is an easy matter to secure the presence on the same area of a young wood of the same or of an equally valuable species. This may be done either by arranging the fellings in such a way that the denuded ground, while still in a receptive condition, is naturally supplied with seed, or by artificially sowing or planting the area. But in Scandinavia and Russia no such steps have been taken in the vast forests from which much of Britain's supplies are drawn. I say deliberately "have been taken," for steps are now being taken, and will no doubt be taken to a greater extent in future, to secure better results, but the vast areas of forest land that have already been cleared are at present almost a wilderness. Even under improved methods of regeneration, one must not forget that in the great forest lands of Sweden and Russia, situated as they are in high latitudes, tree growth is very slow, so slow indeed that a pine or spruce is no larger at 150 years of age than would be the case in Central Europe at half this age.

¹Professor Schwappach, of Eberswalde, as a result of his visit to the forests of Russia in 1901, has supplied us with a vivid picture of the condition of things in that country. From his report I may make the following translation:

"It is to be noted that in these northern districts, where the temperature is low and the air moist, the soil is concealed beneath a thick layer of raw humus, which in spruce forests bears a covering of moss, and, in pine woods, of blaeberry and similar plants. When the trees are felled it takes at least six to eight years before the humus is sufficiently decomposed to permit of seedling pines and spruces establishing themselves. In the interval the birch and aspen occupy the ground in enormous quantities, while grass and other herbaceous weeds form a matted mass on the surface. As no attention is given to protecting such young conifers as may have sprung up they are rapidly choked out by the vigorous competing vegetation. Where the soil is wet the forma-

tion of peat begins directly a forest is cleared; Polytrichum and Sphagnum rapidly occupy the surface, and on such an area young pines are scarce, while spruces are entirely absent. Further south, between St. Petersburg and Moscow, peat does not form so rapidly, but for some reason or another natural reproduction is so rare that the most diligent search only resulted in finding a pine seedling here and there. Aspen and birch, on the other hand, spring up quickly and grow vigorously." There are signs of the State doing more in the future than in the past to secure regeneration of the denuded areas, but there would appear to be no doubt that from the areas already cleared practically no second crop can be expected.

M. Mélard, the distinguished French forest statistician, in the review of the world's timber supply that he presented to the International Congress of Silviculture in Paris in 1900,¹ points out that "In Russia population is increasing at a faster rate than in any European country," and continues, "When in the middle of the twentieth century Russia will have a hundred and fifty million of inhabitants, when its smelting furnaces, cotton mills and industrial enterprises of all kinds have extended as far as we have every reason to expect, its timber exports will have ceased, and it will be fortunate if Russian forests have been so carefully managed as to supply her own local wants." Speaking at a Conference held in London in 1907 Sir William Schlich pointed out that although timber-exports from Finland had increased of recent years, those from Russia proper had actually decreased, a state of things that seems to confirm M. Mélard's forecast of seven years previously. With regard to Finland Schlich said:

"It is asserted by the Forest Staff of Finland that already the increment of the Finnish forests is smaller than the annual cuttings by twenty per cent, which is not a very cheerful prospect."²

I regret that I have no Schwappach, Schlich or Mélard to quote in regard to the condition of things in Sweden, but at p. 620 of the volume on the industries of that country, edited by G. Sundbörg,

¹ English Trans. by Fisher in Trans. Eng. Arb. Soc. Vol. iv. p. 386.

² Report of a Conference on the subject of Afforestation, 1907, p. 13.

¹ Schwappach, Forstliche Reisebilder aus Russland, Zeit. f. Forst und Jagdwesen, 1902.

and issued by the Central Bureau of Statistics in 1904, it is stated that 106,000,000 cubic feet of timber are being annually cut in Swedish forests beyond the annual increment. If this official information be correct, and I have no reason to doubt it, it would appear that Swedish timber exports cannot be indefinitely maintained at their present high level. I cannot pretend to know much about Sweden from personal examination, but last year I travelled for about a thousand miles in the country and endeavored to learn what I could. The impression left on my mind was that in much of the country the rock is hidden by but a thin covering of soil, and that the growth of trees is very slow. Moreover, when a forest is felled, the soil suffers severely from washing by the heavy rains, and where drainage is defective there is the same tendency to the formation of peat as Schwappach noticed in Russia. It was also evident from my cursory inspection of the country that no attempt is being made to continue the forests on much of the area hitherto under wood. Dairy farming is advancing at a great rate, and herds of cows could be seen grazing on much of the disafforested land, and effectively repressing any young forest growth. The State, however, has recognized the need for action, and has recently placed a small export duty on timber, the proceeds of which are to be devoted to the reforestation of Government lands. In Sweden, therefore, as in Russia, the future will see some improvement in the methods of forest exploitation, but with a crop like trees results mature but slowly, and especially in a high latitude.

I do not propose to do more than merely allude to the position of matters in the United States and Canada. The Bureau of Forestry of the United States has recently issued several publications that take a distinctly gloomy view of the situation. In one of them¹ it is stated that in that country "the present annual consumption of wood in all forms is from three to four times as great as the annual increment." In another official brochure² it is estimated that the timber supply will be exhausted in thirty-five years at the

most, but that this point may be reached as soon as nine years. In its publication entitled "The Waning Hardwood Supply," the Bureau commits itself to an estimate of sixteen years as the duration of the supply of this class of timber.¹ That the United States is feeling the pinch of scarcity is clearly indicated by the fact that she is importing more and more timber every year.

I will not presume to say more about the position of the timber supply in the country in which we are now assembled than this, that it is common knowledge that great areas of forest in the Eastern Provinces have been depleted, that the exports of Canada's most valuable lumber tree—White Pine—have greatly diminished, and that she has now got to import no inconsiderable quantities of such hardwoods as hickory, oak and walnut. But that there are great untapped areas to the north of Ontario and Quebec and on the west of the Rocky Mountains appears to be generally admitted, and no doubt the meeting will be favored with an authoritative statement on this important subject.

There is one region of the world to which the eyes of men are keenly bent, that seems to offer possibilities of considerable, perhaps of large, supplies, but it is most difficult to make even an approximate estimate of what these possibilities really are. I refer, of course, to Siberia. The latest authoritative statement of the timber resources of that country has come in the form of a report from the British vice-consul, Mr. Hodgson,² who speaks hopefully of developments in the East of Siberia, where forests cover an incalculable area. From that region timber may be got out to the Pacific by means of such great rivers as the Amur; but with regard to Siberia as a whole, the opportunities of export are very limited. A shipping trade with the north of that country cannot be contemplated, and transportation over thousands of miles of rail is almost equally impossible.

I have indicated the opinion of M. Mélard with regard to the future of Russia's timber exports, I may also quote his opinion on the question of the world's supply generally. In the review already referred to he says: "The con-

¹ p. 8.

² Report on the Lumber Industry in the Russian Far East, 1908.

¹ The Timber Supply of the United States, 1907, p. 12.

² The Drain upon the Forests, 1907, p. 15.

sumption of wood is superior to the normal production of all accessible forests, and there is a deficit in this production that is temporarily compensated for by the destruction of forests." In other words, we are living on our forest capital, and everyone knows where such a spendthrift proceeding must ultimately land either the community or the individual.

The increasing difficulty in obtaining supplies of timber is clearly reflected in the rise of price on the English market. The most important class of imported wood is classed in the Board of Trade returns as "Sawn or split, planed or dressed," and whereas, according to Sauerbeck's figures, the average price for the ten years, 1888-1897, was 44s. 6d. per load, it was 57s. in 1907, a rise, namely, of 28 per cent. Striking as is this rise, it only represents a half truth, for we have to bear in mind two facts, the one, that during that time certain of the more valuable classes of timber were getting scarcer on the market (e.g. the White Pine of Canada and the Eastern United States, and the Kauri Pine of New Zealand); and the other, that the quality of imported timber generally has been steadily and rapidly falling for some years. Several witnesses examined by the Royal Commission on Coast Erosion and Afforestation stated that timber now passed as Grade II would have been put into Grade IV or V twenty or thirty years ago.¹ If, in fact, we could compare exactly the same quality of timber to-day with that of fifteen years ago, we should find that the rise in price in the interval was much more than 28 per cent. The United States Department of Agriculture has made

¹ Report p. 9, Vol. II and the evidence of Parry, Henzell, Walker, Forbes, Margerison, Mackenzie and Somerville.

such a comparison for the years 1886 to 1908 in a tabular sheet recently issued,¹ which shows that of thirty-two brands of timber nine had risen 100 per cent. and over, fourteen from 50 to 100 per cent., seven from 25 to 50 per cent. and only two less than 25 per cent.

There are, of course, those who maintain that all fears of a timber famine are groundless, and that when the proper time comes, some way will be found for getting the huge supplies that exist in Siberia to the world's markets. They also point to the use of iron and concrete as substitutes for wood, and of the stalks of sugar cane as a substitute for pulp wood. But in spite of the fact that other substances are now being used to replace wood for certain purposes, statistics show that the consumption of timber is annually increasing, and that the maintenance of the supply is one of the most important economic problems that confront mankind. It is extremely difficult to say how much can be done in this direction, but at least it is obvious that a great effort should be made to save timber from wasteful destruction by forest fires. It is also clearly in the interests of every country to see that forests are exploited in such a way as to secure immediate regeneration of the denuded areas. And, lastly, it is becoming more and more recognized that silviculture offers a means for the profitable utilization of much waste land, and of land that is at present yielding a rent of only a few pence per acre for rough grazing. These and many other aspects of the timber problem cannot be amplified in the present paper, though perhaps other members of the association may find time to deal with them.

¹ Wholesale Lumber Prices, 1886-1908.

The Tree Planting Problem in Western Saskatchewan and Southern Alberta.

By A. MITCHELL, TREE PLANTING DIVISION FORESTRY BRANCH.

Most people coming into the Western Provinces for the first time are struck forcibly with two important aspects peculiar to the prairies, namely, their immense area and their treelessness.

All the way up from Winnipeg to a point a few miles east of Regina native poplar growth may be seen on either hand from the train; but from that point to the foothills of the Rockies, a

distance of about 500 miles, the lack of tree growth never fails to be remarked. It is a great stretch to be practically without trees and its breadth is in proportion, for it extends from the boundary line at least two hundred miles north, and in all this vast area practically the only indigenous trees are a few scattered specimens dotted along the river bottoms, with the exception of the forest on the Cypress Hills (a strip of about forty miles long by ten or fifteen broad). The rest of this immense area is practically treeless, except where some enterprising farmer has made a beginning towards doing his share of furnishing a much-needed complement to the prairie landscape.

CAUSES CONTRIBUTING TO TREE- LESSNESS.

The causes contributing to this treelessness have been much discussed. Undoubtedly the chief cause has been fire; even before the coming of the white man the prairie was often fired by the Indians, usually either to circumvent an enemy or to provide grass for the buffalo during the following season. The very richness of the prairie soil, which caused such a luxuriant growth of grass that the young trees were eventually smothered, and the comparatively low rainfall of southern Alberta and southern Saskatchewan, preventing the germination of seeds, also contributed largely to this result.

THE CHINOOKS.

The chinook winds of Southern Alberta and the western portions of South Saskatchewan were also powerful factors in checking the natural spread of tree growth, but their most important effects were exerted indirectly rather than in the way many of the old timers thought. The chinooks are warm winds which come over the mountains from British Columbia, and in summer, after a day or two's vigorous "chinooking", the grass gets crisp and brown and the water holes dry up very rapidly. In winter the chinook makes the snow disappear as if by magic, and it looks as if a slice of early spring or fall had suddenly been sandwiched into the heart of winter. Both these conditions are peculiarly favorable to the progress of a prairie fire, and thus is brought about the significant fact that in the

district mentioned it was possible for a prairie fire to sweep over the entire country any time of the year except about two months in the very vigor of the growing season. Very small indeed were the chances of any tree seedlings surviving many seasons under conditions like these.

At one time it was thought that the warmth of the chinooks encouraged the flow of sap in winter and that a sudden frost immediately following killed the trees, but this is a theory that has not much to support it. There may have been cases where this has occurred, but it has not been general and probably confined only to introduced trees. If this thawing and freezing have had any large share in bringing about the treelessness of the prairie, why do we find such fine specimens of poplar in the valleys of the Old Man, the Bow and other rivers of Alberta? and why do we find usually a fringe of pine trees, commonly Lodgepole Pine or Western White Pine, along the crests of the hills north of Pincher Creek? These trees stand right in the teeth of the chinooks, and if there were much in this theory of thawing and freezing surely that is where it would be most felt. But no! there they stand, some of the poplars 50 or 60 feet high, and doubtless close to 100 years old, proof positive that on them at least the chinooks have had no evil effects. The surrounding country is bare because of repeatedly recurring fires from which these trees were protected by the snow drifts along the edge of the river valleys. A visit to the fringes of pines will soon convince the observer that they also were saved by their surroundings, for they are growing either in rocky land where there was no grass to carry over the fires, or among ground cedar (or, rather, dwarf juniper) which would not burn, and so kept the fires at a distance.

THE SETTLERS.

The first settlers were cattle ranchers and such a country suited them well. There was abundance of grass and water, and although some of them may have wished for a little more tree shelter for their stock very few took the trouble to find out if trees would grow or not. Those who did usually found their attempts ended in failure and till within a few years ago the general opinion was that

trees would not grow on the prairies and that, as was actually said once at a meeting at Medicine Hat, "Providence never intended trees to grow on the prairie, or they would be there now."

THE EXPERIMENTAL FARMS.

In dispelling illusions such as these the work of the experimental farms soon began to make itself felt—largely through their publications, for, living as they did many miles from the farms, very few of the Western men ever had an opportunity to actually see the farms for themselves. People gradually got the idea that it was possible to grow a few trees, especially in sheltered situations, and the free distribution of small quantities of seedlings gave a great stimulus to the movement. But these experiments were mostly confined to the towns, and very few farmers had done any planting prior to 1900 and that nearly always in the river bottoms or behind the shelter of a slab fence. Here and there you would find a farmer who had dug holes in the sod and planted a tree or two, but these were, of course, always a dismal failure.

THE FORESTRY BRANCH.

The co-operative system of tree planting was begun by the Forestry Branch of the Department of the Interior in 1900, and utilized to a very great extent the results of the work of the Experimental Farms. A very complete system of procedure has been worked out which has given good satisfaction, and the success of the efforts of the officials and the popularity of the work is attested by the fact that the number of applicants this year is 44 per cent. greater than last year.

The inspection of the land prior to planting was of great importance, as proper preparation had been found of paramount necessity in all the work of the experimental farms; its usefulness will be readily allowed when it is known that only about 50 per cent. of the people who apply for trees have their land ready for planting when visited by the inspectors. And when it is remembered that thirteen million trees have already been distributed it will be seen how important this feature of the work has been, for, if these trees had been sent out indiscriminately to all and sundry who applied for them, there would have been

at least six millions and a half which never would have had a chance to grow. Value these at 25 cents per 100 and you have a saving effected to the country of \$16,250.00 in seedling trees alone, not taking into account their potential value to the future. Add to this the labor saved by these men in insisting on close planting, early cultivation and wide plantations kept well back from the buildings and so on, and you have work done of a value many times beyond its cost.

With regard to supplying trees, when it is remembered that two and a quarter millions were sent out this spring, and that the number of applicants is increasing so rapidly, it will be readily seen that all the private nurseries in the West together would find it difficult to keep up with the demand.

Now-a-days people have a far better understanding of the question and even in southern Alberta, in the chinook country, people realize that trees will grow on the prairie, if you treat them properly.

PRESERVATION OF SOIL MOISTURE.

But while tree growing is proving quite successful it must never be forgotten that the conditions which worked so strongly against the natural forest are still with us and are just as much the enemy of tree life as ever they were. Other conditions are different now, though, for settlement has curtailed the prairie fire, and plantations seldom or never suffer from that source, and thanks to the work of Mr. MacKay we know now how to carry over the rainfall of one year to help that of the next, and by cultivating thoroughly the year before planting—either by summer fallowing or by breaking and backsetting—we are able to give the young trees a first-rate start and a good chance of success. Careful cultivation for three or four years afterwards, till the branches meet and shade the ground, brings the plantation through till it is able to take care of itself. Broad belts of twenty or thirty yards wide with the trees closely planted, not wider than four feet, we find of great advantage in combatting the lack of rainfall. A narrow belt of only four or five rows allows the drying winds to go through it, and in a prolonged dry spell with high winds the plantation is sure to suffer.

This rainfall question is one that few of the settlers understand at first and many are astonished when they are strongly advised not to prune their trees up like whip stocks or plant them at six or eight feet apart as they used to do where they came from.

THE CHINOOKS AND THE NEW PLANTATIONS.

In the new plantations in the chinook belt we have found no trouble so far from the untimely flow of sap in the winter and the subsequent freezing that we used to hear so much about. What does do damage occasionally is the lack of moisture in the winter, for it must be borne in mind that in that country there

that in these districts the rainfall is usually much greater than further out on the prairie, and the growth is sometimes carried on late into the fall, when, if the new shoots are not matured when frost comes, the trees are sure to be killed back to within a few feet of the ground. This is notably the case with the Dakota Cottonwood and sometimes also with the maple, and it has now been decided to plant a hardy variety of Russian Poplar in the plantations instead of cottonwood. Whenever there is likely to be trouble of this sort it has been found good practice to pinch back the tips of the growing shoots about two weeks before frost is expected, which stops length growth and enables the



Photo by A. Knechtel

Inspector of Reserves Knechtel and Chief Forest Ranger Margach (Calgary), on a tour of inspection along the eastern slope of the Rockies. (August, 1909.)

is no steady covering of snow to protect the trees and keep the ground moist as there is farther east. This sometimes gives trouble, but we find that if cultivation has been thorough the previous summer and so a plentiful supply of moisture has been kept in the soil there is usually no damage done.

DAMAGE FROM EARLY FROSTS.

In the more elevated parts of Alberta, towards the foothills and northwards, a good deal of trouble has been experienced with early frosts. It is not so much the earliness of the frost, as the fact

wood to ripen up before the first nip of winter. On this account, also, it is well in these districts to stop cultivating earlier in the season than usual and it should never be done after the middle of July. Any weeds that may grow up after that date and are likely to seed may be destroyed by hand pulling.

IRRIGATION.

Under irrigation the plantations do extremely well, and, as might be expected, their growth is considerably greater than under "dry" conditions. Care, however, must be exercised to avoid

applying the water too late in the season in case the trees keep on growing late in the fall and we have trouble from frost. Water should never be applied after July 1st. Fall irrigation has latterly been found safest, and some of the best men now thoroughly soak their plantations just before the freeze-up in the fall, and cultivate in the following summer in the usual way. This insures abundance of moisture in the growing season and gives excellent results, while it has the merit of being quite safe.

THE PUBLIC SCHOOLS.

One interesting feature of the tree planting movement is the attitude which some of the school districts are beginning to take towards it. Several of these have already taken advantage of the assistance afforded by the Forestry Branch with very good results, and it is to be hoped that there will be quite an extension of this kind of planting in the future. This is work that is well worth encouraging and shows a proper appreciation on the part of the trustees of the fact that the school is the social centre of the district in which it is situated, and if the tastes of the children are to be influenced by their surroundings, no better way of directing these tastes could well be devised than by surrounding the school grounds with trees. For best results, however, it would be well for them to remember that at least two acres of ground are necessary, though three would be better.

We have seen how important it is to establish wide belts in the drier parts of the country; and one acre, which is the usual area secured for school grounds, is far too small. The larger area is necessary to allow for the plantation being set back a suitable distance from the buildings to avoid trouble from snow-drift, and when allowance is made for a sufficient width of plantation, there is not much room for playground or demonstration plots. Not very many school districts have taken this matter up so far, but what has been done is only another indication of the place that tree planting is beginning to take throughout the land. School inspectors and the Departments of Education have been encouraging tree planting a great deal and it is to be hoped that in a very few years the school that has not a belt of trees sheltering its grounds will be a very rare exception.

Thus on all hands, from public institutions and individual farmers, tree planting on the prairies is receiving more and more attention as time goes on. Already a good deal has been done and plantations are beginning to show up against the level line of the prairie horizon and making a pleasant variety in the monotony of the landscape, but the region requiring to be planted is very long and very wide and there still remains an immense amount of work to be done before every farm is furnished with the number of trees it ought to have.

The Forest Trees of Canada.

The list of trees given below includes only those native to Canada; hence it will be noticed that a number of familiar trees, such as the Norway Spruce and English hawthorn, are not included.

The scientific names have as far as possible been brought into accordance with the rules adopted by the International Botanical Congress, held at Vienna in 1905. For the eastern trees the names given in the seventh edition of Gray's *Manual of Botany* have been adopted, and for the western species Piper's "*Flora of Washington*" has been the general guide. The popular names given agree very largely with those adopted in the "*Checklist of the Forest Trees of the United States*," by Mr. G. B. Sudworth (*U. S. F. S. Bulletin* No. 17).

As to the distinction between trees and shrubs Dr. C. S. Sargent's "*Silva of North America*" (Boston, 1890-1902) has been followed. In this connection may be quoted Dr. Sargent's definition of "trees" as "all woody plants which grow up from the ground with a single stem, excluding all such as habitually branch at the ground into a number of stems, whatever size or height they attain" (see preface, Vol. I, page viii).

The chief works consulted in the preparation of this list have been Dr. Sargent's "Silva," Prof. Macoun's "Catalogue of Canadian Plants," Gray's "Manual of Botany" (seventh edition), and Piper's "Flora of Washington," referred to above; Prof. Macoun's paper on "The Forests of Canada" in the Transactions of the Royal Society of Canada, Vol. XII (1894), pt. iv; Dr. Sargent's "Manual of the Trees of North America," Mr. Sudworth's "Checklist of the Forest Trees of the United States," and Mr. J. R. Anderson's "Lists of the Trees of British Columbia," published in the Canadian Forestry Journal and the proceedings of the Canadian Forestry Convention (Ottawa, 1906).

For assistance received from Prof. Macoun and Mr. J. M. Macoun in compiling this list the editor wishes to express his thanks.

| COMMON NAME. | BOTANICAL NAME. | DISTRIBUTION. |
|--|--|---|
| 1. Alder, Red..... | <i>Alnus oregona</i> Nutt..... | B.C. |
| 2. Alder, White (Mountain) | <i>Alnus tenuifolia</i> Nutt..... | B.C. |
| 3. Arbor Vitae..... | <i>Thuja occidentalis</i> Linn..... | P.E.I., N.S., N.B., Que., Ont., Man. |
| 4. Arbor Vitae, Giant..... | <i>Thuja plicata</i> Don..... | B.C. |
| 5. Arbutus (Madrona)..... | <i>Arbutus Menziesii</i> Pursh..... | B.C. |
| 6. Ash, Black..... | <i>Fraxinus nigra</i> Marsh..... | P.E.I., N.S., N.B., Que., Ont. |
| 7. Ash, Blue..... | <i>Fraxinus quadrangulata</i> Michx..... | Ont. |
| 8. Ash, Green..... | <i>Fraxinus pennsylvanica</i> Marsh., var. <i>lanceolata</i> (Bork.) Sarg..... | Que., Ont., Man., Sask. |
| 9. Ash, Red (Rim)..... | <i>Fraxinus pennsylvanica</i> Marsh..... | N.S., N.B., Que., Ont., Man. |
| 10. Ash, Oregon..... | <i>Fraxinus oregona</i> Nutt..... | B.C. |
| 11. Ash, White..... | <i>Fraxinus americana</i> L..... | P.E.I., N.S., N.B., Que., Ont. |
| 12. Aspen..... | <i>Populus tremuloides</i> Michx... | All Canada east of the Rocky Mts. |
| 13. Aspen, Large-toothed... | <i>Populus grandidentata</i> Michx. | N.S., N.B., Que., Ont. |
| 14. Balm of Gilead..... | <i>Populus balsamifera</i> L..... | All the provinces. |
| Balsam Poplar; see Balm of Gilead..... | | |
| Balsam Fir; see Fir, Bal- sam..... | | |
| 15. Basswood..... | <i>Tilia americana</i> Linn..... | N.B., Que., Ont., Man. |
| 16. Beech, American..... | <i>Fagus grandifolia</i> Ehrh..... | P.E.I., N.S., N.B., Que., Ont. |
| 17. Beech, Blue..... | <i>Carpinus caroliniana</i> Walt... | Que., Ont. |
| 18. Birch, Sweet (Cherry or Black)..... | <i>Betula lenta</i> Linn..... | N.S., N.B., Que., Ont. |
| 19. Birch, Paper (Canoe, White)..... | <i>Betula alba</i> Linn., var. <i>papy- rifera</i> (Marsh.) Spach..... | All the provinces. |
| 20. Birch, Western..... | <i>Betula occidentalis</i> Hooker... | B.C., Alta. |
| 21. Birch, White..... | <i>Betula populifolia</i> Marsh..... | P.E.I., N.S., N.B., Que. |

| COMMON NAME. | BOTANICAL NAME. | DISTRIBUTION. |
|---|---|---|
| 22. Birch, Yellow..... | <i>Betula lutea</i> Michx..... | P.E.I., N.S., N.B., Que., Ont. |
| 23. Buckthorn, Cascara..... | <i>Rhamnus Purshiana</i> deC..... | B.C. |
| 24. Butternut..... | <i>Juglans cinerea</i> Linn..... | N.B., Que., Ont. |
| Buttonwood; see Sycamore. | | |
| 25. Cedar, Red..... | <i>Juniperus virginiana</i> L..... | N.S., N.B., Que., Ont., B.C. |
| Cedar, White; see <i>Arbor Vitae</i> . | | |
| Cedar, Western White; see <i>Arbor Vitae</i> , Giant. | | |
| 26. Cherry, Bitter..... | <i>Prunus emarginata</i> Walp..... | B.C. |
| 27. Cherry, Black..... | <i>Prunus serotina</i> Ehrh..... | P.E.I., N.S., N.B., Que., Ont. |
| 28. Cherry, Choke..... | <i>Prunus virginiana</i> Linn..... | N.B., Que., Ont. |
| 29. Cherry, Western Choke.. | <i>Prunus demissa</i> Walp..... | B.C. |
| 30. Cherry, Wild Red (Bird). | <i>Prunus pennsylvanica</i> Linn.. | N.S., N.B., Que., Ont., Man., Sask., Alta., B.C. |
| 31. Cherry, Woollyleaf..... | <i>Prunus emarginata villosa</i> Sud..... | B.C. |
| 32. Chestnut..... | <i>Castanea dentata</i> (Marsh.) Borkh..... | Ont. |
| Cornel; see Dogwood..... | | |
| 33. Coffeetree, Kentucky.... | <i>Gymnocladus dioica</i> (L.) Koch..... | Ont. |
| 34. Cottonwood..... | <i>Populus deltoides</i> Marsh..... | Que., Ont., Man., Sask., Alta. |
| 35. Cottonwood, Black..... | <i>Populus trichocarpa</i> Torr. & Gray..... | B.C. |
| 36. Cottonwood, Lanceleaf.. | <i>Populus acuminata</i> Ryd..... | Alta. |
| 37. Cottonwood, Narrowleaf (Black)..... | <i>Populus angustifolia</i> James.. | Alta. |
| 38. Crab-apple, Sweet (American)..... | <i>Pyrus coronaria</i> Linn..... | Ont. |
| 39. Crab-apple, Oregon..... | <i>Pyrus diversifolia</i> Bong..... | B.C. |
| Cratægus, see Haw. | | |
| 40. Cucumber Tree..... | <i>Magnolia acuminata</i> Linn..... | Ont. |
| 41. Cypress, Yellow..... | <i>Chamaecyparis nootkatensis</i> Spach..... | B.C. |
| 42. Dogwood, Alternate- leaved (Blue Dogwood) | <i>Cornus alternifolia</i> Linn. f.... | N.B., N.S., Que., Ont. |
| 43. Dogwood, Flowering.... | <i>Cornus florida</i> Linn..... | Ont. |
| 44. Dogwood, Western Flowering..... | <i>Cornus Nuttallii</i> Aud..... | B.C. |
| 45. Elder..... | <i>Sambucus callicarpa</i> Greene.. | B.C. |
| 46. Elm, Cork (Rock)..... | <i>Ulmus racemosa</i> Thomas..... | Que., Ont. |
| 47. Elm, Slippery (Red).... | <i>Ulmus fulva</i> Michx..... | Que., Ont. |
| 48. Elm, White (American).. | <i>Ulmus americana</i> Linn..... | P.E.I., N.S., N.B., Que., Ont., Man., Sask. |
| 49. Fir, Alpine..... | <i>Abies lasiocarpa</i> (Hook.)Nutt. | Alta., B.C. |

| COMMON NAME. | BOTANICAL NAME. | DISTRIBUTION. |
|---|---|---|
| 50. Fir, Balsam..... | <i>Abies balsamea</i> (L.) Miller.... | P.E.I., N.S., N.B., Que., Ont., Man |
| 51. Fir, Douglas..... | <i>Pseudotsuga mucronata</i> Sud.. | Alta., B.C. |
| 52. Fir, Lowland (Western Balsam Fir, Western White Fir)..... | <i>Abies grandis</i> Lind..... | B.C. |
| 53. Fir, Amabilis (White)... | <i>Abies amabilis</i> (Dougl.) Forbes..... | B.C. |
| Fir, Yellow; see Fir, Douglas..... | | |
| 54. Gum, Black (Sour)..... | <i>Nyssa silvatica</i> Marsh..... | Ont. |
| 55. Hackberry..... | <i>Celtis occidentalis</i> Linn..... | Que., Ont., Man. |
| 56. Haw, Scarlet..... | <i>Crataegus coccinea</i> Linn..... | N.S., Que., Ont., Man. |
| 57. Haw, Pear..... | <i>Crataegus tomentosa</i> Linn... | N.S., N.B., Que., Ont. |
| 58. Cocks spur Thorn..... | <i>Crataegus crus-galli</i> L..... | Ont. |
| 59. | <i>Crataegus brevispina</i> (Dougl.) Heller..... | B.C. |
| 60. | <i>Crataegus columbiana</i> Howell | B.C. |
| 61. Hemlock (Eastern)..... | <i>Tsuga canadensis</i> (L.) Carr.. | P.E.I., N.S., N.B., Que., Ont. |
| 62. Hemlock, Western..... | <i>Tsuga heterophylla</i> Sarg..... | B.C. |
| 63. Hemlock, Black..... | <i>Tsuga Mertensiana</i> Carr..... | B.C. |
| 64. Hickory, Shagbark (Shellbark)..... | <i>Carya ovata</i> (Mill.) K. Koch.. | Que., Ont. |
| 65. Hickory, Pignut..... | <i>Carya glabra</i> (Mill.) Spach... | Ont. |
| 66. Hickory, Mockernut (Whiteheart)..... | <i>Carya alba</i> (L.) K. Koch..... | Ont. |
| 67. Hickory, Bitternut..... | <i>Carva cordiformis</i> (Wang.) K. Koch..... | Que., Ont. |
| 68. Hickory, Little Pignut... Hornbeam, see Beech, Blue..... | <i>Carya microcarpa</i> Nutt..... | Ont. |
| 69. Hornbeam, Hop..... | <i>Ostrya virginiana</i> (Mill.) Koch..... | N.S., N.B., Que., Ont. |
| Ironwood; see Hornbeam Juneberry; see Service- berry..... | | |
| 70. Larch, American..... | <i>Larix laricina</i> (DuRoi) Koch. | All the provinces. |
| 71. Larch, Western..... | <i>Larix occidentalis</i> Nutt..... | B.C. |
| 72. Larch, Mountain..... | <i>Larix Lvyallii</i> Parl..... | Alta., B.C. |
| 73. Locust, Honey..... | <i>Gleditsia triacanthos</i> L..... | Ont. |
| 74. Maple, Black..... | <i>Acer saccharum</i> , var. <i>nigrum</i> (Michx f.) Britton..... | Que., Ont. |
| 75. Maple, Dwarf..... | <i>Acer Douglasii</i> Hook..... | B.C. |
| 76. Maple, Oregon (Broad- leaved)..... | <i>Acer macrophyllum</i> Pursh... | B.C. |
| 77. Maple, Sugar (Hard)... | <i>Acer saccharum</i> Marsh..... | P.E.I., N.S., N.B., Que., Ont., |
| 78. Maple, Manitoba..... | <i>Acer Negundo</i> Linn..... | Ont., Man., Sask., Alta. |
| 79. Maple, Mountain..... | <i>Acer spicatum</i> Lam..... | P.E.I., N.S., N.B., Que., Ont., Man. |

| COMMON NAME. | BOTANICAL NAME. | DISTRIBUTION. |
|--|---|---|
| 80. Maple, Red (Soft)..... | <i>Acer rubrum</i> Linn..... | P.E.I., N.S., N.B., Que., Ont. |
| 81. Maple, Silver..... | <i>Acer saccharinum</i> Linn..... | N.B., Que., Ont. |
| 82. Maple, Striped..... | <i>Acer pennsylvanicum</i> Linn... | P.E.I., N.S., N.B., Que., Ont. |
| 83. Maple, Vine..... | <i>Acer circinatum</i> Pursh..... | B.C. |
| Moosewood; see Maple, Striped..... | | |
| 84. Mountain Ash..... | <i>Pyrus americana</i> (Marsh.) deC..... | N.S., N.B., Que., Ont., Man. |
| 85. Mountain Ash, Western.. | <i>Pyrus sitchensis</i> (Roem.) Piper..... | B.C. |
| Mountain Balsam; see Fir, Alpine..... | | |
| 86. Mulberry, Red..... | <i>Morus rubra</i> Linn..... | Ont. |
| 87. Oak, Bur..... | <i>Quercus macrocarpa</i> Michx... | N.B., N.S., Que., Ont., Man. |
| 88. Oak, Chestnut..... | <i>Quercus prinus</i> Linn..... | Ont. |
| 89. Oak, Dwarf Chinquapin (Dwarf or Scrub White or Overcup)..... | <i>Quercus prinoides</i> Willd..... | Ont. |
| Oak, Mossycup; see Oak, Bur..... | | |
| 90. Oak, Pacific Post..... | <i>Quercus Garryana</i> Douglas .. | B.C. |
| 91. Oak, Pin..... | <i>Quercus palustris</i> Muench.... | Ont. |
| 92. Oak, Post..... | <i>Quercus stellata</i> Wang..... | Ont. |
| 93. Oak, Red..... | <i>Quercus rubra</i> Linn..... | P.E.I., N.S., N.B., Que., Ont. |
| 94. Oak, Scarlet..... | <i>Quercus coccinea</i> Muench.... | Ont. |
| Oak, Scrub; see Oak, Bur | | |
| 95. Oak, Swamp White..... | <i>Quercus bicolor</i> Willd..... | Ont. |
| 96. Oak, White..... | <i>Quercus alba</i> Linn..... | Que., Ont. |
| Oak, Western White; see Oak, Pacific Post..... | | |
| 97. Oak, Yellow..... | <i>Quercus velutina</i> Lam..... | Ont. |
| 98. Papaw..... | <i>Asimina triloba</i> Dunal..... | Ont. |
| Pepperidge; see Gum, Black..... | | |
| 99. Pine, Bull..... | <i>Pinus ponderosa</i> Dougl..... | B.C. |
| 100. Pine, Jack..... | <i>Pinus Banksiana</i> Lam..... | P.E.I., N.S., N.B., Que., Ont., Man. Sask., Alta. |
| 101. Pine, Lodgepole (Black). Pine, Oregon; see Fir Douglas..... | <i>Pinus Murrayana</i> Murray.... | Alta., B.C., Y.T. |
| 102. Pine, Limber (Rocky Mountain Pine)..... | <i>Pinus flexilis</i> James..... | B.C., Alta. |
| 103. Pine, Pitch..... | <i>Pinus rigida</i> Mill..... | N.B., Que., Ont. |
| 104. Pine, Red..... | <i>Pinus resinosa</i> Aiton..... | P.E.I., N.S., N.B., Que., Ont., Man. |
| 105. Pine, Scrub..... | <i>Pinus contorta</i> Dougl..... | B.C. |
| 106. Pine, Silver..... | <i>Pinus monticola</i> Dougl..... | B.C. |
| 107. Pine, White..... | <i>Pinus strobus</i> Linn..... | P.E.I., N.S., N.B., Que., Ont., Man. |
| Pine, Western White; see Pine, Silver..... | | |

| COMMON NAME. | BOTANICAL NAME. | DISTRIBUTION. |
|---|---|-----------------------------------|
| 108. Pine, Whitebarked..... | <i>Pinus albicaulis</i> Engel..... | Alta., B.C. |
| 109. Plum, Canada..... | <i>Prunus nigra</i> Ait..... | N.B., Que., Ont., Man. |
| Poplar; see also Cotton- wood, Balm of Gilead, Aspen..... | | |
| 110. Poplar, Vancouver..... | <i>Populus vancouverensis</i> Tre- lease..... | B.C. Ont. |
| 111. Red-bud..... | <i>Cercis canadensis</i> L..... | Ont. |
| 112. Sassafras..... | <i>Sassafras variifolium</i> (Salisb.) Kotze..... | Ont. |
| 113. Service-berry..... | <i>Amelanchier canadensis</i> (L.) Medic..... | N.B., N.S., Que., Ont. |
| 114. Sheepberry..... | <i>Viburnum lentago</i> Linn..... | Que., Ont., Man., Sask., Alta. |
| Shadbush; see Service- berry..... | | |
| 115. Spruce, Alberta..... | <i>Picea albertina</i> Baker..... | Alta. |
| 116. Spruce, Black..... | <i>Picea mariana</i> (Mill.) B.S.P.. | All provinces. |
| 117. Spruce, Engelmann..... | <i>Picea engelmanni</i> Engel..... | Alta., B.C. |
| 118. Spruce, Red..... | <i>Picea rubra</i> (DuRoi) Dietr.. | P.E.I., N.S., N.B., Que. |
| 119. Spruce, Sitka (Menzies).. | <i>Picea sitchensis</i> Carr..... | B.C. (coast). |
| 120. Spruce, White Sugarberry; see Hack- berry..... | <i>Picea canadensis</i> (Mill.) B.S.P. | All provinces. |
| 121. Sumach, Dwarf..... | <i>Rhus copallina</i> Linn..... | Ont. (1000 Isles.) |
| 122. Sumach, Staghorn..... | <i>Rhus typhina</i> Linn..... | P.E.I., N.S., N.B., Que., Ont. |
| 123. Sycamore..... | <i>Platanus occidentalis</i> Linn.. | Ont. |
| Tamarac; see Larch..... | | |
| Thorn, Scarlet-fruited; see Haw, Scarlet..... | | |
| Thorn, Black (Pear); see Haw, Pear..... | | |
| 124. Tulip-tree..... | <i>Liriodendron tulipifera</i> Linn.. | Ont. |
| Viburnum, Sweet; see Sheepberry..... | | |
| 125. Walnut, Black..... | <i>Juglans nigra</i> Linn..... | Ont. (southern). |
| Whitewood; see Tuliptree | | |
| 126. Witch Hazel..... | <i>Hamamelis virginiana</i> Linn.. | N.S., N.B., Que., Ont. |
| 127. Willow, Almondleaf (Almond or Peach W.) | <i>Salix amygdaloides</i> Anders.. | Que., Ont., Man., Sask. |
| 128. Willow, Bebb (Livid)... | <i>Salix rostrata</i> Rich..... | All Canada. |
| 129. Willow, Black..... | <i>Salix nigra</i> Marsh..... | N.S., N.B., Que., Ont., Sask. |
| 130. Willow, Glaucous..... | <i>Salix discolor</i> Muehl..... | N.S., to Man. |
| 131. | <i>Salix discolor</i> , var. <i>eriocephala</i> (Michx.) Anders..... | N.B., Que., Ont. |
| 132. Willow, Glossy leaf (Shining)..... | <i>Salix lucida</i> Muhl..... | All provinces but B.C. |

| COMMON NAME. | BOTANICAL NAME. | DISTRIBUTION. |
|---|--|---|
| 133. Willow, Hooker..... | <i>Salix Hookeriana</i> Barratt.... | Vancouver Island; near the Grand Rapids of the Saskatchewan. |
| 134. Willow, Longleaf (Sand- bar)..... | <i>Salix longifolia</i> Muhl..... | Que., Ont., Man., Sask., Alta., Northern B. C., Mackenzie Dist. |
| 135. Willow, Mackenzie..... | <i>Salix cordata</i> Muhl var. <i>Mackenzieana</i> Hook..... | Great Slave Lake and Mackenzie River, south through the re- gion at the base of the Rockies. |
| 136. Willow, Nuttall..... | <i>Salix Nuttallii</i> Sarg..... | Alta (Cypress Hills), B. C. (Donald). |
| 137. Willow, Silky..... | <i>Salix sitchensis</i> Sanson..... | B. C. |
| 138. Willow, Silverleaf..... | <i>Salix sessilifolia</i> Nutt..... | B. C. |
| 139. Willow, Western Black.. | <i>Salix lasiandra</i> Benth..... | B. C. |
| 140. | <i>Salix macrostachya</i> | |
| 141. Yew, Pacific..... | <i>Taxus brevifolia</i> Nutt..... | B. C. |

The Canadian Conservation Commission.

The appointment of the Conservation Commission marks another important step forward in the policy of making the best use of Canada's natural resources. The Commission has been constituted under the act of last session specially providing for its creation, of which an outline was given in the last issue of the Journal. The personnel of the Commission was announced on August 31st last.

Hon. Clifford Sifton, who, it will be remembered, was the chairman of the Canadian delegation at the International Conservation Commission in February last and subsequently chairman of the special committee of the House of Commons on Forests and Waterpowers, has been appointed chairman of the Commission. The other members are: Hon. Sydney Fisher, Hon. Frank Oliver and Hon. Wm. Templeman, Dominion Ministers of Agriculture, of the Interior and of Mines, respectively; Hon. F. L. Haszard, Premier of Prince Edward Island; Hon. W. T. Pipes, Commissioner

of Crown Lands of Nova Scotia; Hon. W. C. H. Grimmer, Surveyor-General of New Brunswick; Hon. Jules Allard, Minister of Lands and Forests of Quebec; Hon. Frank Cochrane, Minister of Lands, Forests and Mines for Ontario; Hon. Hugh Armstrong, Provincial Treasurer of Manitoba, Winnipeg, Man.; Hon. J. A. Calder, Provincial Treasurer of Saskatchewan; Hon. A. C. Rutherford, Premier and Provincial Treasurer of Alberta; Hon. F. J. Fulton, Commissioner of Lands and Works of British Columbia; Hon. Benjamin Rogers, of Alberton, P. E. I.; Prof. Howard Murray, of Dalhousie University, Halifax, N. S.; Messrs. Frank Davison, of Bridgewater, N. S.; Cecil C. Jones, M. A., Ph. D., Chancellor of the University of New Brunswick; W. B. Snowball, of Chatham N. B.; Dr. Henri S. Beland, M. P., of Beauce, P. Q.; F. D. Monk, M. P., Montreal, P. Q.; Dr. W. J. Robertson, President of Macdonald College, Ste. Anne de Bellevue, P. Q.; Mgr. J. C. K.

Laflamme, Dean of the Faculty of Arts, of Laval University, Quebec; Sir Sandford Fleming, Ottawa; Hon. W. C. Edwards, Ottawa; E. B. Osler, M.P., of Toronto; C. A. McCool, ex-M.P., of Nipissing, Ont.; J. F. Mackay, of 'The Globe,' Toronto; Dr. B. E. Fernow, Dean of the Faculty of Forestry of the University of Toronto; Rev. Dr. Geo. Bryce, of the University of Manitoba, Winnipeg; Dr. W. J. Rutherford, of Regina, Deputy Commissioner of Agriculture for Saskatchewan and Dean of the Agricultural College; Prof. H. M. Tory, of Strathcona, President of the

University of Alberta, and Mr. John Hendry, of Vancouver, B.C.

Members of the Canadian Forestry Association will note with interest that the Commission includes the Vice President of the Association, four of the Provincial Vice-Presidents and four Directors. The Journal congratulates these gentlemen on their selection as members of the Commission, as the result of whose investigations great things are hoped for, not only for the forests of Canada, but also for the other natural resources of the Dominion.

Reserves for Protection of Game.

BY T. N. WILLING, CHIEF GAME GUARDIAN FOR SASKATCHEWAN.

In the prairie provinces, the home of the grouse and breeding ground of the wild fowl, the decrease in numbers is alarmingly evident. Big game is fast disappearing, there being now not one living buffalo in Saskatchewan, and only about two thousand antelope scattered over the south western portion of the province, with probably a like number in Alberta, while both these species are now extinct in Manitoba.

Settlers are coming into the country in great numbers and the area under cultivation has increased over one hundred per cent. the last season. This is a small proportion of the land area of the province, but it has a widespread effect on the game preservation problem, as on the outskirts of settlement the temptation to kill for the pot usually proves stronger than any respect for the game laws. If, then, it is thought desirable to maintain wild game in the country, some steps must be taken to provide suitable areas where various species may breed unmolested by man.

Some unthinking persons fail to see any reason, practical or sentimental, why any effort should be made to perpetuate the existence of the wild creatures, but fortunately this is not the view held by the majority, and the movement for more effective protection is actively supported by both the sportsmen and the nature lovers—two classes that do not, however, entirely agree as to what should be considered game.

In my opinion those wild creatures that necessitate healthful exercise and skill in the taking and are of value as food when taken should be considered game, and the best measures possible taken to favor their propagation to offset the loss incident to the hunting season. Both migratory and non-migratory game may be considered a valuable asset to the country if we look at the matter from a utilitarian point of view. The food value of the game annually consumed by our people, especially in northern districts, would be hard to estimate, but might be represented by very high figures, and there is a distinct advantage in having a good supply of birds feeding over our fields, picking up vast quantities of insects and seeds that may be detrimental to our crops.

A close season in Spring for all birds is a very important step in the right direction, as no game can increase, or even exist for long, if hunted and harried at the time of mating and nesting. The birds may nest in the immediate neighbourhood of our homes, in the absence of guns and dogs, but every shot fired in Spring gives fresh impetus to the flight of the migrants towards the northern wilds, or possibly destroys a prospective parent of a downy brood. A majority of the Canadian provinces and most of the Northern States have already prohibited spring shooting, and it is hoped others will soon fall in line. The

advocates of federal legislation for protection of birds during migration have good arguments to advance and the subject is worth consideration.

Our land owners have the right under Section 7 of the Saskatchewan Game Ordinance to prohibit shooting upon their enclosed or cultivated lands, and they might with advantage exercise their right and themselves protect the game upon their farms from destruction by vermin or vagabond.

Reserves. Native birds and other game should, because of hardiness and suitability to the climate, prove more profitable to raise than tender introduced forms, and a wide market could be found for game after it had served the purpose of furnishing the sportsmen with the pleasure of the chase. The dual purpose wild game may yet prove very profitable by the combination of sporting and market value, and game be available for the tables of the people for years to



Photo by H. R. MacMillan

The above cut of a moose, made from a photograph taken on the Riding Mountain Forest Reserve, gives some idea of the possibilities of that reserve as a game preserve.

Lands unsuitable for cultivation in settled communities might with advantage be reserved and stocked with birds from the larger reserves after some planting of trees and shrubs had been done. Wild lands might well be leased to clubs or syndicates that would put a game keeper or keepers on the land to protect and propagate game. The escapes from such game preserves would help stock the surrounding country.

I see no reason why experiments in the propagation of game should not be conducted by the Government on Forest

come. Deer farming has been the subject of one bulletin issued by the Washington Government which is well worth reading.

Aside, however, from anything in the way of experimental work the Forest Reserves might be made serve the very good purposes of refuges and breeding grounds for game by the prohibition of the carrying of guns upon the reserves and by having the wolves and other checks to the increase of game destroyed by the forest rangers. The prevention of fires will prove a great help towards

increasing the number of birds, and, when the numbers justify it, birds for restocking might be transferred to districts where this would be an advantage.

It may not be out of place here to point out the great destruction of game wrought by the coyote. During 1908 bounty was paid in Saskatchewan on 141 gray wolves and over 15,000 coyotes. If we assume that a coyote destroys on an average one bird a day for a year, we would see that the killing of those coyotes had saved the lives of over 5,000,000 birds, or enough to have provided each man, woman and child in Saskatchewan at the end of 1908 with 14 birds.

Gray and timber wolves have proved very destructive to big game in the northern portion of our province and in the country beyond, and also have been troublesome on the ranges in the Cypress Hills district, where all those were killed that bounty was paid on.

We must eliminate competition in the killing of game and preserve it for our sportsmen by cutting out the wolf, weasel, etc. We might then find that, after prairie and forest fires have been kept out for a time, the increase of game would permit the maintenance of liberal game laws that would encourage our young men to indulge more in healthful and invigorating exercise in the open, where they could enjoy the beauties of nature and become more familiar with bird life. Reserves and game refuges should in years to come furnish a constant overflow of game that would radiate from these centres through the surrounding country.

The number and area of forest reserves might well be increased in this province and some lands set aside as public parks and pleasure resorts. It would seem that Saskatchewan had been overlooked in this matter when we look westward and observe the large Dominion Reservation and Museum at Banff stocked with game and exhibits; nearer Edmonton we see a large elk park enclosed and stocked, while on the plains nearing the border of our province

we find the large new buffalo park has been located. I do not think it can be said that no suitable lands can be found in Saskatchewan, the former home of the buffalo, the antelope and other large game.

The problem of how best to prevent the antelope and the beaver from soon becoming extinct is one for consideration and may well be thought over by our legislators, both Federal and Provincial. Bearing on this is the fact that, owing to the prolonged close season for beaver now in force, complaints are received from settlers on prairie streams of the damage the beavers are doing to their much prized timber along the banks, one man pathetically stating that where he had a nice grove previous to the coming of the beaver he has now only a hundred and eighty stumps. If an open season for beaver is proclaimed, it is certain that many newly established colonies will be depopulated; so some other scheme for retaining breeding stock must be devised. It may be that trapping privileges might be granted to the person on whose land a colony occurs, conditional on the protection and maintenance of the colony. On forest reserves trapping of the fur bearing animals should be regularly carried on under supervision of the forest ranger.

There are areas of suitable land about some of our prairie lakes that could be reserved for the antelope and the water fowl. A movement is on foot for the establishing of bird reservations, and much progress has been made along this line by our neighbours to the south. There are many islands in our inland lakes on which the gulls, cormorants, pelicans and other interesting birds nest in vast numbers, and these also should be reserved as permanent refuges and breeding grounds for these birds.

More attention to care of game on Indian reserves should be given by the Indian Department and endeavors made to have the Indians realize the advantage of conforming to the requirements of the game law as to close seasons.

British Columbia Forestry Commission.

The Forestry Commission appointed by the Government of the Province of British Columbia to enquire into the

timber resources of the province, forest preservation and protection, afforestation and kindred subjects held its first

session at Victoria, B.C., on August 16th. The Commission consists of Hon. F. J. Fulton, Commissioner of Lands for that province and Messrs. A. S. Goodeve, M.P., of Rossland, and A. C. Flumerfelt, of Victoria. Mr. R. E. Gosnell was appointed secretary. The Commission held sessions at the following places: Victoria, Nanaimo, Vancouver, New Westminster, Kamloops, Vernon, Revelstoke, Nelson, Cranbrook, Fernie and Grand Forks. The commissioners also attended the First National Conservation Congress at Seattle, Wash., on August 26th, 27th and 28th. Among the questions on which evidence has been taken are the advisability of ex-

tending the term of licenses, the exporting of second and third class cedar, export and import duties, the extension of the system of fire wardens, the destruction of debris and the protection of the forests from fire generally. The importance of the last named item was especially emphasized. An interesting incident of the sittings was the application of the Municipalities of Vernon and Spallumcheen for the setting aside of lands on the Aberdeen Mountain watershed for the purposes of a forest and game reserve, which was very favorably received. The report of the Commission is awaited with much interest.

A Travers les Revues Forestiers Francaises.

JOURNAL FORESTIER SUISSE PUBLIE A BERNE.

Janvier 1909.

Influence du gel sur la chute des feuilles. M. Paul Jaccard continuant les recherches de Wiesner à ce sujet étudie la signification biologique de la chute des feuilles. Habituellement les arbres feuillus se dépouillent brusquement de leurs feuilles dès les premiers froids, tandis que l'an dernier, la plupart des arbres ont conservé une partie de leur feuillage assez longtemps. L'altération due au froid produisit un effet divers suivant les essences, changement de couleur chez les fruitiers, les feuilles des chênes et du marronnier devinrent cassantes et se recroquevillèrent, etc. Mr. Jaccard explique ces phénomènes par l'absence de la couche séparatrice du côté du pétiole, alors que normalement cette couche séparatrice se forme dès le ralentissement de la végétation. Aux premiers froids il se forme entre les cellules aqueuses et turgescentes de la couche de séparation, une lamelle de glace qui fait détacher les feuilles de l'arbre. Comme les arbres étaient encore en activité et les feuilles n'étant pas préparées à dis paraître le gel a bien altéré les cellules du limbe mais la chlorophylle n'a pas été désorganisée et n'a subi qu'une décomposition partielle.

Nouveau plan d'études de la Section forestière de l'Ecole polytechnique fédérale.

L'ancien plan d'études comprenait six semestres, mais la Conférence des professeurs de la Section forestière a élaboré un projet augmentant d'un semestre la durée des cours afin de donner une culture plus complète aux

jeunes forestiers. On élimine quelques cours théoriques pour les remplacer par des leçons pratiques.

Mars 1909.

Ce numéro renferme des détails très intéressants au sujet des travaux de défenses construits pour protéger contre les avalanches la ligne du Gotthard.

BULLETIN DE LA SOCIETE CENTRALE FORESTIERE DE BELGIQUE.

Cette société qui compte plus 1,000 membres publie un intéressant bulletin, aujourd'hui dans sa 16ème année sociale, édition mensuelle.

RÉGÉNÉRATION DE L'ÉPICÉA.

Dans le Janvier numéro et les deux suivants M. le garde général Pokin énumère les conditions et traitement de régénération de l'épicéa tant en Suisse qu'en Allemagne (Forêt Noire) et discute leurs applications aux forêts belges.

EXPÉRIENCES ET OBSERVATIONS EN MATIÈRE FORESTIÈRE.

Le service de recherches forestières belge publiée à tous les deux ans un résumé des recherches faites sur l'élevage des plants en pépinière. Les notes publiées cette année porte sur l'influence de l'origine des graines de pin sylvestre, établissant la supériorité de la semence indigène, puis sur le repiquage et la résistance des végétaux au froid et à l'insolation. (Nous résumerons ces notes dans un article spécial sur les Pépinières).

Canadian Forestry Journal

VOL. V.

DECEMBER, 1909.

No. 4.

Convention at Fredericton, Feb. 23rd and 24th.

At the meeting of the directors of the Association, noted in another part of this issue, it was decided to accept the invitation of the government of the Province of New Brunswick to hold a convention in Fredericton during the

present season. It has since been decided to hold the convention on Thursday and Friday, Feb. 23rd and 24th.

The regular annual meeting of the Association will be held in Ottawa March 10th and 11th, 1910.

The Nova Scotia Forest Survey.

The forest survey, or, rather, "re-connaissance," of the province of Nova Scotia (the inauguration of which was noted in the June issue of the FORESTRY JOURNAL) was proceeded with during the past summer, and satisfactory progress was made, those counties west of Hants being covered. Dr. Fernow and his four assistants succeeded in covering a total of about 8,500 square miles in this first season of the work, which will take another season to complete.

COST, OBJECT AND METHODS.

The low cost of the survey is a point especially noteworthy, the expenditure per square mile averaging less than twenty cents.

A high degree of accuracy was not aimed at, the object of the survey being rather to furnish approximately correct information regarding the character, extent and condition of the province's forest reserves. Such information, it must be observed, even though but approximately correct, is vastly more reliable than the haphazard guesses that have up till now been the expression of our knowledge of the extent and value of Canadian woodlands.

Five men were engaged in the survey and each was left largely to himself, a certain territory being assigned him

to cover by whatever means should seem best to him. In making investigation as to the timber, etc., personal inspection of the woodlands was supplemented by interviews with persons in each locality who knew the condition of certain parcels of timber. Much valuable information was obtained in this way, the lumbermen especially being very generous in giving information.

The survey plats of the Crown Lands Department, on the scale of two miles to the inch, were used as the basis of recording the forest survey. These were found only fairly satisfactory. Owing to the fact that no system of triangulation has been established, difficulty was found in tying new surveys to definitely located points. Moreover, the surveyors in the field frequently made "mistakes," such as locating the boundaries of a 100-acre grant of land to enclose an area of eight hundred acres. It was indeed, often found difficult to locate Crown lands at all, and much land shown on the maps as the property of the province did not exist.

POINTS NOTED.

The information gathered was, as far as possible, plotted on the maps in the field, colored pencils being used; numbers and letters were used to denote

different conditions. From these the information will be compiled and maps made on a smaller scale for publication.

Points usually ascertained were:— (1) the composition or "type" of forest; (2) the degree of culling; (3) the extent of burned areas; (4) the condition of reproduction; (5) the character of the barrens, the meadow lands and the farm areas within the timber country.

The forest land was divided into three classes:—(1) "severely culled;" (2) "partially culled," (where only from one-third to one-half of the timber had been removed), and (3) "virgin." Reproduction of conifers was noted as "good," "medium" and "poor."

As regards the composition of the forest, three "types" were recognized, namely (1) pure hardwoods, (2) pure conifers, and (3) mixed hardwoods and conifers. A mixture of 25 per cent. of either hardwoods or conifers was necessary to constitute the last-named type. Provision was made for a further subdivision of the areas into "sub-types" by recording the other species met with on any tract in the order of the frequency of their occurrence.

The original idea of securing information regarding soil conditions proved too troublesome to be carried out. In the timber country (generally speaking) not ten per cent. of the area is fit for farming; in some districts, however, meadow lands can undoubtedly be extended by the reclamation of marshes, bogs and swamps.

THE FUTURE OF THE FOREST.

To the forester the future of the forest is of paramount importance, and so it is gratifying to note Dr. Fernow's opinion on this point in a letter to the Western Nova Scotia Lumbermen's Association. "Although the data on reproduction and rate of growth are not yet collated," he writes, "it is safe to say that if the fires are kept out (and apparently with the present organization, further perfected, this may be done reasonably well) there is no difficulty in restocking by natural means the cut-over areas if not too severely culled. . . . In the pure hemlock-spruce stands all that is necessary is to remove the old hemlock thoroughly and cleanly to have the young growth of spruce, already established on the ground, take its place."

Reproduction of conifers is prolific, where not prevented by repeated fires, especially on abandoned pastures. Unfortunately two inferior species, namely, white spruce and balsam fir, take the lead. In the open white spruce beats red spruce, a slower-growing tree. In old timber the red spruce forms over ninety per cent. of the growth and reproduces well, especially under hemlock.

The white pine is rare. In Shelburne county there is a large area, burned over about ninety years ago, which is grown up almost entirely with white pine, and has for some time been logged. The timber, while merchantable, is not very desirable.

"As to the rate at which young growth attains merchantable size," Dr. Fernow further observes, "erroneous notions seem to be abroad. While the white spruce on abandoned pastures grows at an astonishing rate into a knotty rampike and occasionally makes a saw-log in sixty years, the forest spruce grows at a much slower rate, and may not average a twelve-inch tree in less than a hundred years."

The three important conifers, viz., pine, spruce and hemlock, were found to be to a large extent confined to particular localities. Annapolis County, for instance, may be called the "hemlock" region, as this species forms 60 to 70 per cent. of the stands. Shelburne County and part of Queen's are largely pine country, while Digby is a spruce county, seventy-five per cent. of this species often occurring in the stand of timber.

MAILING LIST CORRECTIONS.

The mailing list of the Canadian Forestry Association publications has been rearranged and brought down to date. In a list of this size a number of errors necessarily creeps in and some of these were rather annoying to members whose Journals or other publications were delayed or went astray. It is hoped the new list will obviate this, and every effort has been made to have it correct. Any member who finds that his name or address is not correctly given on the revised list will confer a favor by dropping a line to the Secretary giving the proper address. The matter can now be attended to without further delay.

The Spruce Budworm.

BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST,
EXPERIMENTAL FARM, OTTAWA.

In the annual report of the Division of Entomology of the Dominion Experimental Farms, covering the injurious insects of the year 1909, it is purposed to give a rather lengthy account of the injury done in Canada to spruce and balsam trees by the Spruce Bud-worm, *Tortrix fumiferana*, Clemens, during the past summer. As this report will not be published until the end of the present fiscal year, it has been thought advisable here to make a short statement of the work of this insect, dealing particularly with the ravages wrought in the Upper Gatineau country of the Province of Quebec.

In July last, the Deputy Minister of the Department of Agriculture was informed by the Hon. Senator Edwards that an insect of some kind was doing much damage to spruce and balsam trees in the above district, and as a consequence I was instructed to proceed at once to the infested locality to investigate the outbreak.

Early on the morning of July 29th, therefore, I left Maniwaki, Que., in company with Mr. M. Boyle of the W. C. Edwards Company, and drove to Baskatong about 40 miles due north. Around Baskatong the injury to spruce and balsam was very apparent, owing to the conspicuous reddening of the tops of the trees. Early the following morning we left Baskatong and spent the whole day examining trees at different points.

As soon as the first tree was cut down we saw at once that a lepidopterous insect had been at work. Thousands of the empty pupal cases of the moths were present on the trees, and these, with the partly eaten and discoloured dead foliage, together with the excrement from the caterpillars, gave the conspicuous reddish appearance to the tops of the trees.

The injury for this year, of course, had stopped before the time of our visit. The caterpillars had evidently become full-grown during the first and second week of July. Moths which had issued some days before the end of July were present in large numbers on the

trees, and from fairly good examples collected, I saw that the species was *Tortrix fumiferana*, Clemens, which is known popularly as the Spruce Bud-worm.

The caterpillars had fed chiefly at the tops of the trees, although some injury was done towards the ends of many of the lower branches. The foliage for about four or five feet from the tops of the infested trees was almost wholly destroyed, being either partly or completely eaten by the caterpillars. This, with the exposed pupal cases above referred to, gave the trees the conspicuous reddish appearance, and caused the rather widespread report among lumbermen that the trees were dying. In looking over a valley on the opposite hillside, the trees appeared as if fire had swept through the region. Other than loss of foliage and the consequent setback thus caused, the trees did not seem to be seriously injured. The tops were perfectly green under the bark.

The outbreak of the Spruce Bud-worm this year has been most remarkable and very widespread. Not only has this insect done much damage all through the Upper Gatineau country and other adjacent districts, where there are large tracts of spruce and balsam trees, but even in British Columbia reports have been received of much injury by the *Tortrix*. Dr. C. Gordon Hewitt, Dominion Entomologist, when in British Columbia in October last, saw the conspicuous work of the insect and received reports from local entomologists concerning its ravages.

The Spruce Bud-worm, when mature, is nearly an inch in length, tapering slightly from the middle to the end. In colour it is dark brown and bears conspicuous whitish-yellow piliferous tubercles, and along the sides of the body there is a yellowish stripe. The eggs of the insect are scale-like and are deposited in clusters overlapping each other. The partly-grown caterpillars pass the winter among the terminal shoots of the trees, completing their growth the following year.

The moth expands about seven-eighths of an inch in width when the wings are spread. In colour it is dull gray, the fore wings overlaid with bands, streaks and spots of brown. In the middle of the upper margin of the front wings there is a rather large conspicuous whitish spot. In British Columbia, this year, the moths were of a distinct reddish colour, but all the eastern specimens noticed were of the gray form.

When an insect attacks forest trees, as the Spruce Bud-worm has done during the past summer, it is, of course, impossible to do anything in the way of applying remedial treatment. such as

is done for leaf-eating insects when attacking orchard or ornamental trees. Fortunately an outbreak of such a nature, however, is generally attended by natural parasites, which sooner or later restore the balance of nature. From observations made, and from parasites reared in the Division of Entomology from material collected in the Baskatong district, we have reason to hope that the Spruce Bud-worm will not next year continue to any serious extent its work of destruction. Undoubtedly, too, birds will help materially to reduce the numbers of the hibernating caterpillars.

The British Columbia Timber Situation : Two Remedies.

(The JOURNAL presents herewith two views of the British Columbia timber situation, both from foresters of high reputation and recognized ability. Both these experts agree in recommending the modification of the royalty or stumpage dues. Prof. Roth suggests that, instead of an arbitrary tax on all timber alike, a proportion of the real stumpage value of the logs be levied; Dr. Clark would base the tax on the f. o. b. value of the mill product. In both cases what is plainly aimed at is to make the dues proportionate to the actual value of the wood.

As regards the licenses Prof. Roth emphatically advocates not only the non-extension of the present licenses but the complete abolition of the license in its present form, the transfer feature of the licenses being especially objectionable. Dr. Clark aims only at the modification of the terms of existing licenses, and, from the standpoint of the bona-fide investor and holder of timberlands, seems to have a good case.

Both are agreed that the reduction of taxation on licensed land is imperative, if forestry methods are to be introduced. It is interesting to note Dr. Clark's suggestion that the high ground rent is a method of paying for the timber on the instalment plan. Both agree that no general cutting regulations should be laid down, as, on account of widely varying conditions, a set of regulations which would suit one tract

of forest land would be altogether unsuited to another.

Prof. Roth's views are taken from an article in the "Vancouver World," while the expression of opinion credited to Dr. Clark is taken from his testimony before the provincial Forestry Commission).

PROF. ROTH'S VIEWS.

Prof. Roth, who is the head of the department of forestry at the University of Michigan, gives a short summary of conditions in British Columbia as below, and then goes on to give his suggestions for a remedy of existing evils. He writes in part as follows:—

BRITISH COLUMBIA CONDITIONS.

(1) The bulk (probably 80 per cent.) of all good forests of the province are held under license.

(2) The greater part of these licenses are new, less than ten years old.

(3) The men who now hold the timber limits paid but a small sum for them; they have not bought the merchantable timber, let alone the property.

(4) It is fair to assume that they can easily log off enough timber to well repay them for what they paid, even within the 21-year limit and with present rental and royalty.

(5) Most of the limits are held not to saw timber to supply an eager market, or help develop the country; they are held on speculation. Nearly every

cent that the speculator makes the people of British Columbia lose. These limits were picked up as real nuggets. The search for them was a "stampede;" many of the men who located them never planned to develop them; the very spirit and object of the policy and law is lost.

(6) The province gets a high rental, over 20 cents an acre, and gets a stumpage if timber is cut. Thus this stampede has led to a large revenue for the province, and one which looks very tempting to a district which has waited a long, long time for "development."

(7) The holders of limits are rapidly "bonding," mortgaging, selling and

THE REMEDY.

Any modification of present legislation should consider both the people and the holders of licenses. Legislation and the practice under the law should be fair and just to the holder of a license; it should fully consider his rights and equities; it should carefully determine his real investment and what should constitute a fair return on this. But it should also consider the real owner of the forest, the people; it should consider the people's rights and equities and it should not be misled into fallacies by certain vicious practices which have established themselves in the timber license business.



Cedar Forest along the Columbia River, B.C.

(Photo by E. Stewart)

trading. They are selling and pawning the property of the people. Their investment is a trifle; the people's property enormous. They are selling the merchantable timber of the forest on a rapidly rising market. They have changed a mere permit into a deed; the custom and practice of the Government sanctions this. They are selling timber they never bought. A man looks a section of land with twenty million feet of timber, he puts down a stake, pays a few clerical fees and then turns around and sells this twenty million feet of timber, which he does not own at all, at \$20,000 to some corporation. And this practice the province sanctions in its present law.

(1) How far are the people—the province—to-day the owner of the forest? and

(2) What can and should the people do to safeguard their interest, both in the marketable material and in the growing forest and in the forest land?

These two questions should form the first criterion of any measure suggested.

On the whole, it would seem clear that the ownership question is already beginning to be a mooted one; the law claims the title of everything to rest in the people; the limit holder speaks of the limit as his property and his investment.

As to the development of the forest as a property, the rental and royalty,

there can, of course, be but one honest position.

The people have a right to demand that the timber be honestly paid for; that the forests be used decently and not be devastated and destroyed; that the growing material be given a chance and that the land continue to produce. In fact it is a moral duty that the present generation make these demands in the interest of the country and the children to come.

Keeping these conditions in mind a few changes may well be suggested:

(1) Refuse any extension of time or life of license for the present.

(2) Modify the rental, make it a variable one, and suit the rental to actual conditions of the limit. The rental was originally intended to be a preventive and a spur. It should prevent "dog in the manger" business and stimulate active development. Retain this form of rental. But in remote districts, where it is practically impossible and undesirable to do anything with the timber under present conditions, make the rental an easy one. On the other hand, for other limits, where an income is had or can and should be had by fishing, hunting, resort business, or where the logging should be started and development stimulated, raise the rental. Once logging development is well started the object for this rental falls away and it may well be reduced to a minimum. Ten dollars per section for remote limits and up to \$300 for those well in position and in need of development. Such a plan is just as feasible as ordinary assessment of property. Probably 95 per cent. of all property is assessed on very superficial knowledge and investigation. Let the same suffice in this case and give the holder a chance for an honest hearing before competent men. In all cases hold the rental low and never allow it to become a club which drives the axeman on to work and to cut timber prematurely.

(3) Modify the stumpage dues or royalty. Mr. A. has a lot of timber. He gets \$12.00 per thousand feet, board measure, for his logs, and it costs him \$6.00 to log and deliver them. The real stumpage value of this particular tract at present is \$6.00 per thousand feet.

Mr. B. has a limit. He gets \$10.00 per thousand feet for his logs, and it costs him \$7.00 to log. His timber has a stumpage value of only \$3.00 per thousand feet.

Is it reasonable and good business that A. should pay only 50 cents when B. has to pay the same fee? Make the royalty a certain part, say, 25 per cent., of the real stumpage value of the logs, as indicated by the above examples. Then Mr. B. pays 75 cents and Mr. A. pays \$1.50 per thousand feet. Moreover, if Mr. A. has a market for the poorer quality of logs and can only make 50 cents per thousand feet, he would still log this stuff and save it, for his fees would only be 12½ cents on such stuff.

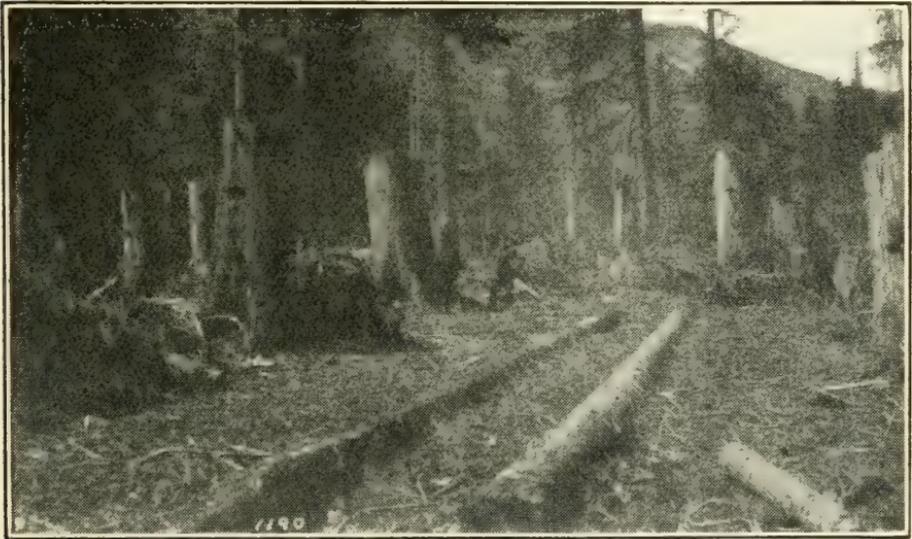
This system might still be safeguarded by a certain minimum price on a certain quality of logs as criterion. Thus it might be specified that the fee cannot be less than 50 cents on logs of a certain kind and size and quality. In any case the province would retain the right to say what is market price and would not be dependent entirely on a recital of the interested man.

(4) Put into every license the requirement that the forest property be used in a reasonable way and one which shall insure to the real owners—the people—the safe continuance of the growing forest. But do not try and prescribe and give detail rules how this should be done. The so-called "selection" system, the use of a "diameter limit," etc., are all very well, but it would be the sheerest nonsense if one would try to prescribe the same treatment for a body of yellow pine or lodgepole in the Kootenay country as is prescribed for a body of Douglas fir (red fir), cedar, spruce and hemlock on the Coast. In fact, the forest is complex, and, even on the same limit, one would want to vary the methods. On the other hand, good sense and good will are quite sufficient (if properly backed up by supervision) to prevent devastation and destruction and to guide any good timberman (and they are all experienced and knowing men) in so removing his timber and in so cleaning up that the young trees are allowed to live and grow. This may be a bit crude at first, but if a proper penalty is prescribed and, what is better still, if it is applied, the forest will soon

show the good effects and timber-butcery will become a past tradition. Of course, there will be the "practical" man who opposes any measure which does not cheapen logging, but the government has, for its chief reason of existence, the wielding of the power of the people for the good of all the people, and should be able to wield it in this case. A reasonable use of the forest, no clearing without reproduction of young trees in a reasonable time, no wasteful logging, no great slashes as menace, reasonable care in cutting and removal of logs, to prevent undue destruction

the price of British Columbia timber and its forests.

(5) But most important of all: Abolish the transferable license. Make it impossible for any man to sell or buy a license; cancel the license whenever a man joins another, enters any combination, corporation or deal, unless he is willing to handle his limits as a separate and distinct business. And never issue any more licenses at all; but replace them by a simple form of contract for variable periods, each case resting on its own peculiar conditions. Such a law may seem harsh at first,



(Photo by J. R. Dickson, May, 1909.)

High Stumps left in some British Columbia Logging, an Example of Wasteful Lumbering.

of the forest, employment of a few good men to act as inspectors to see that these requirements are lived up to—these are some of the measures that must be enforced if the forest is to be perpetuated. Give the officer power, moreover, to call the holder into court and show cause, whenever his work is too bad.

"But this will interfere in our logging and disable us in our competition with the men in the States."

The men in the States hold their timber in fee simple. If they want to destroy it, let them. It will only help

but in fact is not so at all. It is well known that the bulk of licenses in British Columbia are young; that they have cost the present owners but little, and that even within the 21 years the holder can easily remove enough timber to repay himself well. To the bona fide limit-holder, who intended, in any case, to develop the limit in keeping with the spirit of the license law, to him this change would mean practically nothing. If he should die, his heirs would be allowed to continue. To the locator, and usually the purchaser No. 1 or No. 2, it would mean little; their invest-

ment is nil as yet, and but little development would return them their few dollars. The man whom it would hit most is the speculator in limits, the man who is allowed by the present system to gamble with millions of the people's property without paying for it. He would have to settle down to business in keeping with the spirit and intent of the license law and make his money (and it would be good money, too) in a way slower than gambling.

That this change would lead to an immediate "slaughter" of the forest is not necessarily true at all. The people, in their government, have ample power to prevent this by raising the stumpage or by direct prohibition of wasteful and destructive cutting.

The claims that the lumber industry would receive a serious backset, that "development" is stopped, that roads, towns, etc., etc., would not be built, may be true in part. But it will be a very small part only. These "nugget hunters" did not come until prices warranted their coming. The men who will build mills and do business will come whenever there is money in the lumber business. This will depend on prices of the large markets, which in turn are in no wise affected by the license and its character.

Give the real lumberman his timber, all he wants of it, and at a price where he can make money, but prohibit all future gambling through the transferable license.

The transferable license is class legislation and has worked in favor of few and against the many. The small logger is crowded out, monopoly has taken his place. The transferable license has led to "stampede," "nugget hunting" location, to a premature boom-claim business with all its gamble and mischief. The transferable license has given to aliens as well as citizens the property of the people by the millions of dollars.

The transferable license has perverted the license system, and has worked in the direction of complete alienation of forest property. The license is a permit and the transfer power has made the permit into a deed.

The transferable license, like the unwise and premature selling of timber lands in the United States, has been

largely responsible for much of the forest destruction, the robbing of our children and the devastation of our land. It will do the same for British Columbia that it has done for Ontario.

The transferable license has complicated the license to a point where not only the ownership of the forest but even the proper regulation of the business of the forest is largely prevented.

It has tied the hands of the people and prevents them from asserting their moral duty.

The transferable license is at the root of all evil in the disposition and the management of the Canadian forest. It should go.

DR. CLARK'S OPINIONS.

Dr. J. F. Clark, formerly Provincial Forester for Ontario, has, since entering the lumber industry in British Columbia, taken a position of prominence and his opinion, coming from one who is a trained forester and is likewise familiar with business conditions in the province, carries considerable weight. Part of his evidence before the Forestry Commission is as follows:—

THE TENURE OF LICENSES.

The limited tenure feature of timber licenses is, in view of the large amount of timber to be sold, a direct and most powerful incentive to wasteful logging and also utterly prohibitive of any forestry practices on the part of loggers. Twenty-one years is too short a time for a logger who is looking to the future to plan for future crops of trees, and hence that term prohibits forestry measures so far as he is concerned. So far as the logger who cares nothing for the future of the forest is concerned, he could have no objections to a limited tenure, provided there was a harmonious relation between the timber to be cut, the markets available and the time allowed in which to cut it. When the tenure was fixed at twenty-one years there were but a few hundred sections under license and future development in this line were not and could not have been foreseen.

A failure to bring the time limit on licensed timber into harmony with the amount of timber so licensed would inevitably result in the embarrassment of all logging and lumber manufacturing enterprises by forcing a chronic state of

over-production; but more serious and more permanent would be the loss sustained by the province as a whole by the irreparable damage it would bring to the forests themselves and to the provincial forest revenues.

My suggestion for remedy I quote from the "News-Advertiser's" report of my address before the Canadian Club last autumn.

"Let the license-holder be given the option for a period of, say, ten years of renewing his license as per the present law, or of converting it into a license renewable from year to year without time-limit, as now obtains on Dominion lands, with the provision that the logging, whenever undertaken, be conducted in conformity with plans approved by the Provincial Forest Department. Special and reasonable provision must, of course, be made for the clearing of timber from lands suitable for and actually needed for agricultural settlement."

THE LICENSE FEE.

Foresters are everywhere agreed that next to the fire the greatest enemy of forest conservation is high annual taxation. High taxation places a premium on hasty and uneconomical logging, with a view to the abandonment of the land after it has been stripped of whatever has any market value at the time.

The British Columbian case is complicated by the fact that the high license fee is essentially a method of paying for the timber on the instalment plan, and cannot now be changed without unfairly discriminating in favor of the licensee, desirable as such a course might be from the standpoint of forest conservation. It is a matter in regard to which we, as a province, have started on the wrong tack, and we will have to pay the price.

Provision should, however, be made for the reduction of the annual license fee to a nominal rate on all cut-over lands, whether under lease or license, which are logged according to plans approved by the Forest Department, in order that operators may find it good business to log carefully and otherwise care for their cut-over lands with a view to returning later to cut a second and succeeding crops of logs.

How impossible it would be for lumbermen to hold cut-over lands for

second crops of logs with any hope of profit under the present taxation will be appreciated when it is recalled that an annual tax of \$140 per year for thirty years amounts (at 8 per cent. compound interest) to \$16,600 in thirty years; \$40,180 in forty years; \$86,600 in fifty years; \$191,940 in sixty years; and it takes fully fifty years to grow a lumber tree even in British Columbia!

THE ROYALTY.

The royalty is capable of being adapted as an ideal method of forest taxation. The royalty as at present collected has two defects, viz.: (1) It bears relatively more heavily during seasons of low prices than when prices are higher, and (2) assesses as high a rate on the comparatively worthless top-log as on the log which gives a large proportion of flooring or finish. A royalty assessed as a per cent. of the f. o. b. value of the mill product is not subject to either objection. For example, if the royalty rate be 3 per cent., the royalty payable on all low-grade material averaging \$10 per thousand at the mill will be but thirty cents per thousand, while the royalty on flooring and finish will average between \$1.00 and \$1.50 per thousand. This would tend to encourage the utilisation of low-grade logs. Thus, too, a falling of prices will bring with it automatically a slight lessening of the cost of production, while an improvement in prices will bring automatically an increased revenue.

As the values of forest products increase in price from time to time, it is right that the provincial treasury should reap increased revenues. A percental royalty on the value of the product gives this earned increase automatically in large measures, though the provinces should ever reserve the right to increase the percental rate should increased stumpage values call for such a course.

CUTTING REGULATIONS.

The adoption of general cutting regulations, having in view a reproduction of the forest, applicable to all licenses or even all licenses in any given district, is not desirable. Forest conditions vary indefinitely even within small areas and efficient cutting regulations can only be prescribed for particular tracts after

examination by competent persons on the ground. Minor regulations having in view the utilisation of all merchantable material felled, can, of course, be applied to all lands.

A FOREST SERVICE.

As regards a provincial forest policy, permit me to suggest the desirability of having at Victoria a thoroughly efficient Forest Service. Let the men in charge be thoroughly trained and practical men and be free to carry out a consistent and farsighted forest policy, unhampered by the vicissitudes and exigencies of party politics.

PROTECTION OF THE FORESTS FROM FIRE

is not only the corner-stone of all forest policy, but is the whole foundation of practical forestry. Forest fire patrol—for the prevention rather than the extinguishing of fires—is the forester's insurance. The present patrolling system should be greatly extended. All fire rangers wearing badges should have the power of a constable to arrest without warrant, and head rangers in all out-of-the-way places should have the powers of a justice of the peace for the enforcement of penalties under the Fire Act. The cost of the fire service might very properly be divided between the license-holder and the province.

The problem of disposing of the

Forestry in New Brunswick.

BY LT.-COL. T. G. LOGGIE.

The receipts from the territorial revenue for the past year have been the largest in the history of the Province. Improved methods in the collection of the stumpage is principally accountable for this increase. No change was made by the Government in the tariff rate of \$1.25 per thousand superficial (board) feet for spruce and pine. New regulations were adopted, having for their object a more economical mode of cutting and a lessening of the fire danger, as was also a more systematic manner in the collection of the stumpage dues.



Effects of Forest Fire in British Columbia.

debris incident to logging operations is essentially a problem of fire protection and is as yet an unsolved problem on the Pacific Coast on both sides of the International line. The United States Forest Service is conducting extensive experiments along this line, but has reached no definite conclusion. I suggest that the provincial government make a modest appropriation for the purpose of determining the practicability and cost of burning the brush under local conditions. Such investigations are properly within the province of the government, and the information gained might be of the greatest value to the lumber industry and to the public. Certainly no intelligent legislation can be formulated along this line until we have definite knowledge gained by experiment both as regards its practicability and cost.

The regulations now call for the use of the saw instead of the axe in the felling of lumber and sawing the tops up into lengths. It has been estimated that a gain of at least six per cent. will be added to the quantity of the timber so cut in comparison with the old system. The regulations also provide for the under branches to be lopped off so that the tops may rot by lying flat on the ground.

Portable mills are only allowed to be set up and used on crown lands with permission of the Surveyor-General

under regulations providing for fire danger.

Forest fires, caused by excessive drought, raged through the province during the first week in June and much valuable timber, both crown and private, was destroyed. The number of fires reported to the department by the fire wardens totalled sixty-six and the damage was estimated at \$40,000; 161 square miles of ground were burned over. One hundred and twenty-three fire rangers were on duty during the year and each ranger had instructions to call out a sufficient force to fight these fires. In addition to this force 68 fire wardens were specially commissioned to patrol the lines of the Transcontinental and Intercolonial Railways now building and 70 fishery wardens were appointed to protect the angling waters.

It is proposed to introduce legislation to make the fire laws more stringent by enacting that no fires can be set during the dry months for clearing lands without permission in writing from the forest warden.

The forest lands of this province are fast falling into the hands of United

States citizens and a large portion of these lands are being exploited for pulp. The government regulations require that no permit be granted where it is shown that spruce will attain a diameter measurement of 14 inches breast-high in 75 years. A large area has been examined to enable the Department of Crown Lands to pass upon the applications made. It is proposed to introduce legislation during the coming session looking to the prohibition of the export of pulp wood, thus compelling this lumber to be manufactured in the province into paper on the same lines as adopted by the provinces of Ontario and Quebec.

A step in advance has been made with regard to applications made under the Labor Act for actual settlement. Lands are now first examined, and if 50 per cent. is not found suitable for agriculture the application is not accepted.

These reforms are in a large measure due to the representations made by the Canadian Forestry Association.

Fire Protection on Forest Reserves.

BY ABRAHAM KNECHTEL, Inspector of Dominion Forest Reserves.

This article is written to indicate very briefly some of the measures being taken by the Forestry Branch of the Department of the Interior to guard the Dominion Forest Reserves against fire. The idea is too prevalent among forest officials that their duty to the woods in this respect ends with the establishment of a fire patrol. Forest patrol is necessary to instruct and caution the public in regard to the use of fire, but when a fire occurs the patrol is unfortunately usually somewhere else; or he finds himself unable to do anything to put the fire under control. As will be seen, the department is using some other means, and is constantly seeking new means to reduce the destruction of the woods by fire.

GENERAL DESCRIPTION.

The Dominion Forest Reserves number twenty-six. Manitoba has six, with

an area of 2,288,160 acres; Saskatchewan, four with 473,600 acres; Alberta, six with 6,209,280 acres, and British Columbia ten, with 1,467,800 acres. The total area is 10,800,840 acres.

These reserves have been set aside by parliament with a view to conserving the timber thereon, and have been placed under the management of the Forestry Branch of the Department of the Interior. It is the intention of the Department that upon these areas shall be worked out improved methods of forest management which may afterwards be applied to the great forest domain of Canada. The work has several main lines, fire protection being the chief.

FOREST PATROL.

The reserves are constantly patrolled by forest rangers. These are permanent officials. In summer it is their chief

duty to prevent and extinguish fires. They prevent fires by posting along roads and streams and around lakes and ponds cloth notices which state the law in regard to fires. They also call upon the farmers and caution them in regard to the use of fire, and warn hunters and fishermen to be careful with camp fires, wadding from the guns and lighted matches.

Then these forest rangers extinguish fires that start in the woods. Sometimes they can extinguish the fire without any assistance, but in case they cannot do so they warn out the farmers or villagers, who are obliged by law to obey the summons, and the rangers direct them in fighting the fire.

During the danger periods, which occur usually in spring and fall, the forest rangers are assisted by temporary fire rangers. These are appointed by the Forestry Branch upon the recommendation of the forest rangers. Each forest ranger and fire ranger provides himself with a horse.

BURNED GUARDS.

To prevent prairie fires from coming into the reserves, the forest rangers burn the grass along the boundaries wherever such a measure is practicable. This is done after the snow is off the grass-land, but before it is out of the woods. Railways burn the grass and other debris along the right of way, under the immediate supervision of the forest rangers. Such burning needs to be done at the right time. Otherwise there is danger of setting fire to the woods.

PLOWED GUARDS.

In arable ground along the boundaries, and through the reserves wherever it is considered advisable, plowed fire guards are made. In making these guards a strip is plowed eight furrows wide; and four rods distant from this on the danger side another strip, four furrows wide, parallel with the first is ploughed. These strips are disc-harrowed in the spring and fall just before the danger periods. The grass strip between the guards is burned when it can be done with safety. This double guard is used as a line from which to back-fire when the forest ranger sees it necessary.

FIRE ROADS.

Roads are made around the boundaries and through the reserves. These are located so that, when a fire occurs on the reserve, men can be promptly transported to it. Moreover, these roads make it possible for the rangers to patrol the reserves more thoroughly, and also allow the settlers an easy means of getting out the timber. When it is deemed advisable, such roads can be used as lines from which to back-fire. Where these are made through poplar woods they need attention every year, as the poplars sprout readily from the root, and, if not kept down, will soon make the road impassable.

SETTLER'S SLASHINGS.

The forest rangers supervise timber cutting so as to lessen as much as possible the danger of fire. Settlers are instructed by them to cut the trees low so as not to leave stumps more than a foot high; to take out of the woods all parts over four inches in diameter of every tree cut; and to cut the branches so that they will lie flat on the ground.

SPARK ARRESTERS.

It is the duty of forest rangers to see that railway engines passing through or near forest reserves are properly equipped with spark arresters. These are not placed in or over the smoke stack, as many suppose, but are bolted to a framework in the forward extension of the boiler. To examine the screen it is necessary for the engineer to remove the front plate of the boiler. This can be done conveniently only at divisional points.

CLEANING THE FOREST FLOOR.

As opportunity affords, forest rangers are required to clean up the forest floor. Dead tree trunks and branches lying around on the ground greatly endanger the forest. Without this material the forest would hardly burn. Grass and leaves will carry fire through the woods, but unless the trees are small they will not be killed. Fire in rotting logs and brush will give heat enough to kill the largest trees. On the Turtle Mountain and Spruce Woods Reserves in Manitoba, on the Moose Mountain Reserve in Saskatchewan and on the Cypress Hills Reserve in Alberta, the removal

of wood by the settlers is restricted to this dead material, the taking of green timber being prohibited, until the forest is clean of dry logs and brush.

GRAZING.

The Department encourages grazing on the forest reserves and the removal of hay therefrom as a means of reducing the danger of fire. On every reserve

there are grazing areas and hay lands among the timber. In some places there is a dense growth of long grass and peavine. This, when dry, offers fuel for fire, and, when the fire gets into it, it is almost impossible to check the flames. Moreover, cattle going to water from the pasture lands make paths, which, though small, offer some resistance to fire and give lines from which to backfire.

Some Manitoba Tree Claims.

In the course of the proceedings of the forestry convention held at Regina in September last a resolution was offered suggesting that the homestead laws be amended so as to provide for the granting of a homestead in return for the planting and successful cultivation in forest trees of a certain proportion of the quarter section.

The idea called forth some discussion, and among other points attention was drawn to the fact that action similar to that suggested had already been taken by the Dominion Government, but without much success.

It was in 1876—considerably over thirty years ago—that certain clauses were inserted in the Dominion Lands Act having reference to "forest tree culture" claims. These clauses provided that any person, male or female, of eighteen years of age or over could make entry for a quarter section, or other area of land, after paying the usual fee of ten dollars. Six years were required to elapse after the date of entry before a patent could be issued. One-fifth of the land applied for was to be planted with trees, that area amounting, in the case of an ordinary quarter-section, to thirty-two acres.

In the case of an entry for a quarter-section (160 acres) eight acres had to be broken and prepared for planting during the first year, the same amount during the second year and the remaining sixteen acres within the third year. Eight acres must be planted to trees during the second year, an additional eight

acres during the third year and the remaining sixteen acres within four years from the date of entry. Trees were to be planted not less than twelve feet apart each way. Cultivation of the trees up to the end of the six years from date of entry had also to be shown.

If less or more land than 160 acres were applied for, the areas specified above were changed to correspond.

These clauses remained in the act with some slight amendments until 1883, when they were dropped.

Only seven patents were ever taken out under these provisions. One of these was near Cartwright, Man., the remainder are within a few miles of Morden, Man.

During the past season Mr. A. P. Stevenson, of Dunston, Man., acting under instructions from Mr. R. H. Campbell, made an inspection of a number of these plantations.

The best of these was found to be that on the north-east quarter of Section 28, Township 3, Range 5; this is now owned by Dr. McConnell, of Morden. The plantation consists of aspen and Balm of Gilead trees, and is six acres in extent. The trees average about forty feet in height and $4\frac{1}{2}$ inches in diameter at two feet above the ground. Originally the trees were spaced eight feet apart each way, but as the young shoots and suckers were never cut out, the number of trees has increased until they now stand at an average distance of five feet apart each way. The soil is a moist sandy loam.

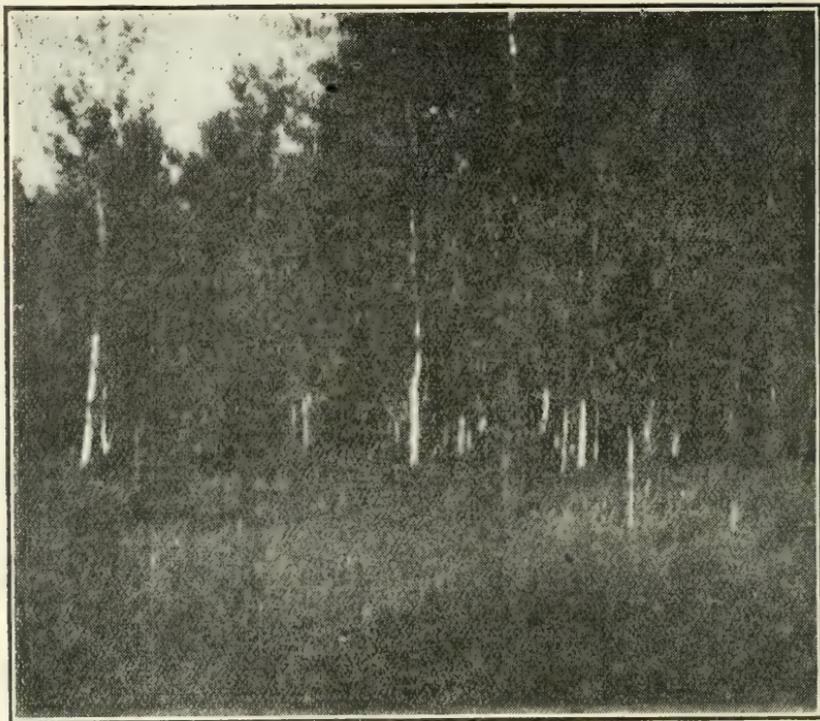


Photo by A. Mitchell, 1908

General View of old Tree Claim Plantation near Morden, Man.

Two of the other plantations situated in the vicinity of Morden are also reported as doing well. In one of these aspen alone was planted; in the other aspen and Balm of Gilead in about equal numbers. Where poplar alone was used (in a plantation of four acres) the average height attained, on moist sandy loam, was 39 feet, average diameter at two feet above the ground 5½ inches. The trees here were set four by twelve feet apart, and all the young shoots and suckers kept out.

In the other one of the plantations referred to the trees had, on the average, reached a height of 35 feet, and an average diameter of four inches. The trees were originally planted ten feet apart each way. The number has since increased and they now number about

2,700 to the acre. No suckers were ever cut out. The Balm of Gilead appeared to have made the better growth. This plantation consisted of eight acres of sandy loam soil.

A fourth plantation, eight acres in size, on high sandy land, contained aspen trees only, originally set four feet apart each way. Here the average height was only 28 feet, and the average diameter at two feet above the ground 3½ inches. This lot has been for years used as a sheep pasture, and to this fact is attributed the comparatively poor showing it makes.

On the fifth claim all trees had been ploughed up and the ground planted to wheat.

Electrification of B. C. Railways.

(A LETTER BY MR. CECIL B. SMITH, C.E., TORONTO.)

One of the members of the Canadian Forestry Association residing in British Columbia wrote, asking if in view of the great destruction of timber by fires started by locomotives it would not be advisable to electrify the railways in that province, considering the large amount of waterpower now running to waste. The question was submitted to Mr. Cecil B. Smith, C.E., the well-known engineer and authority on hydro-electricity, who some years ago prepared a report on the electrification of the Timiskaming and Northern Ontario Railway for the Ontario Government. Mr. Smith's reply is as follows:—

"The electrification of any steam railway system now operating over a wide area, with its attendant standardizing of equipment and operation, is a serious step for a management to consider.

"The difficulties of handling mixed traffic, including freight, by electric locomotives have been largely surmounted, and we may consider that this will be so perfected in the near future that a railway company may select direct current, three phase alternating, or single phase alternating as the method of propulsion with equal assurance of satisfaction, it being assumed that, acting on the advice of its engineers, the company has selected the type best suited for its special conditions.

"It may be in general assumed that there must be strong inducements to cause a change to be made in the equipment of a well-established system. This inducement may be of the nature of an expected growth of business with which electric operation can best cope. The question of smoke ordinances or smoke in long tunnels may be a governing feature; or again, a dense suburban traffic may demand a remedy. On the other hand, a moderate traffic under standard conditions will not justify electrification unless coal is quite expensive, grades excessive, and water-power electric energy available at a low rate and from assured sources.

"The success of electrification in Europe has induced great activity there in this direction. In Italy, Switzerland, Bavaria, and Sweden the governments

are expending large sums on the electrification of old lines, construction of, water-power generating stations, and construction of new electric lines which handle all kinds of traffic with great satisfaction. Three phase and single phase alternating currents are both used.

"In America the interurban electric is extending its sphere and its competitive influence, and in addition we have the examples of the great systems expending millions on the electrification of the New York district; and in the West the Cascade Tunnel (three-phase) and the Spokane and Inland Railway (single phase) show the tendency of the times. In Canada very little has been done beyond the use of direct current operation of city and suburban lines—which are only developed to a modest degree. The Sarnia tunnel (single phase) is a partial exception, and was forced on the Grand Trunk by a serious accident and the order of the Railway Commission. The Ontario Government considered electrifying the Timiskaming and Northern Ontario Railway from North Bay to Englehart at a time when conditions were formative and the time opportune. The traffic now handled would have fully justified the step, and the only reason apparent for abandonment was timidity. The added steam equipment now owned, and the turning over of its best adjacent water power to private parties make the question now more difficult, but not impracticable. It is to be hoped the Government will still act in this matter and cease hauling coal from Pennsylvania at a cost of \$6 per ton delivered at Englehart.

"In British Columbia, it is true, there is apparently a large amount of water power available, but aside from some of the few large rivers, such as the Kootenay and the Columbia, the water-powers of the interior of British Columbia are not attractive as they are chiefly glacier-fed and run very low in the midwinter season. On the Kootenay, even with its enormous storage areas, the low water flow is quite moderate. On the other hand coal is

moderate in cost and widely distributed, and traffic is light except in the mining district at Grand Forks.

"The special applications most evident are that the C.P.R. should electrify its heavy grades and tunnels on the main line at Field and in the Selkirks and also electrify its mining branches in the boundary district. By using the

three-phase system and having these districts tied together, securing recuperation on the down grades, a well-balanced consumption of power might be obtained. Outside of this there does not appear any evident application of electrification of railways in British Columbia at the present time—aside from suburbans at Vancouver and an interurban in the Okanagan Valley."

Quelque Notes sur le "Douglas."

PAR D. CANNON.

J'ai planté un Douglas, un seul malheureusement, en 1875.

Acheté en pépinière, déjà petite pyramide formée; il devait avoir alors au moins six ans, ce qui lui ferait maintenant 40 ans d'existence. Placé, isolé, dans un coin de ma terre très aride et stérile, ou il m'est impossible de faire pousser la moindre herbe, il a subi, indemne: d'abord une terrible sécheresse persistante en 1876, qui a tué une grande partie de mes plantations de pin sylvestre; ensuite, et encore à l'état de jeune sujet à bois tendre, les froids destructeurs de 1879-80; et plus récemment, les atroces sécheresses de 1893, 1900 et 1906. Aujourd'hui il a environ 16 mètres de haut et 2 mètres de circonférence à 1 mètre 30 du sol, et il n'accuse encore aucun symptôme de perte de vigueur ni de ralentissement de croissance. On ne peut pas dire: "Ex uno disce omnes," mais cet exemple de rusticité me semble frappant.

Depuis 1883, j'élève en pépinière des plants de cette variété, et toujours au grand air, sans abri après la première année; quelquefois une gelée intempête pince les pousses encore tendres des jeunes plants, mais ils refont bientôt leurs têtes. A ce propos, par parenthèse, je pense que l'opinion du besoin d'ombrage pour les jeunes plants de certaines essences est souvent exagérée; comme exemple, nous cultivons en Solonge, sous un climat plutôt dur que tempéré, l'épicéa et même le sapin en plein soleil depuis la deuxième année; nous en perdons quelques plants, mais pas en proportion excessive, et les survivants doivent gagner en rusticité à être exposés à toutes les intempéries.

Pour revenir à mes Douglas, j'en ai planté çà et là en nombre considérable. En sable frais ils poussent superbement; en massif avec d'autres résineux qu'ils ont vite dépassés ils ont déjà de 16 à 18 mètres de haut et de 0 m. 80 à 1 m. 10 de circonférence. Leur plantation date de 1889; élevés de semis, ils avaient probablement alors 5 ou 6 ans, ce qui leur donnerait 25 ou 26 ans d'existence.

D'autres, plantés dans des vides ou des pins maritimes et sylvestres avaient succombé à la maladie ronde, accusent quelques pertes que je ne m'explique pas très bien, mais que j'attribuerais plutôt à une sorte d'empoisonnement du terrain qu'à la sécheresse du climat; ce serait probablement l'effet d'un champignon inconnu. Je ne puis pas m'en plaindre, car c'était vraiment tenter la Providence que de planter des exotiques sur des sols où crèvent les résineux indigènes.

D'autres Douglas, plantés aux expositions du midi et du couchant, en bordure de massifs composés pour la plupart de pins sylvestres existant antérieurement et dont les racines traçantes affament le terrain pauvre et sec, se comportent vaillamment; je n'en ai pas perdu un seul, et leur croissance, quoique inférieure à la normale chez cette variété, dépasse bien celle de toute autre espèce dans les mêmes conditions.

Tous ou presque tous les sujets décrits ci-dessus ont subi les grandes sécheresses et chaleurs de 1893, 1900 et 1906.

Il serait téméraire de conclure, d'après ces exemples, que dans de mauvais sols les Douglas conserveraient la même vigueur jusqu'à un âge avancé, surtout

en massif pur, serré, ou chaque pied dispute à son voisin sa pitance d'eau et de nourriture; mais il me semble très probable qu'en sol de fertilité moyenne, même en tout sol non calcaire, capable de fournir un taillis passable, cette variété, en mélange avec d'autres espèces peu exigeantes, surtout feuillues, présente de grandes chances de succès même sous un climat peu humide. Sans médire de la variété glauque, sur laquelle les expériences de M. Jolyet sont très intéressantes, je préférerais la verte dans la plupart des cas, sa croissance, beaucoup plus rapide, promettant une production à brève échéance, le rendant digne d'essais sérieux. Je dis: essais, car il ne faut pas oublier que le Douglas, variété verte ou glauque, n'a pas encore pu faire ses preuves de longévité en France, comme l'ont déjà fait d'autres exotiques, par exemple le Cèdre du Liban, le Cyprés de Louisiane, le Pin Weymouth, qui nous montrent çà et là des sujets séculaires de toute beauté. Mais il y a tout lieu d'espérer que le Douglas vert rendra toujours, en sol convenable, un produit rémunérateur; car, même jeune, son bois a souvent été trouvé de bonne qualité.

J'oubliais d'observer que dans les clairières de taillis dont traite M. Jolyet, sa croissance très élançée lui permettrait, plus tôt qu'à une autre espèce, d'affranchir sa tête et d'échapper à la concurrence des rejets, qui en s'allongeant, surtout par les années pluvieuses à grande croissance, pourraient menacer de le dominer et d'exiger des frais de dégauchement.

Arrivons maintenant à la question de la résistance du Douglas au froid.

M. Pardé, d'après ses observations au Domaine des Barres, constate que le Douglas (le commun évidemment, car il traite ensuite de la glauque comme de sa variété) "est excessivement rustique." Il existait aux Barres avant 1879-80: *Ancien Catalogue*, 1878, p. 43. Je présume donc qu'il y a résisté aux plus grandes froids, qui furent, aux Barres, de —32°? (L. Pardé, *Arboretum des Barres*, p. 5).

Le livre de Baltet (*Action des Froids sur les Végétaux en 1879-80*), qui constate que dans l'Est cet arbre a gelé à —28; en quelques localités, est en effet un ouvrage remarquable et précieux, mais il aurait été un guide plus sûr s'il

avait pu constater l'âge des sujets observés en chaque cas; car un jeune arbre à bois encore tendre pouvait succomber tandis qu'un plus âgé résisterait. Comme exemple de ce fait, je puis observer que, pendant le terrible hiver, j'ai perdu la plupart de mes pins lariciés de Corse, âgés de 7 ou 8 ans, tandis qu'aux Barres ceux qui dataient de 1823, et qui vivent encore, résistaient au froid polaire constaté plus haut. Le retour, dans un espace de 200 ans, d'une calamité due à tant de circonstances réunies; intensité exceptionnelle du froid; sa durée exceptionnelle; clarté exceptionnelle de l'atmosphère, est extrêmement peu probable, et dût-il arriver, je crois que le Douglas ne le craindrait qu'à l'état de tout jeune pied, dans lequel cas il ne perdrait que quelques années de son existence.

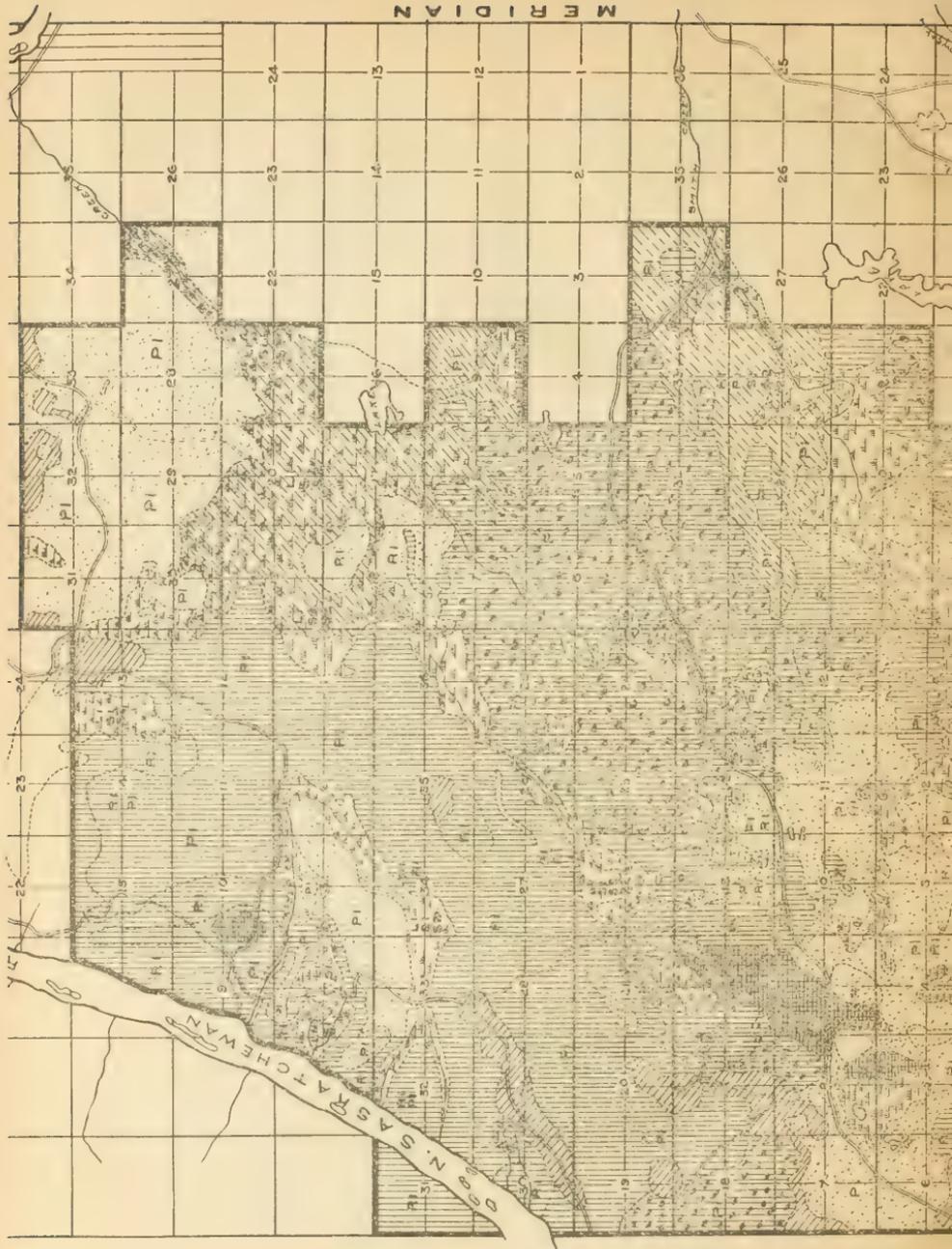
Et encore cela n'arriverait que dans certaines localités exceptionnelles.

En même temps que l'article de M. Jolyet, paraissait dans le Bulletin de juin de la Société forestière de Franche-Comté une étude importante, très documentée, sur le Douglas, de M. Barbey, expert forestier suisse. Elle fait surtout l'éloge de la variété type seule, dont le développement aurait été observé avec suite en Allemagne, en Belgique et en Suisse; partout, même en sol médiocre et sous les climats rigoureux, sa croissance aurait donné des résultats remarquables. Je cite, de la page 119 du Bulletin:

"En 1878, John Booth livra des brins de Douglas âgés d'un an qui furent repiqués dans une bâtarde du Sach-ernwald; puis plantés en 1881 sur terrain graveleux plus ou moins silico-argileux. . ."

Suit un tableau de comparaison entre le produit de cette plantation et celui d'une même étendue de terre plantée en même temps d'épicéas. Résultat, en 1906, à l'âge de 25 ans, sur o h. 235: Douglas, 95 m3, 65, estimés 1000 marks; Epicéa 45 m3, 65, estimés 360 marks; supériorité du Douglas en qualité comme en volume. En effet, même jeune, son bois aurait de la valeur. D'après Booth, "le bois du Douglas le plus mauvais équivaut à celui de l'épicéa et du sapin, tandis que celui de première qualité est presque aussi bon que celui du "mélèze."

TP. 48



MERIDIAN

TP. 47

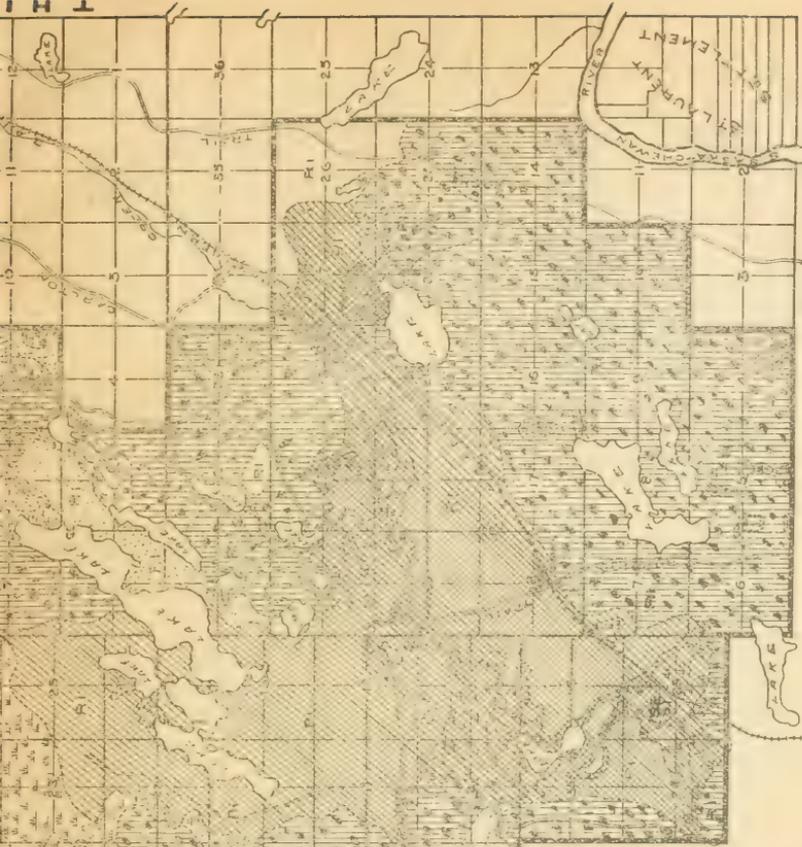
TP. 46



RANGE II
TP. 45

LEGEND

-  Timber less than 2,000 B.F. per acre
-  Woodland, cordwood, poles
-  Prairie grassland
-  Burn, not restocking
-  Burn, forest cover established
-  Old cutting 1/3 to 2/3 merchantable timber removed
-  Old cutting 2/3 to all of merchantable timber removed
-  Boundary line for classifications
-  Burn scattered trees



RANGE I

SYMBOLS FOR TREE SPECIES

- PI - *Pinus divaricata* - Jack Pine
- R1 - *Populus tremuloides* - Aspen
- S1 - *Picea alba* - White Spruce
- S2 - *Picea nigra* - Black Spruce
- L1 - *Larix americana* - American Larch

Les plants formant ce massif avaient supporté, âgés de 2 ans, les gelées de 1879-80, sous le climat de la Prusse, plus rigoureux que le nôtre. M. Barbey, d'ailleurs, qui a étudié un grand nombre d'auteurs forestiers allemands, ne cite aucun cas de pertes de cette espèce par les froids, et page 121 il observe :

"Notons que les Douglas de Freising (près Munich) ont supporté, comme ceux des Ardennes, une température de 30° centigrades. Sous le rapport de la résistance à la gelée, il nous semble que nous pouvons nous déclarer satisfaits."

Viola qui est concluant à l'égard des gelées d'hiver; et l'arbre répare très facilement tout dommage que peuvent lui faire celles d'automne et de printemps, auxquelles nous sommes exposés ici depuis septembre jusqu'en juin; atteintes, d'ailleurs, que je n'ai amais constatées que sur les sujets âgés de moins de 10 ans.

Le Douglas, il est certain, ne doit pas être planté dans des sols très calcaires; je l'ai vu languir sur le coteau craveux de la Loire, près Tours, ou prospérer merveilleusement les cèdres, le sapin pinsapo, et le pin laricio d'Autriche.

M. Jolyet observe très judicieusement que notre arbre ne doit pas être cultivé en massif pur, serré. Outre qu'il n'a pas fait ses preuves de durée en cet état, outre les raisons culturales qui demandent le mélange, la rareté et la cherté de sa graine, par conséquent la production limitée et le prix élevé de ses plants, rendraient de tels peuplements difficiles à établir et beaucoup trop coûteux. Pour une plantation nouvelle

je conseille toujours à ceux qui veulent bien me consulter d'espacer très largement le Douglas, à 4 mètres en tous sens par exemple, soit 625 plants à l'hectare, dépense très modeste, garnissant les intervalles avec les espèces peu accaparantes, communes. Ces espèces pourraient être, selon la nature des terrains et des climats: le pin laricio de Corse, le mélèze, le pin Weymouth; le chêne, le charme, le bouleau, etc.: voisins qu'on pourrait supprimer ou recéper au fur et à mesure du développement du Douglas.

Ici, comme l'a constaté aussi un sylviculteur du Luxembourg, M. le Comte de Villers, cet arbre, jeune, est continuellement attaqué par le chevreuil, qui l'écorce en s'y frottant pour faire ses bois. Cet animal sent une attraction malheureuse pour tout jeune résineux poussant dans un espace clair, par conséquent autour duquel il peut tourner, et qui en même temps étant flexible donne un contact assez doux à la peau couvrant ses bois, très sensible. C'est donc un ennemi redoutable du repeuplement des clairières, et il montre pour le Douglas une affection toute spéciale. Un de mes amis s'est avisé de suspendre une petite clochette aux rameaux de chaque sujet qu'il avait planté, et leur bruit a fait fuir le chevreuil; mais ce moyen n'est pas d'application générale. A défaut du Douglas, le chevreuil se rejette avec le plus de goût sur *Abies balsamera*. Serait-il attiré par l'odeur des rameaux de cette espèce, très agréable comme ce le de la frondaison du Douglas?

D. CANNON.

Les Vaux. La Ferté-Imbaült (L.-et-C.)

Conservation of Natural Resources.

By WILLIAM PEARCE, CALGARY, VICE-PRESIDENT FOR ALBERTA.

Mr. William Pearce, of Calgary, Vice-President of the Canadian Forestry Association for Alberta, made all preparations for attending the special meeting at Regina, but owing to important business unexpectedly arising at the last moment he was unable to go. He had prepared a paper, however, and sent it forward to the Secretary, by whom it was included amongst the papers of the

Convention. A synopsis of this paper is given below.

In opening Mr. Pearce notes that it is not very flattering to an intelligent and educated community like that of North America when, after all the warnings of foresters and experts as to the waste of natural resources, it required a call from ex-President Roosevelt to fix public attention thereon. Fortunately

the first call to the people of the United States was followed by another, which embraced the whole of the continent, and is shortly to be followed by one embracing the greater part of the civilized world. It is anticipated that from these gatherings and from the information they disseminate much good will flow. Canada is to be congratulated that the Federal Government has taken action in this matter. The Canadian Forestry Association should bestir itself to lay before the new Conservation Commission everything affecting these resources, which it is the aim of the Association to protect.

Our water supply, whether for irrigation, industrial or domestic uses, or for navigation, depends for its proper regulation on our forests; the conservation of the moisture in the soil of our fields is aided by the preservation of the forests; our mineral wealth cannot be developed without timber, so much of which is used in our mines. Our forests in retarding the flow of water derived from the spring thaws or from storms prevent flood and erosion.

The principles of the Irrigation Act could with advantage be extended all over Canada and all matters relating to one subject covered in one Act. For instance, it has been held that the Act does not apply to waterpowers.

Mr. Pearce refers with approval to the address of Mr. George Otis Smith, Director of the United States Geological Survey, at the Irrigation Convention at Spokane. The people of Canada should know what the United States is doing to protect the public rights in the public domain, and Canada should be urged to take similar action. By an Order-in-Council of October 31st, 1887, the Government reserved to itself, in all the lands not alienated from the Crown, the right to the minerals throughout those portions of the Northwest Territories west of the Third Meridian. It would be well to extend that reservation to all lands controlled by the Dominion, and the provinces urged to adopt the same principle. Some of the provinces (Nova Scotia, at least) have, it is understood, always acted on it, so far as coal-beds are concerned. Mr. Smith at Spokane urged that the price of all lands disposed

of should be based upon the quantity and quality of the article sold, and Mr. Pearce holds that this should be applied to all natural resources. The proceeds of the sales of United States public lands are made available for the reclamation service. Canada will soon be in the position of the United States, namely, that the lands that can be reclaimed by private enterprise will be exhausted. Canada could therefore with advantage adopt the policy of the United States with respect to the area to be reclaimed by irrigation. There is in Alberta and Saskatchewan, south of the North Saskatchewan River, in addition to what will probably be benefitted by private irrigation enterprise, a large area of land which would be greatly benefitted by irrigation, and which when irrigated would at least quadruple the value of the non-irrigable portions.

The close relation of irrigation and forestry is noted by Mr. Pearce, and in this connection he states that he has burned several cords of wood cut out of a windbreak planted by himself less than twenty years ago.

Mr. Pearce has asserted for years that the people of Canada have been living in a fool's paradise, regarding their timber resources. This assertion he finds borne out by the evidence of Mr. R. E. Young, of the Department of the Interior, before the select Standing Committee on Forests, Waterways and Waterpowers, on April 6th, 1909. In his evidence Mr. Young stated that there was an astonishing lack of information about forests. Estimates of forest area run from 800,000,000 acres down to 100,000,000. His Excellency Earl Grey, addressing the Canadian Forestry Convention at Toronto in February, 1909, put the area at 354,000,000 acres which was perhaps the best estimate. But there was no doubt that Canada's area of merchantable timber was much smaller than that of the United States.

Mr. Young's evidence regarding the timber of the Northwest and Northern British Columbia is quoted by Mr. Pearce at considerable length, and Mr. Pearce states that Mr. Young's conclusions are more optimistic than his own, after having given attention to the sub-

ject for many years. Mr. Pearce in conclusion holds that the matter of creating public interest in forest conservation is the great one before the Canadian Forestry Association and the one to

which it should energetically address itself. He commends in particular the arousing of attention by sending frequent bulletins on forestry subjects to the newspapers of the country.

Patriotism in Forestry.

Dr. B. E. Fernow, Dean of the Faculty of Forestry of the University of Toronto, lectured before the Canadian Club of the town of Berlin, Ont., on October 22nd last on the subject of Forestry in Canada. There was a large and interested audience, presided over by the President of the Club, Dr. Honsberger. The speaker of the evening was introduced by an old friend, Mr. W. H. Breithaupt, C.E., who spoke of the need of reforestation to check the devastation wrought by floods on the Grand River. On the conclusion of the lecture a hearty vote of thanks was tendered to the speaker on motion of Mr. George Pattinson, M.P.P., for South Waterloo.

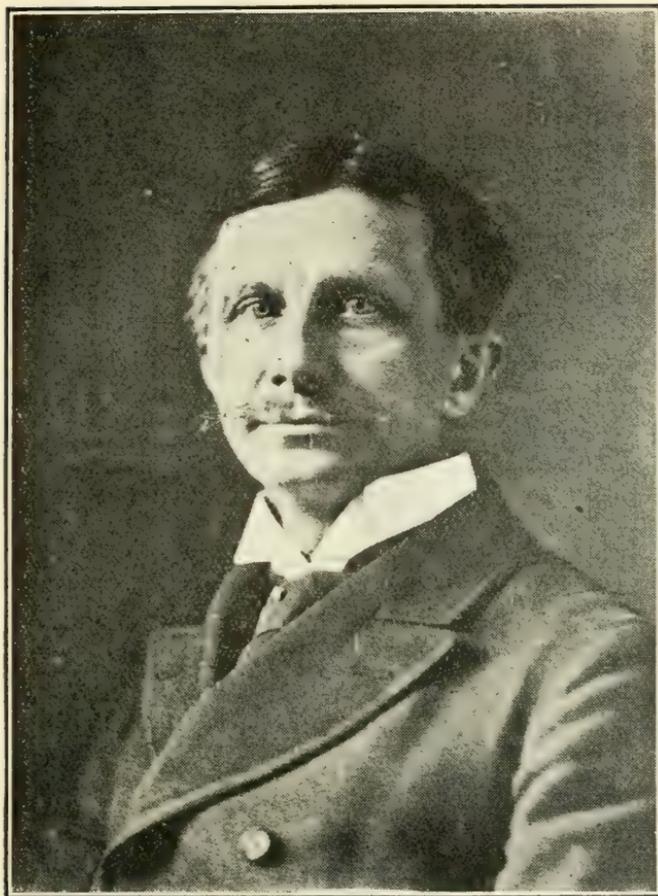
Dr. Fernow, speaking from a patriotic standpoint, showed that the three factors in the progress of a nation were men, natural resources and accumulated wealth or capital. Of these the most important was the first. Nations with great resources had sunk to decay because of lack of character, while others in lands poorly endowed by nature had become great by energy and foresight. Forestry was essentially a patriotic subject as it meant the leaving of natural resources in the best condition for future generations. The forest, because it produced an absolute necessity, wood, and because of its power of reproduction and its effect on climatic and water conditions, was the greatest single resource of any country.

Two-thirds of the area of the eastern provinces was fit only to grow timber, and half of this would become unredeemable desert if allowed to be burned over and exposed to the sun, rain and wind. Of Ontario not more than one-third would ever be used for agriculture and the remaining two-thirds was in the rocky thin soil of the Laurentian plateau where the danger of its becoming a desert was imminent. Even of south-western Ontario two-fifths was unfit

for agriculture and should grow the fuel and some of the timber required, besides maintaining the stream flow and preserving favorable climatic conditions. Yet, important and vital as the maintenance of these conditions were, the Governments were doing almost nothing to guard the future.

What, asked the speaker, was wrong in the administration of Canadian woodlands? This question must be answered even if it suggested criticism of the present administration. But in fact it did not involve such criticism, only an apology; for the present administration had merely inherited the system of management under which it worked, and it was only natural that it should follow the line of least resistance and prefer, as long as it could be avoided, not to make radical changes, which in the end would be absolutely necessary.

It must be recognized that in matters of administration what was wrong today might have been right before; the system which was quite right at one time, answering the surrounding conditions, became wrong gradually as the conditions gradually changed; and before a change in the system would be attempted it must have become quite convincingly wrong. The timber license system of Ontario, under which the Crown retained ownership of the land and growing timber and sold only the mature timber fit for harvest, was a most ingenious device, which in the early pioneering stages could hardly have been improved upon, except for the abuses which had grown up around it but were not a necessary part of the system. Apparently inexhaustible forest areas needed to be made useful and a revenue derived therefrom, and to do so, capital needed to be attracted. Yet the land itself, at least as far as it was available for farming purposes, needed to be reserved for settlement. As long as mere exploitation of the surplus of virgin



Dr. B. E. Fernow, Dean of the Faculty of Forestry of the University of Toronto.

timber and the opening up of the country was the object, this system worked well enough, although an unnecessary and undesirable liberality allowed the timber limits to be retained in the hands of licensees and their claims to be extended not only to the grown, but to the growing timber. Now, however, when it was recognized, first that the virgin timber supply was not only not inexhaustible, but near exhaustion, when there was no more need to force settlement, when there was no more difficulty to induce capital to embark in timber exploitation, when the revenue question was not any more

urgent, and the need of considering the future ought to be most prominent, the antiquated license system had become an evil, which should be excised or thoroughly reformed to permit a rational use of the remaining forest resource.

According to the reading of the licenses the Government had the right to change the conditions of the contract and impose new ones. While this would theoretically enable the Government to impose such conditions as would protect the future of its properties, prevent conflagrations and secure a satisfactory young growth, pr_{ac}

tically, and in equity, it would appear to be debarred from imposing conditions which would involve additional cost to the licensee who might not be the original contractor. It must, therefore, be realized that such changes could practically only be made by the government adjusting in an equitable manner any financial loss caused by changes of contract. Moreover, he was convinced that mere tinkering with the existing conditions would not satisfy the situation; a radical change of attitude and a radical cure was needed. This he believed could be brought about by the appointment of a Royal Commission which should ascertain the conditions and devise new plans in detail.

After expressing the belief that each province would soon have a bureau of forestry and expressing the hope that Canada would make progress like that of Germany, Dr. Fernow went on to refer to the work the Ontario Government was doing in the reforestation of

waste lands in Norfolk. There were at least 125,000 acres of such lands in Lambton, Norfolk, Simcoe, Durham and Northumberland, and while the beginning was a small one it was in the right direction and should be encouraged, and continued on a definite basis like the Prussian policy.

At the same time he made a comparison. Five thousand acres of replanted lands in sixty years when the timber was fit to cut would have cost \$187 per acre. On the other hand, if the Government would take five thousand acres of cut-over lands reforested by nature and place two men in charge it would cost in sixty years \$80 per acre. Thus the Government was spending twice as much to reforest waste lands as it would cost to take care of the natural timberland which is allowed to become waste. He hoped in conclusion that his words would stimulate them to help in devising means for the conservation of Canada's resources

New Diseases of the White Pine.

For some years past alarm has been felt in sections of the United States where white pine was growing as to a "blight" which has appeared on many trees of this species. Readers of the JOURNAL will remember the publication in the March, 1908, issue of a circular from Dr. Haven Metcalf, of the United States Bureau of Plant Industry asking for information regarding instances of the blight.

The present knowledge of the blight—or, rather, "blights," for several of these have been found—is outlined by Dr. Perley Spalding, of the United States Bureau of Plant Industry, in a circular on "The Present Status of the White Pine Blights."

In a short foot-note Dr. B. T. Gallo-way, Chief of the Bureau, writes some re-assuring words. "Comparatively few trees have been killed," he notes, "and timber owners should not become unduly alarmed, as the trees have in many cases already partially recovered from the blight. At present there is absolutely no reason known for cutting or disposing of thrifty young white pine

forests in which are scattering trees affected with the blight in any of its forms nor should work upon proposed plantations of this species be relinquished or postponed from fear of this trouble."

LEAF-BLIGHT.

Two forms of the injury, viz.: "leaf-blight" and "twig-blight," have been more or less widespread. In the former the leaves, or needles, died down for one-third or one-quarter of their length measured from the free end (sometimes even to the base, with the result that the leaves fell off). The dead parts first become reddish and in two or three months fade to a dull brownish gray. The leaf-blight affects trees of all ages from four years up, and occurs indifferently in thin or thick stands. The pine bears leaves of two different ages, as the leaves stay on for two years; either the younger or the older set of leaves may be affected. This form of blight was particularly prevalent in 1907.

After discussing various probable causes of the disease, the author con-

cludes:—"It is impossible to state definitely what is the primary cause of the leaf-blight, but it is probably closely connected with extreme climatic conditions which have prevailed during the past few winters."

The outbreaks usually begin about July 1st and vary in intensity from year to year. The leaf-blight may cause the death of affected trees occasionally in a single season, more often in two or more seasons, but even in the worst affected districts the number of trees killed outright bears a small proportion to the total number. No new trees became affected in 1908 and half of those that were affected in 1907 did not have their 1908 leaves touched by the blight.

TWIG-BLIGHT.

In 1908 the most common form of disease was a twig-blight. Of this there were three forms found. One form of this injury affected only small trees (usually less than ten to fifteen feet in height) and was common in Maine. In this form the injury was usually confined to the northern and western sides of the tree, the opposite sides being uninjured. This was apparently a real winter-injury: during the winter months a great deal of water was evaporated from the leaves, while the roots were frozen solid in the earth, and so were not able to absorb from the soil moisture to replace that taken from the leaves; hence the trees suffered. A small number of trees died through this winter-killing and others experienced a set-back, amounting to one, or, perhaps, two years' growth.

Another blight, found in New Hampshire and northern Maine, was apparently due to insects. Only lateral branches were affected, the leaders almost always escaping injury.

At Brunswick, Me., and sparingly in a number of other places, a twig-blight, due to a fungus (*Lophodermium brachysporum*) did some damage.

THE WHITE PINE BLISTER RUST.

A more serious disease and one that demands much attention and vigilance for its suppression, is the one just named.

The White Pine Blister Rust (*Peridermium strobi*) is one of the rust fungi (*Uredineæ*). As is the case with other rusts, part of its development is made on one plant, after which spores are carried to plants of another kind, where the fungus completes its course. The first part of the life of the above rust is passed on the White Pine, after which it passes over to black and red currant plants, sometimes to gooseberries.]

The period of growth on the currant is much shorter than that on the pine. The spores which are produced here appear in summer and autumn as an orange-colored powder. If these are carried by the wind to a white pine tree they may germinate and the plant body (mycelium) of the fungus establishes itself in the soft inner bark of the trees. No sign of the disease is noticeable the following spring, but during the summer after stem and branches often begin to thicken and swell. In the following spring the fungus breaks through the bark, and light orange-colored fruiting bodies (about one-eighth of an inch thick) appear. From these spores are emitted which, on reaching a currant bush, germinate and begin the round again.

The disease was discovered on stock imported by the New York State Forest, Fish and Game Commission from the nursery of J. Heins Sons, Halstenbeck, Germany, and was identified by Dr. Perley Spalding, of the Bureau of Plant Industry, United States Department of Agriculture and, later on, by others.

It was located in Vermont, Massachusetts and Connecticut.

A meeting of foresters (state and private) and others interested in the matter was held in New York and the problem discussed. It was decided that further importations of German white pine stock were undesirable.

The New York State authorities have adopted the following plan for fighting the disease:—

All places where it can be ascertained that Heins' white pine stock has gone during the past two years are to be inspected, and all currant and gooseberry

(Ribes) plants, wild and cultivated, within a distance of one hundred yards from any of these trees are to be destroyed by pulling up or cutting out, as necessary. These and all other infected or suspected plants are to be destroyed by burning. Cultivated cur-

rants and gooseberries are to be closely inspected, especially after July 15th, while suspected plantings of white pine are to be carefully inspected between May 10th and June 10th. These measures have already been put into force, and some effective work done.

A Year's Work in Federal Forests.

"The work of the Forest Service of the United States is spoken of in the highest terms of praise and with good reason, but it may be pointed out that, although the extent of Canada is not less than that of the United States, the forest service of the latter has an appropriation of \$4,640,000 and a permanent staff of over 2,000, while the Canadian forest service has an appropriation of \$100,000 and a permanent staff of about forty. If the Canadian people wish a service equally efficient with that of the United States, they must be prepared to deal much more generously with it than they do now."

The foregoing words form part of the introduction to the report of the Dominion Superintendent of Forestry (Mr. R. H. Campbell), which forms part of the 1909 report of the Department of the Interior, lately laid before Parliament. In addition to the forestry work proper the Forestry Branch has charge of the irrigation work and the national parks.

PROTECTION OF THE FORESTS FROM FIRE.

The main divisions of the forestry work carried on are the protection of the forests from fire, work on the forest reserves and work in tree planting on the prairies. At present the protection of the forests from fire is accomplished by means of rangers, who patrol their respective districts, discover and extinguish fires and warn travellers and residents of the danger of setting fires. While the season of 1908 was exceptionally dry and the risk from fire correspondingly great, few serious fires occurred on Dominion lands. The most serious fires were at Salmon Arm, Manson Creek and White Lake, in British Columbia, and in the valley of the Spray River in Alberta. For the British Co-

lumbia fire, squatters on timber berths were chiefly responsible and in one case carelessness on the part of a lumber company was a partial cause. For the Spray valley fire the carelessness of tourists was responsible. By the British Columbia fires 200,000 feet, board measure, of timber was destroyed and 10,000,000 feet damaged. The Spray valley fire burned about 3,000,000 feet of timber.

The total number of rangers employed during the season of 1908 was 82, as compared with 47 during the season of 1907. A special patrol was maintained along the line of the G.T.P. and no serious fire occurred there. Additional rangers were employed north of The Pas, in the country north of Prince Albert and on the Peace and the Great Slave Rivers. Despite this extension, however, there is the most pressing need of protecting the forests of the great Northern Forest Belt, a district reaching from Hudson Bay to the Rocky Mountains (a distance of 1,900 miles), and from 300 to 600 miles wide; there is also great need of the same along the many lines of railway projected into the northern country.

FOREST SURVEYS.

The need of a survey of this Northern Forest Belt is also dwelt upon. All this area is more or less forested and the forest is of great value for local consumption. While along certain lines of travel the country has been explored, large areas are entirely unknown and more definite knowledge of these is imperative in order to secure its proper administration and management. Mr. Campbell calculates that an exploration of this forest belt, similar to the one made in 1900 by the Ontario Government of the northern part of that province, could be made for \$200,0

an annual expenditure for ten years of \$20,000.

Timber surveys on the reserves were continued during 1908 and the survey of about 1,250,000 acres out of the 10,000,000 acres on the reserves completed. The results are rather discouraging, inasmuch as the reserves are found to be in poor condition as a result of fire and careless cutting. Plans of administration for the reserves, based on the results of these surveys, are now being prepared.

THE FOREST RESERVES.

A full list of the forest reserves, with their areas, dates of setting aside and other particulars is given in the report of the Inspector of Forest Reserves, Mr. A. Knechtel. The survey of the Riding Mountain reserve has been completed, and the results have been published as a separate bulletin (Bulletin No. 6, "The Riding Mountain Forest Reserve"). A reconnaissance survey of "The Pines" forest reserve near Prince Albert, Sask., was also made in the summer of 1908, the result of which is published in an appendix to the report (Appendix No. 2, Report of H. R. MacMillan, Assistant Inspector of Forest Reserves). Maps of the above reserves have also been published. Inspection was also made of a tract of some 200 square miles lying to the north of the Saskatchewan River, near Prince Albert, with a view to setting it aside as a forest reserve. A considerable extension has also been recommended to the Cypress Hills reserve, the value of which as a source of hay for the ranchers in the vicinity has been abundantly shown. An investigation was made of the forests of the Crow's Nest district in Southern Alberta, the result of which has been published as Bulletin No. 5 ("Forest Conditions in the Crow's Nest Valley, Alberta," by H. R. MacMillan, Assistant Inspector of Forest Reserves). Regulations for the manage-

ment of camping sites in the forest reserves and also for mining claims within the reserves have been prepared and are printed at the conclusion of the report.

TREE PLANTING DIVISION.

In the spring of 1909 over 2,500,000 trees were distributed from the Forest Nursery Station at Indian Head, Sask., to 2,010 applicants. The new applicants for trees to be delivered in the spring of 1910 number 2,235.

A new feature will shortly be introduced into the tree distribution by the distribution of coniferous trees, such as pine and spruce; this it is hoped to begin in 1911. The species distributed will be white spruce, jack pine, lodgepole pine and Scotch pine. It is hoped before long to add to these the tamarack or native larch. All applications for trees are now handled directly from Indian Head instead of from Ottawa as formerly.

DOMINION NATIONAL PARKS.

A list of the Dominion national parks is given, with a short description of each park, and the revision of the park regulations noted. The fence around Buffalo Park has been satisfactorily completed; it is seventy-four miles long, nine feet in height and composed of fourteen strands of wire. The St. Lawrence Park reservation, consisting of eleven islands and a small peninsula on the St. Lawrence between Brockville and Gananoque (formerly the property of the Mississauga Indians) is also administered by this department.

Fire notices have been printed in Cree and Chipewyan and a facsimile of that in Cree is appended to the report, together with a translation.

Copies of the report, as well as those of the bulletins referred to above, may be obtained free by addressing R. H. Campbell, Superintendent of Forestry, Ottawa.

Maps of Western Forests.

The Forestry Branch of the Department of the Interior has inaugurated and made some progress with the compilation of a forest atlas, which will be continued as the work of surveying the reserves and other forested districts ad-

ministered by the Forestry Branch progresses, thus furnishing adequate data for the maps. There have been already published a "legend" sheet and maps (in colors) of "The Pines" forest reserve in Saskatchewan and the Riding

Mountain forest reserve in Manitoba, both on the scale of one mile to one inch. The map of "The Pines" reserve was published some time ago, and that of the Riding Mountain reserve (in four sheets) is published as a supplement to the report of the Superintendent of Forestry for 1909. On pages 158 and 159 is shown a map of "The Pines" reserve, in black and white, on a much reduced scale, which will, however, give some idea of the general plan of the maps. Symbols are here used to denote burns, degrees of cutting, etc., instead of colors, as in the original maps. Tree species are

designated by a letter in conjunction with a figure. The annual report of the Superintendent of Forestry for 1909 is also accompanied by a map of the irrigated districts of Alberta and Saskatchewan, in eight sheets, on a scale of three miles to the inch, and a sketch map of the present and proposed routes of patrol in the Northern Forest Belt on the scale of 50 miles to the inch. The originals of all these maps were prepared in the draughting office of the Forestry Branch, under the supervision of the chief draughtsman, Mr. Geo. S. Proctor.

Hydrographic Survey of the Milk River.

BY L. GLEESON.

Closely related to the work of the forester in conserving and regulating the flow of streams is the work of measuring and distributing the available water so obtained, with a view to ensure its being put to the best and most economical use, whether for irrigation or domestic purposes or as the source of industrial power.

Such a work has been taken hold of by the Forestry Branch of the Depart-

ment of the Interior, and several parties were in the field during the past summer inaugurating the work of a systematic hydrographic survey. In this connection a short outline of the work of one of these parties will be of interest.

The actual work in the field began when the party, after two days on the trail from Lethbridge, pitched camp on the north bank of the Milk River at Milk River Station. The party consisted



Photo by P. M. Sauder, 190
Cable Car and Gauge Height, Elbow River, Alta.



Cable Car and Frame Complete.

Photo by L. Gleeson, 1909.

of four men, namely, Mr. Peters, the engineer, an assistant, a teamster and a cook, and the outfit consisted of two teams of horses, two wagons, two tents and a small but complete cook and camp outfit.

The work accomplished during the summer may conveniently be divided into two parts, each occupying about two months. The first consisted of a preliminary survey of the river, the second, the construction of the cable stations. The object of the preliminary survey was to discover the best possible and most convenient "sections" for

cable stations that the river afforded, to erect low-water gauging stations and to engage competent men to take daily observations on the gauge rod. When a satisfactory "section" has been found, a "bench-mark" was placed near the bank of the river, high enough to be out of danger of destruction by spring floods. Using this bench-mark as a starting point a line of accurate levels was run across the river, extending as far back as high water and flood indications could be found.

A gauge rod was then set up in the river close to the bank. This was made

firm by braces which were nailed to it at one end, the other ends being spiked to posts driven into the ground. A wire was stretched from post to post across the river and marked at intervals of five feet with tin hangers, upon which were marked the distances from a zero point. This point was generally taken on the face of the bench-mark.

Low water gauging stations of this sort were placed at eight places on the river; the first of these is situated close to the place where the river enters Canada, the last is about two hundred yards north of the International boundary near the spot where the river re-enters the state of Montana. A low-water gauging station was also placed at Sage Creek and elevations for cable stations were run at Lodge and Battle Creeks.

Cable stations were erected on the river only; these were seven in number. A bridge station was also established at Milk River Station. The length of the spans differed considerably, varying from 140 feet to 350 feet. The heights of the frames varied in a corresponding manner, from fourteen feet to twenty

three feet. A picture of one of the frames is shown. The timber for these was assembled right on the line of the section. A "deadman" was placed six feet in the ground and between twenty and thirty feet back from the frame. Around this the main cable was looped and then stretched over the top of the frames, across the river and around another "deadman" on the other side of the river. A turnbuckle was placed in the main cable at one end for the purpose of adjusting the proper sag. A smaller wire was simultaneously stretched to serve as a measuring wire and tin hangers denoting the distance from the zero point were fastened to it. Thirty feet upstream another smaller wire stretched across the river. The purpose of this wire was, by means of a cord, to hold the meter stationary and pointing up-stream, when the current is swift.

The erection of these stations was completed by the end of October after which the assistant and the teamster made a trip of inspection to see that all was in proper running order and leave everything in readiness for the district hydrographer next season.

The Forest Schools.

THE FACULTY OF FORESTRY AT THE UNIVERSITY OF TORONTO now has an enrolment of forty-three students, of whom twenty-four are new men. A number of these are graduates, some have spent a year or two in other faculties, others have been from two to six years in business; the average age of the student in the faculty of forestry is thus distinctly ahead of that of the ordinary undergrad. The six-year combined Arts and Forestry course is now in full operation, two men being in the third year of it and one man in the first. The library now numbers over 2,000 volumes and is free to all students.

At the beginning of the past term the three men of the senior class were, in response to a request for assistance, allowed to go to Maine where they were employed in forest survey work in connection with the estimation of damage

to forests alleged to have been done by locomotives of the Canadian Pacific Railway. Two of the junior class also assisted Mr. E. J. Zavitz in marking timber in Rondeau Park. One of the seniors has also been employed in doing survey work for the same lumber company which has employed several of the advanced men during the past two summers.

THE UNIVERSITY OF NEW BRUNSWICK has ten men enrolled in the Department of Forestry; four of these are in the senior class. Under Prof. R. B. Miller, the professor in charge, special attention is being given this year to the practical work of cruising and mapping timber. A couple of representatives of this school also took part in the work of estimating fire damage in Maine along with University of Toronto men and others. Fire patrol, timber cruising and similar practical work also occupied the

men of the department during the summer. Uncertainty of future employment for the graduates seems to be the chief hindrance to the enlargement of the department.

THE YALE FOREST SCHOOL has decided to make a distinct advance in its requirements for entrance. Certain courses now given at the school in botany and drawing will, for all students entering in 1911 and thereafter, be re-

quired for entrance, and the time now taken for them will be devoted to the extension of the technical work and advanced work in various subjects. After the above date graduates of the Sheffield Scientific School of Yale University will be required to take two years of graduate work in order to qualify for the degree of Master of Forestry, instead of being able, under certain conditions, to obtain the degree in one year, as at present.

Directors' Meeting.

A meeting of the Directors of the Canadian Forestry Association was held at 10 a.m. on Tuesday, December 14th, in the office of Mr. R. H. Campbell, Superintendent of Forestry, Ottawa. Mr. Southworth, of Toronto, President of the Association, occupied the chair and there were also present: Hon. Sydney Fisher, Messrs. E. G. Joly de Lotbiniere, and H. M. Price, of Quebec, Que.; J. B. Miller, of Toronto; Gordon C. Edwards and R. H. Campbell, of Ottawa; Jas. Lawler, secretary, and F. W. H. Jacombe, assistant secretary.

Mr. R. H. Campbell reported for the committee appointed to engage a permanent secretary, reporting the engagement of Mr. Jas. Lawler for that office.

The Secretary presented his report for the period since his appointment in April; the report noted an increase in membership of about two hundred and seventy five, the membership of the Association being now somewhat over 2,250. The report also noted the work of preparing for and carrying through the Regina convention, and the work of lecturing at Port Arthur, Fort William and Kenora, and also the later tours as noted elsewhere in this issue; the total number of lectures and addresses so far delivered by the Secretary was twenty-one. A condensed report of the Toronto convention in French had been published and distributed; acknowledgement of assistance received in this work were made to Mgr. J. C. K. Laffamme, Senator Edwards, and Messrs. G. C. Piche, H. M. Price and E. G. Joly de Lotbiniere.

Much consideration had been given to the matter of making the FORESTRY

JOURNAL a monthly, but up to that time no decision had been arrived at. Grateful acknowledgement of aid rendered by President Southworth, Mr. R. H. Campbell and Dr. Fernow were made, and in this connection special mention and acknowledgement was made of assistance given by Mr. A. H. D. Ross, the former secretary of the Association, who had not only given great help to the present secretary in becoming familiar with the business of the Association, but had carried on all the secretarial work up to May 1st, 1909, and had supervised the publication of the annual report for 1909.

The assistant secretary also reported in regard to the newspaper bulletin service; four bulletins and other literature had been sent out, and the number of newspapers and other periodicals on the list now numbered over a thousand.

It was decided to hold the next annual business meeting in Ottawa, the dates, as provided in the constitution, being March 10th and 11th, 1910. The invitation of the Government of New Brunswick to hold a meeting in Fredericton was accepted, and a special convention will be held at that place on a date to be shortly determined. Notice of motion was also given to change the constitution (Clause VII) so as to provide that the annual meeting be held in Ottawa during February.

The President and Mr. Miller were appointed a committee to confer with the executive of the Canadian Lumbermen's Association with regard to a change in the time of the annual meeting. The latter body holds its annual meeting in the beginning of February;

many of the members of that association are members of, and deeply interested in the work of, the Canadian Forestry Association, and would like to attend the meeting of the latter, but find themselves prevented from doing so by the time at which the Forestry Association's meeting is held.

The matter of the Association's adopting a crest was brought up, and Mr. Joly de Lotbiniere was requested to interview an artist and have a design

for a crest prepared and submitted to the executive.

A resolution was passed expressing, on behalf of the Association, its regret at the death of Hon. W. T. Pipes, Attorney-General and Commissioner of Crown Lands of Nova Scotia, and vice-president of the Association for that province. As successor to Mr. Pipes, the lately-appointed Attorney-General and Commissioner of Crown Lands of the province, Hon. A. K. Maclean, was appointed.

The "Odd Lengths" Campaign.

A new movement in the direction of the conservation of the supply of timber has been started among Pacific Coast lumbermen in the United States. A very large proportion—practically all of these—have entered into an agreement to manufacture flooring, finish and other similar planing mill products in "odd" lengths, i.e., lengths measuring odd numbers of feet in length. Heretofore these have been manufactured only in even lengths, such as twelve feet, fourteen feet, etc. Under the customary way of using even lengths quite a proportion of the timber which came from the shaper was wasted, huge piles of such waste being a feature of the yards of many large mills.

The movement was launched at a meeting of the National Lumber Manufacturers' Association at Seattle, Wash., in July last. It is endorsed by the United States Forest Service as a move in the direction of the conservation of timber resources.

The Portland, Ore., office of the Forest Service recently made an investigation of the actual amount of timber wasted unnecessarily in restricting the manufacture of such material to "even" lengths and found it amounted to two per cent. of the planing mill product manufactured in Oregon and Washington from Douglas fir and other valuable species. It is estimated that fifteen million feet of high-priced timber can be saved annually in Washington and Oregon by adopting the proposal of using odd lengths. This amount of lumber would require the yearly growth on about thirty thousand acres of average timber.

The majority of British Columbia

lumbermen, it is said, also favor the movement.

Considerable opposition to this innovation has arisen among retailers and consumers. The retailer says that it is impossible for him to dispose of odd length material because of the common practice in the construction of wooden buildings, claiming that the initial saving of the manufacturer is transferred to the consumer. This is denied, however, because of the proportionally small amount of odd length material which will occur under the new system, and because of the latter-day practice of laying sub-floors of rough lumber and sheathing on the sides of the house before putting the finishing material in place.

NOTES.

No date for the proposed forestry convention has yet been fixed, but it is expected that this matter will be taken up when the Commission of Conservation meets, as per statute, in January.

The electrification of the lines of the National Transcontinental Railway in parts of Quebec and New Brunswick is coming to the front and a conference of officials from these provinces with officials of the road was held in Ottawa during December.

The Canadian Forestry Association has pleasure in welcoming to its ranks M. Chas. Guyot, Director of the Ecole Nationale des Eaux et Forêts, Nancy, France, who through the good offices of Mr. G. C. Piche, M.F., forester to the Department of Lands and Forests of Quebec, has become a life member of the Association.

Notes.

**TIMBER
RESOURCES
OF THE
WINNIPEG
BASIN.**

In a report by W. Thibaudeau, C.E., to the Surveyor General of the Dominion of Canada, reference is made to the pulp wood resources in the drainage basin of the Winnipeg River in Manitoba. Mr. Thibaudeau reports as follows:—

"The drainage basin of Winnipeg River in Manitoba, exclusive of 10 miles on both sides of the Canadian Pacific Railway right-of-way, and exclusive of the farming lands, has an area of about 1,840 square miles, which added to the drainage basin of English River, in Keewatin, which joins Winnipeg River east of the boundary and covers an area of 9,500 square miles, forms a total of 11,340 square miles. Assuming about half this area to be covered by rivers, lakes and swamps, the balance, 5,670 square miles, or 3,628,000 acres, is forest, averaging 20 cords to the acre; this equals 72,576,000 cords of pulp wood, which is a conservative estimate. Assuming this to be equal to a supply for twenty years, it would allow a consumption of 3,628,800 cords per year, or about 3,000,000 tons of pulp, or 9,615 tons per day, which would require about 500,000 horse power to convert it into pulp.

"Within the area alluded to the proportion of pulp wood from my own observations and information gathered from many sources is about as follows: Poplar, 55 per cent.; spruce, balsam and tamarack, 25 per cent.; jackpine and a few white birch, 20 per cent. Poplar is found mostly along the rivers and lakes on the flats. As one goes inland spruce, balsam and tamarack take the place of poplar. Jackpine is found on rocky ridges. The present size of the timber is a growth of about twenty years. Outside the pulp area already described, but tributary to Winnipeg and English Rivers in Ontario, there are 12,000 to 15,000 square miles of the same kind of wood, existing under the same conditions, and which would average about the same per acre.

"To preserve the pulp wood industry it is imperative that stringent regulations should be adopted and enforced prohibiting the cutting of trees under

a certain size, say 3 inches in diameter. The owner of the timber berth should not be allowed to cut over the same area twice in twenty years, except in special cases. I saw only two places where the timber had been destroyed by fire. Although the country is rough, it would be easy to construct a railway logging road at a reasonable cost. Logging with teams would have to be done in winter owing to the swampy character of a portion of the ground."

**A USEFUL
BOOKLET.**

The Department of Lands and Forests of the Province of Quebec has lately issued a pamphlet entitled "A Treatise on the Protection of Forests from Fire," of which the authors are Messrs. W. C. J. Hall and B. L. O'Hara, Superintendent and Assistant Superintendent, respectively, of the Bureau of Forestry of that Province. The book is intended for distribution to forest rangers, the clergy, municipalities and others. After a short introduction treating of the necessity of the forests to a country and the uses of woodlands, the causes of forest fires, especially those along railways, are discussed. The prevention and fighting of fires are taken up, prominent topics being fire-breaks and back-firing. The use of telephones is noted with approval and short description given of the "Look-out Station" system as used in Maine. Full instructions are given to fire rangers. The progress of a fire is graphically described from an actual instance. A number of half-tone cuts make the booklet more interesting and attractive.

**PROPOSED
LEGISLATION.**

At the approaching session of the Quebec Legislature it is proposed to seek legislation (1) to require settlers to stop making flat slashings and instead to pile the timber to be burnt in rows or heaps, at least fifty feet from the forest; (2) to make it compulsory for all able-bodied men from eighteen to sixty years of age to assist in putting out a forest fire, when called on by a forest ranger; (3) to have the windows of all smoking cars on trains screened

so as to prevent live ashes, matches, etc., from being thrown out; (4) to require all industrial plants in the immediate vicinity of forests to have the smoke-stacks screened with efficient wire-screen bonnets; (5) to make it obligatory on limit holders to put on a sufficient number of fire-rangers, the department to be authorized to do so at the limit-holder's expense in case of his refusal or neglect.

CONTINUING THEIR EFFORTS. The project of planting waste land in the counties of Durham and Northumberland continues to make headway. The agricultural committee of the council of the counties is pushing the matter, and the Ontario provincial government has undertaken to have a survey made of the lands in question. A series of meetings is being held in the counties to further agitate the question. A large meeting was held at Cobourg on December 9th, during the session of the council of the counties, which was addressed by Dr. B. E. Fernow.

BACK NUMBERS WANTED. The Association would like to secure a few copies of the issues of the **FORESTRY JOURNAL** for June and October, 1908, for which the sum of 25c. each will be paid. Such copies should be forwarded to F. W. H. Jacombe, Assist.-Secretary, Forestry Branch, Department of the Interior, Ottawa.

RECENT ONTARIO CHANGES. Restriction of cutting by the imposition of a diameter limit is a recent innovation in Ontario timber sales; in the sale of October 15th last, it was provided by the terms and conditions of sale that no trees of a less diameter than nine inches on the stump should be cut, and, further, that all timber should be taken down to this limit. Ground rent was charged at the rate of \$5.00 per mile, and \$2.00 per thousand feet was charged as stumpage dues, in some cases on the pine only, in other cases on all timber. The fire ranging system has been strengthened, not only by the increase in the number of rangers appointed, but also by the

appointment of Chief and Supervising Rangers, with the object of attaining greater efficiency.

FORESTRY ABROAD. The Department of Trade and Commerce has given instructions to the Trade Commissioners to send in reports on forestry in the countries to which each is accredited. The list of questions to be answered is as follows:— (1) What is the forestry organization of each country? (2) What is the forest fire protection? (3) What are the principal forest laws and how are they applied? (4) What are the principal commercial trees of each country? (5) What are the principal uses made of the forest products and by-products? (6) How is the forest force recruited? (7) What are the forest schools, etc.? (7) What are the principal publications published by the forest department of each country? Are they available to Canadians? (8) Is reforestation thought of or carried on to any large extent? What are the species planted? Is convict labour used for the purpose?

A number of the reports have already been received, and when all are in they will be published together and should make interesting reading for all interested in forestry.

B. C. FOREST FIRES OF 1909. The official summary of forest fires in British Columbia during the season of 1909 states that the total number of fires reported was 489. During the season thirty-five fire wardens have been patrolling the wooded districts. Of these fires 118 were reported as being started by railway locomotives, 99 from clearing land and 56 from campers. Many other minor causes are assigned, such as slashing, pic-nic parties, ranchers, Indians and cigar stubs; of 124 fires the causes are unknown. The area of timber and slashing burned over is put at 18,619 acres. The quantities of timber destroyed are put as follows: 1,420,000 board feet of poor quality timber; 5,710,000 feet of medium quality; 300 to 400 piles; 4,000 fence posts; \$220 worth of cordwood; 30 bolts and 50 ties. "Improvements" to the value of some \$7,500 were also destroyed. Eight

hundred and fifty men were engaged in fighting fire, and, in addition to regular salaries, the sum of \$11,997.18 is reported as expended in wages and labor, besides a considerable amount authorized direct to government agents. A total of \$627.00 is reported as having been expended by private parties. The total number of miles covered by the patrol was 68,130. The clearing permits issued totalled 2,530; 57 informations were laid for violations of the Bush Fires Act, 26 convictions obtained and the sum of \$800.00 levied in fines.

It is gratifying to note that the problem of forest fire prevention is receiving much more attention from the provincial authorities, and the matter of forest fire protection is regarded as a very important one. During the last session a provision was introduced into the "Bush Fires Act," requiring all persons wishing to clear land in the restricted months, in addition to the usual precautions required, to first obtain a permit for the clearing from the district fire warden or other government officer. Application has also been made to the Railway Commission to have the regulations governing the operation of railway locomotives amended so as to lessen the danger arising from this source.

A PIONEER WESTERN TREE-PLANTER. The Nor'-West Farmer, in its issue of November 6th, shows a number of half-tone cuts of trees in the orchard of Mr. A. P. Stevenson, of Dunston, Man. Mr. Stevenson's orchard this year produced over 100 barrels of apples and between forty and fifty bushels of plums. His sales of apples alone amounted to over \$450.00. One Hibernian apple tree, twenty years old produced five barrels, and a Transcendent crab tree, twenty-nine years old, gave over six barrels. Mr. Stevenson is a pioneer in the growing of both fruit and forest trees in Manitoba and his knowledge of all sides of the problem gave him the best kind of qualification as supervisor of tree planting in Manitoba under the free distribution scheme of the Forestry Branch, with which he has served since the inauguration of that scheme in 1900. For nine years he has carried the gospel of tree planting throughout the prov-

ince, doing much by example and instruction to spread a knowledge of the principles of tree growing on the prairies. Long may he be spared to carry on the good work!

THE FOREST WILL ENDURE. In extolling (quite rightly) the importance of agriculture to Ontario, as compared with "the more alluring products of the mine and the forest" the Toronto "Globe" of December 8th remarks: "While mineral wealth must be exhausted and the forests are in danger of depletion, the productive land promises a return to labor down all succeeding years." Surely the forestry specialist of the editorial staff was on leave of absence; otherwise he was surely nodding. Present forests may be pretty badly depleted and that process may go on, but all the forest needs in order to give "a return to labor down all succeeding years" is proper treatment and the return will be as sure as, or surer than, that given by farm land, though it may not be as great per acre.

INDIANS INTERESTED IN FOREST PROTECTION.

Mr. William McInnes of the Geological Survey, who spent the summer of 1909 in the Lac la Ronge district, in Saskatchewan, brings back gratifying information regarding the greatly increased interest among the Indians of that district in the prevention of forest fires. The fire notices in Cree which have been sent out by the Dominion Forestry Branch are faithfully read by the Indians, nearly all of whom can read the syllabic characters and who are proud of that knowledge. At Lac la Ronge a particularly noticeable mark of this interest was given. On one of the points that jut out into the lake a fire had occurred which burned over a large portion of it. One of the Indians had been noticed leaving the neighborhood shortly before, and his carelessness was blamed for the setting of the fire. The case was taken up by the Indian council, and the proposal was made that the offender should be taken into custody and handed over to the authorities for punishment. After discussion, however, it was finally decided to let the man go with a warning.

SECRETARY LAWLER'S LECTURES.

On the last day of November the Secretary left on a trip between Toronto and Ottawa to speak at a number of places on the way. These were Peterborough, Belleville, Trenton, Kingston, Brockville, Ottawa and Carleton Place. The organizations under whose auspices he appeared were Boards of Trade, Canadian Clubs and Boards of Education.

In Peterborough he first delivered a lecture before the Board of Trade. Then upon invitation this was repeated before the Peterborough County Council then in session. The councillors took hold of the subject and it was stated that there were 128,000 acres in the northern part of the county fit only to grow trees. This area has been nearly all cut off and the few settlers remaining are now moving out since their market, the lumbermen and the chance of working during the winter in the shanties have been removed. Evidently it will not be long before Peterborough county will be wrestling with its deforested lands problem.

At Belleville the lecture was held in the city hall under the auspices of the Canadian Club. On the second evening of his stay he was invited to address the students of Albert College. In Kingston it was the Board of Trade which arranged for the meeting. Several of the professors of Queen's University attended and upon invitation the Secretary addressed the members of the Engineering Society of the University on the following afternoon.

In Brockville the lecture was delivered in Victoria Hall, the Board of Trade

being the sponsors, while at Ottawa, Trenton and Carleton Place the Boards of Education arranged for the meetings. In Ottawa the meeting was held in the fine new Assembly Hall of the Collegiate Institute and Mr. Peter Whelen, the President of the Board of Trade, was in the chair. In every case the lectures were illustrated by stereopticon views and no small interest was aroused in all these places. This form of work is to be continued during the winter and spring.

TIMBER ALONG THE FRASER RIVER.

Mr. G. S. Mallock of the Geological Survey, during the past summer travelled down the Fraser River from Tete Jaune Cache to Fort George. After Tete Jaune Cache is left twenty miles in the rear the banks of the river are very heavily timbered till one gets to a point some sixty miles from Fort George. At the latter place a sawmill is being built. Spruce predominates, with some fir. Practically no fires have occurred of late. The province keeps a fire ranger along the river. For a stretch of fully two hundred miles, viz., from Gisborne Portage to within seventy miles of the Cache there has been practically no fire. Some fine cedar was met with, usually some little distance from the river, on the first slopes of the mountains; it runs up to 12 feet in diameter. Other species met with were white birch, fir and cottonwood, some specimens of the last-named species running up to eight to ten feet in diameter. Near Fort George, for a stretch of some seventy miles, there have been fires and jack pine and aspen poplar predominate.

FORESTRY ENGINEER

FRENCH SWISS, 26 years of age, having the diploma of the Federal Polytechnic School in Zurich, late pupil of the School of Forestry in Munich, 2 years practice, knowing French, German and English, seeks good and permanent situation either as manager of a wooded estate or as working manager or technical expert, in a timber business or other similar post. Copies of testimonials and diplomas if desired. Please address

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