

2. p

Canadian Forestry Journal

VOL. VIII.

MARCH.-APRIL, 1912

No. 2.



On the Way to the Lumber-camp.

OTTAWA, CANADA.

“Science, Sense and Satisfaction”

Long Life Trees

20,000,000 of them now growing.

Trees of health and vigor. The product of American seed and American soil, adapted to American living conditions.

We fill orders from the field, from growing plants, and not from cellars and store-houses.

Drop Postal for “Book About Little Trees.”

American Forestry Company,

Theodore F. Borst, Forest Engineer.

Box 58.

South Framingham, Mass., U.S.A.

Near Boston.

THE CANADIAN FORESTRY ASSOCIATION.

is the national organization for the informing of public opinion in the effort to secure a rational development of the Canadian Forests through the co-operation of national, provincial and municipal organizations and private enterprises. The objects of the Association are:

- (1) The exploration of the public domain, so that lands unsuitable for agriculture may be reserved for timber production.
- (2) The preservation of the forests for their influence on climate, soil and water supply.
- (3) The promotion of judicious methods in dealing with forests and woodlands.
- (4) Tree planting on the plains, and on streets and highways.
- (5) Reforestation where advisable.
- (6) The collection and dissemination of information on the forestry problem in general.

To promote these ends the Association publishes the *Canadian Forestry Journal*, issues bulletins, arranges for the delivery of free illustrated public lectures, and holds conventions in different parts of Canada.

The Association desires as members all (both men and women) who are in sympathy with this work. The membership fee, which entitles the member to the *Journal*, the annual report and other literature issued, is one dollar per year, (life membership \$10). Applications for membership or requests for information may be addressed to the Secretary, Canadian Forestry Association, Canadian Building, Ottawa, Canada.

CANADIAN FORESTRY ASSOCIATION.

Patron, H. R. H. the Governor General.
Honorary Pres., Rt. Hon. R. L. Borden.
Honorary Past President, Rt. Hon. Sir Wilfrid Laurier.
President, John Hendry, Esq.
Vice-President, Hon. W. A. Charlton.
Secretary, Jas. Lawler, Canadian Building, Slater St., Ottawa.
Asst. Secretary, F. W. H. Jacombe.
Treasurer, Miss M. Robinson.

Directors: Wm. Little, Hiram Robinson, Aubrey White, E. Stewart, H. M. Price, W. B. Snowball, Thomas Southworth, Hon. W. C. Edwards, Geo. Y. Chown, Hon. Sydney Fisher, R. H. Campbell, J. B. Miller, Gordon C. Edwards, Dr. B. E. Fernow, Ellwood Wilson, Senator Bostock, F. C. Whitman, G. C. Piché, Alex. MacLaurin, Carl Riordon; Mgr. O. E. Mathieu, Bishop of Regina; A. P. Stevenson, Wm. Pearce, Wm. Power, C. E. E. Ussher, Denis Murphy, C. Jackson Booth, Wm. Price, J. W. Harkom, A. S. Goodeve, M.P., W. C. J. Hall, J. S. Dennis.

Territorial Vice-Presidents:

Ontario—Hon. W. H. Hearst.
Quebec—Hon. Jules Allard.
New Brunswick—Hon. J. K. Flemming.
Nova Scotia—Hon. G. H. Murray.
Manitoba—Hon. R. P. Roblin.
Prince Edward Island—Hon. J. A. Matheson.
Saskatchewan—His Honor G. W. Brown.
Alberta—Hon. A. L. Sifton.
British Columbia—Hon. W. R. Ross.
Yukon—Geo. Black, Commissioner.
Mackenzie—F. D. Wilson.
Keewatin—His Honor D. C. Cameron.
Ungava—His Grace Mgr. Bruchesi, Archbishop of Montreal.

Canadian Forestry Journal

VOL. VIII.

OTTAWA, MARCH-APRIL, 1912.

No. 2

THE official organ of the Canadian Forestry Association. A magazine devoted to the interests of forestry and in general to the advocacy of the wise and conservative use of the natural resources of Canada.

Annual Subscription, - \$1.00
Single Copy, - - - 25c

Literary Contributions and communications regarding editorial matters together with communications regarding subscriptions, changes of

address, and advertisements should be sent to the Secretary Canadian Forestry Association, Canadian Building, Ottawa, Canada.

The Canadian Forestry Journal is a good advertising medium.

Advertising rates on application.

EDITORIAL COMMITTEE:— Jas. Lawler, Editor; G. C. Piché, Associate Editor; Thos. Southworth, R. H. Campbell, J. M. Macoun, A. Bédard, F. W. H. Jacombe.

Table of Contents

	Page.
Constitution and By-laws of the Canadian Forestry Association	29
Forests of the Oxford House District, N.W.T.	31
Canadian Lumbermen's Association	34
Investigations on Forest Insects and Forest Protection: C. G. Hewitt	35
Stations d'Observation et les Téléphones	38
Stumpage Prices in British Columbia: R. D. Craig	39
Tree Planting in Southern Alberta: A. Mitchell	42
Conservation Hymn: E. G. McDougall	47
Canadian Pulp Woods: J. A. DeCew	48
The Brown-tail Moth in Canada	50
Value to a Farm of a Woodlot: W. F. Payne	51
British Forestry Notes	52
Co-operate to Protect Forests	53
Douglas Fir vs. Yellow Pine	53
N. B. Shade Tree Law	54
C. F. A. Treasurer's Report, 1911	54
A Banker's Statement	54
With the Forest Engineers	55
Notes from the Schools	55
Miscellaneous	55

Constitution and By-laws of the Canadian Forestry Association

Corrected to Feb. 8, 1912.

I. NAME.

The name of the Association shall be: The Canadian Forestry Association.

II. OBJECT.

Its objects shall be:—

(1) To advocate and encourage judicious methods in dealing with our forests and woodlands.

(2) To awaken public interest to the sad results attending the wholesale destruction of forests (as shown by the experience of older countries) in the deterioration of the climate, diminution of fertility, drying up of rivers and streams, etc., etc.

(3) To consider and recommend the exploration, as far as practicable, of our public domain and its division into agri-

cultural, timber and mineral lands, with a view of directing immigration and the pursuits of our pioneers into channels best suited to advance their interests and the public welfare. With this accomplished, a portion of the unappropriated lands of the country could be permanently reserved for the growth of timber.

(4) To encourage afforestation wherever advisable, and to promote forest tree-planting, especially in the treeless areas of our north-western prairies, upon farm lands where the proportion of woodland is too low, and upon highways and in the parks of our villages, towns and cities.

(5) To collect and disseminate, for the benefit of the public, reports and information bearing on the forestry problem in general, and especially with respect both to the wooded and prairie districts of Canada, and to teach the rising generation the value of the forest with a view of enlisting their efforts in its preservation.

(6) To secure such forestry legislation from time to time from the federal and provincial governments as the general interests demand, and the particular needs of the people seem to require.

III. MEMBERSHIP.

Its membership shall include all who pay an annual fee of \$1.00 or a life membership fee of \$10.00.

IV. OFFICERS.

(1) The officers shall comprise an honorary President, a President, a Vice-President, a Secretary, an Assistant Secretary, a Treasurer, the editor of the official organ of the Association and thirty directors.

(2) In addition to the above all past presidents of the Association, from (and including) the Association year 1909-1910, shall be *ex-officio* members of the Board of Directors.

V. ELECTIONS.

These officers shall be elected by ballot at the annual meeting of the Association, and shall serve one year, or until their successors are elected. Vacancies occurring during the year may be filled by the Executive Committee.

VI. EXECUTIVE COMMITTEE.

The officers shall constitute an Executive Committee, and five of the same shall be a quorum, and they will appoint a Vice-President for each province and as far as possible for each provisional district of the Dominion.

VII. ANNUAL MEETING.

The annual meeting of the Association shall be held during the month of February in the City of Ottawa, unless otherwise determined by the Executive Committee of the Association and a notice of one month of the date selected shall be given to each member by the Secretary.

VIII. SPECIAL MEETINGS.

Special meetings shall be held at such times and places as the Executive may decide, a sufficient notice of which shall be sent to each member by the Secretary.

IX. AMENDMENTS.

Amendments of the Constitution can only be adopted by a two-thirds vote of the members present and entitled to vote, and at the annual meeting of the Association, and a notice of such intended amendment shall be given with the notice calling the meeting.

BY-LAWS.

President.

The President shall preside at all meetings of the Association.

Vice-President.

In the absence of the President a Vice-President shall preside at all meetings of the Association; and in the absence of all of them a President *pro tempore* shall be elected by the meeting.

Secretary and Assistant Secretary.

The Secretary shall keep a record of the proceedings of the Association and of the Executive Committee and shall be custodian of all documents, books and collections ordered to be preserved.

He shall conduct the correspondence of the Association and shall keep a list of members with their residences and shall notify members of the time and place of meeting of the Association, and in his absence his duties will be discharged by the Assistant Secretary.

Treasurer.

The Treasurer shall have the custody of all moneys received, and shall deposit or invest the same in such manner as the Executive Committee shall direct, and shall not expend money except under direction or approval of the Executive Committee. The financial year of the Association shall close on December 31st of each year.

Order of Business.

At the regular meeting of the Association the order of business shall be that proposed by the Executive Committee and announced by the Presiding Officer. In the absence of such prepared order of business, the following shall be observed:—

- (1) Calling to order.
- (2) Reading and referring or disposing of letters, accounts, etc.
- (4) Reports of Committees.
- (5) Inquiries and notices of motion.
- (6) President's address.
- (7) Papers, addresses and discussions by members and others invited by the meeting.
- (8) Nomination and election of officers.
- (9) Unfinished and miscellaneous business.
- (10) Adjournment.

Forests of the Oxford House District, N.W.T.

[In the annual report of the Director of Forestry for 1911, recently published, an account is given of work carried on by one of the Dominion fire-rangers, Mr. J. T. Blackford, in the Oxford House district of the Northwest Territories, some distance to the northeast of the present limits of the province of Manitoba. This is a district whose forest conditions are not well known, and the account is therefore reproduced here.—*Ed.*]

Mr. J. T. Blackford, an experienced woodsman acquainted with conditions in the north, was appointed to explore, estimate and map the timber, and act as fire-ranger in the district surrounding Oxford House.

Accompanying this report is a sketch-map made by Mr. Blackford showing the districts which he traversed, and the location of the timbered and burned-over areas. Mr. Blackford travelled south from Oxford House to Minnihik, Clearwater and Rat lakes, and north and east from Oxford House to Fox and Deer lakes, covering in all about 5,433 square miles of country.

About 1,612 square miles of this territory still bears merchantable timber; on about 3,821 square miles all the merchantable timber has been destroyed by fire.

There are abundant evidences that this whole country was originally heavily forested with spruce, tamarack, jack pine, balsam fir, birch and poplar. On the islands, which have been naturally protected from fire, are dense stands of trees two to three feet in diameter, and around some of the lakes are blackened stumps two to three feet in diameter.

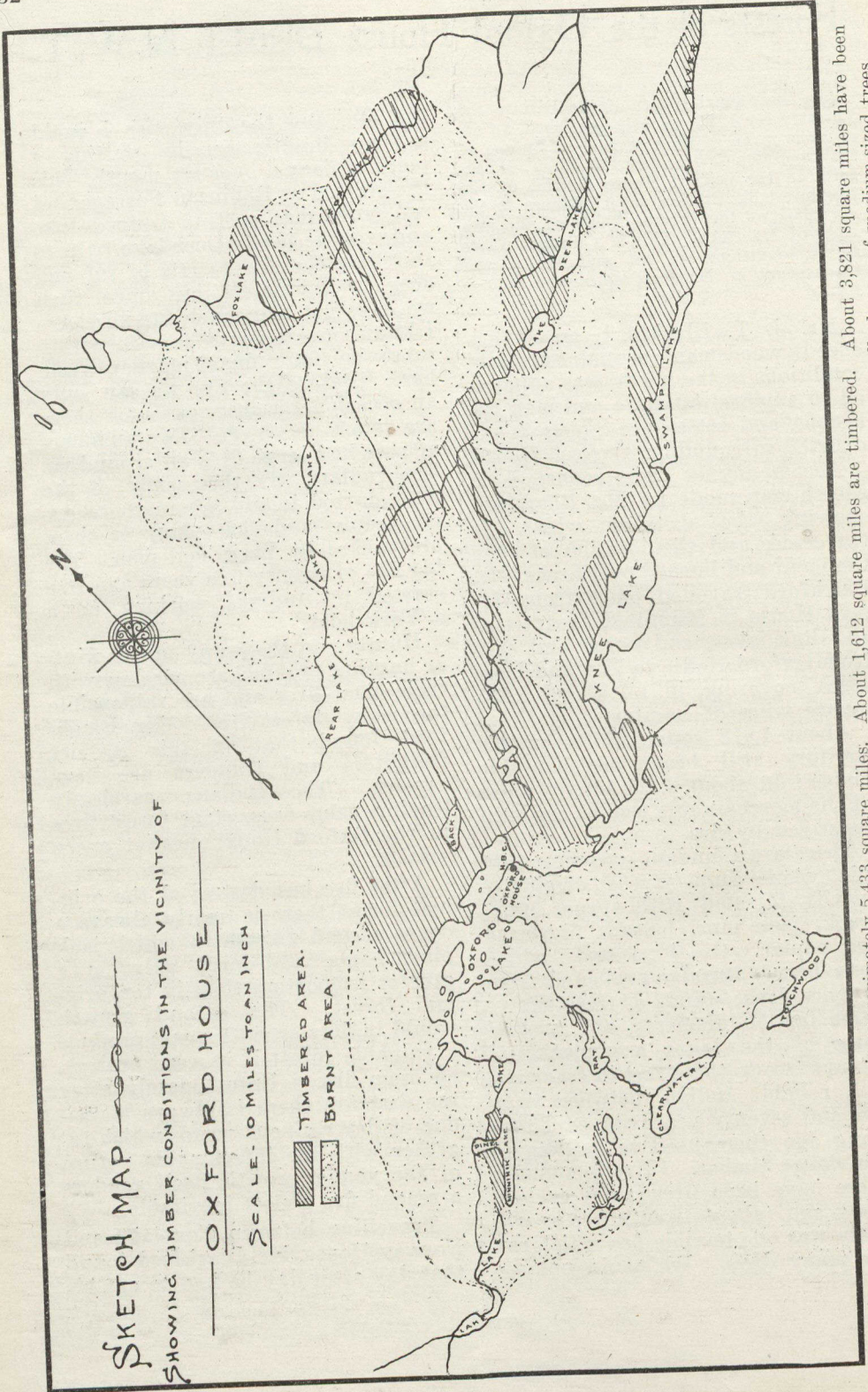
A reliable Indian, between sixty five and seventy years old, said that 'long ago there used to be lots of fine large timber. Every summer there have been fires, more or less. Long ago (about twenty five years) there was one terrible fire which ran for many days. We could not see

the sun, and the only way I could get my breath was by putting a piece of flannel over my mouth. This fire started at Robinson Portage and ran from that east to Oxford lake and west as far as Deer lake. Up to this time there were lots of fur and deer by thousands, but since then we have not had much fur nor have I known one deer to be seen within three or four days journey from here. Before the fire we saw only an occasional moose, but now there are lots.* * * * Two summers ago we had large fires all around us. The Indians say that many of the fires started inland where there are no people, and that many of them are caused by York boat men. The big fire of twenty five years ago was started by Indians working on a York boat.'

Hunters on their way to the winter hunting grounds are careless with their camp-fires and are responsible for many forest fires. Mr. Blackford found that in this district freighters and trappers are very careful. The Indians, carelessly leaving camp-fires, start forest fires in the Oxford House district every season.

After fire has destroyed the original forest there is nearly always a dense second growth in which jack pine, poplar and birch occur in a greater proportion than in the original forest. This second growth would in fifty or sixty years produce a valuable forest if it were protected from fire. Unfortunately after the first fire there is always a residue of dry resinous wood, which together with the inflammable nature of the young growth itself renders a second fire almost inevitable.

Travelling between Fox lake and Norway House, Mr. Blackford found that day after day he had to cut his



The area covered by this map is approximately 5,433 square miles. About 1,612 square miles are timbered. About 3,821 square miles have been burned over within recent years. Some of the burned areas are treeless; others bear very young trees or small clumps of medium-sized trees.

way through fire-killed timber. Fires are driven with such fury in this country that even the rivers are insufficient to stop them. A fire which occurred three or four years ago burned both sides of the quite wide Fox river. Repeated fires destroy all seed-trees, all seed and much or all of the rich upper layers of soil and render it impossible for another valuable forest to start naturally, except after a long period of time. Mr. Blackford observed that this had been the case over large areas in the Oxford House district, that the whole country had been fire-swept many times, chiefly within recent years, that the soil had been impoverished, that where there had been valuable stands of spruce and tamarack there was now nothing but willow, poplar, birch and scattered small spruce. Where fires had been exceptionally fierce or frequent, the country was burned to prairie. Tamarack seems not to be coming in after fires, but where fires have not been frequent there is good natural reproduction of spruce and jack pine, the jack pine usually occurring on the ridges.

On several extensive trips Mr. Blackford never saw the limit of the burned area. Fires have evidently been much more frequent in the country tributary to the routes followed by the York boats than elsewhere.

The muskegs carry fire and have nearly all been burned over.

During the summer Mr. Blackford found no commercial timber of any quantity, but he states that, except for fire, the whole country would be covered with timber two or three feet in diameter.

Around Knee lake, along Loaf river, around Nest lake, Mossy lake and God's lake, there is timber five to six inches in diameter—spruce, tamarack, poplar and balsam fir. On the islands in these lakes timber is two to three feet in diameter.

Around Oxford lake the timber is all of very recent growth.

On the shore of Minnihik lake, where it has been naturally protected from fire, is about two hundred acres of the best timber in the country.

One small grove of timber near Rat lake contained spruce trees thirty eight inches in diameter and eighty feet high. There were here 320 trees per acre over seven inches in diameter, and 844 trees over four inches in diameter. On a jack pine ridge there were 775 trees per acre over five inches in diameter. These small patches are typical of what the whole country would be if it had not been burned.

On the shore of Minnihik lake there is a strip of timber five miles long and three quarters of a mile wide, containing trees from eight to twenty inches in diameter, and about seventy five feet high.

For twenty miles northeast from Oxford House there is a strip of timber, mostly spruce with some jack pine and very little tamarack and balsam fir, averaging from eight to ten inches in diameter. Along the Deer river there has been good timber, but it is all burned. Around Deer lake there is a belt of scrubby spruce twenty five miles wide.

It has been represented by travelers following Fox river that the river flowed through timber. Mr. Blackford found only a very narrow fringe of trees along the shores; behind these the country has all been burned. The Indians near Fox river say that as far as they have travelled in any direction the country is all burned. Between Oxford House and Norway House the timber is larger than any near or north of Oxford House. Unfortunately the best of it has been burned. There is much poplar along the waterways.

Mr. Blackford attended the council meetings of the Indians at God's lake and Oxford House. He explained that the government was sending out men to protect the forest from fire, and that it was to the interest of the Indians to prevent and ex-



[Photo J. T. Blackford, 1911.]

Norway House Indians Taking Pledge to Help in Prevention of Forest Fires.

Chief and Councillors in Foreground.

tinguish all fires. The chief and councillors spoke in favour of the work and the Indians seemed during the summer afterward to have been very much impressed and to be acting more carefully than usual. The Hudson's Bay man in charge of the post at God's lake said early in 1911 that he did not know of a single fire started by the God's lake Indians in 1910. This was a most unusual record and he attributed it to the presence and influence of the Dominion fire-ranger.

Mr. Blackford gave the boys at the Indian school at Oxford House a talk on fires and how they were to be prevented. He spoke also to headmen of the York boats, and had them promise to be more careful in the future.

The Indians throughout the district depole the burning of the forest and feel very doubtful about their future should fires continue to destroy the forest and the game.

Mr. Blackford suggests that the Indians may be encouraged to be careful with camp fires if they are given a little badge to wear as In-

dian volunteer fire rangers. Badges have been supplied to the Indians in the Oxford House district.

Timber and game will, for a long time at least, be the chief products of the Oxford House district. There is but little of the territory fitted for agriculture, there are so many ridges, muskegs, streams and lakes. It is, therefore, very important that the timber should be protected from fire.

Canadian Lumbermen's Association.

The Canadian Lumbermen's Association held their annual meeting in the Board of Trade Chambers, Ottawa, on February 6. The president, Lt.-Col. J. B. Miller, of Toronto, being absent, the chair was occupied by Mr. Alex. MacLaurin, of Montreal. About forty members were present. Among other topics the matter of uniform grading rules was discussed, and a committee was appointed to consider the matter and report. The election of officers resulted in the choice of Mr. Alex. MacLaurin, Montreal, as president, Mr. Frank Hawkins, Ottawa, as secretary, Mr. R. G. Cameron, Ottawa, as treasurer, and J. S. Gillies, Braeside, Ont., J. C. Browne, Ottawa, Ont., John Hendry, Vancouver, B.C., and D. C. Cameron, Winnipeg, Man., as vice-presidents.

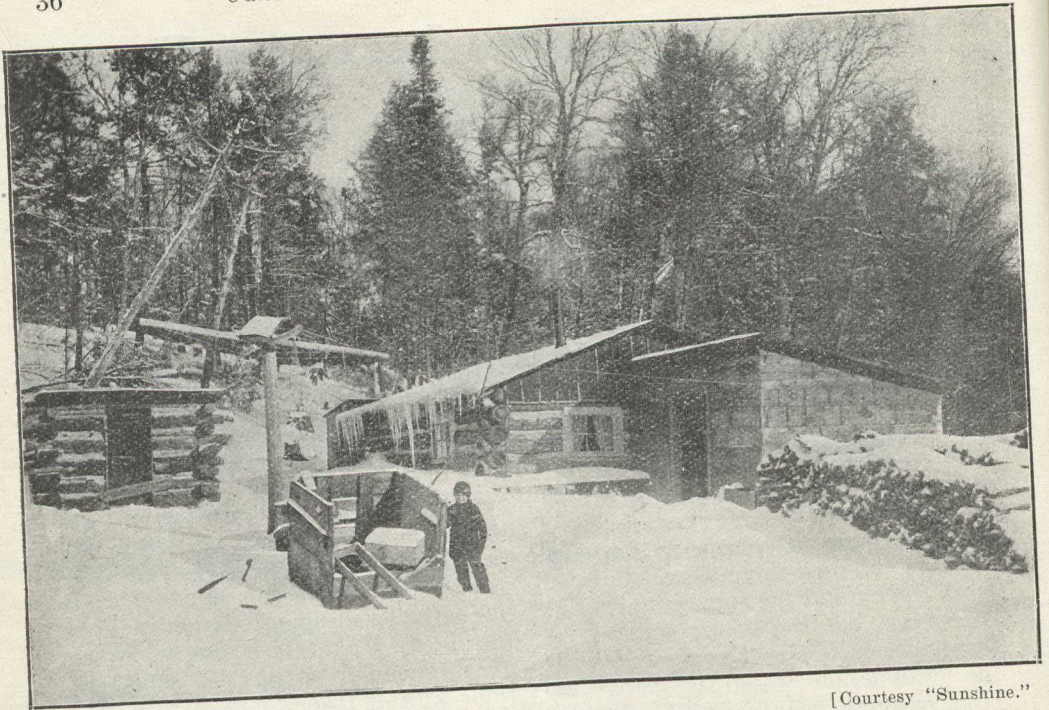
Investigations on Forest Insects, and Forest Protection.

By C. Gordon Hewitt, D.Sc., Dominion Entomologist, Ottawa.

The problem of the protection of Canada's forests resolves itself into a question of controlling the destructive agencies. Of these fire, being so obvious in its outbreaks and spread, is receiving increasingly great attention in Canada. Not less serious, though usually unnoticed and very frequently attributed to other causes, are the depredations of forest insects which up to the present time have received practically no attention in Canada. We have studied the outbreaks of the larch sawfly and the spruce budworm, it is true, but the injury caused by these insects is slight compared with the destruction which is going on from year to year owing to the depredations of a number of species of widely spread bark beetles which destroy the trees by attacking the bark. Their depredations are frequently closely associated with destruction by fire and are often mistaken for it. When they do not kill the trees before the advent of fire, thereby rendering areas more combustible, they weaken them beyond the recuperative stage, or they may follow fire and bring about the final destruction of timber which might otherwise have recovered.

At present little or no information is at hand as to the extent of the destruction of Canadian forests by these insects, owing to the fact that no attention has been paid to these destructive agencies; consequently, in discussing this question, it is impossible to give actual instances. We have only to go into the neighbouring states of the United States, however, where considerable attention has been and is being paid to the depredations of forest insects, to find evidences of great destruction by them. A few

instances mentioned by Dr. Hopkins, who is in charge of the forest insect investigations of the United States Bureau of Entomology, may be mentioned. The Douglas fir throughout the region of the Rocky Mountains from New Mexico to British Columbia has suffered severely from the ravages of the Douglas fir beetle, with the result that a large percentage of dead timber is found, much of which will be a total loss. During the past fifty years the Englemann spruce beetle has caused widespread devastations in the Rocky Mountain region to forests of Englemann spruce, in some sections killing from 75 to 90 per cent. of the timber of merchantable size. In the Black Hills National Forest of South Dakota it is estimated that during the past ten years more than a billion feet of timber have been destroyed as a direct result of the work of the Black Hills beetle. Speaking of the Eastern spruce beetle, Dr. Hopkins states that during the period between 1818 and 1900 there were several outbreaks of this insect in the spruce forests of New York, New England and south-eastern Canada. It caused the death of a very large percentage of the mature spruce over thousands of square miles. In the aggregate many billions of feet of the best timber were destroyed and the larger areas of this dead timber furnished fuel for devastating forest fires with the result that in most cases there was a total loss. In his report for the year ending June, 1910, Dr. Howard, the Entomologist of the United States Department of Agriculture, and Chief of the Bureau of Entomology, in reporting on forest insects, says: 'The principal depreda-



[Courtesy "Sunshine."]

A Typical Lumberman's Camp.

tions of the year have been by the *Dendroctonus* beetles on the pines, spruce and Douglas fir of the Northwest and Pacific Coast and on the pine of the Southern States. As knowledge increases of the actual losses of merchantable timber caused principally by these beetles, it appears that former estimates have been conservative and that these beetles are in fact one of the principal factors in causing the enormous continued waste of the most valuable timber resources of the Rocky Mountains and Pacific Coast regions and of the Southern States.'

What is true for the Rocky Mountain and Pacific Coast regions of the United States is also undoubtedly true for the corresponding regions in Canada and likewise for the northern forests of the Dominion. It is owing to the fact that in Canada there has not been given the attention to these destroying agencies that their importance demands that so little information on the subject has been

acquired and their destructive powers are so little realised.

We are now endeavouring to obtain all the information possible as to the depredations of these bark beetles and other forest insects, in order to be able to investigate these destructive factors thoroughly. The Division of Entomology of the Federal Department of Agriculture has been strengthened by the appointment of Mr. J. M. Swaine, M.Sc., B.S.A., formerly lecturer in Entomology at Macdonald College, Que., as Assistant Entomologist, to devote his entire time to the study of forest insects. Mr. Swaine's extensive work and investigations on the bark beetles have made him one of the two chief authorities on these insects in North America, and he is now engaged in studying the distribution of the various species of bark beetles and their life-histories. A thorough investigation of their life-histories and habits is necessary, as it is upon the facts so ascertained that control measures are based. Different

species may be vulnerable at different periods of their life-history and at different times of the year.

There has been rather a tendency, unfortunately, on the part of practical lumbermen and foresters to doubt the practicability of measures of control for bark beetles, not to mention other forest insects. Practical demonstrations, however, are now convincing them that the trees can be treated for bark beetles and that large areas can be protected. Excellent demonstration work of this kind is being carried on in the United States by Dr. Hopkins in co-operation with the United States Forest Service, private owners and other bodies. In one locality in Montana 10,000 trees were treated in 1909 with the result that in 1910 instead of the former death-rate of more than 10,000 trees annually, only 2,000 trees required treatment within an area of over one hundred square miles. This control work cost nothing, as the utilization of the treated trees for fuel and lumber more than repaid the cost of treatment. Reviewing the control work in the Rocky Mountain region, Dr. Howard states that since 1902 over 155,400 trees have been treated at an ultimate cost of \$31,211; 114,607 trees having been utilised so as to more than cover the cost of treatment, while 44,519 trees were treated at a direct expense of \$30,925. It is estimated that the timber saved as the direct result of this control work represents a stumpage value of over \$2,000,000. 'It is significant,' Dr. Howard says, 'of the practical nature of the methods of control recommended by the Bureau and of the practical demonstrations that have been carried on that no complaints of depredations have come to the Bureau during the year from the areas in Colorado and Montana, where control work was carried on in previous years according to the instructions of the Bureau.' To those who are acquainted with the extent of the depredations of bark beetles in Canada the fore-

going reports of successful control work under forest conditions not dissimilar from our own are a source of great encouragement in the work before us of controlling these serious destructive agencies. The most important requisite now is the cordial support and co-operation of all who are connected with the forests without which co-operation our work cannot succeed.

The following circular has been drawn up and is being sent to as many as possible of the persons who are engaged in forestry work in Canada. Mr. R. H. Campbell, Director of the Forestry Branch of the Department of the Interior, who is co-operating with the Division of Entomology in this work, is issuing this circular to all the officers of the Branch.

1. The Division of Entomology requests your assistance and co-operation in obtaining information upon the species of insects injurious to our forests, the extent of the injuries caused by them, and other information valuable in their control. We wish to be notified of any outbreaks of forest insects known to, or observed by, you, so that studies may be made of the habits of the beetles, or control measures adopted.

There have been for some years, and are at present, numbers of serious outbreaks of destructive bark-beetles in the United States forests. Such occurrences are to be expected in Canadian forests at any time. We wish to obtain information, essential to obtaining a knowledge of their control, as rapidly as possible.

2. It is particularly important at the present time to obtain all information available upon the species and habits of the bark-beetles (*Scolytidae* or *Ipidæ*) injurious to our forest trees. Special studies are also being made of other bark and wood-boring beetles and caterpillars; and any assistance in obtaining such material, or notes upon the occurrence and habits of such insects, will be very helpful.

The simplest method of collecting and shipping material is to wrap carefully sections of the bark or wood, containing the beetles, and showing their tunnels and borings, in strong paper and ship in a box or as a wrapped package. This should be addressed to 'The Dominion Entomologist, Central Experimental Farm, Ottawa,' and may be mailed 'Free.' Parcels up to 5 lbs. in weight may be mailed

(Concluded on page 47.)

Stations d'Observation et les Téléphones.

(Extrait du Rapport du Ministre des Terres et Forêts de la Province de Québec, 1911.)

La 'River Ouelle Lumber Company' rapporte que son service téléphonique a été constamment en usage et que cela a été extrêmement utile. Cette compagnie, vu probablement que ses concessions forestières occupent un terrain comparativement plat, trouve que le service téléphonique est plus pratique et plus utile que le système d'observation. Dans tous les cas cela lui donne satisfaction.

La compagnie Jno. Fenderson, qui a installé l'année dernière une bonne station d'observation, rapporte qu'elle en a obtenu de très bons résultats cette année.

La 'Charlemagne and Lac Ouareau Lumber Co.' a érigé un très bon poste d'observation sur la montagne du Lac Ouareau, et le rapport que fait le chef des gardes-feux de la compagnie est si clair que j'ai cru à propos d'en donner ci-dessous un résumé :

'Suivant des ordres reçus de monsieur A. MacLaurin, j'ai construit durant l'été que nous venons de passer, une station d'observation au sommet de la montagne du Lac Ouareau.

Le poste est situé sur le côté ouest de la baie, à l'extrémité sud du lac et à une élévation au-dessus du lac, de 800 pieds, d'après les calculs de l'honorable juge Fortin. Vers l'est on peut voir loin dans le comté de Berthier, au nord, à une grande distance qui n'a pas encore été déterminée, au sud et au sud-est on peut voir de l'autre côté du fleuve Saint-Laurent, et même, dans un temps clair, on peut distinguer la montagne de Belœil; à l'ouest on peut voir sur toute la largeur du comté de Terrebonne, en certains endroits la vue au nord-ouest est la moins étendue.

Le poste d'observation est divisé en sections, la partie inférieure est aménagée comme une habitation pour le garde résidant, les deux étages au-dessus sont des appartements, et en

haut la tour d'observation. Chaque étage a dix pieds de hauteur, la hauteur totale du poste est de 55 pieds, et la superstructure est disposée de manière qu'un homme peut monter sur le toit si c'est nécessaire. A la base les dimensions sont de 24 pieds carrés, montant en rétrécissant jusqu'à neuf pieds carrés. Toute la structure est solidée par des étais en câbles d'acier, partant des coins au dernier étage. Un escalier relie chaque étage avec l'étage supérieur.

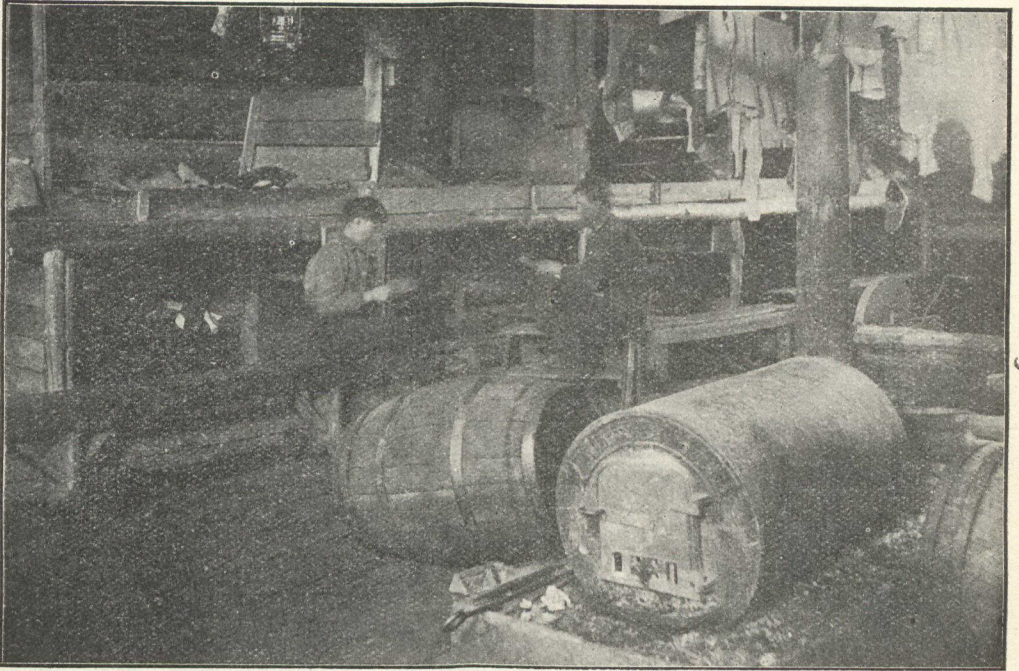
Un monsieur, de Welmington, Del., E. U. A., qui a visité le poste, disait qu'il n'avait jamais vu de point de vue comme celui que l'on peut avoir du haut de la bâtisse; qu'elle était admirablement située et que cela serait d'un grand avantage pour la protection des forêts.

Le poste est à environ un mille et demi du chemin principal, et l'appareil téléphonique qui doit le relier avec les centres est tout prêt à être installé; quand il sera en opération nous pourrons communiquer avec plusieurs points, entre autres, avec le bureau chef de la compagnie, à Montréal.

Je crois ne rien exagérer en disant que ce poste vaut quarante hommes stationnés comme doivent l'être nos gardes, et que l'on ne saurait trouver de meilleurs moyens de protéger les forêts qu'en construisant de ces stations d'observation partout où l'on peut en mettre dans les terrains boisés, car l'on peut ainsi indiquer aux hommes, par téléphone, le plus court chemin à prendre pour se rendre à un commencement d'incendie que l'on aurait aperçu du haut du poste.

Le poste est muni de table, compas, lunettes télescopiques, etc., et j'aimerais le voir inspecter par un officier du gouvernement.

(Signé) T. W. WAY.



[Courtesy "Sunshine."]

Interior of a Lumberman's Camp.

Stumpage Prices in British Columbia.

By Roland D. Craig, F. E.

There are two ways of determining the value of stumpage; one is the price for which standing timber may be bought, and the other is the net profit that can be obtained after deducting the cost of logging and sawing from the price of the manufactured product, i. e., the lumber, shingles or pulp. The difference between these two values varies greatly, and in British Columbia there appears to be very little relation between the two.

Until about five years ago standing timber in British Columbia had practically no sale value. The Government gave the timber to anyone who was willing to pay the ground rent, and it was not to be expected that purchasers would pay much of a bonus to private timber-holders when they could stake other limits

themselves, but since the reservation by the Government of what little timber it had left in 1907 the sale value has risen at the rate of about 100 per cent per annum. At that time good available stumpage could be bought at from 15c to 25c per M., which is now selling for from 75c to \$1 per M. In some of the recent sales the price has been as high as \$3 per M, but it is yet possible to buy some of the very best timber in the province for \$1.50 or less per M.

In comparison with the price in other North American districts, British Columbia stumpage is still abnormally low. Pine in Ontario and the Northeastern States sells readily at from \$8 to \$10 per M, and southern pine at \$2.50 to \$4; and Washington timber similar to that of British Columbia, only as a rule

not so accessible, at from \$2.50 to \$5 per M. The assessed value of the timber in the State of Washington averages \$2 per M, and this is always considerably below the sale value.

That these differences will be eliminated in the near future is certain. One of the chief reasons is that the supplies in the East are diminishing rapidly, and the centre of timber production is moving west. The cut of white pine in the United States has been reduced from 7,742,000,000 b.f. in 1900 to 3,900,000,000 b.f. in 1909; of hemlock, from 3,421,000,000 b.f. to 3,032,000,000 b.f., while that of Douglas fir has increased from 1,737,000,000 b.f. to 4,856,000,000 b.f. and Washington has jumped from sixth place to first as a lumber-producing state. Another reason is that so much of the British Columbia timber is located directly on protected arms of the sea, that logging operations and shipping can be carried on at all times of the year. The increased railway facilities furnished by the Grand Trunk Pacific and the Canadian Northern and the completion of the Panama canal, will remove a handicap which British Columbia has suffered in competing in eastern markets. Then, again, the size and quality of the British Columbia timber cannot be obtained elsewhere except in the Pacific States. The damp climate and broken topography of the country renders the fire risk less than it is with almost any other timber in North America.

From the standpoint of the investor, the tenure under which the bulk of the timber is held is very attractive. The owner may now hold the licenses in perpetuity, or as long as there is merchantable timber on them, or they are not required for agricultural purposes. Settlers are not allowed to homestead, purchase or squat on licensed lands, thereby eliminating one of the greatest sources of trouble and loss from

which Eastern Canadian lumbermen suffer. An annual ground rent of \$140 is charged for coast timber, \$115 for interior timber, and this amounts on the average to, approximately, one cent per M. The largest part of the taxation is reserved until the timber is cut, as it should be. This gives the Government an interest in the timber to the extent of 50c per M, and is a great stimulus to Government co-operation in forest protection. This reservation of the 50c royalty is practically a loan to the investor of that amount of money without interest for an unlimited time. On an average stand of 20 M per acre, this loan amounts to \$10 per acre, and the interest saved to the investor at 6 per cent is 60c per acre, or about three times as much as the ground rent. The lumbermen of Washington are trying to have their taxation arranged in this way, on the ground that high annual taxation forces early and wasteful logging.

The only practical way of studying stumpage values, however, is by comparing the net values after deducting the cost of manufacture from the prices of lumber. This may be called the absolute stumpage value. Canadian data on this point have not been collected, but in Bulletin 122 of the U. S. Forest Service the report of a careful investigation of prices between the years 1899 and 1906 is given. In spite of the increased efficiency of logging machinery, there is no doubt that the cost of labor is increasing, and the timber logged is less accessible, so that \$2 to \$2.25 should be allowed for increased cost of manufacture during that time. It was found that the average mill value of fir increased from \$8.67 per M in 1899 to \$14.20 per M in 1906, which, after deducting \$2 for increased cost of manufacture, shows a net increase of \$3.53, or an average of 50c per annum. Cedars increased in the same time from \$11.68 to \$19.27 per

M and, allowing \$2.25 for increased cost of manufacture, there is left a net increase of \$5.34, or 76c per annum. It is confidently expected that the census of 1910 will show that the same rate of increase has been maintained.

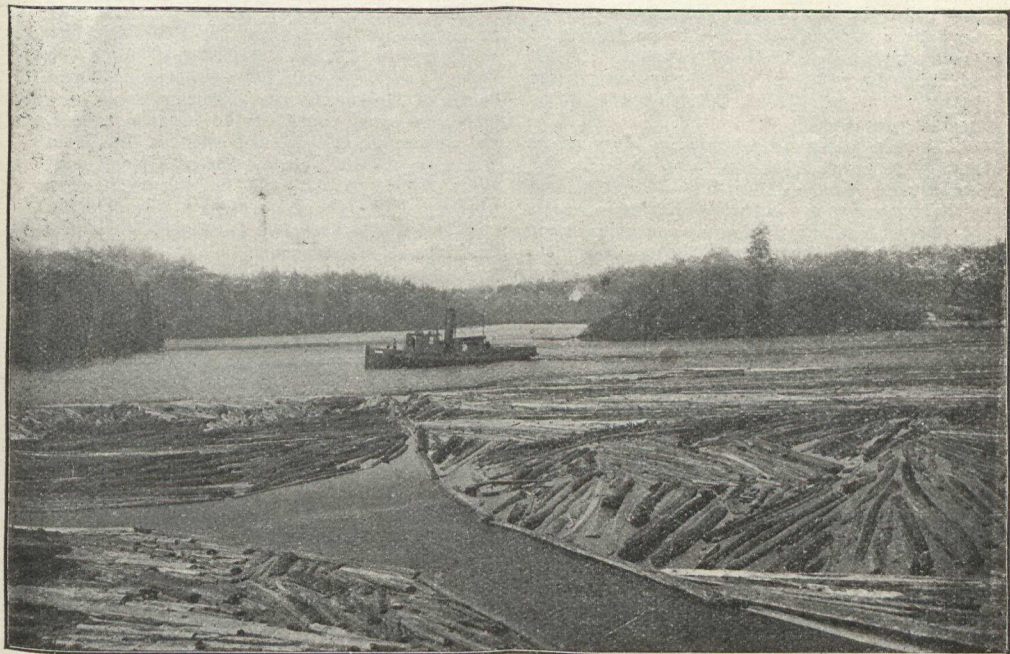
In predicting the future, the chief guides are past experience, supply and demand.

Canada and the United States are so interdependent that what affects the one must affect the other, and we must consider the increasing demand which the Republic is bound to make on us. It is estimated that at the present rate of cutting (about one hundred billion feet, including all forest products) the United States has sufficient wood to last only twenty-five years, and, according to the estimate of the Hon. Clifford Sifton, we have in Canada only 500 billion feet, or enough to supply that demand for five years. Further exploration may, in the opinion of the writer, bring this estimate up to about 700 billion feet.

Of this amount, about 300 billion feet is in British Columbia.

With the rapid growth of population and development of industries, the consumption of wood is increasing rapidly. The increase in the cut of 1909 over that of 1900 in the United States was 27 per cent. It is estimated that less than one third of the consumption is being replaced by new growth, so that we must expect to be called upon to supply an increasing demand. Not only do we have to consider the demand in the home and the United States markets, but our lumber trade with Australia, the Orient, and Europe is each year assuming larger proportions.

The only inference is that stumpage values must continue to rise, and that British Columbia timber, which is so exceptionally well situated to supply the markets of the world and is at the same time the cheapest to buy and carry, offers an unparalleled opportunity for investment.



Booms of Logs.

[Courtesy "Sunshine."]

Tree Planting in Southern Alberta.

By A. Mitchell.

Of all the prairie provinces, Alberta has the greatest variety of climate; and it is well worth the while of anyone who contemplates planting to endeavor to get a thorough understanding of the particular set of conditions which will apply to his locality. The thorough preparation of the land previous to planting is necessary everywhere, as in the other prairie provinces, and so, too, is the after cultivation; only, in southern Alberta, with a somewhat lesser rainfall and more dry winds, there is a greater need to conserve the moisture, and consequently the value of cultivation at the right time is more apparent. The kinds of trees suitable vary in the several districts, and when a man is planting it will pay him well to plant only what is likely to succeed.

The 'Chinooks.'

The warm Chinook winds coming over the mountains from British Columbia are the cause of many a pleasant gap amid the rigors of winter, and they have been blamed for a great deal of tree-killing they never were guilty of. The trouble usually arises from faulty cultivation. The influence of the Chinooks is usually considered to extend from the boundary line to a distance of about fifty miles north of Calgary. North of this, the winters are steady and differ little, if at all, from those of the other prairie provinces.

The rainfall in the Chinook country is, as a rule, a good deal less than it is in the north, and ranges from about thirteen and a half to nearly eighteen inches. North of the Chinook belt the precipitation runs from eighteen inches up to as high as twenty-seven inches in some years, and, as a great part of the country is bush, a set of conditions prevails which differs very much from that met with in the south.

The Chinooks have been blamed for doing damage to trees in this part of the country by inducing an untimely flow of sap in the late winter or early spring, which, when followed by a sudden drop of the temperature immediately afterwards, ends in disaster to the trees. This may be true, but the writer has never seen it. What looks like it, and is often mistaken for it, is the fact that sometimes the buds swell toward spring, but advance no further, and the branches bearing them die, because there was not, at the roots of the tree, moisture enough to enable them to supply what was necessary to keep up the growth. It is only a question of

moisture, and where trees are irrigated properly or cultivated thoroughly, there is never any trouble from this source, and in the Chinook country, as in all the rest of the prairie, it will be found that the man who cultivates best in the summer is the one whose trees best survive the winter. This has been proved over and over again.

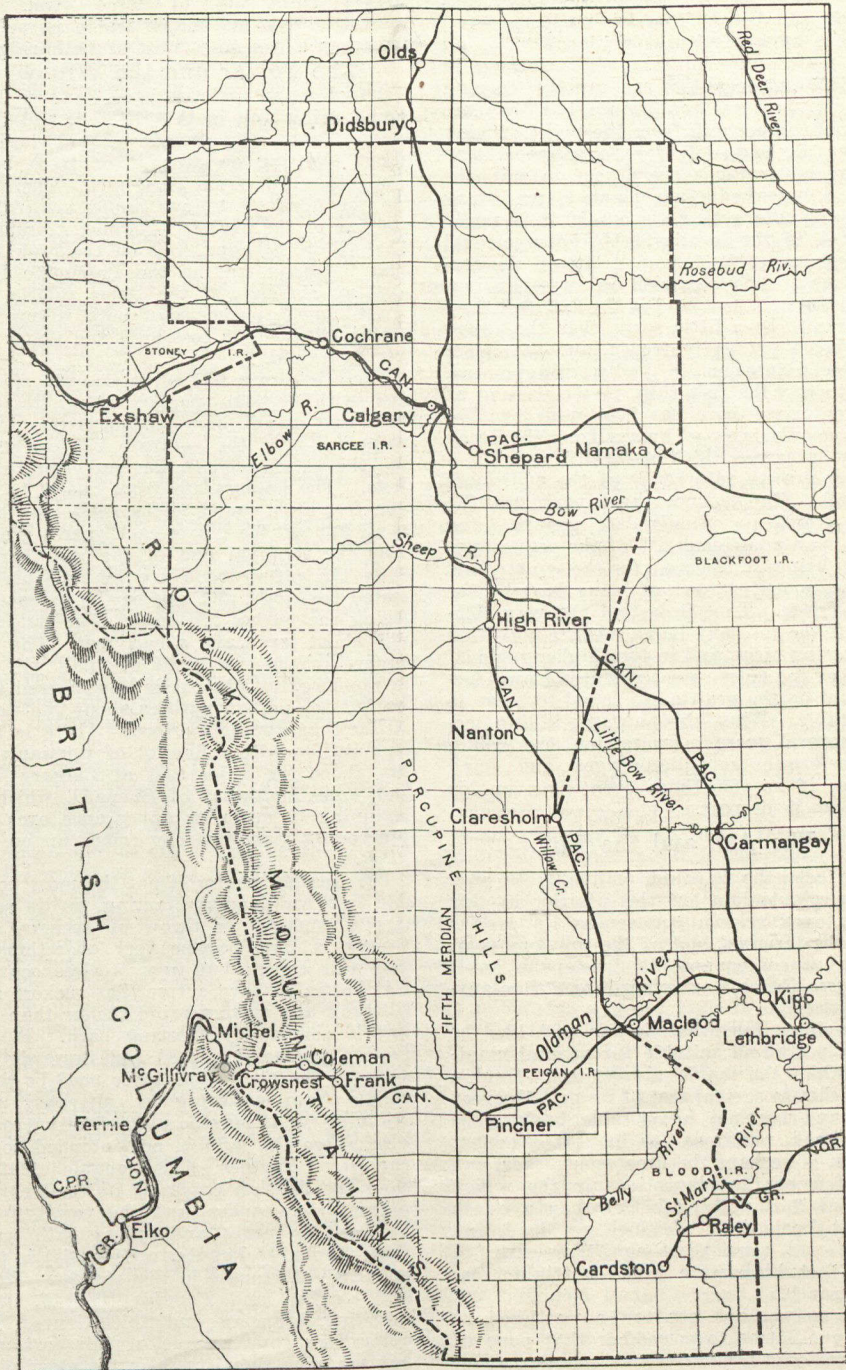
The 'Higher District.'

But the Chinook is not the only thing that influences the climate of southern Alberta. Another feature bears very materially on this subject, especially in relation to tree-growing, and that is the rapid slope upward as you approach the mountains. From Medicine Hat, at a height of about 2,171 feet above sea level, to Calgary (only about 150 miles west) there is a rise of 1,257 ft., and from Macleod westward the rise is even more rapid, for the altitude of that town is about 3,208 feet, while Pincher Creek (only thirty miles further west) is some 600 feet higher. Conditions like these cannot fail to have an influence on the climate, and not infrequently these higher regions are visited by a touch of frost several weeks earlier than the country further east.

This 'higher district' of the province may be defined as lying from the boundary line north to about Olds, a distance of some 200 miles; and includes all the country west and south of Spring Coulee, Pincher Creek district, west and south of the Piegan reserve, the Porcupine Hills, and west of a line from Staveley on the Calgary-Macleod line, running NNE, to Namaka on the main line of the C.P.R.; thence west of a line between ranges twenty-three and twenty-four till the bush country is reached.

All the country included in this area may be classed as the 'high country' from an arboricultural point of view, and it will be found that trees which do quite well further east do not always succeed here.

The sudden rise from the Pacific, as is well known, causes the moisture-laden breezes from the ocean to lose their moisture almost entirely as they come over the mountains; so that the western slope is very wet, while east of the Rockies the rainfall is very small. Not all of the rain-clouds are deposited on the western slope, however, for frequently during the summer the skirt of a cloud may be seen coming over the summit to fall in rain on the higher prairie and the foothills, which are in this way usually blessed with a considerably better rainfall than the flat country further east. (The prairie



Map of the 'Higher District', Alberta.

The broken line marks the boundaries of the district.

rains, unless in the case of thunderstorms, are almost always from the north.)

From an agricultural point of view all these matters are important, and farmers in the different localities are rapidly learning to meet the local conditions; but they are far more important from the point of view of the silviculturist, for the farmer may change his methods every year to suit the seasons, but when a man plants a tree it may be years before he finds out if it is really adapted to the locality. If the occasional showers are continued until late in the season, tree growth is carried on correspondingly late into the fall, and if the first fall frost happens to be a little early, then the young tree-shoots get badly frozen, and the owner of the plantation is badly disappointed. Add to this the fact that, in the passing of the centuries, there has been added to the soil a goodly layer of humus from the decay of the grasses, which naturally took on a greater growth as a result of the additional rainfall. Humus encourages rank growth; rank growth is usually late growth, and there is an additional risk of the young tree-shoots being unprepared for the winter, and the consequent danger of being hurt by the early frosts. Thus it is that the very richness of the soil may be an adverse condition to growing trees, and in the 'higher regions' many of the trees so successfully grown further out on the prairie are found to be quite unsuitable. When this 'autumn killing' occurs several years in succession, the would-be tree-grower gets discouraged, and small wonder if he sometimes even gives up his attempts in despair.

The Ash and the Elm.

The ash, the hardiest of the trees used in the plantations on the prairie, in this region very seldom commences its growth from the terminal bud of the previous year, and as a consequence it develops a habit more resembling a sweeping-broom than anything else.

The elm is somewhat similar, and, like the ash, is not at all suitable for general planting; while the maple always loses from a few inches to several feet of its growth every year, and becomes a veritable bush. The cottonwood, notorious for its soft succulent growth, is perhaps the greatest sufferer, and in a few of the plantations in the region specified it is nothing better than a bunch of root-shoots, half of which are dead, and in one case, some years ago, trees seven to eight feet high were killed outright, root and branch.

This is perhaps not to be wondered at when one comes to remember that none of these varieties are native to the region under consideration. They are found in the river bottoms all over the prairie to the east, but they never seem to have been able to climb the last sharp rise towards the mountains. The ash comes no further west than the

Cypress Hills, south of Maple Creek, while the cottonwood and maple are found no further than a few miles west of Lethbridge.

The Poplar and the Willow.

Two Russian varieties have, however, been found doing well in this district, and there is no reason why anyone should hesitate about planting on account of trees being likely to suffer from frost-hurt. These are the sharp-leaved willow (*Salix acutifolia*), and one of the poplars (*Populus Petrofski*). The willow is doing well on the high land near Cardston, and in the Porcupine Hills west of Staveley, at the Oxley ranche, are several good specimens of both willow and poplar twenty-four feet high and about sixteen years old.

There is also a fine seven-year-old plantation with Russian poplars about thirteen miles east of Didsbury, and it is very interesting to note the contrast between them and the cottonwood in the next row beside them. The poplars are from twelve to sixteen feet high, sound to the tips,—and have to all appearance begun each year's growth from the terminal bud of the year before, while the cottonwoods are bushy from repeated freezings, and half of the stems composing the bushes are dead. The tallest is only about seven and a half feet. The difference in the two kinds of trees will not be wondered at when it is remembered that the Russian poplar matures about two weeks earlier than the cottonwood. There is also a plantation with a fine lot of Russian poplars about ten miles east of Calgary and four miles southeast of Shepard, which is beginning to make its appearance over the intervening ridges as one comes up on the C.P.R.

The Russian poplar is not the most desirable tree for general planting, as its roots have a tendency to throw up suckers, and it may in time become very objectionable from this cause; but in a treeless country it is better to have a tree that suckers and will grow and make a rapid shelter than one that is continually freezing back. If the Russian poplar is placed well towards the inside of the plantation, there need be little trouble from suckering in cultivated land adjoining, or it may be planted in narrower belts where the land is not intended to be cropped. Another objectionable feature about the Russian poplar is its tendency to contract stem-canker, and the variety with the erect branches and leaves with wavy edges (probably *Populus certinensis*) is particularly unfortunate in this respect. *Populus Petrofski* and *Populus Wobstii*, with spreading branches and thick leaves, are pretty free from trouble of this sort, and they are good sound trees in the older plantations at the Indian Head and Brandon Experimental Farms.

When the tree is left alone for nature to prune, there would seem to be little danger of this sort of trouble; but when a man

gets impatient to see a clean stem and cuts off the lower branches, that tree very frequently becomes cankered. In most cases it is best to leave well alone and let nature remove the branches and develop a clean bole in her own way.

Mixing the Trees.

Although maple (*Acer Negundo*), American elm and green ash are not the success in the higher districts of Alberta that they are further east, it does not follow that they should be left out entirely from the plantations. They are very good trees, and, as hardwood timber is very useful on the farms, it will always be worth while planting a few in with the others. As the plantation grows up and affords them the necessary shelter, they will no doubt ultimately succeed and become fair-sized trees. Maple, especially, should always be included in a plantation, even in the higher districts of Alberta, for it furnishes the soil shade so necessary for good growth.

In examining some plantations recently in this district, the writer found its soil-shading advantages brought out very well in several places. Timothy seed had blown in from the neighboring hay-fields and in every case, where the maple was in its normal bushiness, the grass had made no headway, but was choked out by the shading of the trees; while all around, among the elm, ash and cottonwood, it was quite flourishing.

A good mixture for the high country would be, in a plantation of fifteen rows wide, i.e., 22 yds., M.M.W.M.RP.M.RP.M. RP.M.W.M.W.M.M. Every sixth tree of the maple rows would be ash or elm. In this mixture there would be ample provision for soil shade and a few of the more valuable ash and elm would be introduced so that they might by-and-by work their way up as they found themselves sheltered by the other trees. The Russian poplar would be well inside the plantation and away from any danger of suckering in the adjoining land.

Preparations for Planting.

The question of water supply is the real crux of the situation in regard to tree growing, as it is in all other crops on the prairies, and in southern Alberta, with such a low rainfall, its conservation is of first importance.

This makes necessary the preparation of the soil previous to planting by breaking and back-setting and thorough fall-working on raw sod land, or summer-fallow on stubble. This preparation mellows the soil, reducing it to a fine tilth so that it will carry the maximum of moisture over to the following year when the trees are planted.

The time for breaking is important, and the best time for breaking may be defined as being in the 'flush of the growing season,' i.e., from about the middle to the end of

May. Sod, when turned over at this time, rots readily, but it must be laid flat and it will pay even to run a roller over it in order to lay it right down.

It should not be disked immediately after breaking. This is a practice which may be all very well for winter wheat, but it makes a very poor preparation for trees. About six weeks after the sod is broken it should be quite well rotted and should be back-set; and the plow should run about two inches deeper than the breaking. The soil thus broken up should at once be disked and worked up, and, as soon as it so worked, back-set. Leaving it even for a day allows the escape of far too much moisture and it is much more difficult to work afterwards. A deep plowing and further working in the fall will leave it in fine shape for taking trees in the spring.

Keep Out the Grass.

When back-setting is left longer than six weeks, the little spears of perennial grass-roots which may be unrotted get a chance to grow, and later on will cause a lot of extra work in the plantation. If any of these little grass patches do appear among the trees, it will always pay well to fork them right out and destroy them. They are not deep, only about four inches, but a cultivator or a hoe is of no use in dealing with them. A fork or a spade is the only sure cure, and half a day spent the first summer after planting will often be time well spent.

Summer-Fallow.

Summer-fallow should be done at the proper time. If this is not done, the proper function of summer-fallow is not taken advantage of, and, instead of going into the winter mellow and moist, the land goes in dry and hard with consequent detriment to the growth following. Some men still have the idea that summer-fallowing means allowing the weeds to grow and then plowing them under for a green crop to enrich the soil. That was the method they followed further east, and it is hard at first for them to understand anything different. They allow the weeds to use up all the moisture in the soil, and are surprised on turning up the land next spring to find them unrotted. They need not be surprised, for there is only rainfall enough in the west to grow plants, and, when that has already been used up in producing the weeds, there is none left for rotting them. Summer-fallow in the west is for storing moisture. Weeds are, of course, destroyed in the process, and ought to be, but the main object is to store up the water for future plant growth. The plowing should be done about the beginning of June, and the land packed and harrowed the same day it is plowed. A double stroke with the disk in the early spring is an excellent preparation for summer-fallow, as the loosening of the surface soil helps to

keep the moisture from escaping. Cultivation during the summer to loosen the surface soil and destroy weeds must always be done.

Cultivation of the Trees.

After the trees are planted, they should at once be cultivated to loosen the soil and keep in the moisture. This is a matter that is often neglected and the trees suffer. It does not take long to do, and it pays well, for often one finds a plantation doing probably well enough, but not nearly so well as that of a neighbor's under precisely similar conditions, even to the number of times the cultivator was used, the only difference between them being that one was cultivated at the right time and the other was not.

In Other Parts of Alberta.

With the country to the east—the 'dry-farming' country—there need be no difficulty about tree-growing, for the same methods of preparation and treatment found so successful in Saskatchewan and Manitoba are no just as successful here, and there is no more risk of damage from frost-hurt (indeed, probably less) than in some of the districts toward the north of these two provinces.

The growing of trees in the other parts of Alberta (i.e., north and east of the Chinook country) does not differ materially from what has been said about the south. The winters are steady and the drying effects of the winds are not so apparent, but the same cultivation and preparation previous to planting are just as necessary as farther south.

Arranging the Plantation.

The best way to arrange the plantations would be to plant, say, three belts, running north and south across the farm, one on the extreme west, and the other two one-third and two-thirds of the way across, respectively. There would soon furnish shelter enough for all purposes, and when such a movement comes to be universally taken up, there will be quite a change in the appearance of Alberta's prairies, as well as in some of the climatic conditions of the country. An alternative arrangement would be to plant similar belts all around the fields, but, as the prevailing winds in Southern Alberta are from the west southwest, probably the north and south strips would be best.

In order that they may be established and maintained economically, the plantations would require to be about twenty-two yards wide and the trees three feet apart. This seems close planting, but it would mean at least one year less cultivating—a matter of some importance to a busy farmer. Trees at three feet apart usually require only two years cultivation, while those at four feet take three years and sometimes more.

The cost need not be excessive. A few thousand cuttings of Russian poplar and willow and a thousand cottonwood trees (these to be used as a supply nursery from which to get cuttings for the plantations) and about two thousand maple, ash and elm seedlings every year would be sufficient to plant an acre, at 4,840 trees to the acre.

Planting can be done at the rate of one thousand trees per day per man, working with a spade, so that two men could finish an acre in about two and a half days. The poplars, cottonwoods and willows would speedily reach a good height and furnish a great deal of shelter, which could not fail to benefit the land to the eastward of them, while the maples would maintain the necessary ground shade and incidentally develop into poles.

Tree-planting has a great future in Alberta. It is a country of very recent settlement and there is consequently very little soil drift at present. But it is also a country of much wind—much worse than its neighbors to the east—and in a very few years the farmers of Alberta will be face to face with the problem many of the farmers of Saskatchewan are facing now, viz., 'How to prevent the drifting of the soil', only in a more accentuated form. The growing of winter wheat will help to some extent, but the only sure and safe way is for each farmer to protect his own farm by planting trees.

This wholesale planting may appear a little premature, but it is not. No one will question the need of it and we know now what trees will grow and the best way to set about growing them. There are plenty of farmers now in the country prosperous enough to stand the little extra time necessary to prepare and maintain an acre or two of trees. If such plantations are ever undertaken (and they will be some day) they must just be figured on as part of the year's work on the farm, and attended to systematically like everything else; otherwise they had far better be left alone.

Three four-rod belts across the fields would come to about twelve acres per quarter-section, and a plantation of similar width all around would be sixteen acres—not a very large area, and certainly not too much if the country is to have its proper complement of trees. Such plantations would answer, to some extent, the fuel question, which is just as likely, in some hard winter in the future, to become acute as it has in past seasons of that character. Moreover, if mixed farming is to become the system followed in the west (and no one can doubt that it will come sooner or later) such belts of trees will be of the greatest use in sheltering the stock. Work for the hired men in the winter, too, is a pressing problem which the thinning of the woods and the cutting up of the cordwood will help to solve in the years to come.

It will take years to accomplish all this, doubtless, but it is equally true that if it is never begun it will never be accomplished, and there are plenty of farmers in the country able to begin right now.

Summary.

On the 'high land' of Alberta, plantations should consist chiefly of maples, Russian poplar and willow (Acute-leaved variety). The poplars and willows ripen up earlier and suffer less from early frosts.

The owner of such plantation need not feel greatly disappointed if the Manitoba maple is killed back repeatedly and becomes a mere bush. It is intended to shade the ground in the plantation in order that the better trees will grow rapidly. It is in the plantations for this purpose, and will do it quite as well as a bush. By and by the more rapid growing trees will shelter it and give it a chance.

If a tree or two dies in a plantation of 1,000 trees, the owner need not worry. He does not grow individual stalks of wheat but whole fields, and he should think of the plantation in the same way. One or two trees less or more makes no difference in a large plantation.

Remember that proper previous preparation is half way to success, and it means far less work later on.

Cultivation done at the right time only takes about half the time it does when neglected a few days, and the results are never so good.

Break in the flush of the growing season. Always back-set sod, and never leave it over six weeks after it is broken.

The finer the tilth the better the growth. Half a day with a fork digging out the patches of blue-joint grass the summer after the trees are planted will save many a sweat afterwards.

The 'blue-joint' should never be allowed to spread in from the sod at the sides of the plantation.

In the Chinook country as everywhere else, the trees that are cultivated best come best through the winter.

Investigations on Forest Insects, etc.

(Continued from page 37.)

'Free' by parcel post. Larger parcels should be sent by express. With each collection or sample a slip should be included giving the locality, date of collection, the food tree, and, if possible, observations noted upon habits of the insects.

Specimens of adult beetles, without the wood in which they have worked, are of great value to us, if the locality of collection is given. Adult beetles should be killed in a vial of alcohol, or in a cyanide

bottle, and should be stored in folded papers between layers of cotton, with notes enclosed. The papers may be packed in a small box and sent to the Dominion Entomologist.

3. Insect larvæ can be preserved only in fluids, such as 80% alcohol or 5% formalin. We shall be glad to send cyanide bottles, vials, etc., to anyone willing to make collections in this way, but shall be grateful for material shipped in any sure and convenient fashion, with notes on locality, date and food plants.

It is hoped that associations and private individuals will co-operate with the Division of Entomology, and, by so doing, assist in the work of forest protection, which of all aspects of forestry is the most important.

CONSERVATION HYMN.

E. G. McDougall.

When God had made the forests grow,
And spread the prairie free;
Had bade o'er earth great rivers flow,
And hollowed out the sea;
To man He said: "To thee I give
This garden broad and fair;
But if within it thou would'st live,
To guard it be thy care.

"All beasts, all birds for thee I've made,
With herbs for food supplied thee:
My trees shall yield thee warmth and shade,
How little I've denied thee!
I ask but this: withhold thy hand
From snatching all My treasure!
With temperance rule this fertile land
And taste My gifts in measure!"

How man hath spurned this mandate fair,
Let Syria tell the story,
Let China's ravished hills declare,
And Spain's departed glory.
By greed betrayed, by want depressed,
In terror of his neighbors,
In penance now for wanton waste,
In sweat and tears he labors.

Then let us keep the covenant,
And our dominion cherish
'Ere yet, beneath the spoiler's hand,
Her virgin beauties perish.
This land our fathers bled to keep
Shall we, her sons, despoil her?
Or shall we plant where'er we reap
To bless the future toiler?

O, Foresters of Canada,
How great a charge ye carry!
Ye priests and scribes of Nature's law
To preach it do not tarry!
Be keen and true in duties new
Nor Zeal from Wisdom sever;
And generations that ensue
Shall bless your name forever!

The faculty and students of the Biltmore Forest School have returned to America after spending the winter in Germany. Their spring term's work on this continent begins at Tupper Lake, N.Y.

Canadian Pulp Woods.

The Species Useful for Paper Manufacture and their Qualities.

By Judson A. DeCew, Chemical Engineer.

The classification of certain species of timber as pulpwood, in contradistinction to other kinds of wood, is but an arbitrary nomenclature based upon the commercial application of these particular woods in the paper trade.

The pulp woods of North America are quite distinct species from those in common use in Europe, and were it not for the more or less free interchange of these products on this continent, these distinctions might eventually develop with us. Since the increased necessity for a more economical use of available woods has forced investigations, resourceful workers have evolved methods for converting practically any kind of wood into good pulp and paper. The problem resolves itself into one of total cost, the cost of wood and the cost of conversion being variables for each species of wood used.

Since the spruce woods have proven to be the best adapted for the manufacture of a good paper at the least cost, these woods have become the standard from which all others are judged, and have become invested with such values as the best raw material always brings. The use of the other woods for making pulp is a matter of trade knowledge rather than public recognition, although the practice of the future in this regard will likely alter the popular viewpoint.

There are a number of woods which from their properties and use may be easily classed as pulp-woods, a goodly portion of these being inhabitants of Eastern Canada, while others are found only in the Far West.

EASTERN WOODS.

White Spruce—*Picea canadensis*.
Black Spruce—*Picea mariana*.
Balsam Fir—*Abies balsamea*.
Hemlock—*Tsuga canadensis*.
Jack Pine—*Pinus Banksiana*.
Poplar—*Populus tremuloides*.
Balm of Gilead—*Populus balsamifera*.
White Birch—*Betula populifolia*.
Canoe Birch—*Betula alba*, var. *papyrifera*.

WESTERN WOODS.

Engelmann (White) Spruce—*Picea Engelmanni*.
Sitka (Tideland) Spruce—*Picea sitchensis*.
Western Hemlock—*Tsuga heterophylla*.
White (Balsam) Fir—*Abies concolor*.
Lowland (White) Fir—*Abies grandis*.
Amabilis (Red) Fir—*Abies amabilis*.

Bull Pine—*Pinus ponderosa*.

In studying these woods in their relationship to paper making, let us first consider those properties which make the spruce wood so suitable for this purpose.

Eastern Conifers.

The white spruce, *Picea canadensis*, which is the most important tree north of the 60th degree of latitude, is somewhat larger in size than its near relative, the black spruce. Its wood is light, soft, straight-grained and satiny. The bands of summer cells are thin and the resin passages few. The color of the heart and sap is hardly distinguishable. The resin content may vary from 0.2 to 0.4 per cent. The specific gravity is 0.4051 and ash 0.32. In this wood the structure of the spring and summer growth is more uniform than in most of the coniferous woods, the fibres are long and regular, and therefore it is found to grind easily, giving a pulp of light yellow color and a fibre that readily forms in a sheet of paper.

The black spruce, *Picea mariana*, generally occurs with the white spruce, and its wood is very similar in character and structure, although the summer cells are more resinous and there are fewer medullary rays. The color of the wood is from light red to white, the specific gravity is 0.4584, the ash 0.27, and the resin from 0.3 to 0.5 per cent. It is noticeable that the black spruce is heavier than the white spruce, and the yield of pulp from it is therefore proportionately larger.

The Balsam Fir, *Abies balsamea*, is found with the spruces above described and is used in greater or less quantities, mixed with the spruce pulp wood of commerce. The only noticeable difference in its character from the above, is the fact that it is lighter in weight, slightly more coarse-grained and a little more resinous. Specific gravity 0.3819, ash 0.45. When ground a somewhat smaller yield is obtained, and the pulp is a little rougher in its character.

Hemlock, *Tsuga canadensis*. This wood is found in greatest abundance in Canada, although it occurs also in Michigan, Wisconsin and in the Alleghany mountains. Its wood is soft, not strong, brittle, coarse and non-resinous. It shows broad summer bands, and the color varies from light brown to white. Its specific gravity is 0.4239 and ash 0.46. The resin content is very low, being about 0.2 per cent. Chiefly owing to its color and large sum-

mer bands, it is much less suitable for ground wood than spruce or balsam, but, owing to its non-resinous character, it is quite suitable for the production of sulphite fibre. The hemlock fibre is larger and coarser than the spruce, and since the wood is more lignified there is a lower percentage yield of cellulose.

Jack Pine, *Pinus Banksiana*. This is a species of conifer which should be of importance in pulpmaking, for there are very large quantities growing in some districts, and the tree is really too small to be of much importance for lumber. This wood, which is locally called Jack Pine, presents some important technical difficulties in its use, but it will no doubt in the near future be generally utilized. The wood is light, soft and rather close-grained. The medullary rays are numerous, and these are generally very much in evidence in any low grade sulphite made from this wood. In comparison with other pulp woods, this wood is very resinous, the resin content probably averaging about 2 per cent. The heart is light brown in color and the sap white. Specific gravity, 0.4761, ash 0.23. This wood is now being used to some extent for railway sleepers and pulp, there being no unsurmountable objections to its use in pulp making, when proper working processes are employed. The fibre of the jack pine resembles the hemlock in structure, but the wood is of softer nature, although heavier in weight. Amongst pulp woods, therefore, these two woods, with some others of similar character, might easily be placed in a class by themselves, a second grade.

Hardwoods Used for Pulp.

Amongst the broad-leaved trees we have the poplar and white birch, which are destined to take a place of considerable importance in the manufacture of pulp.

Poplar, or aspen, *Populus tremuloides*. This is the most widely distributed North American tree, and it occurs in almost any place where virgin timber is being replaced by a younger growth. It is a small tree, barely large enough for lumber, and its wood is light, soft, close-grained and compact. The color of the heart is a light brown, but it has a thick sapwood which is nearly white. The wood is also non-resinous and its specific gravity is 0.4032, while its ash is 0.55.

Balm of Gilead, *Populus balsamifera*. This is an allied species to the poplar, common along the shores of northern rivers. It is a large tree, but the fibre and the characteristics of the wood are quite similar to that of the poplar. The fibre in both of these woods is short, being about one-half the length of the spruce, and this is the factor which regulates largely the use of these pulp woods. The balm, however, is a lighter wood than the

poplar, since it has a specific gravity of 0.3636, its ash being 0.66.

Of the birch family there are two closely allied species, each of which is quite suitable for making pulp.

The White Birch, *Betula populifolia*. This is a short-lived tree of rapid growth, which sometimes reaches a diameter of two feet. It grows with the poplar on abandoned or burned lands. The wood is soft, light, close-grained and not durable. The color of its heart is light brown and the sap nearly white, the young trees, having the larger percentage of sap, being the best adapted for pulp. The specific gravity of this wood is 0.5760 and the ash 0.29 per cent.

The Paper Birch, *Betula papyrifera*. This is a very widely distributed tree throughout the whole of Canada. It is very common in the northern Atlantic region, and grows farther north than any other deciduous tree. The wood is light, hard, non-resinous and close-grained. The heart has a brownish tinge, but the sap is white. Specific gravity, 0.5955, ash 0.25 per cent.

The fibre of the birch woods is but slightly longer than the poplar, and they can be used to good advantage along with it or replacing it. Being about 40 to 50 per cent. heavier than poplar, however, they are more difficult to bring from the forest, as they are very heavy while green and do not float well. The evident advantage in yield per cord, however, is one that should fully compensate for the extra cost of driving these woods.

Western Conifers.

Engelmann, or White, Spruce, *Picea Engelmanni*. This wood is found chiefly in the central Rocky Mountain region and the Peace River plateau. In this locality it forms extensive forests, at altitudes of over 5,000 feet, and grows to be a large tree, except at extreme heights. The wood is soft, satiny, and with a close, straight grain. Like the eastern white spruce, the summer bands are not conspicuous and the heart wood can hardly be distinguished from the sap. The wood is lighter in weight, however, than the eastern variety, for its specific gravity is but 0.3449, and its yield of pulp will therefore be from 15 to 20 per cent. lower. The ash is 0.32.

Sitka, or tideland, Spruce, *Picea sitchensis*. This tree is found in British Columbia, within 50 miles of the coast, and grows to a large size, sometimes ten feet in diameter. The wood is soft, with a close, straight grain, the heart being of a light brown color and the sap nearly white. The wood is almost as heavy as the eastern black spruce, its gravity being 0.4287. The ash is 0.17. The fibre of this tideland spruce is very long and strong, being about 30 per cent. longer than the

eastern spruce. The maximum length would be about 6.7 mm. as against 5 mm. in the eastern species. The cellulose made from this wood should be very desirable for the manufacture of strong papers, providing it is not weakened in the process of conversion.

Western Hemlock, *Tsuga heterophylla*. This wood is found in British Columbia and the Pacific States, growing along with the other large trees of the country. It is somewhat heavier, harder and darker than the spruce, but it is superior in many ways to the Eastern Hemlock. This wood can be satisfactorily ground, but owing to the blackness occurring in some trees, its average color would be a disadvantage. It is non-resinous in character, however, and well adapted for the manufacture of sulphite fibre.

White, or Balsam, Fir, *Abies concolor*. This is used with the spruce for sulphite and ground wood, but, like the eastern woods, the balsam is the more resinous. Its wood is soft, coarse-grained, and compact. The summer bands are narrow and the color is from light brown to white. The gravity is 0.3638 and the ash 0.85 per cent. The fibre is almost as long as the tideland spruce.

Lowland, or white, Fir, *Abies grandis*. This is a large tree found all along the Pacific slope. It is hardly suitable for ground wood except in young trees, and then the resin content is a disadvantage. Owing to the broader summer bands, it is harder than the other woods described, but it has a long strong fibre, and will make excellent cellulose by any alkaline process.

Amabilis, or Red, Fir, *Abies amabilis*. This is another species of fir, which is found in the valleys of the Fraser and Columbia, and on the mountain sides. In the valleys it is a fairly large tree, but on the hillsides, it exists very largely as a scrub, with a very close-ringed growth. This scrub growth is very little use for anything except pulp, for a tree from 50 to 60 years old would have a diameter of about 6 inches. It contains about 1 per cent. of resin, which is about the same as the species of black spruce, which also grows as scrub in these mountain regions. The specific gravity is 0.4228 and ash 0.23. The color is not too dark for ground wood, and some day it will probably be used for that purpose, although it is rather too resinous for present requirements.

In the interior of British Columbia, there is another species of pine called the Bull Pine, *Pinus ponderosa*, which is a wood quite variable in character. This wood is supposed to be very resinous, but an average sample examined by the writer, was found to contain but 0.67 per cent. of resin, which is quite within the workable

limit. As scrub this is a faster-growing wood than the spruce, and it is somewhat surprising that it should be heavier in weight. The specific gravity of this wood will average 0.4715, and the ash 0.35.

To those interested in the study of woods from either their scientific or commercial aspect, it is a well recognized fact, that any species having a wide distribution, will, when growing under different influences of climate, soil, altitude, etc., show a considerable variation in its structure and physical characters. Any fixed data, therefore, although it may represent the results of a number of observations, can only be taken as a basis from which other specimens may be judged.

In the above descriptions it has been the writer's endeavor to show from the properties of the various woods, those attributes which are essential in any wood for the present requirements of pulp making.

The conditions of growth in a northern country seem to be best adapted for the development of those species which have a soft and non-resinous wood. Naturally these woods will be exploited and used in the production of pulp and paper, until the costs of working from this source are such as to allow the profitable working of the cheaper but more resistant woods.

The Brown-tail Moth in Canada.

The history of the Brown-tail Moth in Canada is briefly as follows:..

1902. Mr. Wm. McIntosh, of St. John, New Brunswick, took a single male specimen about twenty miles from St. John, N. B. Mr. G. Leavitt also took one.

1905. In July, Mr. John Russell took a specimen of the moth at Digby, Nova Scotia.

1907. A single winter web was received by the Division from Mr. C. P. Foote, Lakeville, King's County, Nova Scotia. Immediate investigation revealed the presence of several thousand webs in Annapolis and King's Counties.

1909. Winter webs containing living caterpillars were found in shipments of seedling nursery stock imported into Ontario, Quebec, and British Columbia, from France, as a result of the inspection of these shipments.

1910. A single egg mass received in August from St. Stephen, New Brunswick.

1911. Winter webs discovered at Pomeroy Ridge, Charlotte County, N.B., being conclusive evidence of the establishment of the insect in New Brunswick. The infestation in Nova Scotia also discovered to be greater.

—Report of Dominion Entomologist for 1911.

Value to a Farm of a Woodlot.

(Wm. F. Payne, in Farm and Dairy.)

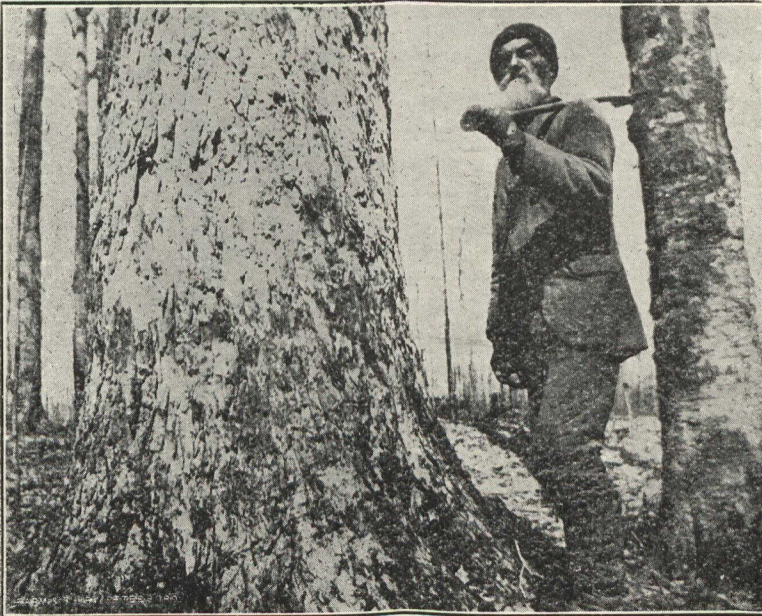
The value of any farm is greatly increased by having a woodlot large enough to furnish a permanent supply of fuel and timber for use on the farm. About 25 per cent of the farm in timber would furnish such a supply and when the timber is matured there would be quite a surplus to dispose of and contribute to the revenue of the farm. In the case of maple bush the sugar and syrup that may be manufactured from it adds still more to the revenue. On our own woodlot, which contains about 25 acres on a farm of about 95 acres, we have a constant supply of firewood and also plenty of timber for building purposes, and some to sell besides, each year; and by protecting the young growth and weeding out the crooked and leaning and mature and dead trees, the quality of the timber will gradually improve so long as one sells only what he doesn't need for his own use.

The varieties of trees represented naturally in my woodlot are: Cedar, hemlock, spruce, pine, basswood, soft maple, sugar in winter from blowing off the fall wheat maple, beech, ironwood, black birch, white

birch, black ash, white ash, tamarack, balsam, grey elm and American elm.

The growth of timber annually is considerable; the larger the tree the faster it makes timber till it reaches maturity; so the wastefulness of thinning out the saplings from among the larger trees more than is necessary for firewood is apparent, since a tree sometimes adds from two-thirds of an inch to one inch to its diameter in one season.

Then the woodlot is further useful in that it adds humidity to the air. A tree in hot weather gives off a large amount of moisture through its leaves; and plant life in the fields will thrive better in a moist atmosphere. Where there is a shelter belt of timber it prevents the soil from drying out as rapidly in dry weather, as the greater the velocity of the wind in passing over a field the quicker it will dry out, and so hinder the growth of the crops. It also helps to prevent the snow and clover fields and so affords them better protection. In cold weather it prevents so great a loss of heat from the



[Courtesy "Farm and Dairy."]

In Mr. Payne's Woodlot.

buildings when they are protected by shelter belts of trees.

A woodlot also shelters and furnishes a nesting place for many birds that are so valuable in the fields and orchards. It also adds beauty to the landscape; and what is more refreshing and beautiful than the trees in leafy June or the varied colors of the trees in October?

On my own farm I have a hedge of evergreens on the west side of the orchard. Along the central lane through the farm the cedars are extending on each side from the woodlot on the west to the concession line on the east side of the farm. These in time will probably make a continuous avenue and windbreak. Besides there are many trees in the fences over the cleared part of the farm, affording shade to the stock in hot weather.

If one would have a permanent woodlot he must fence it and keep the stock out, as cattle eat the little seedlings of deciduous trees and injure the roots of the large trees by treading on them. Cattle and fire are two of the worst enemies of the woodlot. I would suggest as helps toward improvement in the woodlots on farms that the Report of the Department of Forestry for Ontario be distributed through the Farmers' Institutes, as in this way a greater interest in Farm Forestry and also in National Forestry would be created. Also that woodlots up to a certain percentage on each farm in well settled districts, under certain conditions, be exempt from taxation.

The large tree in the illustration is a tall, clean stick measuring four feet through at the base. This tree is a rent-paying sort, since it is a maple, and is tapped in two places each year. It is on Mr. Payne's farm.

The lodgepole pine of the west is used chiefly for mining timbers and props, and occurs, fire-killed, in vast areas on the mountain slopes of Alberta and British Columbia. It cannot be used for lumber, on account of checking, and, if untreated, it lasts only about fifteen years when used for railway ties. At present this wood stands dead and perfectly seasoned and would take chemical treatment readily, after which it would make lasting and economical ties. By the use of such inferior qualities of timber, railway companies would assist conservation and at the same time decrease the cost of railway maintenance.

The value of the cooperage industry in Canada in 1910 was \$1,740,709. Slack cooperage made up \$1,395,545 of this, or \$200,000 less than in 1909. Tight cooperage amounted to \$345,164, which is \$100,000 more than in 1909.

British Forestry Notes.

The Right Hon. Walter Runciman, M.P., President of the Board of Agriculture and Fisheries, has appointed a Committee to advise the Board on matters relating to the development of forestry. References will be made to the Committee from time to time as occasion arises. The Committee will be asked in the first instance: (1) to consider and advise upon proposals for a forestry survey; (2) to draw up plans for experiments in silviculture, and to report upon questions relating to the selection and laying out of forestal demonstration areas, and (3) to advise as to the provision required for the instruction of woodmen. The Committee is constituted as follows: Sir Stafford Howard, K.C.B. (Chairman); Mr. F. D. Williams-Drummond; Sir S. Eardley-Wilmot, K.C.I.E.; The Right Hon. R. C. Munro-Ferguson, M.P.; Lieut.-Col. D. Prain, C.M.G., C.I.E., F.R.S.; Mr. E. R. Pratt, President of the Royal English Arboricultural Society; Professor Sir W. Schlich, K. C.I.E., F.R.S.; Professor Wm. Somerville, D. Sc.; The Hon. Arthur L. Stanley. Mr. R. L. Robinson, of the Board of Agriculture and Fisheries, will act as Secretary.

Sir E. Stafford Howard has tendered his resignation of the office of one of the Commissioners of His Majesty's Woods and Forests. His resignation will take effect as from March 31st next. No new appointment of a Commissioner will be made to fill the office he vacates, and there will be a fresh allocation of the Commissioners' duties between the two remaining Commissioners, Mr. Runciman, the President of the Board of Agriculture and Fisheries, and Mr. G. G. Leveson-Gower. The supervision of the Crown Forests other than Windsor and of the more important Crown Woods will now be committed to Mr. Runciman, with the object of bringing their administration into closer co-operation than has hitherto been possible with the work of the Board in regard to the development of silviculture and forestry.

—*Journal of the Board of Agriculture.*

A new firm of forest engineers has recently opened offices in Philadelphia under the name of Clark, Lyford & Sterling. The members are Judson F. Clark, of Vancouver, B.C., C. A. Lyford, of Montreal, Que., and E. A. Sterling, of Philadelphia, Pa. Mr. Clark and Mr. Lyford are also identified with the well known firms of Clark & Lyford, Vancouver, B.C., and Lyford, Clark & Lyford, Montreal, Que. Mr. Sterling has resigned as Forester of the Pennsylvania Railroad, which he has held for the past five years. This organization is making a specialty of timber estimates and forest maps, and is prepared to examine and report on timber properties anywhere.

Co-operate to Protect Forests.

At a meeting held at the Place Viger hotel, in Montreal, on Saturday, March 2, a number of limit-holders in the St. Maurice Valley, Quebec, formed a forest protective association, to be known as the St. Maurice Valley Forest Protective Association. Those present at the meeting were Hon. Jules Allard, Minister of Lands and Forests, and Messrs. W. R. Brown, R. F. Grant, Ellwood Wilson, Alexander MacLaurin, H. Biermans, L. Devenyus, J. H. Dansereau and S. L. de Carteret.

The object of the association is to protect from fire the timberlands of the valley of the St. Maurice river. This river supplies a large amount of power, by means of the Shawenagan Falls, for Montreal and Three Rivers (the latter place being situated at the junction of the St. Lawrence and St. Maurice). The largest pulp and paper companies in the province also derive their power from the St. Maurice.

The association is composed of the following members: the Quebec and St. Maurice Industrial Company of La Tuque, the St. Maurice Lumber Co. of Three Rivers, the Laurentide Co. of Grand Mere, the Union Bag and Paper Co. and the Gres Falls Co. of Three Rivers, the Wayagamae Paper Co. of Three Rivers, the Belgo-Canadian Pulp and Paper Co. of Shawinigan Falls, J. H. Dansereau of Montreal, William Power of Quebec, and J. H. Rousseau.

The association will, through its manager, patrol the whole valley, placing men on all the larger streams to follow the river drivers, hunters, fishermen and prospectors to see that they put out their camp-fires and smudges and observe the government regulations. These rangers will also see that the settlers burn their clearings only when it is safe, and will compel them to take precautions to prevent fires spreading. On the railways men on gasoline 'speeders' will follow the trains and extinguish fires started by sparks or hot coals. Lookout stations will be established on high hills from which fires can be detected, and these will be connected by telephone with the nearest settlements so that help can be obtained. Telephone lines and trails will be built and fire-fighting tools placed in convenient locations. Educational work will be undertaken to teach the settlers and farmers the value of the forests and the necessity of protecting them.

The members of the association have agreed to assess themselves one-fourth of a cent per acre for the coming year for fire protection. In response to a letter sent him by the association, explaining their objects and methods, Hon. Jules Allard, Minister of Lands and Forests, has promised that the provincial government will contribute three thousand dollars (\$3,000.00) to the associa-

tion, in consideration of the protection afforded the unsold and unlicensed lands still in the Crown, and will also bear a share of the cost of lookout stations and telephone lines.

Douglas Fir vs. Southern Pine.

Douglas fir, notes Mr. H. R. MacMillan in Bulletin 24 of the Forestry Branch of the Department of the Interior, is the only Canadian wood existing in any quantity, the natural qualities of which are such as would enable it to displace yellow pine for car and furniture building.

It has been shown that, in addition to the physical qualities which render Douglas fir as easily worked, as readily polished, and as suitable for finish as yellow pine, Douglas fir possesses the mechanical qualities which render yellow pine adaptable for car building and for use in situations where durability, strength and resistance to compression are required.

Douglas fir is about twenty per cent. lighter than longleaf pine. Bending tests show that Douglas fir will support a greater weight without taking a permanent set than will longleaf pine, and that Douglas fir will support almost as great a weight as yellow pine before breaking.

Douglas fir is not as stiff as longleaf pine and will not support as great a pressure parallel to the grain. It will, however, support without crushing just about the same pressure perpendicular to the grain.

On the Pacific coast, Douglas fir is rapidly coming into favour for furniture-making and car-building.

Douglas fir is easily worked and when well seasoned is free from warping or checking. It takes a high polish and is very suitable for all cheaper grades of furniture, such as bedroom sets, tables, kitchen cabinets, chairs, school, lodge and church furniture. It may be stained to represent other woods and may be stamped to imitate quarter-cut oak. Its straightness of grain and the contrast between spring and summer wood render it very suitable for mission furniture.

Douglas fir is a splendid wood for car building, the use for which the greater part of the 21,000,000 feet of yellow pine was imported in 1910. It is strong, hard, stiff, large and clear enough for car frames, is suitable for car sidings and ceilings, and is beautiful enough for the interior finish of passenger coaches. It has been used for the interior finish of private cars in the United States.

The designation 'Southern' or 'yellow' pine, as used above, denotes that kind of pine also known as 'hard,' 'Georgia,' 'North Carolina' and 'pitch' pine. The 'longleaf' and 'shortleaf' pines are species, the timber from which is included indiscriminately under the above names.

N. B. SHADE TREE LAW.

The only legislation directly applying to shade or street trees in New Brunswick seems to be the 'Act respecting Local Improvement Associations', passed in 1903 (3 Ed. VII. c. 22.)

By this Act it is enacted that ten or more persons may be incorporated for the purpose of improving and ornamenting the streets and public squares of a city or town by planting and cultivating ornamental trees under the provisions of the New Brunswick Joint Stock Companies Act.

Any city or town may hand over to such an association the care of the parks and the ornamentation of its streets and is empowered to make the association a grant for the purpose of assisting in its work. This grant may be levied and collected as part of the regular assessment.

A fine up to twenty dollars is provided for anyone injuring or interfering with the work of such an association by driving animals or vehicles across its property, playing ball thereon, etc., the fine to be payable to the association.

Fredericton, the capital city of the province, has an association formed under this act, which has done much in beautifying the city. Lt.-Col. Loggie, Deputy Surveyor-General of the province, is the president of this association.

The implement manufacturers of Manitoba paid in 1910 about \$67 per thousand feet for oak which they imported from the United States. White oak is native to Manitoba and reaches large sizes in the Turtle Mountain Forest Reserve. This reserve has been cut over and burned over, but it is now being put under scientific management. When properly stocked this reserve will produce 6,000,000 feet of white oak timber per year. The local production of this timber will be of great assistance to the industries of Manitoba. This is an instance of what can be done by the proper management of waste lands.

C.F.A. Treasurer's Report, 1911.

RECEIPTS.

Balance from 1910, \$1,033.67.
 Membership fees, \$2,002.22; copies of Canadian Forestry Journal, \$19.90; advertising in Canadian Forestry Journal, \$242.34; grant from Dominion government, 1910, \$2,000.00; grant from Dominion government, 1911, \$1,500.00; grant from N.B. government, \$100.00; grant from Quebec government, \$200.00; grant from Ontario government, \$300.00; grant from B. C. government, \$200.00; interest, \$35.50.
 Total, \$7,633.63.

EXPENDITURE.

Salaries, \$1,875.00; clerical work, \$130.08; annual report, \$200.75; expenses of secretary, \$200.00; printing and supplies, \$292.46; lantern and lectures, \$121.81; Quebec convention, \$2,095.00; Canadian Forestry Journal, \$1,019.51; commission on cheques, \$11.57; postage and telegrams, \$53.94; typewriter, \$120.00; refunds, \$9.00; wreath, \$10.00.

Total, \$6,139.12.

Balance on hand, \$1,494.51.

M. ROBINSON,

Treasurer.

Ottawa, Dec. 31, 1911.

Audited and found correct, Jan. 9, 1912.

FRANK HAWKINS,

T. E. CLENDINNEN,

Auditors.

A Banker's Statement.

In Canada and the United States the use of fireproof building material and of cement and iron generally in place of wood is growing rapidly. Already it is suggested that the United States has passed the highest point of per capita consumption of lumber. As yet, however, we use only a fractional amount of fireproof material as compared with an old-world country such as Germany, so that an important readjustment of our lumber requirements relatively to other things will gradually come about. This will certainly not lessen the necessity for conservation, but it may cause the punishment for our wastefulness to fall a trifle less heavily than we deserve.

—*Report of the General Manager of the Canadian Bank of Commerce, 1911.*

The mines of Canada used, in 1910, 52,848,000 linear feet of round timber, which cost \$523,339. This is an average cost of \$9.90 per thousand. They reported the use of twelve species of wood in their mining operations.

Oak, together with yellow pine, made up nearly one-third of all the wood used in the furniture and car industry of Canada in 1910. Practically all is imported.

With the Forest Engineers.

NOTES FROM THE SCHOOLS.

The Faculty of Forestry of the University of Toronto has this year forty five students in attendance, the same number as last year. Of these, six men are taking the combined Arts and Forestry course. Besides these and the regular four-year course men, there are also a number of non-matriculated students, taking special courses. Thirty three of the students are Ontario men, while three come from the United States and one from England. The standard for entrance to the faculty is again being raised for the session of 1912-3, and will correspond nearly to senior matriculation. The standard demanded on examinations will be forty per cent. on each paper and sixty per cent. on the aggregate, except in English, for which the minimum is sixty six per cent. A course of lectures by Dr. von Schrenk on Diseases of Trees and a course of lectures in First Aid to the Injured are new features of the curriculum. The Forestry Club is found to be a very useful and interesting adjunct to the regular class work.

The Forest School of Laval University has an attendance of forty students; of these seven are in their final year and will graduate this spring. The second-year class (that of 1913) has twelve students, and the first-year class twenty one men in attendance. Of the total of forty men, twenty seven have scholarships and work in the provincial Forest Service. The courses comprise elementary and higher mathematics up to, and including, calculus, applied mathematics (surveying, mechanics, construction of mills, road-and-trail-building, drawing and mapping), forest science (forest botany, den-

drology, soils, forest zoology, silviculture, reforestation, management, lumbering, wood industries, technology, forest geography, lumber markets, statistics and law) and the elements of medicine and surgery.

The forestry department of the University of New Brunswick also reports a successful year. One of the latest additions to its equipment is a special forestry and engineering permanent camp. This comprises a substantial log building, the construction of which was done by the students themselves on the tract of forest land owned by the university and situated only about three miles from the university itself. A description of the building and of its construction, from the pen of Professor Miller, will appear in next issue of the JOURNAL.

Mr. W. N. Millar, M.F., has been appointed District Inspector with headquarters at Calgary. He will have entire direction of all the Alberta reserves. Mr. Millar has been for a number of years in charge of the Kaniksu National Forest, in Montana, which is some three million acres in extent, with complete control of its administration, including the organization of a fire ranging force, the sale of timber, and the disposal of claims of various kinds to lands within the reserve. During the summer of 1910, when so great a loss of life and property occurred in Idaho and Washington from forest fires, the forest under his charge escaped almost unscathed, owing chiefly to the efficient fire protective organization he had built up. This organization includes patrol, a system of trails and telephone lines and other effective features. Mr. Millar assumed his new duties in March.

Mr. H. R. MacMillan is now in the West and will visit various offices of the Branch with a view to improving organization and methods of work.

Mr. D. Roy Cameron has been appointed to take general supervision of fire protection and other work in the Dominion forest reserves in British Columbia.

Appropriations for forestry work under the Department of the Interior amount for the ensuing fiscal year to \$355,000, an increase of \$100,000 over last year.

Dr. J. F. Clark, of Vancouver, reached home about the middle of March after an extended trip east.

Prof. Filibert Roth, who is at present the only honorary member of the Canadian Society of Forest Engineers, has been appointed head of the recently revived department of forestry at Cornell University.

The purchase of the Nipissing Central railway, an electric road running from Cobalt to Haileybury, by the Timiskaming and Northern Ontario railway, is thought to foreshadow the electrification of the latter road. This step would be a measure of tremendous importance for the protection of Northern Ontario forests, and is a consummation devoutly to be wished.

In the French forest of Chantilly rabbits have become so numerous as to threaten the destruction of the entire forest.

Cedar is the wood most frequently used for poles in Canada, as it is practically the only Canadian wood growing to a convenient pole size which is cheap, easily handled and durable. There were 758,209 cedar poles purchased in Canada in 1910, or 99.2 per cent. of the total number purchased.

The state of Maine will again this year receive from the U. S. federal government a grant of \$10,000 to assist it in protecting its forests from fire, according to the provision of the Weeks bill providing for co-operation between the federal and state governments for this object.

The furniture and car manufacturers of Canada used, in 1910, 177,893,000 board feet of timber, costing \$2,987,219. That the timber used in these industries is of a much higher average quality than the mill run of Canada's saw mills is shown by the fact that it cost \$25.35 per thousand, whereas the average selling price of the lumber produced in Canada in 1910 was only \$15.81.

Much of the timber used in Canada for the manufacture of furniture and cars is imported. In 1910 one-third of the total used was imported, chiefly from the United States, at an average cost of \$33.86 per thousand board feet; two thirds were native-grown timber and cost only \$20.82 per thousand board feet. Nothing could more clearly show the general inferiority of the common Canadian timber for use in manufactures than the fact that Canadian manufacturers are forced to buy fully one third of their supply from a foreign country at a price exceeding, by over sixty per cent., that paid in the home market. It is impossible to secure in Canada, in sufficient quantities, woods which combine beauty with strength so as to be suitable for furnishing high-grade furniture and passenger cars, or which are strong enough for car frames or sidings.

Including round and sawn timber, timber to the value of \$827,337 was used in Canada during 1910 for mining purposes. This total is made up of 52,848,000 linear feet of round timber, worth \$523,339, and 22,305,000 board feet of sawn timber which cost \$303,998.

CHANGES OF ADDRESS.

The secretary would be grateful if members of the Association would promptly notify him of any change in their addresses, so that the addresses on the mailing list of the Journal can be kept correct. Persons removing from one place to another should give both the old address and the new; this will greatly assist in the corrections.

R. O. SWEEZEY,

CIVIL & FORESTRY ENGINEER

Timber Surveys, Lumbering
and Water Powers.

Metropolitan Bldg. - - QUEBEC, Canada.