February
1921
15¢

Illustrated Canadian Forestry Magazine

Along Ottawa's Beautiful Driveway.

Photo by Photographic Stores, Ltd.

Bureau of Canadian Information

The Canadian Pacific Railway has established a Bureau of Canadian Information as a branch of its Department of Colonization and Development, with the object of disseminating reliable and up-to-date information as to agricultural and industrial openings in all parts of Canada.

WESTERN CANADA FARM LANDS

The Company has yet for sale several million acres of choice farm lands in Western Canada, at low prices and on long terms of payment. In certain districts lands will be sold without settlement restrictions, but the Company is prepared to grant special concessions to those who will settle upon and develop their farms.

IRRIGATED FARM LANDS

In its irrigation districts in Alberta, the Company has irrigated lands for sale at reasonable prices and on terms extending over twenty years. Under certain conditions, loans for improvements will be granted purchasers of irrigated lands in amounts up to two thousand dollars, to be repaid with land instalments.

EASTERN CANADA FARM LANDS

Lists of selected improved farms, available for settlement in Ontario, Quebec and the Maritime Provinces, with the names and addresses of their owners, may be obtained on application at any office of the Department.

INDUSTRIAL INVESTIGATION AND RESEARCH

Investigations, looking to the utilization of undeveloped natural resources and waste products and new industrial processes, are being carried on by the Research Section of the Department. Inquiries as to promising fields for investigation in this connection are invited.

INDUSTRIAL OPENINGS

Reliable information as to sites for new industries in all parts of Canada, and of special business openings in the growing towns and cities along the lines of the Canadian Pacific Railway in both Eastern and Western Canada, will be gladly furnished on request.

CANADIAN INTELLIGENCE SERVICE

Well equipped Canadian reference libraries have been established by the Department at Montreal, New York, Chicago, and London, England. These libraries contain the fullest information on all matters relating to Canada and her undeveloped resources, and are kept supplied with the latest information pertaining to new developments through the medium of a news service organized through the co-operation of the other departments of the Company's service. The information on hand in these libraries is available without charge to those interested, and inquiries addressed to any office of the Department will receive prompt attention.

DEPARTMENT OF COLONIZATION AND DEVELOPMENT CANADIAN PACIFIC RAILWAY

MONTREAL: C.P.R. Bureau of Canadian Information, 335 Windsor St. Station.
WINNIPEG: J. F. Sweeting, Industrial Agent, C.P.R. Depot.
CALGARY: M. E. Thornton, Supt. U.S. Agencies, Dept. of Natural Resources Building.
NEW YORK: C.P.R. Bureau of Canadian Information, Wilson Building, 1270 Broadway.
CHICAGO: C.P.R. Bureau of Canadian Information, 163 East Ontario Street.
LONDON: A. E. Moore, Manager, 62-65 Charing Cross.

E. G. WHITE,
Superintendent,
MONTREAL, Que.

J. S. DENNIS,
Chief Commissioner,
MONTREAL, Que.

.....1921

To the Canadian Forestry Association,
Suite 224 Jackson Building, Ottawa.

I nominate .....

Business or Profession .....

Address .....

for membership in the Association and as a Subscriber to the Illustrated Canadian Forestry Magazine.

.....

Name and Address of Nominating Member

CIRCULATION: 13,000 COPIES MONTHLY ROBSON BLACK, Editor

THE ILLUSTRATED CANADIAN FORESTRY MAGAZINE

VOL. XVII. PRINTED AT KINGSTON, CANADA, FEBRUARY, 1921 No. 2

Address all communications to Suite 224, Jackson Building, Ottawa.

Turning the Tree Into a Pipe Organ

By G. Gerald Blyth,
Assistant Secretary, Canadian Forestry Association

A Piece of Manufacturing Magic in Which Canadian Materials and Men have Established World Standards

WOOD enters very largely into the manufacture of most musical instruments but the amount and the variety of species used is not generally appreciated by the average individual. In an article published in a recent issue of the Canadian Forestry Magazine the writer described the manufacture of pianos and attempted to show how the different kinds of woods enter into their manufacture. It is the purpose of this article to give our readers an idea as to the extent to which wood is used in the building of our large Church organs and to trace its use in this connection from the first stage to the finished product.

Wood has always been extensively used in organ building but with the development of the organ (to the present day four and sometimes five manuals, together with pedal, containing from 75 to 100 speaking stops, and even sometimes more) the amount of wood used is much greater.

The modern organ is composed of several units or separate organs each of which is complete in itself and is capable of being played separately or in combination with the other units. They are as follows:—"Pedal," "Choir," "Swell," "Great," "Solo" and in the very large organs sometimes an "Echo" organ is included. Each organ, except the "Great" is entirely enclosed in sound-proof cases known as "Swell" boxes which are fitted

The "console" of a modern organ showing the four manuals, pedal keyboard, stops, combination buttons, balanced swell pedals, etc.

with shutters. Unlike a piano where the keyboard is attached to the instrument, the keyboards or manuals and pedal keyboards in most organs, together with all the controlling devices, are built in a separate unit known as the "Console" and may or may not be attached to the instrument. As nearly all our modern organs are controlled either by pneumatic or electro-pneumatic action, the "Console" may be located in the most suitable position which may be any distance from the organ to which it is connected by electric wires or lead pipes. Figure 1 shows a four manual "Console" and Figure 3 the exterior of an organ. We might build the largest and most costly organ but in order to play it we must furnish it with the necessary breath or wind to make it speak, so the next most important feature is the blower-fan which furnishes the wind. The constructional details of this and the other portions of the organ will be dealt with later.

Our largest organ building establishment, that of Messrs. Casavant Freres Limitee, located at St. Hyacinthe, employs between 175 and 200 men all the year round and has built to date in the neighborhood of 900 organs varying in size from the small Chapel organs to the mammoth five manual organs which cost anywhere from $50,000 to $100,000. The average 4 manual organ requires between 20,000 and 25,000 feet board measure of lumber to construct it and the total annual consumption of wood by this one organ building firm is about 500,000 feet board measure of all species. The following are the different kinds of wood which are used:—

Oak, Pine, Basswood, Spruce, Poplar, Mahogany, Maple, Ash, Birch, Elm, Chestnut, Butternut, Beech, Black-Walnut, Ebony, and Rosewood or 16 species all told. Some of these species are used entirely on the exterior and others in the interior.

Table showing the principal woods used in order of amount consumed:—

Interior.

1. Poplar or Whitewood.
2. Pine.
3. Basswood.

In Cases and Consoles.

1. Oak.
2. Basswood.
3. Ash.

Before showing which species enter into the make-up of an organ let us first see what are the principal parts of an organ:—

Exterior.

1. Case.
2. Console—(a) Frame.
   (b) Drawstop action.
   (c) Keyboards.
   (d) Switchboard.
   (e) Couplers.
   (f) Combination pistons.
   (g) Other accessories.

Interior.

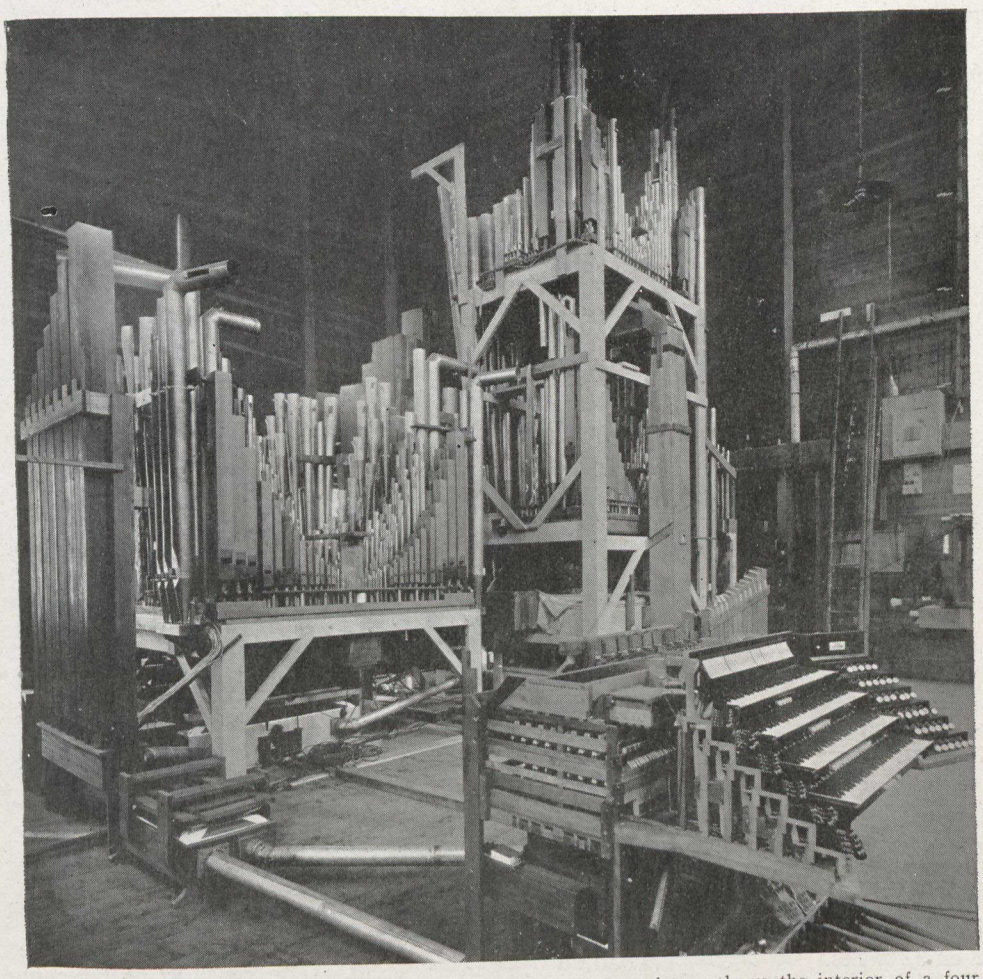
1. Frame—(a) Main Organ.
   (b) Rests or frames for big pipes.
2. Chests—(a) Main chests.
   (b) Pedal chests.
   (c) Auxiliary chests.
   (d) Drawstop boxes.
3. Pipes— (a) Metal.
   (b) Wood.
4. Swell-boxes—Fitted with shutters.
5. Wind Supply—
   (a) Blower.
   (b) Wind Reservoirs.
   (c) Wind Trunks.
   (d) Concussion bellows on path of wind which serve as regulators.

To those entirely unfamiliar with organs it will be necessary to briefly describe the function of each of the principle parts mentioned above. As the primary object of this article is to show what woods are used in constructing an organ, it will not be possible to describe very fully the construction or function of the many complicated portions.

The Exterior.

1. *The Case.*—Figure 3 is a good illustration of an average case. It is usually of an artistic design. The necessity of a case will be observed on referring to Figure 2, where we have an organ, practically completed, but minus the case.

2. *The Console.*—The Console of an organ is like the switch-board in an electric power-house as it controls the entire



What a pipe organ looks like before the casing goes on. Our picture shows the interior of a four manual organ showing arrangement of pipes. The organ is completely erected in the factory, tested, and then all taken down and crated for shipment.

organ, every pipe in which is connected either electrically or pneumatically with the manuals. The console is a highly complicated piece of mechanism, too intricate in fact to receive a detailed description in an article of this kind.

By the manipulation of any stop or combination of stops on the console desired, wind is automatically admitted to the wind chest which supports the particular set or sets of pipes. However this is only a preliminary action as no wind is admitted to the individual pipes until a key on the manual is depressed. The same is true of the pedal keyboard or manual. Figure 1 is an excellent photograph of one of the most modern consoles in existence.

The Interior.

1. *Frame.*—The entire organ is built up in heavy frames which support the main organ and act as rests for the big pipes, chests and swell-boxes.

2. *Chests.*—The Chests are made of wood and are long boxlike things whose chief functions are to support the pipes and distribute wind to the pipes.

3. *Pipes.*—A modern organ contains several thousand pipes, most of which are made of wood, which range in size all the way from a tiny pipe a few inches high to

The final form of the tree in its journey through the factory: A beautifully decorated organ case.

the great pedal pipes which are often 32 feet in length.

A stop on the console represents at least 65 pipes and sometimes 68 or 73 pipes. On the pedal, a stop represents 30 or 32 pipes.

Some idea of the size of the pedal pipes may be obtained from the following:

The Open Diapason are on the average, 16 inches x 19 inches x 16 feet long. Three inch deal is used to construct the huge 32 feet pipes which often weigh over 1,500 pounds and are 32 inches x 38 inches x 32 feet. These latter are known as Double Open Diapason and belong to the Pedal Organ.

Wooden pipes seem to produce a better and mellower tone than the metal ones for certain species of pipes and are extensively used throughout the entire organ.

4. *Swell-Boxes.*—All the organs, excepting the "Great" are enclosed in sound-proof boxes made of boards, between which is placed seaweed to deaden the sound and an air space is also left between the boards which constitute the envelope. The boxes are fitted with shutters which open and shut at the organist's will, he simply having to press a balanced swell pedal. The opening and closing of the shutters gives a swelling or diminishing effect to the sound which very greatly adds to the tonal effect. The swell boxes are of course hidden out of sight entirely or as much as possible, by the case or by a few pipes which ornament the exterior as shown in Figure 3.

5. *Wind Supply.*—As has been stated before, an organ is useless unless it has a supply of wind and the supply must be adequate and regular. Wind is produced by a blower which is similar to a centrifugal pump and is encased in a wooden or metal box. The wind passes from the blower to wind reservoirs through trunks and then to the chests and later to the pipes when the action of the stops and keys causes wind to be admitted to them. Concussion bellows are usually located on the path of the wind which serve as re-

gulators. The proper and quick distribution of wind to all parts of the organ is a very important and necessary feature and much depends upon the successful distribution of the wind supply.

Having mentioned the principal parts of an organ and briefly described the function of each let us now see what woods are used in their construction:—

What Woods are Used and Where.

1. *Oak.*—White Oak—Red Oak.

The two varieties above mentioned are the ones most frequently used for exterior portions of organs such as the case and the console. Oak has an exceedingly attractive appearance and is largely employed for decorative purposes. The Oaks are of very great importance commercially because of the high technical qualities of their wood and it is to be regretted that in Canada the supply is nearly exhausted.

2. *Pine.*—White.

It is not surprising to find the most important lumber tree in Canada being used extensively in the building of organs. The wood is soft, easy to work, easy to season and once properly conditioned, holds its shape as well as any other coniferous wood known to commerce.

Pine is extensively used in making the following parts of an organ:—

(a) Pipes—used on account of its tonal qualities.

(b) Reservoirs—used in making these because it is easy to work and does not readily split.

(c) Blowers—The envelope and partitions are almost invariably constructed of Pine.

(d) Frame-work.

(e) Keys—The body of the keys is usually made of Pine.

(f) Swell-boxes—Both the frames and shutters are constructed of Pine as a rule.

Red Pine is often used in building the frame-work owing to its strength and hardness.

3. *Basswood.*—This wood is very extensively used throughout the entire organ, principally owing to the fact that it is easily worked, and also because it possesses the quality of holding its shape better than many other woods, after seasoning. The following is a list of those parts of an organ in which Basswood is very largely used:—

(a) Case (Both organ and console).
(b) Concussion bellows.
(c) Underboards of wind chests.
(d) Drawstop boxes.
(e) Reservoirs.
(f) Sometimes for blowers.
(g) Curtain boxes and other similar parts.

4. *Spruce.*—White, Red, Black.

Spruce is not as extensively used by any means as Pine but the above varieties are often used.

White Spruce is employed in making the large 16 and 32 foot pedal pipes, when obtainable in the dimensions required. White Spruce is also used in the smaller pipes to a large extent.

The Red and Black Spruce are sometimes used in constructing the frame but when Spruce is used in the construction of Swell-boxes, it is always the White Spruce that is selected.

5. *Whitewood or Poplar.*

Whitewood or Poplar is very largely used in building organs as it is one of the most adaptable of woods. The Whitewood used, is mostly imported as the tree is not common in Canada. Many of the small mechanical parts of an organ are made of this wood and the following list shows a number of other portions of an organ where it is employed:—

(a) Wind chests (Both main and pedal).
(b) Large pipes.
(c) For all the mechanical accessories such as:—
    (1) Drawstop Boxes.
    (2) Auxiliary Chests.
    (3) Numerous pneumatic motors.
    (4) Switchboard of tubular organ.

6. *Maple.*—Sugar Maple and Silver Maple.

The Sugar Maple is perhaps used more extensively than any other variety of this species as it possesses the qualities of hardness, strength and stiffness to

a greater degree than any of the other species.

Silver Maple is sometimes used when the Sugar Maple is unobtainable, but it is inferior in many respects as it is not so strong as that of the Sugar or "hard" Maple.

The principal uses to which the Maple is put in organ building is in the construction of the following and especially in those parts where minimum warping and maximum strength is required:—

(a) Pedal keys.

(b) Anything that belongs to combination racks.

(c) Drawstop rods.

(d) Special pipes.

(e) Contact rollers of the electric switch-board in electro-pneumatic organs.

(f) Coupling bars of electric switch-board.

(g) Dowels—To hold parts together.

NOTE.—Wooden dowels are very freely used in constructing an organ as they can be more readily used in the less accessible places than nails or bolts. They cost less, have great strength and the ease with which they can be used in different other parts too numerous to mention, makes them a valuable instrument.

7. *Ash.*—Black, White, Red and Green.

The Black and the White Ash are more extensively used than the two other varieties which latter are used as substitutes for White Ash when it is not readily obtainable.

For all exterior work, plain or decorative, on the case or console of an organ Black Ash is the variety most employed. In addition Ash is used for the following:—

(a) Frame-work.

(b) Swell-boxes (The skeleton frames of which are often made of this wood).

(c) Pedal-board and bench, if console is of Ash.

8. *Birch.*—Paper and Yellow.

The wood of the Paper Birch is soft and tough. It is also compact and easily worked. Birch is the most important hardwood sawn into lumber in Canada and Yellow Birch forms the greater part of the Birch lumber produced. This wood is used extensively throughout the organ and the following list will give the reader an idea as to the extensive use made of same:—

(a) Cases (both organ and console).

(b) Frames for pedal boards.

(c) Special pipes.

(d) Frames (Extensively used)

(e) All the frames of the console.

(f) Small pneumatics of the auxiliary chests.

(g) Blocks on caps and pipes.

9. *Beech.*—

This wood is very little used in organ building but when it is, it is most suited to the mechanical parts.

10. *Elm.*—White.

Elm is often used in the cases, but more frequently the lower grades of this wood are used for crating the organs for shipment.

11. *Chestnut.*—

Chestnut is often used, when obtainable, for the case and for the exterior of the console. The close grain of this wood and texture causes it to take glue well.

12. *Butternut.*—

This wood is used in making cases for organ and console. It is also used throughout the mechanism, where trueness of shape is necessary. Butternut constitutes the foundation of most of the veneer used at the organ building establishment visited.

13. *Black Walnut.*—

Black Walnut is an exceedingly beautiful wood and its popularity for fine cabinet work, etc., has resulted in the almost commercial extinction of the tree in America. It is only used in the visible exterior portions of the organ and console.

14. *Ebony.*—

This tree is not indigenous to Canada, but according to "Sargent" it is common in the bluffs of the Gulf Coast and on both banks of the lower Rio Grande. South of the Rio Grande it is one of the commonest and most beautiful trees. The wood is used for the black keys of the manuals and pedals and for stop nobs. It is also used for delicate moulding in the panelling of the case and console.

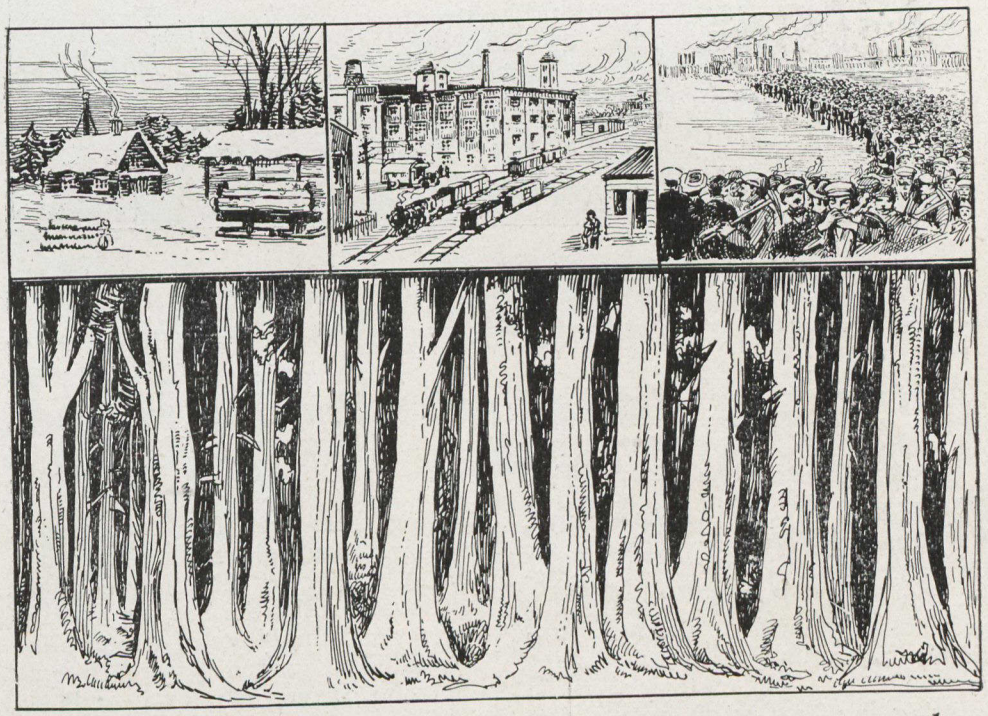
15. *Rosewood.*—African.

This is a tropical tree and consequently all the Rosewood used is imported. The above variety which grows in Africa is the true Rosewood but in the tropics almost any dark colored wood is known as Rosewood. About the only place where this wood is used is for stop nobs.

16. *Mahogany.*—

Is used for the jams (facing around stops) on console; for the envelope of case of console, fronting and sometimes the entire organ case is constructed of this beautiful but costly wood.

Of the sixteen different kinds of wood above mentioned as being used in organ building it may be of interest to note that thirteen are indigenous to Canada.

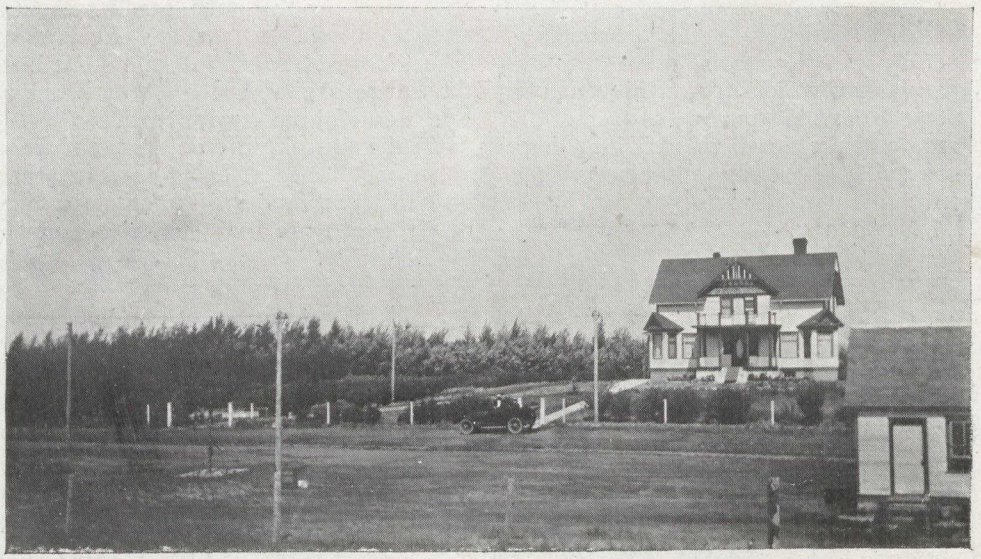


The Prosperity of Canada rests its weight upon tree trunks.

Kick out the Forest Prop and no Canadian industry can long survive. The security of the forest means the security of employment, the security of factory production, the security of farming, mining, fisheries, lumbering and the vast industry of pulp and paper. The Forest is the Mother of Civilization.

Tree Seeds for Great Britain.

In response to requests from forestry authorities in the United Kingdom tree seeds were collected in British Columbia by officers of the Dominion Forestry Branch. These were forwarded to the Forestry Commissioners for Great Britain to be used in the carrying out of reforestation plans under way in the United Kingdom. The seeds included those of Douglas fir, Sitka spruce, alpine fir, and of other species which the British authorities desire to test.—Annual Report, Director of Forestry, Ottawa.



A real home on the prairie. Trees shelter the orchard and garden and attract feathered friends.

Attracting Birds to the Prairie Home

By Hoyes Lloyd

WHEN the white man first crossed Western Canada he found a great deal of the country practically treeless. Perhaps these plains were looked upon for so long as unsuitable for cultivation because they grew no trees. An easterner, while admitting the fertility of these plains, often shuns the thought of living there in spite of prospects of wealth because the level monotony of the prairie had not the same appeal to him as has a partially forested country.

On the treeless prairie, with its lack of shade, the home however well-built, has not the beautiful setting that a grove of trees would make for it. Even the camper on the prairie who usually pitches his tent where dark overtakes him will travel many miles and be late in getting his evening meal in the hope of finding a clump of trees or even a few prairie shrubs such as wolf willows to shelter his frail home.

Some of the important reasons for planting trees are often emphasized; trees are beautiful, and they are useful. A sheltering belt of trees about the house breaks the hot dry wind of summer and the blasts of winter alike. The kitchen garden protected by a shelter belt from the prairie winds will not be blown out by the roots and is bound to be a greater success than the unprotected one.

Fortunately the foresters have selected a variety of trees that will make this welcome shelter and many are the homes on the prairies that are now improved in this way.

The wild fruits of the prairie are found in the shelter of the coulees—the cultivated fruits—apples, currants, strawberries, and all are grown only in the shelter of planted trees.

There is one advantage in tree planting that has been overlooked. The prairie has its own peculiar bird life. It is the home of the Longspur, the Horned Lark, Sprague's Skylark the Western Meadowlark and many

Where the song-bird nests in the cool shade of planted trees near a prairie home.

kinds of native Sparrows. The Vireos, Warblers, Thrushes, Chickadees, most of the Flycatchers, most of the Woodpeckers and many other valuable insect-eating birds and arboreal. They nest in or among trees and as a rule are seldom found far from their shelter.

The garden on the prairies which is guarded by trees will also be protected from many pests by the insect-eating birds which the trees have attracted. So in addition to the other economic and aesthetic value of the trees themselves, they serve to attract valuable birds to the gardens where their work is needed.

Birds travel a considerable distance for food and once they are established their insect control will be extended to neighbouring field crops as well as to the garden.

As the trees grow they will provide nesting sites for other highly desirable birds, such as the Ferruginous Rough-legged Hawk and Swainson's Hawk which spend most of their lives in hunting that pest of the prairies, the gopher. Their skill in this respect is reflected in the popular name of gopher-hawk, by which these two species are known throughout the West. The efforts of a pair of these birds in ridding the farm or ranch of gophers continue throughout the summer, and make such faithful allies worthy of every protection, especially when it is considered that they probably never take chickens .They will use trees as nesting sites, and the place where they take up their dwelling will be rid of any gopher pests before they rear their family. The staple "gopher" always ranks high in importance in the food of adult and young. Mr. P. A. Taverner estimates the cash value of one pair of these large hawks at $77 per year. If they use your tree plantation for a nesting site, this should be remembered.

The songs of birds about the house will be increased by tree planting. Our prosaic friend the Robin will not stay in treeless regions, and will eat no cut-

1. The Hawks of the Canadian Prairie provinces in their relation to Agriculture, Musuem Bulletin 28, Geological Survey, Ottawa, p. 6.

worms in gardens which have not shelter for his nest.

One may travel on the prairie for weeks without seeing a Robin, but the first tree planting of any size will almost certainly have a pair at least, and in addition to the good services of birds in controlling insects, it must be a barren life that does not enjoy their presence and their songs. These pleasures can be enjoyed in the cool, quiet shade of a planted woods on even the otherwise treeless prairie.

The bird lover will do more for his bird friends than merely provide them with the shade they need. Bird-houses will be appreciated by many of them and do not forget birds must have water. A shallow dish with a few pebbles for foothold will satisfy them for drinking and bathing. It should always be kept filled and be so placed that cats cannot reach it. In the limited area of a shelter belt about the house and garden a cat or two will succeed in destroying many adult and nesting birds. Cats and birds are not compatible, and one must decide upon which to encourage. A regular water supply is especially necessary on the prairies, and domestic cats can cause more damage in the limited area of a prairie shelter belt than elsewhere.

The persons who have taught the value of planting trees on the prairies have been concerned, and rightly so, in getting any suitable trees planted that would grow under the various climatic conditions of the Canadian West. Certain trees and shrubs are especially attractive to birds because of their fruit, and in case any bird-lover on the prairies wishes to plant some trees and shrubs, especially for the birds, he cannot do better than consult the list which is given below. Some otherwise valuable birds will molest cultivated fruits, but the damage they cause has usually been amply repaid and more by the insects destroyed.

One way to lessen damage to domestic fruits is to provide the birds with early wild fruits. The list given at the end of this article was compiled by the Biological Survey, Washington, D.C., under the title: "Plants That Attract Birds and Protect Fruit." The original list as published was carefully amended to meet Canadian conditions by the late James M. Macoun.

Plant trees on the prairie, for in addition to their obvious advantages there is pleasure and profit in attracting tree-loving birds to devour the insects in your garden and orchard.

To the oft-repeated question: "How fast will a planted shade tree grow?" there are many convincing replies. The above silhoutte photograph shows a mammoth maple planted in 1860 in the Seminary courtyard at Quebec by King Edward VII., then Prince of Wales

Plants to Draw Birds

The plants given below will grow in the western or arid division of the Transition zone, which comprises the southern Assiniboia (now southern Saskatchewan and Alberta) and small areas in southern Manitoba . . . the higher parts of the Great Basin and the plateau region generally (except the Boreal Mountains). . . . . In this area the sharp-tailed Grouse . . . . is a characteristic bird. . . . Many other species occur, however, and those desiring to attract them will find the following shrubs and vines serviceable:

Juniper (*Juniperus scopulorum*), barberry (*Berberis thunbergii*), currant (*Ribes cereum*), service berry (*Amelanchier florida*), red raspberry (*Rhubus strigosus*), choke cherry (*Prunus demissa*), aromatic sumach (*Rhus trilobata*), silverberry (*Elaegnus argentea*), buffalo berry (*Shepherdia argentea*), red oiser (*Gornus stolonifera*), snowberry (*Symphoricarpus racemosus*), elder (*Sambucus glauca*), mountain ash (*Pyrus americana and P. Aucuparia*), and Siberian crab-apple (*Pyrus baccata*).

In addition to these plants any of the native fruit-bearing plants of the coulees may be transplanted to the place to which it is desired to attract birds.

Timber Industries' Council

Under the able direction of Mr. M. A. Grainger, former Chief Forester of British Columbia, the Timber Industries Council of British Columbia has been formed. This marks a definite step forward in co-operative organization for the advancement of the timber industry in all its branches. The Council will tie together not only the timber owners but the industrial operator. In its Directorate will be included representatives of the Lumbermen's, Loggers', Shingle Manufacturers' and Timberholders' Associations, as well as the pulp and paper companies. The Council is not a separate grouping of the individual operators and timber holders' associations.

Many general matters affecting the industries which have been nobody's business and have thus run the risk of being neglected—unless one or two of the associations or a commiittee of individuals were willing to look after them—will now be referred to an office definitely responsible for getting results. The general question of how to secure more stable conditions throughout the timber industries and closer co-operation between the different sections into which they are divided will naturally be one upon which persistent get-together work will have to be done. Taxation, transportation, forest protection and legislative issues; united action when laws, regulations, government or banking policy impose hardships on timber owners or timber industries; the securing and circularizing of information useful to those concerned with timber; joint action in advertising forest products—these are among the many matters in which the Council will take an active part.

Canada's Forests Vital to the Empire

The position of Canada in the world as a forest country is a large and important one, and in the British Empire it is even more important. The authorities on forestry in the British Isles are laying stress on the unique position held by Canada in the British Empire for the supply of coniferous timber, and have been urging on the Imperial Government the necessity of providing fully for the proper protection and management of Canadian forests. The situation in Canada is complicated by the fact that the forests are divided in ownership among a number of governments which have independent jurisdiction, but it would seem that in response to the call from the Imperial Government some wider system of co-operation between the Federal and Provincial Governments might be worked out.—Annual Report, Director of Forestry, Ottawa.

The following slogan was awarded first prize out of a total of 1,150 submitted in the recent fire preventive slogan contest in Oregon:

"Lumber, fuel, beauty, joy,
Forests furnish, fires destroy."

Experiments in New Brunswick: The two photographs presented on this page illustrate an interesting experiment in the burning of the debris left by logging operations. The above picture shows the appearance of the woods with the slash snowed under before the burners arrived. Fires are in progress to the right and left. The depth of the slash may be judged by the fact that nearly all the stumps are covered over. The following picture was taken from nearly the same spot a few days later.

Experiments in New Brunswick: The burners have completed their work. The covering of snow made the operation perfectly safe and did not seriously interfere with the effectiveness of the burn. Note the number of stumps now visible as compared with the foregoing photograph. This area illustrates a severe cutting, 244 trees having been taken off, yielding 7,500 feet, board measure.

Forest Experiments in New Brunswick

By W. M. Robertson, Forester, Commission of Conservation

An Effort to Discover Better Methods of Securing Maximum Reproduction of Black Spruce

THERE is an increasing appreciation among timber-land owners that the old methods of forest exploitation do not as a rule leave the forest in a condition to produce another crop of timber of the more valuable species.

In connection with the Crown timber survey, the New Brunswick Forest Service has devoted considerable attention to studies of regeneration, volume and rate of growth of the principal timber species. As one phase of this research work, the Provincial Forest Service, in the summer of 1919, entered into a co-operative arrangement with the Bathurst Lumber Company, Limited, for the conduct of some experimental cuttings on the limits of the latter near Bathurst Mines, Gloucester county. In this project, the Commission of Conservation has also co-operated, the field work being carried on under general direction of Dr. C. D. Howe, with the writer as party chief. A tract of 500 acres has been set aside and is reserved for twenty-five years for experimental purposes.

The object of the work is to demonstrate what are the best and most practicable methods for the management of slow-growing black spruce, of which there are considerable areas in New Brunswick as well as in the other forest provinces of eastern Canada. The topography, soil and types found on the plot being characteristic of considerable areas, any deductions from these experiments may be of wide application.

The surface is flat or slightly rolling and the soil for the most part is shallow and sandy, with numerous loose boulders. The main stand of timber is even-aged, 80 to 90 years, having followed the great Miramichi fire of 1825. The forest types may be classed as mixed (conifer and hardwood) slopes, about 200 acres; conifer flats, 250 acres; spruce and cedar swamps, 35 acres; and the remainder of the area as waste (water and rock). The uplands, where the soil is somewhat deeper and the drainage better, bear a mixed type composed of white birch, red maple, poplar, black and white spruce, balsam fir and white pine, over 50 per cent. of which is coniferous. A good growth of cedar occupies the swamps. The stand on the conifer flats is composed of pure black spruce, very dense, and for the most part in the polewood or small timber stage.

A study of ring counts and measurements reveals comparatively good growth of the stand for the first four decades, with a very markedly decreasing rate during the remaining five decades. In order to determine why such a condition exists, and what remedy, if any, can be applied to maintain the increment, intensive study and experimentation are necessary.

Certain parts of the stand have been wind-thrown. A system of cutting to be recommended to reduce loss from this source can be found only by trial.

The principal objects of the experiments are to determine:—

(1) The best conditions for the natural regeneration of the commercial species after logging.

(2) The effect of various degrees of thinning upon the subsequent rate of growth of the remaining stand.

(3) The effect of thinnings upon wind-firmness.

(4) The comparative results from natural regeneration and artificial regeneration (planting).

With these objects in view, the New Brunswick Forest Service surveyed the plot, dividing it partially into strips, one, two or three chains wide, and partially into 1-acre circles, which are being managed under different methods.

The Bathurst Lumber Company logged some 300 acres of the plot during the winter of 1919-20. The remainder of the plot has already been cut this season.

The reference map accompanying this article illustrates the method of subdivision. Each alternate strip was two chains wide. These, in rotation, were cut to 10-inch, 8-inch and 6-inch diameter limit. The slash was alternately lopped and left as it fell.

The other alternate strips were cut clear of conifers, and in pairs were one, two or three chains wide, *i.e.*, two strips were 1-chain wide, next two 2-chains wide, etc. The slash on the clear cut strips was alternately burned and left as it fell.

At the south end of the plot, eighteen 1-acre circles were cut clear. The slash half of the number was burned, on the others either lopped or left.

This arrangement of strips affords an opportunity for a comparative study of the progress of regeneration on areas thinned to 10-inch, 8-inch or 6-inch diameter; and with slash lopped or left; and on clear cut strips of several widths with slash burned or left as it fell. The varying width of the strips will also provide data as to the distance to which seeding from the side can be secured.

The question of wind-firmness may be studied relatively when the windbreak strips are variously thinned with clear-cut strips of different widths intervening.

During the past summer it was deemed advisable to alter the arrangement of the strips somewhat, and accordingly the remaining 200 acres of the plot were surveyed into strips 3 chains wide. The odd numbered strips, *i.e.* Nos. 1, 3, 5, etc., were clear-cut, the others, 2, 4, 6, etc., were cut to a 12-inch diameter limit. Over the entire season's cut, with the exception of some 25 acres on which the slash was piled for burning, the tops were lopped.

This change of regulations considerably increased the range of experimental possibilities. The 12-inch diameter limit is added, and the 3-chain wide windbreak strips do not appear in the original arrangement.

To "mark" the trees for cutting to the proper diameter limit, the regulation governing each strip was written at frequent intervals along the blazed strip line, and a pair of calipers was supplied to each gang.

The principal object of disposing of slash by the various methods on this experimental tract is threefold, namely, to determine the relative values (1) in aiding reproduction, (2) in controlling insect hazard, and (3) in reducing fire hazard.

Behind each logging gang, a crew of two or three "brushers" followed as a separate unit rather than as a part of the gang.

Piling the brush, if fairly dry, in numerous small piles before firing any, then burning a number of piles simultaneously was found to be the most satisfactory method. But when wet or snow-covered tops were to be disposed of, a coal bed from dry wood was first necessary. On such a bed the large percentage of water that can be disposed of with the slash is remarkable.

To compare rate of growth in the past with prospective rate of growth, complete measurements showing stump height, log lengths and top lengths, diameter at each section and at breast height, age counts at each section with the radial growth in 10-year periods, in other words, stem analyses, were taken of all conifers on one tenth-acre plot on each diameter limit strip. From sixteen of these plots, 670 trees and perhaps as many saplings were recorded.

The experiment will afford an opportunity to compare planted seedlings with those of natural regeneration. Therefore, 5,000 plants 3-years-old stock, of Norway spruce of fair viability were set out in May last. These were distributed

Experiments in New Brunswick: In the section shown in the foreground of this photograph a portion of the strip had been cut clear and slash left on the ground in November, 1919. The photograph was taken in October, 1920, and although the spills have fallen to the ground the fire hazard is by no means reduced 90 per cent. of the strips covered with slash.

Experiments in New Brunswick: A similar strip to that shown in the foregoing picture with the substantial difference that the debris of the logging operation has been gathered together and piled for burning. Not more than one-third of the ground is now slash covered. Smaller piles than those shown would be handled more easily.

over the experimental plot in nine plantation plots (see map), varying from one-tenth to one-half acre in extent, so located as to secure representative conditions of soil, ground cover and shade.

A recount of these plants, made in September, shows 71 per cent. living, 17 per cent. dead. The remaining 12 per cent. could not be found. Possibly some of these "missings" hidden beneath slash may survive and increase the percentage of survivals. Careful records of these plots have been made.

Four one acre permanent sample plots, one each on a strip cut to 6-inch, 8-inch, 10-inch and 12-inch diameter limit respectively, were surveyed and mapped; every tree and sapling thereon numbered and recorded as to species, diameter breast high and crown condition, and the location shown on the map.

The primary objects of establishing these plots are to determine the effect of the thinnings:—

(1) on the rate of growth of the remaining stand.

(2) on the wind-firmness of the remaining stand.

(3) on the rate of reproduction.

(4) on the death rate.

It is proposed that these plots be measured and measurements recorded and compared every fifth year hereafter until at least four records have been taken.

A strip survey was run in which all trees, free, suppressed, dead or wind-fallen since the cut, and all stumps on strips cut to 6-inch, 8-inch, 10-inch or 12-inch diameter limit, were calipered and recorded. In all, 44.2 acres, principally in the coniferous type, were included in this survey.

From the data thus obtained, and by the use of the volume table previously mentioned, it is intended to determine:—

(1) the volume of timber that stood on the various strips before the cutting;

(2) the volume removed at cutting;

(3) the percentage volume still standing and

(4) the percentage of wind-fall since the cutting.

At the time the strip survey was being run, an estimate was made of the ground covered by slash under the various degrees of culling. This will be of interest in connection with the study of the progress of the natural regeneration.

The white spruce seed crop of last fall was a bumper one, and it was planned to sow a few acres with this species in various manners and locations on the plot, comprehensive records of these seedings to be taken for future comparative studies. Frost and snow, however, intervened. The seeds are now on hand for the fulfilling of these plans at an early date next spring.

RECORD OF THE GROWTH OF A BALSAM POPLAR

THIS tree grew in a mixed bush of poplars, ash, soft maples, elms and the customary under wood in a swamp spot, in the lumber yards of McLachlin Bros., Ltd., Arnprior, Ontario. The entire grove covered about eight acres of ground. Several other poplars grew around the same spot as the one here referred to, reaching a diameter of from 20 to 25 inches two feet from the ground.

The land upon which these trees grew was cleared absolutely of all trees and underbrush of any kind under the supervision of the undersigned in the autumn of the year 1870. The tree was felled in December, 1920, and produced three saw logs, two of them 16 ft. long and the top log 12 ft. long, 14-inch diameter at top end. The wood in the tree was sound without sign of rot anywhere.

Growth.

1872-1877	3	inch diameter
1877-1882	6¾	" "
1882-1887	10	" "
1887-1892	14¼	" "
1892-1897	17¾	" "
1897-1902	19¾	" "
1902-1907	21¾	" "
1907-1912	23¾	" "
1912-1917	24¾	" "
1917-1920	25½	" "

ARMON BURWASH.

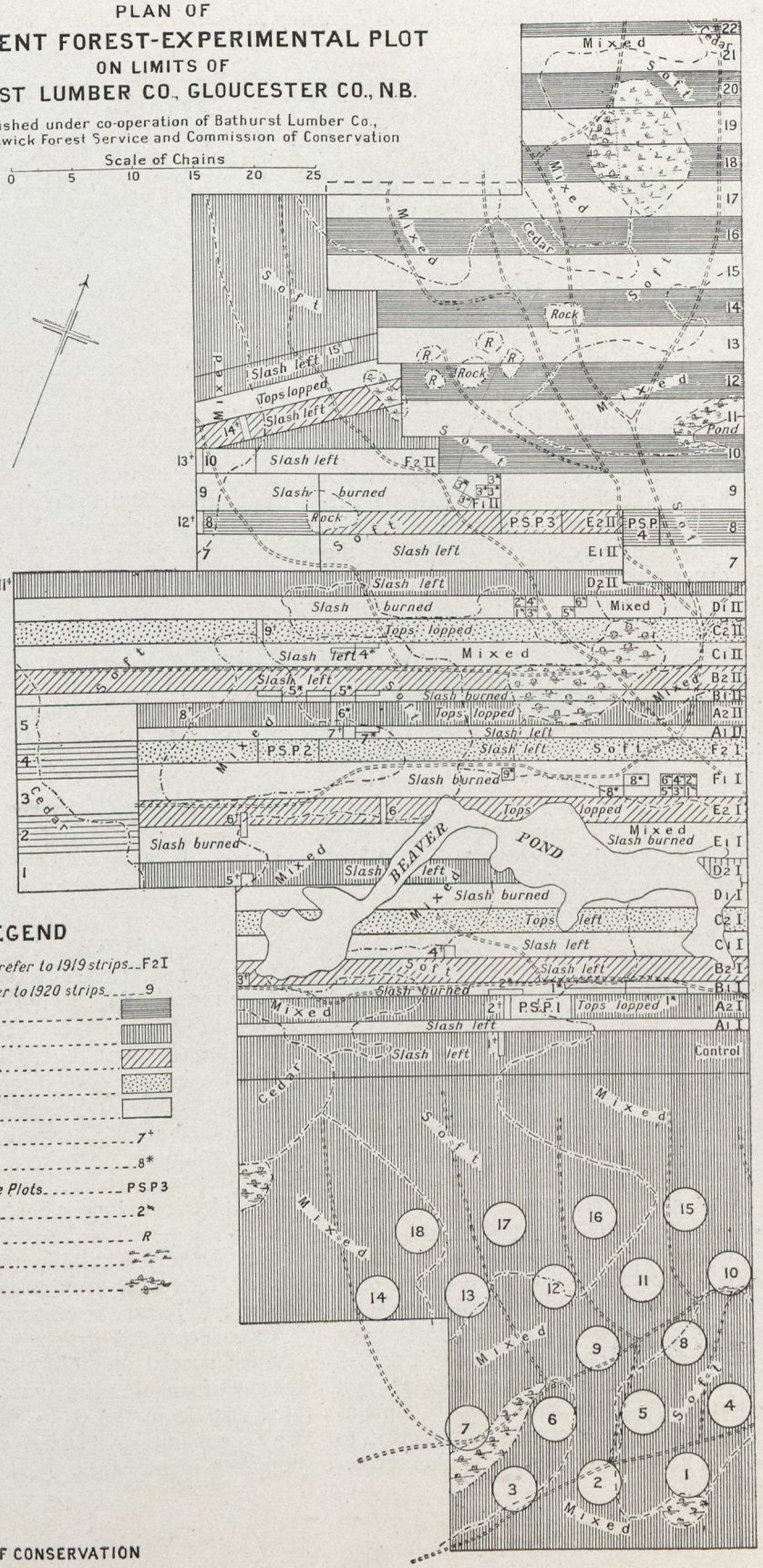
PLAN OF

PERMANENT FOREST-EXPERIMENTAL PLOT

ON LIMITS OF

BATHURST LUMBER CO., GLOUCESTER CO., N.B.

Established under co-operation of Bathurst Lumber Co.,
New Brunswick Forest Service and Commission of Conservation



LEGEND

Lettered numbers refer to 1919 strips	F2 I
Plain numbers refer to 1920 strips	9
Timber cut to 12"	
Timber cut to 10"	
Timber cut to 8"	
Timber cut to 6"	
Timber clean cut	
Growth Plots	7+
Plantation Plots	8*
Permanent Sample Plots	PSP3
Seed Plots	2^
Rocks	R
Soft swamp	
Alder swamp	

COMMISSION OF CONSERVATION

The Year's Story of Our Association

Membership steadily advances with an enlarged programme of field work accomplished

AT the Annual Meeting held at Montreal on Thursday, January 20th, the Canadian Forestry Association celebrated its coming-of-age. The twenty-one years since the Association first saw the light at Ottawa have witnessed phenomenal changes in the development of forest industries and in the incorporation of forest fire prevention as a fundamental policy by the governments, the limit holders and industrial corporations.

In the year just closed, the Directors of the Canadian Forestry Association are gratified to report that the lines of work provisionally laid down by the Association's last annual meeting have been carried out and many new enterprises established. Revenues have been built up almost double those of 1919, membership has advanced by 3,000 and all the field enterprises in which the Association is engaged find themselves today on a secure footing.

It should again be made clear that the Forestry Association is not a passive institution with merely a set of objects and a hopeful attitude but is engaged in aggressive educational campaigns, itself supplying the men and machinery and being responsible for their direction and financial maintenance.

First and foremost we have sought to put the emphasis on forest fires as the supreme foe to forest duty of all responsible authorities. We have endeavored to stimulate better forest protection laws and improved administration. The public advantages of having all land classified in advance of settlement and, if non agricultural or of two meagre dimensions to support a strong community, to reserve it permanently for timber growing, has found in our Association an insistent advocate.

We have striven to impress upon the Canadian people the pre-eminent value of the forest industries as creators of employment and distributors of wealth. At the same time we have tried to demonstrate the identity of interest between the permanent existence of these industries and systematic forest management.

These are all objects of great economic consequence and none can be achieved except through an informed public. The carrying out of this duty of popular education is a vast work and the large share of it given to the Canadian Forestry Association is due probably to the recognition that our freedom of action as an independent national body is guarantor of public confidence and co-operation.

Methods of Working.

Our channels for reaching the public may be defined as follows:

The membership, which is now twelve thousand five hundred.

The newspaper publicity bureau which has retained a friendly contact with all newspapers.

The Speaker's Bureau of three hundred volunteer workers, generously spreading our propaganda to thousands of people, including school children.

Our Western Tree Planting Car.

Our Eastern Exhibition Car.

Our Travelling lecture sets of lantern slides, and lecture manuscripts.

Our Illustrated Forestry Magazine.

Such special methods as results from the use of warnings in cigarette packages, etc., also from the co-operation of railway companies in placing our "sermonettes" on menu cards.

A startling photograph of a raging forest fire taken at the Grand Rapids, Athabasca River, Alberta, by Mr. A. M. Narraway of the Topographical Survey Branch, Ottawa.

The Man in the Field.

One of the most active and effective agencies in the hands of the Association is the field worker who travels to outlying communities and by public meetings, aided by motion pictures, wins the interest of masses of people in forest protection. In 1920 the Association held 340 public meetings. We have had in our service permanently or temporarily, seven men, with four assistants. These men are Messrs. Black, Blyth, Mitchell, Cooch, Valin, Doucet and Blanchard.

As the financial income and volume of field work increased, it was found necessary to secure larger quarters and to add an Assistant Secretary, Mr. Gerald Blyth. This was done in the early summer.

Inasmuch as the ordinary educational methods of the Association have been described in previous annual reports, mention will here be made only in the briefest form of the operation of these agencies.

The best testimony to the reception given the Association's newspapers contribution is the fact that in no year have the Canadian dailies and weeklies contained so much editorial comment favoring forest conservation. The prairie province papers, in turn have been highly generous in their discussions of tree planting, for shelter belt purposes. This favoured treatment by the Canadian press was supplemented in generous manner when thirteen publications agreed to give insertions to the Association's advertisements of its aims and objects. This was tantamount to a gift of many hundreds of dollars to our work, and is herewith gratefully acknowledged.

On the Prairies.

Some special reference should be made to the inauguration of our Tree Planting Campaign in the Prairie Provinces. This was made possible by the private subscriptions of business firms who realized that the economic consequence of extensive shelter belt planting in helping to offset soil drifting, wind damage to crops, and as an improver of home surroundings, justified an educational campaign. For this task we secured Mr. Archibald Mitchell, a western tree planting expert with marked ability as a propagandist. From the beginning of June to the middle of October, Mr. Mitchell and his assistant, Mr. A. Cooch, worked industriously holding 170 public meetings and by direct and indirect methods stirring up a serious popular interest in the purpose and methods of tree planting on the prairies, such as could have been accomplished in no other way. By the courtesy of the President of the Canadian Pacific Railway Company, a railway coach was loaned to us, which we equipped as a motion picture auditorium, with special electric generator and machines, with special tree planting films. Mr. Mitchell, in the course of his work with audiences of adults and school children was able to assist many municipalities and public societies in establishing town parks and beautifying municipal surroundings. He provided complete working plans for many communities. We are under no delusion that miraculous results can spring from a single season's campaign. The enterprise, however, was highly appreciated by the Western people, and has done a pioneer work that will show substantial consequences in the near future.

It is the Association's present plan, with approval of the provinces directly concerned, not only to repeat in 1921 the work done on the prairies last year but to double the length of the working season.

East of Manitoba, our Eastern Exhibition Car, loaned us by courtesy of the President of the Canadian National Railways, was in service from June 1st to nearly the middle of December in charge of our own men for the greater part of the time. The Association herewith thanks the Government of Quebec for the services of Mr. Valin and Mr. Trottier who ably aided us for some weeks at the end of the season.

50,000 *Attendance.*

The object of the Forestry Exhibition Car was to interest the public in the products of the forest and to impress the necessity of forest protection. Meetings were held daily, with motion picture demonstrations, and short lectures. It is a conservative estimate to place the total attendance of visitors at the car during the 1920 season at 50,000 and the total number of people at the evening meetings held in connection with the car's visit at 20,000. The route of this car covered from Sault Ste. Marie, Ontario, to Saint John, New Brunswick. During the late Fall tour in Central Quebec, the public interest in the Car was truly remarkable. Our French lecturer was sometimes obliged to hold as many as five meetings

daily to accommodate the requests of schools and the adult public.

It is well to explain here that the portion of our Association funds, properly applicable to the Exhibition Car, has made it necessary during the past two years to build up the exhibits from borrowed material, without much regard to a definite educational plan. We want to secure a larger and newer coach for this year and to equip it in such a manner that the visitor will carry away a distinct and permanent impression of the car's object.

In addition to the lectures associated with the travels of our railway coaches, we engaged Mr. J. A. Doucet, for two campaigns in the Temiskaming region working out from Ville Marie, Quebec, and the Lake St. John region where series of large and unquestionably influential public gatherings were held. Recent reports from the fire rangers of these districts refer eulogistically to the good results accomplished and ask for an extension of the work in the future. Mr. Doucet carried into the back settlements one of our electric generators and was able to present the first motion pictures seen by hundreds of people. That these pictures were fire prevention propaganda did not by any means weaken the service done to forest protection in those districts.

Developing the Journal.

In holding our members together and quickening their interest in forestry and kindred subjects, our official publication, the Illustrated Canadian Forestry Magazine, has rendered prime service. With sharply rising costs of publishing we faced the alternative of deteriorating the quality of the magazine, thereby forfeiting our likelihood of new members and possibly the allegiance of some of our old members, or building up the magazine to large size and taking the consequences, both favorable and adverse. We feel satisfied that the Association has gained greatly by keeping up the high standard of the magazine. It is now 60 pages as compared with 48 pages last year. Each issue contains numbers of original articles and attractive illustrations while the confidence of many national advertisers has been won and we look forward to overcoming the entire cost of publication by advertising revenue. At the close of 1920 our books contained advertising contracts amounting to $5,000 which in itself is ten times the advertising revenue of the magazine in 1919.

The membership of the Association increased in 1920 by three thousand, which, with allowance for resignations, deaths and the list of missing, gives us a healthy membership strength of 12,500 with which to commence 1921. By no means was the past year propitious for the growth of such a body as the Canadian Forestry Association. Business uncertainty and foreboding tempted prospective members to postpone action and only the improved quality of our Forestry Magazine was able to secure us headway. Corroboration of this general experience of public associations in membership's growth is supplied by the record of other associations in this country and the United States.

Financial Progress.

We come now to our concluding subject: The Association's experience in financing its programme. Outside of our membership fees, we have no source of money except what can be annually procured from friendly governments and private corporations. The record for 1920 shows a total of $38,418.94 as compared with $20,071.88 in 1919. The revenue for the year just closed represented an increase of 91 per cent.

Government grants for 1920 were $8,850 as compared with $4,600 in 1919, an increase of 92 per cent.

Special subscriptions were secured in 1920 to an amount of $15,290, as against $6,840 in the previous year, an increase of 123 per cent.

Membership fees advanced from $7,584.78 in 1919 to $12,973.75 in 1920, an increase of 71 per cent.

Advertising revenues of the Forestry Magazine advanced from $532.75 to $1,968 in 1920, an increase of 269 per cent.

We ended 1920 with a balance on hand of $1,990.27.

It may be appropriate here to recount the steady advance of Association income in recent years:

1915	$ 5,279.23
1916	7,182.60
1917	11,192.16
1918	14,290.10
1919	20,071.88
1920	38,418.94

One of the most satisfactory evidences of the gain made by the Association in the good opinion of the wood-using industries is afforded by comparing our 1920 grants from special sources, exclusive of governments, with those of previous years.

1916	$ 1,010.10
1917	2,235.00
1918	3,750.00
1919	6,840.00
1920	15,209.00

Plans Ahead.

Of the many plans for extending the scope of the Association's influence throughout Canada, one of the most important which has already been passed upon by the Directors of the Association is the establishing of a permanent French-speaking propagandist for the province of Quebec. This has been carried to the point of a formal application to the Minister of Lands and Forests of Quebec for an annual grant of $5,000 which would be entirely expended upon the work of this officer. We entertain strong hopes that our application will meet with the approval of the Quebec Government.

Similarly we have applied to the Government of Ontario for an increase in its annual grant from the previous total of $1,000 to $4,000 and a deputation has already waited upon the Prime Minister to urge our petition. A favorable response has been given us by the Government of Saskatchewan which appears willing to make a grant to maintain our tree planting campaign in Southern Saskatchewan. The decision of Alberta will not be available for about a month. Through the Association's friends in New Brunswick negotiations have been opened with the Provincial Government of that province for an increase of the Provincial grant from $350 to $1,500.

While the Directors feel a reasonable pride in the Association's achievements since its inception and particularly in the year just closed, we do not wish to err on the side of excessive optimism. Our field is continually extending and much careful planning and hard work lie ahead of us if we are to live up fully to our responsibilities.

Changes In Directorate of Canadian Forestry Association

AT the Annual Meeting of the Association in Montreal, January 20th, a new basis of representation of Directors according to provinces was adopted with the object of providing a better balance as between the eastern and western provinces. According to the Constitution of the Association the Directorate shall consist of forty-five elected members and the presidents of the Association since 1909-10, making a total of fifty-six. Mr. G. C. Piché of Quebec pointed out that a preponderance of eastern representatives on the Directorate was a natural outcome of the earlier identification of the Forestry Association's work with Eastern Canada. Mr. Piché held that the redistributing of Directors should not be proceded with at the present time but that in future elections vacancies should be filled by representatives of the Western provinces.

The meeting finally agreed upon the following basis of representation: Ontario15, Quebec 10, New Brunswick 3, Nova Scotia 2, British Columbia 6, Alberta 3, Saskatchewan 3, Manitoba 3.

A nominating committee of seven was chosen and after careful consideration brought in the following list of nomina-

tions for 1921: Patron, His Excellency the Governor-General; Honorary President, Rt. Hon. Arthur Meighen, P.C., M.P.; President, C. E. E. Ussher; Vice-President, Dan McLachlin.

Ontario Directors: Gordon C. Edwards, Clyde Leavitt, R. H. Campbell, Dr. B. E. Fernow, C. J. Booth, E. J. Zavitz, Albert Grigg, Percy B. Wilson, T. W. Dwight, J. A. Gillies, J. W. Black, W. E. Bigwood, C. T. Young, Dan. McLachlin, Hon. Geo. Gordon.

Quebec: Hon. Jules Allard, Alex. MacLaurin, Rev. Mgr. Roy, G. C. Piché, Sir William Price, Brig.-Gen. J. B. White, Geo. Chahoon, R. O. Sweezey, Avila Bedard, Elwood Wilson.

New Brunswick: David Champoux, Angus McLean, W. E. Golding.

Nova Scotia: F. J. D. Barnjum, Hon. N. Curry.

British Columbia: Hon. H. Bostock, Hon. A. C. Flumerfelt, R. D. Prettie, P. Z. Caverhill, Chas. D. McNab, H. R. MacMillan.

Alberta: Wm. Pearce, G. P. Marnoch, Norman Harvey.

Saskatchewan: Hon. W. F. A. Turgeon, John Dixon, Jos. Glenn.

Manitoba: John W. Dafoe, G. W. Allan, E. Fitzgerald.

The following past-presidents of the Association since 1909-10 are ex-officio directors, under the constitution: T. W. Southworth, Hon. W. C. Edwards, G. Y. Chown, Hon. W. A. Charlton, F. C. Whitman, Lt.-Col. J. B. Miller, Hon. Sydney Fisher, Col. J. S. Dennis, J. S. Gillies.

The Committee recomended that Mr. Wm. Little, one of the founders of the Association and a most devoted supporter of its work, should be retained as an ex-officio Director of the Association.

Mr. Ussher entered a strong demurrer to his re-election as President for a second term, owing to the urgency of his official duties. The members of the Nominating Committee, who were heartily backed by the general meeting, brought such pressure to bear upon the President that he finally consented to undertake the duties of the office for 1921. Mr. Ussher declared that he regarded his re-election as a distinct compliment and that his readiness to serve the Association was only tempered by the demands of his official position.

A resolution of condolence to the relatives of the late Mr. Wm. Power and Mr. A. S. Goodeve, who as Directors of the Canadian Forestry Association had given loyal service for many years, was moved by Mr. Cyril T. Young and seconded by Mr. Little.

The meeting gave some time to the discussion of a special subject placed upon the agenda by request: "Forest Fires Continguous to Steam Railways." Mr. Leavitt explained the jurisdiction of the Board of Railway Commissioners, which, he made clear, did not extend over the government-owned systems. Mr. Gregory gave a resume of his address of the previous afternoon to the Quebec Forest Protective Association concerning the neglect of precautionary measures in the prevention of forest fires by the Canadian National Railway lines. Mr. Ellwood Wilson moved, seconded by Mr. Graham, that a committee of the Canadian Forestry Association be appointed by the executive to co-operate with the committee selected by the Quebec Forest Protective Association in bringing before the C.N.R. authorities the question of establishing on C.N.R. lines the same forest protection regulations as now apply to the privately-owned railways.

There is only one way of making the Canadian Forestry Association a fighting power in forest protection: If your membership fee of $2 is unpaid for 1921, put your cheque in the post box to-day. The Association wages its campaigns entirely on voluntary subscriptions.

Methods of Distilling Wood

By Dr. Alfred E. Macintyre, Ottawa

(*Article No. 2*)

HARDWOOD, for distillation purposes, should be cut after the leaves fall, and should be permitted to dry in the sun and wind, during the spring and summer months. Under favorable conditions, the moisture content of the wood should then vary between 12 and 20 per cent. All portions of the tree can be utilized, from the trunk to the small branches. Everything above five inches in diameter should be split to admit of the easier penetration of the heat of decomposition and freer evolution of the gases. Hardwood mill slabs, edgings, etc., can be utilized and, as will be observed later, even hardwood chips and turnings are distilled. Decayed wood should be rejected, as the yields are poor and the charcoal produced from it, a source of danger, owing to its great liability to spontaneous ignition. Moisture in the wood is advantageous, but wet wood takes a longer time to carbonize, and the crude pyroligneous liquor obtained is more dilute, necessitating more evaporation, with corresponding greater consumption of fuel, although the yield of acetic acid and methyl alcohol is slightly higher in comparison.

Carbonizing Systems.

The systems employed for the distillation of wood are shortly as follows:—

1. The plants erected upon the retort system and each unit holding from one to three tons of wood.

2. Mechanical plants which deal with chips, shavings and other small wood.

3. Kiln plants, of beehive type, holding from 100 to 150 tons of wood.

4. Oven, or large retort plant, in which the wood is piled upon small trucks and run into the oven upon rails. The charge averaging about 16 tons, but the capacity can be increased or decreased at will.

(a) The retorts were the early form of apparatus in use, and were formerly cylinders made of heavy cast iron of 3 to 4 feet in diameter and 8 to 9 feet in length, having a door for charging and discharging at the front and an outlet, at the other end, connected to a condenser, for conducting off the gases evolved during the carbonization process. The door sometimes constituted the whole front end, and in other instances was only an oval opening in the front, about twenty inches across, and reaching nearly from top to bottom of the cylindrical retort. The doors were luted and fastened by wedges. These retorts were loaded and drawn by hand. They were protected from the direct action of the flame, from the furnace, by a system of firebrick arches and flues. Two retorts constituted a bench and one furnace supplied the necessary heat. These cast iron retorts were superceded by cylinders made of heavy steel plates, having cast iron fronts and doors. The retorts were arranged in such a manner that, when they were burned by the action of the flame, they could be revolved and another surface exposed.

(b) The mechanical retorts are continuous in their operation and are, as a rule, horizontal. The writer saw a mechanical retort in operation at the Camlachie works of Messrs. Turnbull, Glasgow, which was carbonizing birch turnings from New Brunswick spool wood. This was a cylinder with an endless screw conveyor, and screw hopper into which the turnings were fed and conveyed by the hopper screw to the top of the worm screw of the retort and carried through the latter. The charcoal was discharged, at the back end, into an air tight box. The gases given off in the process were passed to a condenser. The retort was heated from a furnace. A similar retort was at one time, employed for obtaining acetic acid and methyl alcohol from exhausted tan-bark of tanneries.

The vertical mechanical retort consists of a metal cylinder having spaced horizontal plates, with slots in the latter. In

the centre of the retort, there is a shaft with arms attached, and the slots in the plates extend from the shaft to the circumference. The bottom of the retort is cone-shaped and fitted with an air tight box for the charcoal. When in operation, the wood is fed in at the top and is caught by the revolving arms of the rotating shaft and is carried over the hot horizontal plate until a slot is reached, the chips drop to the next plate and again are carried over the surface of the plate until it drops to the top of another, and this continues until the wood has been converted into charcoal and falls into the box. The gases pass upward through a passage surrounding the central shaft to a condenser. The control of the temperature, within a mechanical retort, is difficult and the yields of acetic acid and methyl alcohol much lower than in systems Nos. 1 and 4.

(c) The fire-brick beehive Kiln was introduced principally for the production of large quantities of charcoal for iron smelting. It proved uneconomical, inefficient in the production of condensable products, and offered difficulties in the control of its operation. In America, these installations were located chiefly in Michigan.

(d) From the retort system of steel, described under (a), there was developed the large steel oven having a much greater capacity, and into which the wood is conveyed loaded on small cars. These retorts were, formerly, rectangular steel ovens resting upon brick supports, with rollers to permit of expansion. The general practice, at present, is to suspend, by means of hangers, large rectangular retorts, 40-50 feet long, 8-9 feet wide, and 8 feet high, over furnaces. The expansion is taken care of by the free movement of the hangers. The bottom of the retort is protected, from the direct action of the fire, by firebrick arches and flues and the hot furnace gases circulate round the retort in such a manner that their heat is utilized to the fullest degree. The front, through which the laden cars enter, is closed by doors, and similar doors exist at the rear for the removal of the cars, when the carbonization is complete.

Cooling Charcoal.

The hot charcoal, from the cylindrical retorts (a), is drawn out by means of rakes and is placed in air tight coolers for 60-112 hours. In the case of the oven system, the air tight coolers are usually placed in double couples in the open, and are constructed of steel plates in the form of a tunnel. The first pair take the charcoal charge direct from the retort and holds it for twenty-four hours. It then passes to the second pair where the charge remains another twenty-four hours, and finally is exposed in the air for from forty-eight to sixty hours. This is necessary to ensure freedom from spontaneous ignition before the charcoal is loaded on cars or disposed of to the general public. Notwithstanding these precautionary measures, many cars of charcoal ignite during transportation and are destroyed.

Furnaces and Condensers.

The heating of retorts has been a subject of much technical investigation. The furnaces are generally designed to attain three purposes, protection of the metal of the retort, economical application of the heat, evolved in the furnace, to the distillation process, and further the utilization of the waste gases of combustion for evaporation and drying. The metal of the retort should be protected from the fire by fire-brick arches and flues. The hot furnace gases circulate round the retort in such a manner that they impart the heat efficiently to it. The exit combustion gases, on leaving the retort chamber, frequently, have a temperature of about 750 degrees F. and therefore contain much valuable heat capable of utilization.

The original type of condenser, used to condense the gaseous products given off in the distillation process, was a series of large copper or cast iron pipes of diminishing diameter, placed in tanks filled with water. This water was continually renewed by the introduction of cold water at the bottom, the warm flowing off at the top. The size of the condenser was such, that all the condensable gases, (which enter at a temperature of

660-700 degrees F.) were converted into acid liquor and should leave the condenser at 60-65 degrees F.

The modern type, introduced with larger retorts, is much more compact and consists of a tubular surface condenser, enclosed in a steel shell, cooled by the circulation of water. The efficiency of this condenser will be considered when the actual process of the distillation of the wood and the yield of prime products is discussed. With the oven system there are generally two such condensers, one at each side of the oven.

The uncondensable gases, from the condenser, are sometimes scrubbed to remove any acetic acid and methyl alcohol which they may contain. The gases in the majority of works, pass direct for utilization as fuel, sometimes under the retorts, in other cases for raising steam. The future contributions will deal with the distillation of the wood, products evolved, quantities obtained in general practice, and the possibility of increasing the yields by improved methods and through a more scientific control.

Tree Windbreaks on the C.P.R.

IN response to a request for information in regard to the prices of tree windbreaks on the C.P.R. Western Lines, we are advised that the last two summers were exceedingly trying on trees on the prairie, particularly from Moose Jaw west, where the greater part of the company's windbreaks were planted. The hot winds, that swept the prairie during the dry spell, played havoc even with stock that had been well established and had survived many hard winters. In some cases entire plantations were killed back, and what trees survived were severely checked in their growth. and had to be cut back in order to give them a fresh start. Another feature in the destruction of trees is the panel and slab fence, which has to be maintained until the trees are sufficiently thick to hold the snow. This causes the snow to pile up, and in some cases to completely cover the trees, with the result that the young stock are badly shaken up, when the snow thaws, and settles in heavy masses in the spring.

Of course tree windbreaks are most necessary on knolls and hills, where the track is in a cut. Trees so situated get less than the average amount of moisture, due to quick run off. For this reason trees along the right of way are at a greater disadvantage than they would be around a farm or on low lying ground.

It is generally conceded by all who have tried tree planting on the prairie, that the windbreak must be of at least eight rows of trees, and that it must carry a percentage of dense shade giving, or close foliage, trees. The object of this is to reduce the amount of evaporation and conserve needed moisture. It also reduces evaporation from the leaves in the hot dry spells.

When the C.P.R. started this tree planting there had been no experiments carried on west of Moose Jaw, by either government or private- indi viduals, consequently the company adopted the accepted planting practice of eastern Saskatchewan and Manitoba, and did not plant trees in sufficiently thick strips for territory farther west. When windbreaks have been planted east of Moose Jaw they have been decidedly satisfactory.

Prairie farmers are beginning to realize how beneficial windbreaks are around their dwellings, and more so around the farms, where by repeated cultivation and ploughing, the soil is puverized, and drifts from the heavy winds. This phase of tree windbreaks is receiving attention from the various farmers' organizations, which are advocating it very strongly in their meetings and through their press.

The Forests of South America

Buenos Aires, 1921.

Difficulties in the way of lumber importation during the war has caused the South American republics to turn their attention to their own forests and to-day there is a movement for the conservation of timber lands, for a properly supervised cutting of forests, and a government regulated replanting of trees to replace those cut. The forests of South America constitute the most extensive and the most valuable source of lumber that exists anywhere in the world and if they were protected and worked under regulation, instead of being destroyed as they now are, they could be made the fountain head of untold wealth in the years to come.

Timber probably is the only natural resource in South America the development of which is not dependent on the construction of roads and railways, for there are navigable rivers in all the wooded lands that would permit the carrying of logs to consuming centers.

Recent forestry investigations in Argentina, Paraguay, Brazil and Colombia have shown the fallacy of the widespread belief that the tropical forests of South America contain only hardwoods. These forests contain soft and semi-hard woods which have proven fully as adequate for construction purposes as the pine which is now being imported from the United States.

Forests of West Africa

Among the woods are Okume, Spanish or French, according to its origin in Spanish Guinea or French Gabon, is used for cigar boxes and commonly known as cigar wood; also for veneers and as a substitute for mahogany.

Mahogany, of two species, the aromatic and the capeli, is found over the entire coast country.

Pear, Moabi and Njabi are found principally in Kamerun and Gabon. These are excellent furniture woods.

Others are: African nut, ebony, padona, lemon, zebra, African poplar, apzelia and poplar. These latter appear principally in Kamerun and are useful for various technical purposes and in the manufacture of furniture.

Annual Meeting of Forest Engineers

THE Annual Meeting of the Canadian Society of Forest Engineers was held in the Windsor Hotel, Montreal, on Jan. 18. There was a large attendance of members, and there were also several prominent foresters from the United States present. The meeting included morning and afternoon sessions, at which a number of interesting and instructive papers were delivered and discussed.

The prospects in forestry as a profession were discussed by Mr. Ellwood Wilson, Laurentide Co., in a paper entitled: "Mutual Help and Salaries" and Prof. W. N. Millar, Toronto University, led the discussion.

"The Relation of Foresters to the Logging Departments" was the subject of an able paper by Mr. B. F. Avery, Spanish River Pulp and Paper Mills, and Mr. G. H. Schanche, Abitibi Power and Paper Co., led the discussion.

Mr. E. F. McCarthy, of the Commission of Conservation, read a paper on "What answer can we give when we are asked to tell how timber in Eastern Canada should be cut by pulp and paper companies," which was based on studies made on cut-over lands. This paper aroused considerable interest, and was discussed by Messrs. G. H. Prince, New Brunswick, W. N. Millar and others.

Mr. Ellwood Wilson, assisted by Mr. C. R. Townsend, gave an instructive talk on the Interpretation of Aerial Photographs, illustrated with photos and lantern sildes.

Mr. D. C. A. Galarneau, St. Maurice Paper Co., described his method of conducting forest surveys, which brought out a number of interesting points

which were discussed by Messrs. McCarthy, Schanche and others.

Mr. Roland D. Craig, Commission of Conservation, discussed the question of forest engineers joining the other branches of engineering in their efforts to secure legislation in Ontario protecting the engineering profession.

The following officers were elected for the ensuing three years:

President—M. A. Grainger, Manager, Timber Industries' Council of British Columbia, Vancouver.

Vice-President, Dr. C. D. Howe, Dean of the Faculty of Forestry, Toronto University.

Secretary—Roland D. Craig, Commission of Conservation, Ottawa.

Treasurer—T. W. Dwight, Forestry Branch, Ottawa.

An important amendment to the constitution was made permitting the establishment of a non-resident class of membership.

Resolutions were passed advising that the duties on seeds and nursery stock for forest planting be removed, and that all the government railways should be placed under the jurisdiction of the Board of Railway Commissioners, at least as far as fire protection is concerned.

NEW ZEALAND PLANS TO RENEW HER FORESTS

AN issue of the New Zealand paper called "The Dominion" contains the following interesting article:

"Last session it was announced that it was intended to place the State forests under the control of a separate Minister, and in November last this intention was given effect to by the appointment of the Hon. the Attorney-General as Commissioner of State Forests.

"An area of about 1,800,000 acres has since been proclaimed State forests under that authority. Additional areas will be proclaimed as soon as the necessary maps are completed. It must be understood that the setting aside of provisional State forests is not a final reservation. As soon as the necessary arrangements can be made, the reserves will be inspected, and such lands as are found to be more suitable for settlement than for retention under forest will be made available for settlement. The total area of State forests and provisional State forests is now about 3,273,000 acres, but of this area a large proportion does not bear timber of milling value, and a proportion is treeless mountain land. Taking a mean between the proportion of the forest areas of France and Germany, this Dominion should have an area of 13,300,000 acres under forest to satisfy present and future demands.

"In the plantations a total new area of 2,800 acres was afforested, about one-third of the area having been planted by discharged soldiers. Arrangements are being made to employ a large number of soldiers, but difficulty is experienced in providing both accommodation and trained supervisors.

"The Commissioner of State Forests has publicly announced that the forests of New Zealand must be henceforth utilized for the people of New Zealand, and that consequently the export of all classes of timber must be limited at present and cease wholly in the near future, and further, that on land not suited for settlement, only timber ripe for milling must be cut, and the growing timber conserved on all lands continuing as State forests. Against the policy so declared there has been considerable protest from certain districts where it is contended that the export trade already established should continue and be allowed to increase in volume.

Courtesy American Forestry Association.

The most perplexing of all forest fires is one that starts in an old cutting where debris is heavily piled. Our photograph shows such a fire, against which even the best organized fire protection service is sometimes helpless to make headway.

B. C. Forests Develop Drug Industry

A WARNING that Japanese cutters are despoiling the forests of British Columbia by destroying, root and branch, all the native supplies of the cascara sagrada bush, is given by botanists and timber cruisers interested in preserving this valuable medicinal bark. The Legislature is to be asked at the coming session to pass legislation to preserve this and other valuable medicinal barks and herbs from destruction.

It is known that five tons of this valuable drug were shipped out of the Salmon Arm district recently by two Japanese gatherers, while two other of their compatriots shipped out a ton and a half from near Squamish. Another little company of Japanese gatherers took out three tons of cascara bark and roots from the Jervis Inlet district, and two tons were shipped by Japanese from Nanaimo from a new discovery of cascara on Vancouver Island.

The cascara which is referred to in the botanical works of ten years ago as "the Pacific Coast's great gift to mankind," is said now to be so depleted in Oregon and Washington as the result of reckless gathering that there is no longer any of this bark to be found within reach of transportation. Prices have risen within the last few years from 2 cents a pound to over ten cents a pound for the bark, and with the world shortage it is likely to become even more valuable.

At present Japan and Germany are the two great sources of supply for cascara bark, according to a medical botanist who is interested in the subject. In both of these countries the shrub has been introduced by seedlings from the Pacific Coast. Stringent laws are enforced to prevent greedy collection of the bark, the gatherers from the private orchards being forbidden to take from the trees each year more than it will be possible for the tree to reproduce. To take more than one-fourth of the bark surface from the tree is said to cause the death of the shrub, just as a human being would die from shock if more than a certain amount of the skin surface was removed.

Recently a British Columbia Company was formed to collect and export pharmaceutical herbs and barks and most of its employes are returned men who are being introduced in industrial botany. They are to be encouraged to take up pre-emptions, and will be taught how to cultivate and treat the various forest products. Where there are no existing specimens of needed botanicals on their pre-emptions they will be encouraged to plant them. Under the system they are being trained in, these botanicals will grow larger and heavier in yield from year to year. From the cottonwood trees they get the Balm of Gilead bud, which contains a very fragrant resin, bringing quite a high price per pound. From the jack pine they get a pharmaceutical gum. From the little spruce of 2 inches and 3 inches in diameter they get spruce gum. Five or six barks used in medicine are collected. Altogether, it is figured, a man with 40 acres or so in these wild botanicals, is just about as well off as a man with 40 acres of richly cultivated bottom lands growing fruit and farm produce.

The great market for these barks and herbs is shown by the trade reports. Last week one shipment of cascara bark was received at New York from Hamburg, weighing 30 tons, all of it grown from seedlings from the Pacific Coast. No climate in the world is said to be so good as the moist slopes of the Coast Range in B. C. Experiments tried with the seedlings from shrubs brought from California show that these will grow into quite large trees when planted there. Nature, at any rate, is fighting on the side of British Columbia so far as the cascara bark industry is concerned.

Serving the Settler on the Prairie

The Lecture Car of the Canadian Forestry Association, which was used to excellent effect through the three Prairie Provinces during the summer and fall of 1920 and for a short time in Central Quebec during November and December. This year the Forestry Association plans to reconstruct the interior of the Car so as to provide a sloping floor after the manner of moving picture theatres. The seating capacity will also be much increased and a powerful motion picture projector will be installed at the rear, the Car carrying its own special electric generator. New motion pictures have been arranged for, and with the great publicity given this enterprise last year there should be no doubt as to a hearty reception in hundreds of communities during the 1921 tour. For the greater part of the Spring and Summer this Lecture Car will devote its attention to the Prairie Provinces and will confine its educational work to the single subject of tree planting for shelter belt purposes. It is now widely recognized throughout the Prairie Provinces that the gross damage resulting from soil drifting and wind damage to grain crops can be well remedied by wind-breaks of trees.

Actual Results in Planting.

Mr. Norman Ross, Chief of the Tree Planting Division, Dominion Forestry Branch, at Indian Head, Sask., in speaking of the effectiveness of trees as windbreaks on field crops, at the conference on soil fibre and soil fertility at Winnipeg, under the auspices of the Commission of Conservation, gave illustrations of the results actually obtained. Of special importance was that secured at the new nursery near Saskatoon, which Mr. Ross described, where the main outside shelter belts had not yet reached more than six to eight feet in height. The nursery is divided into one-acre plots, each about 25 yards wide, with caragana hedges about 2 1-2 feet high dividing the plots. Of these plots 35 were sown to oats, after summer-fallow. Almost adjoining and on exactly the same class of soil and similarly cultivated, a ten-acre field was sown, also fifteen acres on stubble either spring or fall plowed. The ten-acre summer-fallow field was completely blown out, while the stubble field yielded but 10 bushels per acre. The protected summer-fallow plots yielded 40 bushels of oats per acre—the largest crop in the district. In other words, hedges 2 1-2 feet high and 75 feet apart, made all the difference between a crop of 40 bushels per acre and a complete failure, all other conditions being equal.

This question is of maximum importance to the Prairie Provinces, and some co-operative system of planting should be developed, whereby large areas could be set out, otherwise much damage may be done to protected lands by blowing soil from adjoining properties.

Lumbermen Choose Officers.

Mr. Dan McLachlin, Arnprior, was again elected President of the Canadian Lumbermen's Association for 1921; A. E. Clark, Toronto, is Vice-President; Angus McLean, Bathurst, N.B., Second Vice-President, while R. G. Cameron, Ottawa, is again Honorary Treasurer, and Frank Hawkins, Secretary. Next year's convention will be held in Toronto.

Forest Fires in B.C.

According to the "Pacific Coast Lumberman" the 1920 forest fire loss in British Columbia was the heaviest in many years, and not since the disastrous year of 1914 had so much damage been done. There were between thirteen and fourteen hundred separate fires recorded in the province, many of them burning over an extensive area. Although a comparatively small amount of merchantable timber was destroyed, amounting altogether to about 120,000,000 feet, as against 300,000,000 feet the previous year, the cost of fighting the outbreaks and the losses suffered in other ways reached a new high mark this year, being approximately $550,000, this including the cost of maintaining patrols and other details of protection service.

Ontario's Reforestation.

The Ontario Government should go in for a vigorous reforestation policy, advises The Farmers' Sun. The tremendous demands being made on our timber resources of the North, both for building materials and for the manufacture of pulp and paper, means that within a very few years this province will have to import its timber unless something is done to replace the trees now being cut down.

Money in Old Bridges.

The appreciation in value of timber is shown in a recent transaction in second-hand material. Last year, at Bellevue, Ont., a wooden bridge on the Algoma Central railway was removed and replaced by a steel structure. The bridge had been built about twelve years ago, of Douglas fir. After being taken down and after twelve years use, the timber, 1,250,000 board feet, was sold for a higher price than that originally paid for it.

Newsprint, another product of the forest, that before the war sold at $38 to $40 per ton, is now selling at $120.

If these products are worth so much more today than a few years ago, what must the increased value represent in the need of precautions for the adequate protection of our forests and for proper methods of cutting?—Clyde Leavitt.

A sketch of the new Forestry Exhibition Car of the Canadian Forestry Association which will be sent on a long tour commencing April third. The 1921 Car will be of a larger and better model than previously used, and will be laid out in such a way as to convey a definite object lesson to all who visit it. During the summer season of 1920 more than fifty thousand people paid visits to our Exhibition Car and an additional twenty thousand were present at the evening motion picture lectures conducted in conjunction with the Car's visit either in the open air or at a local hall. The Exhibition Car has been made possible by the courtesy of the Canadian National and Canadian Pacific Railway companies.

Palestine, a Forestless Land

By Rev. J. A. Macfarlane, M.A.

A Vivid Picture of the Economic Penalty Paid by the Holy Land Farmer of To-day

PALESTINE is the only land on the face of the earth where you can pass from Artic to Torrid conditions in the course of a journey of fifty miles. This is due not only to the heights of her mountains (for other lands have higher mountains), but to the fact that makes her unique amongst all the other parts of the world, the fact that she has land 1,000 feet lower than sea level. Elsewhere in the world places can be found where the land is 300 feet lower than sea level. In Palestine parts of the Jordan valley are almost 1,300 feet lower than sea level. Someone has said that probably no snow flake has ever succeeded in kissing the soil of the Jordan valley near Jericho. Upon the triple heights of Mt. Hermon, the snow lies almost all the year round, as she stands like a sentinel keeping guard over the Holy Land. Fifty miles away, down in the Jordan valley, you have reached

the region of perpetual summer, and suffer from the sticky stifling heat.

Variety of Tree Life.

These conditions, ranging from Arctic to Torrid temperatures, enable Palestine to exhibit within her tiny boundaries samples of tree life that in most lands range from polar to equatorial regions. While oaks, ash, and terebinths; hackberries, carobs, and Pride of India, are found all over the land, certain kinds of trees are grouped in particular districts. From the mountains of Lebanon along the ranges of hills to the northeast (beyond Palestine proper) are still to be found excellent forests of beech, pine, oak, cedar of Lebanon, hornbeam, cypress, spruce and yew. In the valleys near the Dead sea acacias are numerous; on the low lands near the Mediterranean coast, tamarisks abound; plane trees, poplars and willows cover the valleys of the land; northward in Palestine some remnants of the beautiful old forests are also to be found, the oak, pine, spruce, cypress and juniper, with some of the majestic cedars of Lebanon, and scrub oak on Hermon.

Ancient Palestine Forests.

It would take a whole article to describe the Bible references to the woods and forests of Palestine. We must here but say that if one starts from the noble heights of Hermon on the north and journeys southward through Palestine to Hebron, one finds that in the Bible there are plentiful evidences of the splendid forests that covered all the highlands of the country; and the central part of Palestine is one continuous highland, ranging from 1,500 to almost 3,000 feet above sea-level. The wonderful variety of ancient forests in Palestine may be surmised from the mere fact that five different Hebrew words are used in the Old Testament to describe wooded country. Some of the forests mentioned are those of the giant Cedars of Lebanon in the north; those that clothed Galilee and Samaria; the Woods of Ephriam; the Forest of Hareth on the western slope of the Judean hills; the Forest in the highlands of Judah, where King Jotham built castles and towers; the Forests of the South; and many others with their interesting Bible references. From these it is evident that ancient Palestine had these rugged heights of hers, today so desolate and bare and barren, well covered with woods and forests. The woods and forests held the moisture by their shade; their roots prevented the rains from washing the soil bare; and annually her falling leaves gave humus and fertility to a soil now pitifully barren. Even the insect and animal and bird life that congregate in wooded areas help to fertilize the soil. So that when rains washed soil from the wooded heights, they carried down fertility, not barren soil, to the lands cultivated below.

Forests in High Esteem.

There was nothing that the ancient residents of Palestine feared worse than to have their forests destroyed.

The threat to "Kindle a fire in the forest" was one of the sore punishments of wicked Judah (Jer. 21:14).

Sennacherib the Assyrian king was boasting of a fearful blow to Palestine when he declared, "I am come up to the height of the mountains, to the sides of Lebanon, and will cut down the tall cedars thereof, and the choice fir trees thereof; and I will enter into . . . . the forests of his Carmel," (2 Kings 19: 23).

To cut the forests that clothed their heights was always a terror to the ancient Palestinians. And when the nation was filled with joy, the woods and trees and forests were supposed to reflect and echo that happiness: "Sing, O ye heavens, for the Lord hath done it; . . . break forth into singing, ye mountains, O forest, and every tree therein: for the Lord hath redeemed Jacob," (Is. 44:23).

"Let the heavens be glad, and let the earth rejoice; . . . Then shall the trees of the field sing out at the presence of the Lord," (1 Chron. 16:31-33).

Trees, woods, forests, were regarded as essential to the welfare and blessing of the nation.

Terracing Her Hills.

So important was it regarded in Pales-

tine to preserve the soil from washing on the face of her immense hill slopes, that most of the ancient hills were beautifully terraced, and planted to fruit trees. The eastern and southern slopes of the hill of Bethlehem would be a bare desolation, but for the terraces. The whole slopes of this historic hill are terraced and planted with orchards of fig and pomegranite trees; while in the rocky land just eastward, where the plow cannot run her furrows, the whole region was once a forest of Olive trees, a veritable grove of Paradise, where otherwise barrenness would have reigned on a throne of stony desolation.

The Pitiful Contrast.

It is a favorite pastime for cynical travellers in Palestine today, to scoff at the Bible descriptions of Palestine as a "Land flowing with milk and honey." As one stands on any height, and looks about, one sees the neighboring heights, and of course not much of the valleys. Palestine robbed of the regal forest robes that once clothed her uplands with glory and beauty, and enabled her to pour generous hand humus and fertility upon the lower levels, stands today a queen without a crown, a land with mountain heights denuded of their forests; and consequently a land perishing and dying for lack of the moisture and shade and humus which for centuries her tree-crowned heights had supplied.

When Palestine had her forests on her hills, she was a land of wealth and beauty and fertility. Robbed of her forests, everything except her valleys is a desolation. Once her hills contributed an annual gift of fertility to her valleys; now anything that washes from her hills is poverty striken soil, lessening the worth of the soil below.

No longer may a Prophet sing in rapt measures of "The glory of Lebanon" and "The excellency of Carmel." The forests clothed them with glory; the trees with excellency; but their glory faded, and their excellency fled, when the trees and woods and forests were swept from their cloud-mantled heights.

The Menace of Insects.

Portland, Ore.—Of the 10,700,000,000 feet of yellow pine in private ownership in Klamath and Lake counties, Oregon, fully 8 per cent. has been killed during the last five or six years, or is now infested by beetles, says the forest entomologist of the Oregon experiment station. The average annual loss has been about 150,000,000 board feet, worth at least $250,000, or 300 times as much as the average annual fire loss in the two counties.

A careful comparison in other counties in Oregon, described by the entomologist, estimates the loss from insects in one year in a single county as more than double the five-year loss by fire in four counties.

The principal enemy in the Western pine forests is the Western pine dark brown beetle, which bores through the bark of the tree and excavates long, winding galleries in the soft formative tissue next to the bark. The effect of these hundreds of insect galleries is to girdle the tree, thus cutting off its supply of food and water, and causing death.

When the beetles become abundant and kill large numbers of trees, the infestation is known as an epidemic. These epidemic infestations usually run in cycles of from four to six years. The amount of timber killed on a given area while the insects are passing through this cycle may be as low as 6 per cent. or as high as 80 per cent.

The task of eradicating the insect pests has proved to be too big for private owners.

Ontario's Possible Profits.

Speaking at Kingston, Ontario, Premier Drury of Ontario expressed the belief that the timber wealth of Ontario would eventually become sufficient to meet all Government expenses. The new world stood in great danger of a timber famine, and the co-operation of all the people was sought.

Stop the Tree Butcher!

The Ontario Department of Highways has made a first class move in determining to stop tree butchery along public roads. Not only is it the intention to beautify the highways, but to preserve the existing beauty in that trees will not be mutilated or sacrificed wherever it is possible to save them. No company, telephone, power or telegraph, will be allowed to cut the trees without permission and only permission to remove branches which are entirely essential to transmission will be given, and in any case, only the minimum amount of tree pruning will be allowed and such must be done under the supervision of the department of public highways. In this connection various companies have entered heartily into cooperation with the department in that at present they are trying to clear their lines with as little mutilation of trees as is possible.

Air Pilots Organize.

"The Commercial Air Pilot's Association of Canada" is the name of a new organization by which the personnel and practice of aviators in private service will be beneficially influenced and controlled. One extract from the constitution reads: "The association is to try to uphold a high standard of efficiency and professional conduct so that the fact that a pilot is a member of the Association will be a guarantee of his professional ability."

There appears to be much useful service ahead of the Commercial Air Pilot's Association and the Canadian Forestry Magazine will be pleased at all times to give publicity to its work.

What Would Exchange Be?

For the first nine months of 1919 paper, wood and manufactures of wood were exported from Canada to the United States to the value of $163,941,802. The total value of exports of Canadian goods to that country for the same period amounted to $370,246,970.

With our forests supplying over 44 per cent. of the exports to offset our purchases, it is not hard to realize what position our exchange would be in but for the forests.

The depreciated value of our money hurts the patriots pride as well as the pockets of all Canadians. Those who have occasion to visit the United States realize the additional cost to them in purchasing with Canadian money, but it is hard to make the general public realize that the forests of Canada are carrying a tremendous load as the chief support of our credit in the United States. Every effort should be made to protect our forests from fire and to provide efficient forestry management, to enable them to continue in perpetuity the large part they are taking in our foreign trade.—Clyde Leavitt.

Canadian Spruce Supreme.

At a largely attended meeting of the Ottawa Foresters' Club, Mr. E. F. McCarthy, professor of Forestry in Syracuse University, New York State, who has been engaged during the past season in conducting a working plan survey on the pulp limits of the Spanish River Pulp and Paper Mills, near Sault Ste. Marie, Algoma, compared the forest conditions found in Algoma with those obtaining in the Adiroudacks, and declared that the relative freedom from shade-enduring species (hardwoods) in the former country, would greatly simplify the work of managing these forests to secure a sustained yield of pulpwood. He declared the Canadian white spruce to be easily the best pulpwood tree in America—much more rapid-growing than the red spruce and more hardy than the imported Norway.

The presence of Mr. Wm. T. Cox Chief Forester of Minnesota, lent added interest to the meeting. He outlined some of the chief problems to contend with in his state and chiefly that of protecting the forests from fire. As a result of careful patrol organization and wise expenditure for lookout towers, etc., Mr. Cox now feels confident that although the starting of fires and a certain amount of fires and a certain amount of loss can never be wholly prevented, Minnesota will never again be swept by another such apalling conflagration as for instance the Hinchley or the Cloquet fire.

How France Sustains Her Forests

THE Principles of natural forest regeneration (in France) are first, the admission of sunlight to the forest floor in sufficient- quantity to germinate the crop of seeds; second, the maintenance of a suitable shade over the seedlings resulting from a fall of seeds; and, finally the removal of the last of the old stand. These operations are accomplished in practice as follows —The forest is divided into as many cantons as the number of years of the revolution selected (70-120) and a seeding out is made in one canton each year, cutting from east to west. The severity of -the seeding cut is determined by the species and the first canton in the series is selected that has a seed year due that year. With the oaks enough trees are taken to leave the balance on 100 ft. centers; sylvester pine at the other extreme would be left on 200-250 ft. centers. The forester sees to it that these seed trees are all sound, healthy, and capable of shedding an abundant crop of acorns, beech-nuts, hornbeam, samaras or pine wing-seeds that fall (whatever may be the species), and the following spring, since the forest floor is warm and sunlit, an abundant crop of seedlings come up, which gives a thick fur of young trees of the same species as the original forest overhead. If not completely successful, a second crop of seeds is allowed to fall before proceeding to the secondary cut. This removes half of the seed trees, leaving enough protection to guard the young trees from sun scorch and early frosts. Five years later they have grown so as to no longer require protection, and the terminal cut is then made which takes the last of the old stand. The reproduction is now complete and it has cost nothing beyond a slight increase in logging expense due to cutting over the same canton three times instead of once as would have been the case with clear cutting. But the cost of planting, not less than $5 an acre, has been saved.

Everything Brings Revenue.

Continuing the regime of the Standard forest, the young growth is left to itself for about fifteen years after the terminal cut. It then receives its first thinning, taking out from one-half to two-thirds of the thick growth. Periodic thinnings follow at intervals of ten years, the general principle being to keep the tops of the dominant trees so that they will just meet when the next thinning comes due, and to keep enough of the sub-stage trees to protect the trunks of the first-class ones from the sun. None of these thinnings are wasted,—and the income from all classes of thinnings amounts to two-fifths of the market value of the final crop. The thicket-stage trimmings compete direct in the markets with coppice products, and the others furnish lumber of increasingly valuable sizes.

Arrived at the end of the revolution, which is at present taken at 60 years for sylvester prine, 75 for oak, and 100 for fir, the seed cut is made in the nearest seed year for that canton (they occur every two to five years for most species) followed by the secondary cut, and then the terminal cut when the new growth on the canton is established. In a French standard forest of an hundred cantons, each year sees one terminal cut, one secondary cut, one seeding cut and ten thinning cuts; in all thirteen cantons being cut over, so that there is plenty of business going on even through the cantons may be only a few hectares area each.

As the system is one which we will adopt in America for nearly all forests not in close touch with rail facilities (such as replanted barrens and worn out pasturage), I will give here a few generalizations as to how to set about converting a wild American forest into a French Standard forest. The first desideratum is uniformity of species, wherefore when you cut cord wood from your woodlot or forest, replant the spt liberally with the species yu have selected, preferably

the dominant species already placed there by nature as survival of the fittest. The second consideration is uniformity of age for the trees on each canton. A fifty-year American white oak is 12 to 13 inches in diameter, and at 75 years it will reach 19-20 inches, giving first-class new lumber. Having divided your forest into approximately equal areas as determined by the lay of water courses, ravines, logging roads, etc., arrange your thinning cuts and replantings so as to give you an unbroken series of ages year by year. If there are sufficient seed trees year by year on the spot, you can go direct to standard forest by making a seeding cut each year on each successive canton, eking out any bad spots with hand planting. Doing one canton each year you will have three cuts a year until the fifteenth year when your first thinning cuts begin. Any American hardwood forest can be thus converted into standard forest provided that enough seed trees are already on the site. With conifers, I would advise underplanting for white pine or clear cut and replant with three-year nursery transplants for Scotch and Norway pine.

Rich Crops of Hardwoods.

The French have developed coppice management to a science far in advance of the other nations. The coppice type of forest is based on the principle that certain species of trees, notably oak, chestnut, maple and ash have the property of sprouting from the stump, so that you have a forest of straight vertical branches without any trunks. As the root system is quite as large as with standard trees it is natural that the yield in branch wood is very large and sustained and the sprouts are straight enough to be valuable commercially. In twenty years a crop of four-inch shoots twenty feet long, six to ten to the stump, is available. All the shoots but one are taken, and in twenty years more a second crop has grown from the same stump. The sprout left from the first sprout is called a baliveau and serves not only for a future seed tree, but for shade and protection to the young sprout. Left again on the stump it is called a moderne and is 40 years old and about 8 inches in diameter. At the sixtieth yea r a third crop of sprouts is taken and the moderne becomes an ancien and bears seed abundantly. The anciens start a thick growth of seedlings all over the forest floor and after two more crops of sprouts the original stumps die, but the seedlings have grown to 40-year trees, which are forthwith out to stumps and the anciens harvested, putting the forest in shape for coppice again. Horse chestnut coppice is usually managed in "simple coppice" with poplar balivage, that is, the whole crop of sprots is taken every twenty years and the poplars held for shade.

The yield in poles, tan bark and lattice stock from coppice management is tremendous and the returns are quick, so that in Central France, where there is a ready market for cordwood, turning wood, tool handles and tan bark, coppice management is very extensive. It requires a rich clay soil as the roots feed excessively. If many of the stumps are allowed to produce modernes and anciens the sprout crop will suffer from shade, but more heavy timber will be yielded so that in the judgment of the forester almost any yield desired for any particular market can be managed. In our own country native chestnut is the principal coppice crop, and telegraph poles, ties, and lumber for interior trim offers the best market; three or more shoots are allowed to grow to 10 and 12 inch poles per stump, yielding at the same time seed for regeneration.

The Purchaser's Directory

A.—Aeroplanes:
Dayton-Wright Co., Dayton, Ohio.

B—Banks
Bank of Montreal.
Royal Bank of Canada.
Beef and Camp Supplies:
William Davies, Montreal, Toronto, Hamilton.
British Columbia Lumber Commissioner, L. Adelaide St. E., Toronto, Ont.
Brooms:
The Parker Broom Co., Ottawa.

C—Canada—Information Regarding Opportunities:
Canadian Pacific Railway Co., Dept. of Col. & Dev., Montreal, Que.

E—Electric Lighting Plants:
Canadian Fairbanks-Morse Co., Ltd., Montreal
Northern Electric Company, Montreal, Que.
Explosives:
Canadian Explosives, Ltd., Transportation Bldg., Montreal.

F—Fire Protection Equipment:
Canadian Fire Hose Co., Ltd., 30 St. Francois Xavier St., Montreal, Que.
Fire Equipment, Ltd., 244 Notre Dame St. W., Montreal.

H—Hydraulic Turbines:
Dominion Engineering Works, Ltd., Montreal, Que.

I—Insurance Brokers:
Hardy & Reynolds, Booth Bldg., Ottawa.
E. A. Whitehhead Co., Ltd., 509 Lewis Bldg., Montreal, Que.

L—Lumbermen's Clothing:
Grant, Holden, Graham, Ottawa.
Woods Manufacturing Co., Ottawa.

M—Matches:
E. B. Eddy Company, Hull, Que.

N—Newfoundland Investments:
B. M. McGrath, St. Johns, Nfd.

P—Paper Mill Machinery:
Dominion Engineering Works, Ltd., Montreal.
General Supply Co., Ottawa.
Paper Mill Supplies:
Beveridge Paper Co., Montreal.
Projection Equipment (Motion Pictures)
The Perkins Electric Co., "DeVry," Montreal.
Photographic Stores, "Acme," 65 Sparks St., Ottawa.

Pulp and Paper:
Abitibi Power and Paper Co., Montreal.
Belgo-Canadian Pulp and Paper Co., Shawinigan Falls, Que.
Beveridge Paper Co., Ltd., Montreal, Que.
Brompton Pulp and Paper Co., East Angus, Que.
Canada Paper Company, Windsor Mills, Que.
Laurentide Company, Ltd., Grand Mere, Que.
Riordon Sales Co., Ltd., Montreal.
Spanish River Pulp and Paper Co., Sault Ste. Marie, Ont.
Pulpwood:
The Jost Co., Ltd., 285 Beaver Hall Hill, Montreal.

R.—Roofing Material:
Standard Paint Co. of Canada, Ltd.
"Ruberoid Roofing," Montreal, Que.

S—Securities:
Royal Securities Corporation, Ltd., Montreal, Que.
Greenshields & Co., Montreal.

T—Tents:
Grant-Holden-Graham, 147 Albert St., Ottawa, Ont.
Woods Manufacturing Co., Ltd., Ottawa, Ont.

Timber Cruising, Estimating and Mapping:
Gagnon & Morissette, Chicoutimi, Que.
Coolidge and Carlisle, Bangor, Maine.
Hibberson Bros., Suite 701-5 Belmont House, Victoria, B.C.
Lt.-Col. L. J. D. Marquis, Giffard, Que.
James W. Sewall, Old Town, Maine.

Timber Limits:
Can. Woodlands & Pulpwood Agency, Rgd., 600 McGill Bldg., Montreal, Que.

Tractors:
Monarch Tractors, Ltd., Brantford, Ont.
General Supply Co., Ottawa.

Trees, Shrubs and Seeds:
Edye de-Hurst and Son, Dennyhurst, Dryden, Ont.
D. Hill Nursery Co., Dundee, Ill., U.S.A.

W—Wireless Equipment:
Marconi Wireless Telegraph Co. of Canada, Ltd., 11 St. Sacrament Street, Montreal, Que.

A Tree Policy For Ontario's Highways.

According to the plans of the Ontario department of public works, the permanent highways of the province, particularly those which are international in character, and link up with New York and Michigan highways, will be more than a material asset—they will be things of beauty and by attracting American tourists to the province pay handsome dividends. H. J. Moore is the man entrusted to plan the beautification and see that the work is carried out. His title is highway forester, and those who are conversant with the work of Mr. Moore at Queen Victoria park, Niagara Falls, believe that the government has made no mistake in the choice of an official. In addition to the work to be done at the expense of the province, the idea is to have cities, towns, villages and rural municipalities along the line of the highways co-operate.

Mr. Moore has hopes that this work will even become individual that residents along the line will help in beautifying their lands and thus increase the value of their holdings.

To accomplish this result, during the coming and subsequent winters organizations will be formed in various townships to stimulate an interest in the beautification of the highways. Meetings will be held at various centres, and, in all probability, a president or chairman will be appointed for each organization, who will call occasional meetings to discuss the matter of beautification and to bring to the notice of the people the need of co-operation in this very essential work.

Apart from this, there should be a real national desire for the beautification of the highways. If Ontario is to have the

desirable class of immigrant that she deserves, the roadways must be beautified. As tourists pass along the highways, they are either pleased or displeased with the appearance. If these roadways can be so beautified as to cause favorable comment from these visitors, they will largely advertise the province on their return to their homes. If, on the other hand, the appearance of the roadways is displeasing, the province may expect nothing but disparaging remarks. It would seem that were the roadways and adjacent areas beautified, there would be a greater desire on the part of tourists and others to locate along them. Were the roadways and adjacent areas properly beautified, only a desirable type of resident would care to live under those conditions.

Forests on Dominion lands in the west are administered with the object of maintaining a permanent supply of timber. In the cast of forest reserves they are primarily intended to supply the surrounding settlements with timber for local use. Pemits are issued to bona fide settlers for their necessary supplies of firewood, fencing material, and timber for building construction. Permits to operators of portable sawmills are granted in order to provide a means of having the timber so granted under settlers' permits, sawn into lumber for the sole use of the settlers. Larger quantities (than those granted under permit) of fire-killed or mature timber are disposed of by timber sales whereby a mill may be established and the timber sawn and sold on the open market, or whereby the firewod, mine timbers, railway ties, or other forest products may be cut and marketed.

In administering these sales the Dominion Forestry Branch keeps always in view the object of perpetuating the supply. Only such trees as are marked or designated for removal for the forest officer may be cut and all material so designated must be cut and removed from the sale area by the date of the expiration of the final permit. The sale areas are examined by qualified forest officers, the timber thereon estimated, and the area mapped. The right to cut the timber is then disposed of by tender or auction following public advertisement.

British Columbia's Forest Protection System

THE Forest Protection in the Province comes under the head of the Operation office in Victoria in charge of an Assistant Forester and in the field under the District Foresters (of which there are eight) situated in Vancouver, Prince Rupert, Prince George, Cranbrook, Kamloops, Vernon, Nelson and Cariboo. District Foresters are assisted by Assistant District Foresters or Supervisors. The number of Rangers in each district vary

from four to seventeen, according to the needs and size of a district, the total number for the Province being fifty in 1920. Supervisors vary from two to four. Assistant Rangers who are employed during the fire season, May 1st to October 1st, together with Patrolmen, who are employed during the height of the fire season from two to four months, amounted in 1920 to 156.

The average yearly expenditure on Forest Protection work during the last two years has been $449,000.

There are throughout the Province 43 motor cars, 45 forest fire pumps and on the Coast a wireless telephone service connecting Vancouver, Vananda and Thurston Bay and five launches radiating from these stations are also equipped with this means of communication.

H. R. Christie Chosen

H. R. Christie, M.C., F.E., assistant chief forester in the British Columbia department of lands has been appointed associate professor of forestry in the University of Columbia. Professor Christie will have associated with him members of the staff in engineering, botany, biology, chemistry and other related subjects.

Professor Christie graduated in forestry in Toronto University eight years ago. He had a two-year course at Onttario Agricultural College, taking his diploma in 1908, followed by a four year university course. During 1911 he was in the C.P.R. forest service and the next year with the commission of conservation. In 1913 he entered the B.C. Forest Service remaining 3 years when he joined the expeditionary force and proceeded overseas. In 1916-1917 and the first part of 1918 he was lieutenant with the 8th Field Company C. E., in France, winning the Military Cross. In 1918 he was called to Seaford to become instructor in the Canadian School of Military Engineering. From September 1918 to June 1919 he was with the 16th Field Battery C.E.F., Siberia with rank of Captain.

Returning last year to the forest service in British Columbia he became assistant chief forester on the promotion of Mr. Caverhill to the chief forester's position. Professor Christie is a native of Amherst, Nova Scotia.

Why is a Ranger?

"Oh, a Ranger is in danger of congestion of the brain, if he tried to keep all posted up on every latest plan. He is but one lone mortal, at the crossing of the ways of a thousand different theories, of a thousand different days. He must be an expert woodsman and a guide and trapper, too; and must know in all emergencies the proper thing to do; how to fix a motor, mend a leg or rope a steer, play a tune on the typewriter to please the diplomatic ear; also how to run a survey, find a corner where it ain't, and, in extra stressful moments, exercise restraint. He must be a sawmill expert, cowboy and lumberjack, and an information bureau, plumb full of statistic fact. And he must be trained in botany, know every growing plant—so's to educate the cattle what they can eat and can't. He must know the birds and animals, the insects and the fish, their every need and comfort, their every wile and wish, including why a wood chuck would and why a dodo don't, as well as why a whippoorwill and why a coyote won't. All professions and sciences and every common trade is the fund of useful knowledge for which he's highly paid. And still there's something to it that holds the Ranger on, when he tells himself and all his friends that he would fain be gone."—The Idaho Forester.

Canadian Pulp and Paper Association

At the annual election of officers held recently at Montreal, Mr. Percy B. Wilson Vice President of the Spanish River Pulp and Paper Mills, Ltd., Sault Ste. Marie, Ontario, was chosen as President to succeed Mr. George Chahoon. Mr. George McKee is the new Vice President.

Our Work on the Prairies

Lethbridge Herald Editorial.

The Canadian Forestry Association has been doing not only a philanthropic but a national service in encouraging the cultivation of trees, particularly as it applies to the prairie provinces. It is not necessary to go into the value of tree cultivation and the great benefit which it serves. This, thanks to the campaign of the Forestry Association, has become in the nature of a household word. The inestimable service which tree-planting gives is now an every day story.

To speak of Southern Alberta, farmers and others are well aware of the great services which have been rendered by the Forestry Association in its tree-planting campaign, with the visits of the special railway lecture cars. These have brought home the full meaning of tree-planting as it applies to shelter belts, protection against soil drifting, and damage caused by wind. If there is anything that can be done by granting public aid to what is distinctly a public service, there cannot but be a unanimity of opinion that it should be done.

The Forestry Association in order to make its campaign fulfil its object to the utmost limit in this Province is asking its Government for financial aid by bearing a portion of the expense which falls on it. The request is an exceedingly modest one, it being a matter of $2,000 for carrying on its campaign this year. This the Government should readily grant when it is considered how great the economic benefits which the mission of the Association tends to bring about. This is state aid in what is essentially a state policy. The Association at least deserves this encouragement and help in all that it has done and in all that it aims to do. In the returns it will bring it is comparatively a very small outlay. In this part of the Province, at least, action on the part of the Government to meet the wishes of the Forestry Association will be regarded as a highly commendable policy, and will not lack the utmost appreciation. The Association all last year had its expenses borne by a few private subscribers. This is not exactly fair, in the great public service it renders.

Ford Company Owns a Forest

A recent report in the *American Lumberman* (Chicago) states: "Since the announcement by the Ford company of the establishment of a large mill in the upper peninsula of Michagan, where it has acquired 425,000 acres of hardwood timber, five other enterprises have announced their intention of locating in that territory. The upper peninsula of Michigan, that section of the State located north of the Straits of Mackinac, contains a greater amount of available hardwood timber than any other section of the country, official statistics declaring that there are approximately 40,000,000 feet of available standing timber in upper Michigan."

Beaver Farming in Canada

THE beaver is an easily domesticated animal and it has been demonstrated that it will breed in captivity. Beavers will thrive on turnips, carrots, potatoes, etc., with some twigs or bark of cotton-wood, ,willow, birch or maple thrown in by way of desert.

Litters average about four, and the young are born in May. Breeding females should be kept in separate pens and provided with a warm nest. Beavers begin to breed when two years old.

The pens should be constructed very much as for foxes, but the fences need not be so high. Wooden fences would, of course, be useless; nothing weaker than galvanized iron sheets or heavy wire netting will stop a beaver's teeth. Precautions must be taken to prevent the animals burrowing out. All pens should contain large pools or troughs of water.

Probably a more satisfactory way of keeping beaver would be to fence in an area which would form a natural habitat. The owner of such a preserve could prevent trapping by trespassers on his property and, with this protection, the beavers would increase and thrive without much attention. A limited number could then be trapped by the owner himself, care being taken to comply with the provincial laws.

There are several beaver ranches of this kind in Canada, but most of them have not been long enough in existence to report on the success or failure of the venture.

Planting by Townships

The councillors of York County, Ontario, have taken a leading part in carrying out the new reforestation plan announced recently by the Ontario Government. Forest conservation is by no means a new topic in York county for as long as fifty years back the York fathers expressed the opinion that "main-

tenance of the county woodlands would be a manifest benefit both to the climate and agricultural industries of the country," and in the depletion of the forest they foresaw a serious menace to the industrial life of Ontario. Even then the small streams were beginning to dry up, freshets grew stronger every spring as the forests disappeared and the yearly toll of dams washed away never to be rebuilt was growing greater. Small villages that had grown up around small waterheads were beginning to decline, sawmills, flourmills, woolen mills and breweries that once flourished in large numbers were even fifty years ago being forced out of existence.

Spruce a Musical Wood

American Forestry finds that spruce takes up and transmits vibrations more perfectly than any other wood that can be had in adequate quantities. It says, "The cause of spruce resonance is thought to lie in the wood's long fibres and in their uniform or regular arrangement. The fibres vibrate like so many taut cords. Of a total of 43,000,000 feet of softwoods estimated to be used in the manufacture of musical instruments in this country each year, more than 29,000,000 feet is spruce. White pine is second on the list of softwoods with 9,000,000 feet used annually."

Fires From Railways.

Charges of neglect to provide protection against forest fires were made against the Canadian National Railways at the annual meeting of the Woodlands Section of the Canadian Pulp and Paper Association and the Quebec Forest Protective Association at the Windsor Hotel, Montreal, on January 19th. A motion was unanimously adopted favoring inclusion of the Canadian National Railways for fire protective purposes within the jurisdiction of the Board of Railway Commissioners in the same manner as the privately-owned railway systems.

J. F. Gregory of St. John, N.B., led the discussion and described the present status of the Canadian National Railways in relation to forest fire prevention, pointing out that while the Government of Canada imposed regulations upon the Canadian Pacific Railway in regard to

forest fire prevention, such regulations did not apply to the government-owned roads. Mr. Gregory's remarks were endorsed by Mr. Arthur Graham, Chief Inspector of the Ottawa River Forest Protective Association and Mr. Henry Sorgius, Manager of the St. Maurice Forest Protective Association and others. Mr. Ellwood Wilson also took a leading part in the discussion. A defence on behalf of the Canadian National Railway was entered by Mr. H. W. Sharpe, Master Mechanic of the Canadian National Railways.

Forestry and Irrigation

From a Report on the Lethbridge Northern Irrigation District.

For general up-keep of the main canal, in the removal of sand, silt, etc., it may be estimated that, out of the total length, 30 miles may involve an annual expenditure of $300 per mile, or $9,000; say $10,000 per annum. This burden will be affected by the careful location of fencing, as has been mentioned in connection with the cost of construction, and some part of it may be reduced by judicious expenditure on *forestry,* along the canal line. An annual expense of $2,000 in such work may materially reduce the annual cost of cleaning, but, as some time would elapse before its beneficial effect would be felt, the allowance of $10,000 should be reckoned upon.

A Wedding in the Air

From a brief note in the Indian papers to hand it appears that the "wedding in the air" notion has spread to India. Mr. Charles Manson Mann, of Calcutta, was married on the afternoon of Oct. 17 to Miss Vera Kathleen Gardner in a Handley-Page aeroplane flying over Calcutta. There was a full and complete wedding party on board, consisting of the couple and eight guests as well as the officiating clergyman and the best man. Capt. Stackard, a friend of the bride and bridegroom, was piloting, and the machine went up to 6,000 feet in 45 minutes. Then the engines were shut off, the aeroplane put into a slow glide, and the ceremony commenced. Without the noise of the engines there was silence on board, so that the words of the service were quite clear and audible. The ceremony went off without a hitch, and inside an hour from the time of the start the machine had landed and the bridal party had debarked. A cinema operator was amongst the guests, and he took a complete film of the ceremony.

Air Service in New Brunswick.

Major Gordon, representing the Air Board of Canada, conferred with the New Brunswick Forest Service recently regarding the establishment of an air patrol in New Brunswick next season.

HAVE YOU?

By Orville Leonard.

Have you ever seen the smoke clouds from a forest fire burning? Have you ever lived for hours in that crackling, bright inferno? Have you had your shoe soles burned off by those dead looking white ashes? Have you seen men shouting wildly, though you could not hear their voices for the roar and hiss of leaping flames and the fierce wind they engendered? Have you ever seen a country where the furred with living fire and wondered if you'd ever live to feel the cool wind blowing? Have you ever seen a rancher driven from his fired homestead, while years of labor on his fields were wiped out in an hour? Have you ever looked down a line all hedged and feathered wild things have been burned up, every one? And have you seen that country when the fire fiend has finished—the blackened stumps of noble trees, the white ashes, burned bare rocks, no living thing—black, deathlike desolation brooding over all?

If you have, you'll see that your match is out and look where you throw your cigarette.

History of Walnut.

It has been commonly stated and believed that walnut was not found in Europe before the Romans introduced it from Asia, and that the Circassian walnut which they brought in and planted became the English, French and Italian walnuts of the present time. Geological data worked out and compiled by Mr. Edward W. Berry, of John Hopkins University, and published by the Smithsonian Institution, throw serious doubt on the tradition that the Romans introduced walnut into Europe. On the other hand, it appears certain that walnut was in Europe some millions of years before the Romans appeared on the scene. The evidence is found in the records of geology, the imprints of leaves, fruit, flowers and twigs in rock strata, clays, peat and lignite. It can be taken for granted that where walnut leaves and fruit existed, there was walnut timber in the vicinity, and by that line of reasoning the existence of walnut is proved in many parts of Europe, and in geological ages running back to that known as Cretaceous. How long ago that was cannot be definitely determined in years, for there is no known method of translating geological records into measured time. It is commonly believed, however, that the Cretaceous period was not less than 5,000 years ago.

This would place the walnuts among the oldest residents of the hardwood forests. Yellow poplar is as old, and hickory is not much younger. They are believed to have been among the first hardwood trees to appear on earth, but the pines are older. During the past time the different species of walnut grew entirely around the world in a belt corresponding in a general way with the North Temperate Zone, but extending into the Torrid Zone in places, and into the North Frigid Zone in Alaska and Greenland. The ancestors of our black walnut and butternut, and of Circassian walnut were in the ancient forests; and there were no fewer than two dozen other species of walnuts which left the imprint of their leaves in the rocks, but those walnuts have since perished from from the earth.

Everybody Smokes

OLD CHUM

CANADA'S FAVORITE
PIPE TOBACCO