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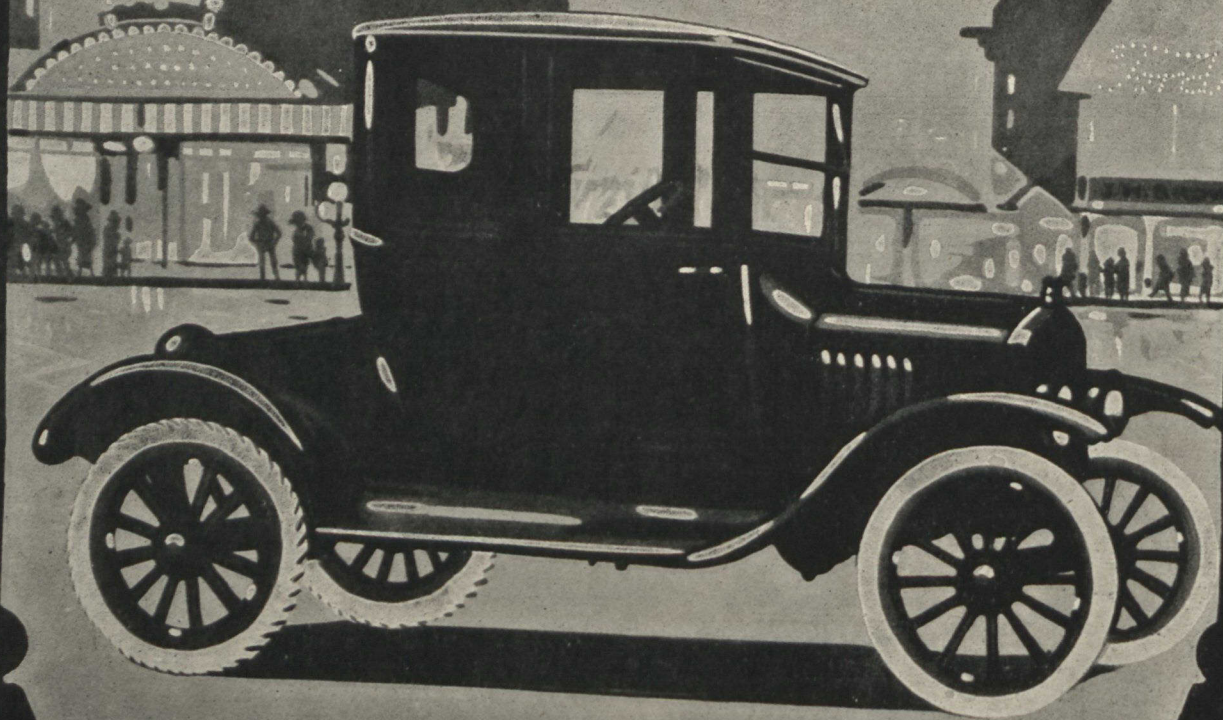
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CANADIAN FORESTRY MAGAZINE



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The plant is compact, sturdy, portable and efficient; it can be taken anywhere that a wagon or sled can go.

The engine runs nine hours on a gallon of coal oil and develops $1\frac{1}{2}$ horse power. The generating unit weighs but 500 lbs., the batteries 400 lbs.

A belt pulley is provided so the engine can run a pump, the grindstone, the saw gummer or any other light machine for the blacksmith's or repair shop.

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Made in 40, 65, 100 and 200 light sizes.

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THE
ILLUSTRATED
**CANADIAN
FORESTRY
MAGAZINE**



VOL. XVIII.

OTTAWA, CANADA, JANUARY, 1922.

No. 1

Remarkable Development of Tree Planting on Prairie

Thousands of Western Settlers Enhance the Value of their Farms by Shelter Belts—Fruit Growing Made Possible by Presence of Trees.

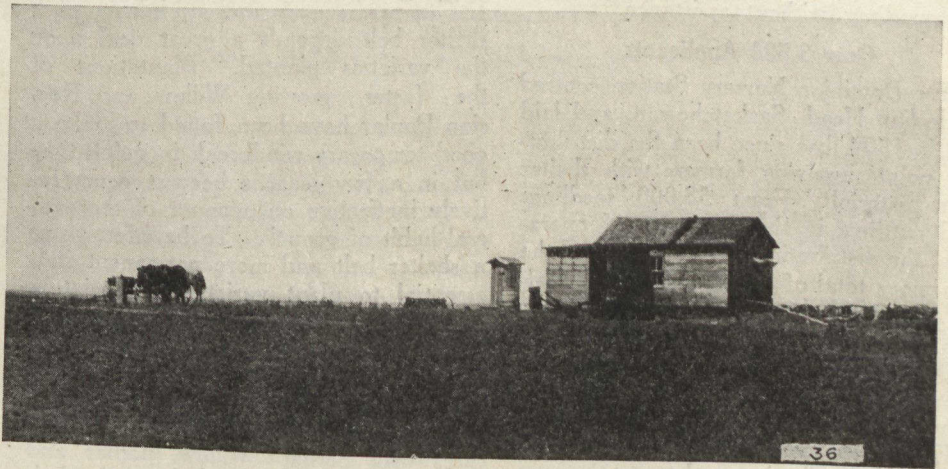
The subject of tree planting in the three western provinces is often a matter of comment, but it is doubtful if many people yet realize or have a clear idea to what extent the work has grown or of the still greater demand for trees and for information concerning their growth.

Tree planting on an extensive scale has long been considered an important factor in the development and permanent settlement of the prairie west. Looking back to the period of early settlement when trees were conspicuous by their absence, it was logical that a strong desire would be created sooner or later to experiment with varieties of trees and shrubs that could be planted and grown successfully. The prairie country has climatic conditions peculiar to the area, varying more or less every year. Districts comparatively a few miles apart differ to a marked degree in types of soil and climatic features.

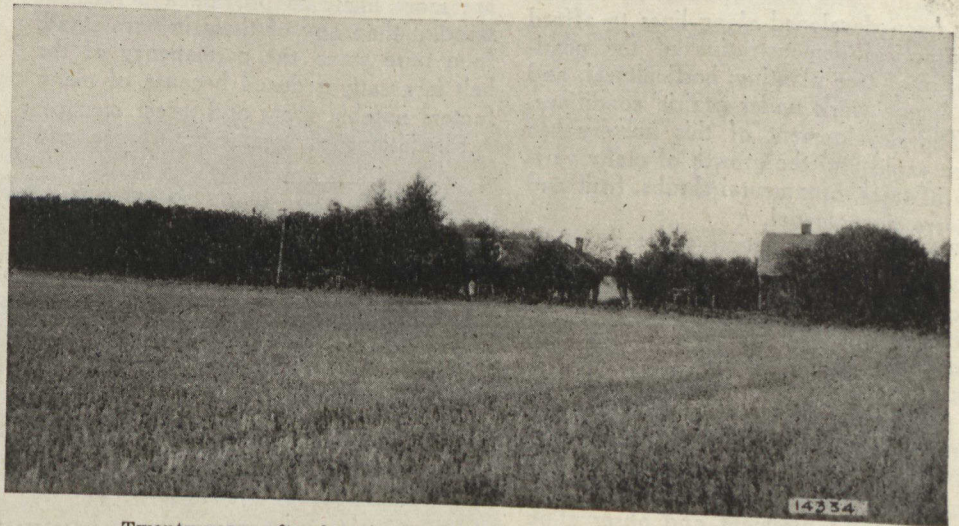
Early Disappointments

The majority of settlers acquainted no doubt with the natural growth of trees in other parts of the country and abroad lacked knowledge of these factors. As a consequence many varieties of trees and tree seeds were introduced with the idea that it was simply a matter of planting them and the rich humus of the prairie would do the rest. Obviously there were many discouragements and disappointments and the idea gained ground that trees could not be grown successfully. Thus the popular desire to plant something to break the monotony of the landscape and provide protection for the farm home, and the problem of accomplishing this end in the face of only a meagre knowledge of the natural conditions affecting tree growth.

Progress however has been made in this direction in the past 16 years through the enterprise of individuals and the co-operative efforts of the Dominion Government. The work is still at its begin-



A typical prairie farm, first season. Rich soil but no shelter



Twenty years after locating on the bald prairie. A comfortable home. Trees supplied by Dominion Government Nursery at Indian Head

ning in comparison to the vast territory classified as treeless prairie. With Western public opinion now generally convinced and awakened to the importance and necessity of this phase in the country's development, much progress in the future may be anticipated.

As with other problems allied with the basic industry of agriculture in the west this was essentially a work for Govern-

ment administration. Very little progress would have been made up to the present time if measures conducive to permanent settlement had been left entirely to individual effort. This is particularly true in the matter of tree planting. Hundreds of settlers have stated that they could not have established belts of trees around their buildings, and with limited means would probably have done very little to-



Under his own green ash tree. Nine years before, this spot was bare prairie.

wards the improvement of their home surroundings without assistance.

Over 3,500 Applicants

The Dominion Nursery Station centred at Indian Head, Saskatchewan, and laid out in 1904, has since been the distributing point supplying farmers with shelter belt material. From 58,000 seedlings and cuttings in the first year of operation, the distribution has now reached the enormous total of over 4,000,000 annually to between 3,500 and 4,000 applicants. Up to the spring of 1921, 60,000,000 seedlings and cuttings have been grown and distributed in the prairie territory from this source.

Established primarily to grow hardy stock for distribution under certain conditions to bona fide farmers, the nursery has been developed along lines to afford a practical demonstration of the possibilities of tree planting, horticultural, and landscape work under prairie conditions.

The development of this nursery has been rapid and the growth of many varieties of trees, ornamental shrubs, fruit and flowers phenomenal.

While the distribution of hardy stock progressed each year, definite information was lacking as to the rate of growth, permanency and future value of the varieties planted. Many demonstration belts have been planted and maintained at the central distributing point for the purpose of obtaining definite and reliable data concerning tree growth. Records carefully compiled each year from the actual measurement and observation of thousands of trees of all varieties have given the following rates of growth:

	At 5 years. ft. in.	At 10 years. ft. in.	At 15 years. ft. in.
Russian Poplar_	12 6	25 0	30 0
Cottonwood_ --	10 9	20 0	26 6
Maple_ ---	8 6	15 0	20 0
Birch_ ----	6 0	15 9	22 0
Ash_ -----	5 0	10 6	15 0
Elm_ - - - - -	4 0	8 9	13 0

Wise to Mix the Stands

The permanency and usefulness of a shelter belt depends a great deal upon the varieties planted. Plantations of the faster growing Willow and Russian Poplar have been found to make a good temporary windbreak in quick time but in a few seasons become comparatively ineffective on account of the general habit of growth. To be effective as a shelter belt and more permanent it is essential to plant varieties in mixture combining the faster growing species with those of slower growth and better wood value. Splendid results have been obtained with mixtures of Maple and Ash, and Ash, Birch and Maple. Such mixtures with perhaps willow, poplar and caragana alternated throughout the belt are more likely to provide a permanent woodlot than any of these in pure stand. In a pure stand the permanency of the belt is greatly reduced because of many factors notably grass and insect menace.

Plantations of tamarack, spruce and

GROWTH OF PRAIRIE PLANTING.

The Dominion Nursery Station at Indian Head is now distributing each year over 4 million seedlings and cuttings to between 3500 and 4000 applicants. Up to the spring of 1921, 60 million seedlings and cuttings have been grown and distributed from this source.

pine have been particularly successful and can be considered the most valuable trees for prairie planting both from the point of permanency and shelter.

Rates of growth recorded over a period of 15 years show:

	At 5 years. ft. in.	At 10 years. ft. in.	At 15 years. ft. in.
Tamarack_ _ _	3 3	12 6	20 0
Siberian Larch	4 6	15 0	22 6
European Larch	4 3	13 9	21 0
White Spruce_	1 0	5 3	12 0
Scotch Pine_ _	1 6	7 6	15 6
Jack Pine_ _ _	2 0	8 9	15 6
Lodgepole Pine_	0 9	5 0	12 6

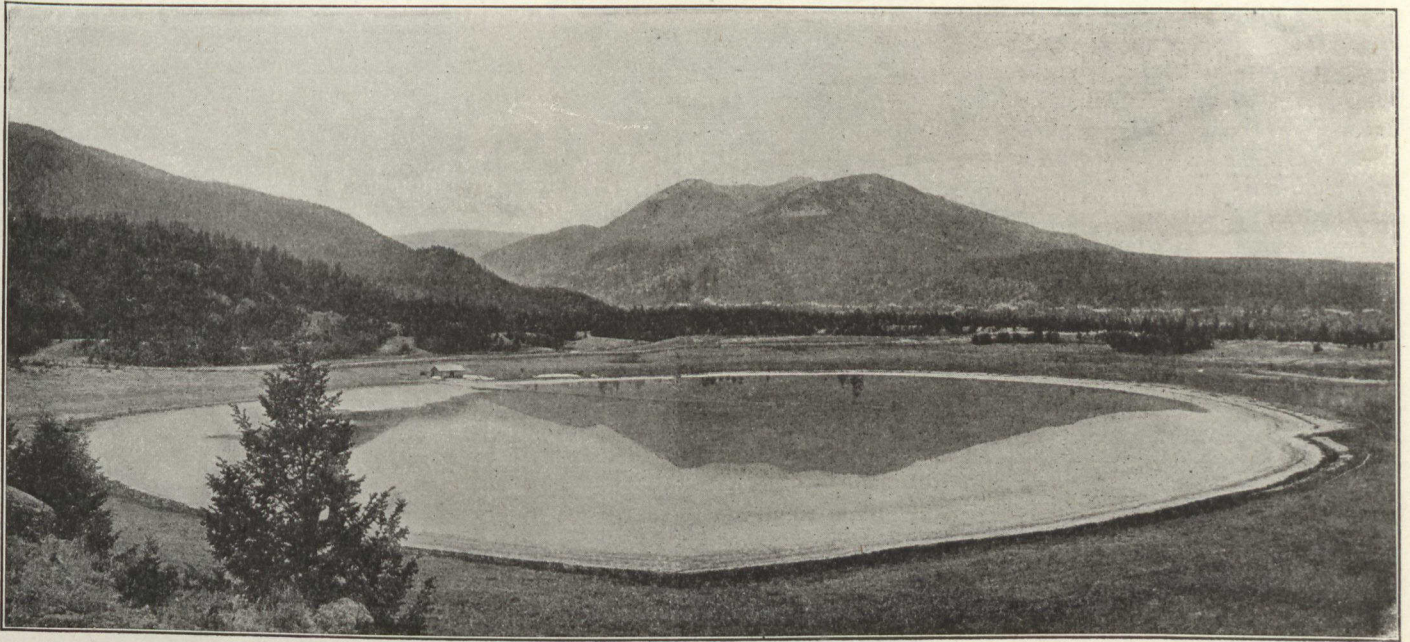
A large number of evergreens are now being planted with success throughout the west. Their hardiness and rapid growth once established has placed these varieties above all others for permanency and shelter. As soon as a broad leaf belt is established several rows of evergreens set out on the lee side will maintain the shelter and effectiveness in later years after the growing varieties have reached their limit under prairie conditions.

Fruit Growing Now a Success.

Many other features have followed the establishment of the prairie shelter belt, notably the growing of small fruits and standard fruit trees. A prediction years



This beautiful vegetable and small fruit garden on the prairie was made possible by the planted wind-break sheltering it.



Epomite lake at Clinton on Pacific Great Eastern Railway, Central B.C.

ago that fruit would be grown and ripened in Saskatchewan would have been ridiculed. To-day this is an accomplished fact and the future along horticultural lines is very promising.

As to the actual planting on the prairie farm. Has this been successful? Without a doubt the answer is in the affirmative. There are now hundreds of splendid belts of trees throughout the three provinces affording pleasure and comfort to their owners. There have been failures but this has not been the fault of the trees unless the stock was Eastern grown or imported from across the line. Successive

years of drought and poor crops in certain districts tend to discourage efforts in many ways. Crop conditions and the general prosperity of the country have a marked influence on the work of tree planting, and many failures to maintain a successful belt of trees can be traced to this cause.

On the other hand, the successful belts predominate as the hundreds of testimonials held by the Forestry Branch indicate. These successes have given an impetus to the work and have raised the question of a more extensive system of planting field shelters with the object of

contributing to the solution of the soil drifting problem. While field shelters alone will not solve the problem there is no doubt they would be an important factor if developed in a systematic way by a responsible organization. Any method of effectively controlling this menace would be of inestimable value to the Dominion. Smaller fields protected by narrow tree shelters would make the operation of a crop rotation practicable and in time assist in replenishing the soil in fibre content and preventing the drift.

The available knowledge of what has been accomplished by individual effort at times under the most adverse conditions is a good foundation for organized endeavour to more extensive operations in this phase of western development.



"Wealthy" and "Charlamoff" apple trees at Indian Head, Sask., bearing a heavy load of excellent fruit. This is a new feature of western farming made practicable by the planting of wind-breaks for the orchards.

HOW PRAIRIE TREES THRIVE

Under typical Saskatchewan conditions, these results are obtained as to tree growth at five years of age.

	Ft.	In.
Russian Poplar	12	6
Cottonwood	10	6
Maple	8	6
Ash	5	
Tamarack	3	6
Siberian Larch	4	6

THAT WICKED XMAS TREE HABIT.

Are Canadians wickedly and wantonly destroying their forests and future timber resources by displaying in homes and shops the ever-popular Christmas tree? Dean Howe, of the Faculty of Forestry, University of Toronto, says decidedly not.

"There is," he said, "a general misconception on this point. Forestry is a business, and the forester must look for profits for himself or his employer. If he can get from ten to twenty cents for fir trees ten feet high he is doing a good and legitimate business.

"This year more balsam than spruce is sold for Christmas trees," he continued. "Spruce is going out of the market, and that means that balsam is easier to get. There may be 2,000 young balsams ten feet high to an acre in the natural forest. When those trees are ready for pulpwood there will be not more than a hundred left. All the rest have been killed in the struggle for existence.

Good Business.

"If these trees, that are going to die anyway, can be sold at a profit, that is a good business proposition. It is a forester's business to know, and he does know, what trees will be in the race at the end.

"A large number of these Christmas trees come from pastures where they are weeds. Therefore it is a great boon to the farmer to get paid for clearing these trees



CHAMPION WOOD CHOPPERS OF THE WORLD.

Can Canadian Woodsmen Equal This Record?

Here are Jackson and Maclaren, of Australia, who authorities state have established the fastest record in the world at tree chopping. The photograph shows them felling oaks and poplars on the estate of the Marquis of Salisbury, at Hatfield, England. Some of the trees were over one hundred feet high and ten feet in girth. They were cut down in less than three minutes each and logs sawn in fifteen seconds.

from the land.

"Although an enormous number of young trees are used at Christmas time

their use for this purpose will never seriously interfere with the pulpwood and timber supplies."

Questions and Answers

Q.—I have a son just graduated from high school who wishes to take a training in Forestry. What schools are available in Canada.

A.—There are Forestry Schools at University of Toronto, Laval University, Quebec, University of New Brunswick, Fredericton, and University of British Columbia, Vancouver. Write for a calendar. The usual course is four years and the summer vacations are usually spent in actual woods work in the employ of governments or private companies.

Q.—I have had some experience as a woodsman and would like to qualify for a position in the Government Forest Service. Is there any short course available?

A.—Nearly all the senior executive officers in the government forest services are graduate foresters who have spent at least four years in a college of forestry. We have not as yet any Canadian schools to train men for the junior branches. You might write the College of Forestry, Syracuse, N.Y., for particulars regarding the State Ranger School at Wanakena, N.Y. The latter provides a short course such as you desire.

Q.—I have heard somewhere that it takes several hundred spruce logs to produce a single edition of one of our large daily newspapers. Have you the figures for this?

A.—It has been estimated that a newspaper with one hundred thousand circulation will require about 225 average size spruce and balsam logs for a single issue.

Q.—Would you advise planting Manitoba Maple as a shade tree?

A.—As you are living in Eastern Canada you had better choose a more satisfactory maple. The Manitoba Maple is a quick grower and that is about its only worthy feature, particularly when you have the choice of a dozen far superior shade tree species. Why not a Norway Maple?

Q.—Is it true that the people of Canada are the legal owners of nearly all the forest lands?

A.—It is true indeed and a fortunate fact for the Canadian people. While a considerable part of the standing timber is leased to corporations and put to good use, the title to the land itself remains in

the name of the people. This means that the mass of Canadian citizens and not primarily lumbermen or pulp manufacturers are responsible for the management of the timber lands and will be answerable for handing on to the next generation the forest asset in as good or better condition that we ourselves have found it.

Q.—Where can I obtain a good bulletin showing me how to care for the bush lot on my farm?

A.—Ask both the Dominion Forestry Branch, Ottawa, and the Ontario Forestry Branch, Toronto, for their special bulletins on this subject. They are excellent.

Q.—I am a Saskatchewan resident and want to learn more about tree planting for shelter belt purposes.

A.—Write the Tree Planting Division, Indian Head, Sask., for their free book on "Tree Planting on the Prairies."

Q.—I have five acres of woods at my summer cottage in Quebec. Can this be made self-sustaining? I don't want to destroy it but would like to get some revenue from it.

A.—Put full particulars in a letter to the Canadian Forestry Association, Ottawa. They will be glad to help you without any charge.

Q.—Is it not a fact that Esparto grass, and other fibrous plants will some day put the spruce tree out of business as a factor in paper-making?

A.—One man's guess is as good as another's. Nobody has made much headway yet in finding a substitute for wood for paper making. A spruce log is the most compact form of fibre yet found. It is easily transported by floating, and does not deteriorate when stored for long periods.

Q.—How much of New Brunswick, Nova Scotia, Quebec and Ontario represents non-agricultural soil, and therefore adapted best to the growing of timber?

A.—About seventy per cent of New Brunswick and Nova Scotia. The percentage is higher for Quebec because the enormous territories of Ungava are included. For Ontario about two thirds is non-agricultural but excellent for the production of tree crops.

Q.—Is Canada losing more of her forest by fire than she is gaining from new growth?

A.—Decidedly so. East of the Rockies the nation's timber assets are rapidly declining. Forest fires sweep much larger areas than are touched by lumbermen each year. The spruce budworm is even a worse destroyer than fire.

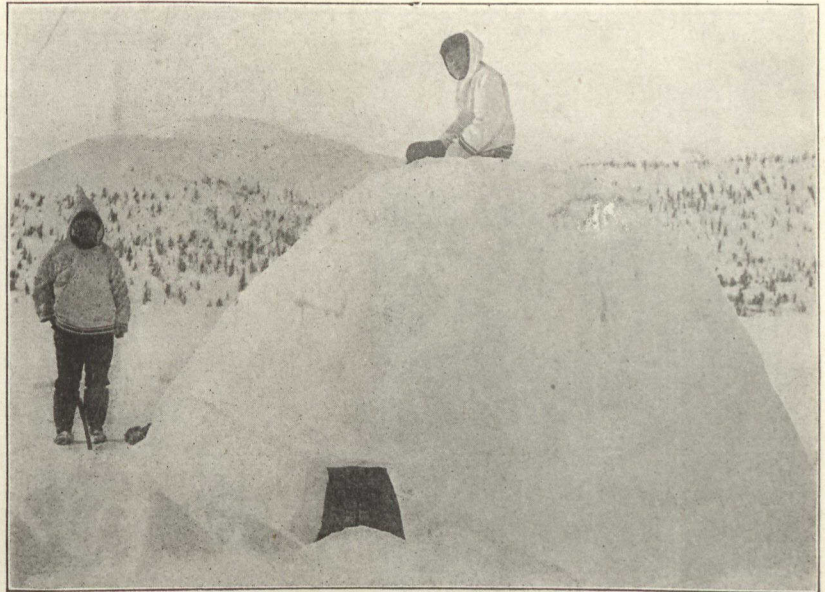
**HALF MILLION DOLLARS TO COVER
100 MILLION ACRES.**

In his remarks at the last meeting of the Northern Ontario Associated Boards of Trade, Mr. E. J. Zavitz said there was great need of a stock taking in regard to our forests, so we know exactly what our resources are. Work on this had been started in the west by hydroplane and next year this district would be recovered.

Along Lake Erie in the nursery there were eight million seedlings. These had been mainly used in holding of sand dunes and covering of cut over lands. Reforestation in the North was difficult. No one would advocate planting out trees until the fire problem had been solved. In the latter fire hazard was small, in Canada great and different methods were therefore necessary.

There were three phases here:—

1. Protection of the pulpwood areas. In this there would be little difficulty if we could get the money. As long as slash was left on the ground fires would occur.
2. Protection of towns and settlements by fire zones.
3. Protection of agricultural settlements. The bulk of opinion was in favor



Completed Eskimo snow-house.

of the continuation of the fire permits system. The big thing was education, for the bulk of fires was due to negligence.

The whole question came down to one

of money. In Sweden 50 per cent of revenue went back into forests. In Canada \$500,000 had to protect 100,000,000 acres.



Pillar Rock, north coast of Graham Island, one of the Queen Charlotte group.



Fort Smith, on Slave River, N.W.T.

Extensive Planting Plan to Save Ontario's Pine Supply

Five Reforestation Centres Proposed to Recover 10,000 Acres of Barrens Each Year for Sixty Years.

By E. J. Zavitz, Provincial Forester of Ontario.

It must be evident that Ontario should be vitally interested in reforestation when we realize that a very large proportion of her area is made up of classes of land which are non-agricultural, and which must eventually be managed for forest uses if they are to remain productive.

In approaching the subject of reforestation in Ontario the writer desires to give a brief description of the forest conditions, especially that portion lying south of the Albany River on the east and the English River on the west.

Very little is known of the forest conditions in the territory north of these rivers, but the meagre reports would lead us to believe that in this sub-Arctic type no material of any consequence will be found. The forest north of these rivers is composed of white and black spruce of small diameter, and chiefly important as possible sources of pulpwood for the future.

The present commercial forests of Ontario lie in the Laurentian Plateau, which

extends for a thousand miles across the Province, with a superficial area of one hundred million acres.

Within this region there exist restricted areas with soils adapted to agriculture. The greater portion of the area is made up of rocky out-cropping and glacial sandy soils, which can only be put to forest uses.

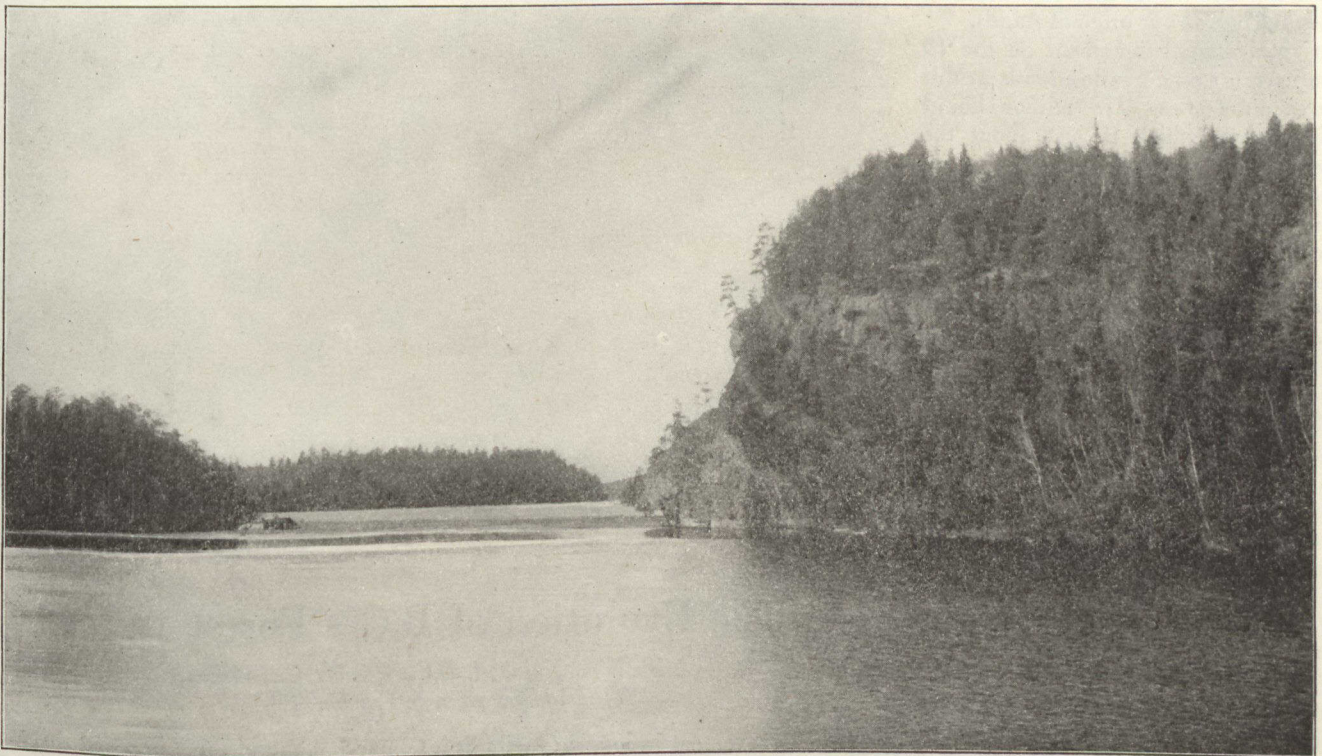
"The height of land" which separates the Hudson Bay watershed from that of the Great Lakes is a dividing line between the two general forest types. On the Hudson Bay watershed white spruce, black spruce and jack pine (*Pinus Banksiana*) are the predominant conifers; aspen and balsam poplar are the most important hardwoods. The poplars in this region attain a splendid development.

While no comprehensive forest survey of this region has been attempted, a number of large areas have been cruised and estimated. The forest of the region is largely adapted for pulpwood and tie timber, with very small average acreage yields. Taking the whole territory on the average I doubt whether we could expect

to secure more than two to three cords of spruce per acre.

On the southern slopes of the Laurentian Plateau we find the white and red pine forests of Ontario, with an admixture of spruce and balsam. Along the southern fringes of this region and especially in the area south of the French River, yellow birch appears as our most important hardwood. Within this region white and red pine are restricted to much smaller areas than is commonly supposed. Virgin pine forests have practically disappeared from the Ottawa watershed, and the country south of the French river. The watershed of Lake Superior does not contain white and red pine in commercial quantities, but is a jack pine and spruce type. In the western end of the Province virgin stands of white and red pine exist to a limited extent in the Lake of the Woods watershed. The most important remaining stands in the district are those in the Quetico Park.

In the east the remaining virgin stands are on the Lake Huron watershed, a large proportion of which is now held under



Vermilion River, near Gowganda Junction, Ontario.

lease. The remaining unsold virgin stands of white and red pine in the east are limited to two small districts in the locality of the Mississagi and Temagami Forest Reserves.

25 Years Supply of Pine.

While no accurate forest survey of this region has been made, an approximate estimate of the remaining supply is possible. From numerous estimates of individual townships and timber berths, the writer believes that ten billion feet of virgin white and red pine would be an outside estimate for the Province.

At the present rate of cutting this pine which took centuries to grow, will be exhausted in from 20 to 25 years. In little more than half a century we have almost exhausted the virgin supplies of our most important saw timbers.

Before leaving this brief description of the forest conditions in the Laurentian Plateau, from which our future supplies of commercial saw material should come, let us glance at what is happening from the standpoint of regeneration. Within the Laurentian Plateau, white and red pine were originally found distributed over an area of about 30 million acres. Through agricultural settlement, forest fires and other minor causes, not more than 15 million acres remain capable of naturally reproducing pine.

Remembering this figure, 15 million acres, let us review what nature did in the way of producing pine in this region before human agencies, other than fire, in-

TO MAKE ONTARIO'S PINE PERPETUAL.

Five new forest nurseries planting 10,000 acres annually.
 First cost of nurseries, \$100,000.
 Annual maintenance, \$50,000.
 Annual cost of planting 10,000 acres, \$150,000.

THE PROFITS TO THE PROVINCE

At end of 60 years an annual production from above plantations of 400 million board feet of lumber, or 50 million feet more than Ontario now cuts.

THE SAVING IN PROVINCIAL FINANCES.

In Ontario's financial statement last year over \$900,000 of the forest revenue was classed as "capital revenue," on the ground that Ontario is now depleting the capital stock of timber and not merely using the annual growth.

With the forest planting programme this \$900,000 could be safely transferred to the credit of ordinary revenue.

terfered. From numerous estimates of virgin stands we find that 36 square mile townships contained as high as 80 million board feet and as low as a few hundred thousand board feet. Assuming 30 million board feet as an average township yield, we would have an average yield of 1,500 board feet per acre. I find in an early estimate made for Minnesota pine-

ries the figure of 2,000 board feet per acre given as an average yield. Considering the relative types of country I believe 1,500 board feet per acre for the Ontario conditions now under discussion, at least high.

In Ontario pineries it took nature at least 100 years to produce 1,500 board feet per acre, which represents an annual

acreage production of about 15 board feet per acre, if we assume 100 years as the average age of our original stands.

Our total annual increment on the 15 million acres of pine bearing lands at this rate would be about 215 million board feet of timber, which is just about the present annual requirement for the wood-working industries of Ontario. Ontario's annual average cut of pine during the past decade has been 350 million board feet of pine. Thus, we are cutting annually at least 100 million board feet more than our pine areas are producing. Only an optimist will assert that our future pine timber supply will be sufficiently reproduced by nature even if forest fires are prevented. Natural regeneration cannot meet our future requirements. A large proportion of this 15 million acres has been so severely cut over and burned that new wood crops equalling the original stands cannot be expected. Investigations in certain portions of this region show that thousands of square miles will not reproduce white and red pine for centuries to come unless they are artificially introduced.

In considering the forestry problems of the Laurentian Plateau, one bright feature presents itself. The ownership of the greater proportion of this non-agricultural region is still in the Crown. Over 12 million acres are held as forest reserves and these areas cannot easily be alienated. Upon these state-owned lands forestry practice may be undertaken without the necessity of regaining the ownership by purchase.

Ontario's Transformation.

The remaining portion of Ontario, lying south of the Laurentian Plateau, was cleared and settled for agriculture during the first half of the last century. In the southwestern peninsula with its fertile soils and mild climate there originally existed a magnificent forest type, similar to that of Ohio and Southern Michigan, with walnut, chestnut, tulip and other valuable hardwoods represented.

In the remaining northern portion of older Ontario the hardwood type was made up of maple, elm, basswood, beech, red oak and ash, as the prevalent species. Throughout this southern region white and red pine frequently occurred in mixture with the hardwoods, or in pure stands on the light, sandy formation. The lands of this entire region have passed into private ownership and are negligible from the standpoint of timber production. The forest has disappeared and the farmer's wood lot, often badly culled, represents the only remaining woodland.

From the municipal returns we find that this southern portion of Ontario has less than ten per cent of woodland, with many townships showing less than 5 per cent. (Concluded on page 594.)



Sand dunes at Skonum Pt., Queen Charlotte Islands, B.C.

The Evolution of B.C.'s Forest Industry

By Wm. Turnbull, B.C., Lumber Commissioner.
(An Address given in London, England.)

The improvement in logging methods is a clear index to the increased timber business of British Columbia.

In the "seventies" when the Government's annual revenue was about \$600—teams of heavy oxen provided the motive power. The steam or spark was supplied by the teamster, who, in addition to a business-like hickory wood as his badge of office, had a command of sulphurous language which seemed to burn its way into the brain of even an ox. Increased de-

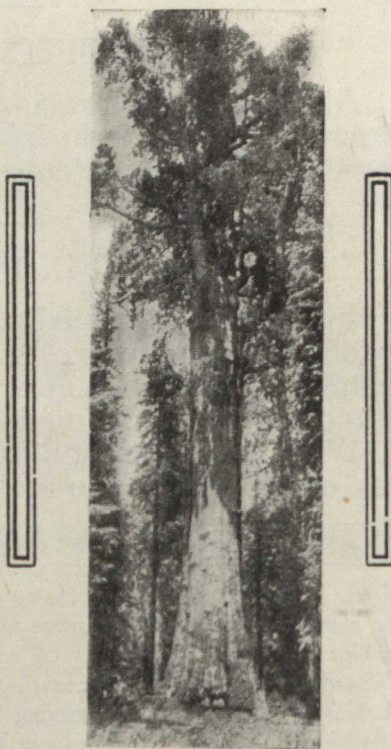
mand required greater speed, and horses and mules superceded the oxen. Mule-driving also required high-power language.

To-day, steam has ousted the horse and mule, and is now being helped out by the motor tractor. The logging superintendent of to-day carefully maps out his timber area in profile, selects his "spar-trees" at strategic points, and lays out his main railroad line and branches. Besides knowing his timber, he knows every "kink," rise and fall in his area.

The donkey-engine and high "spar-tree," with rigging attached, alongside the loading track with its train of skeleton flat cars, are the central features of present day logging operations in British Columbia. From a radius of 1,200 ft. to 1,500 ft., huge logs are hauled by overhead cable from off the mountain slopes to the cars just as easily as a trout is brought to landing-net on a line.

Logging is no longer confined to timber close to the tide water, and logging railways run back into the woods from 10 to 30 miles. Train-loads of logs are brought down, dumped into the sea, formed into booms, and towed to the mills. Booms of logs are towed long distances, and in the land-locked coast waters the percentage of loss is small. The Davis patent whale-back rafting method is also used successfully, but the old sea-level boom is still the most popular.

From a timber conservation standpoint, our logging methods are extravagant, and visitors from Europe are apt to hold up their hands in horror at the amount of waste left in the woods. We are a young country, and the young are not apt to think much of the distant futures. Some-



"THE OLDEST LIVING THING."

The General Sherman Tree in Sequoia National Park, California, is over 3,000 years old.

one has said, "Happy is the country which has no history." We are somewhat in that position, but it has disadvantages, one of which is a light regard for posterity.

However, there is usually a reason for everything, and paradoxical as it may seem, the reason for our extravagance in

the woods is economy. In British Columbia, labour, food, logging machinery, and equipment and towing costs are high. It costs as much to get the skimmed milk as the cream, as it were; we have been in the habit of looking on our forest resources as inexhaustible, and have acted accordingly. We have been "mining"

timber instead of cropping it. The day is at hand when we must think more of future crops. Our Forest Service is taking steps towards that end, and just recently the Hon. T. D. Patullo, the Minister in charge of that Department, spent some time in Sweden looking into Swedish methods.

Birds Guardians of Our Forests

By Hoyes Lloyd, Dominion Parks Branch

When a plague of grasshoppers descends upon the wheat fields, and proceeds to eat up the crop which will be mature and merchantable in a few brief weeks, the attack is so spectacular and the ultimate result so imminent that all the interested parties combat the evil with all possible energy. The service of the birds in helping check such attacks receives ready recognition too, and it is for saving the crops from such an attack that the sea-gulls now have a monument erected to them at Salt Lake City, Utah.

Insect plagues in the forest, while often just as spectacular, are more apt to be out of sight, and hence out of mind; the attack may be damaging a crop which will not mature in our life-time; and although the foresters point out the danger, the response on the part of the public in demanding a remedy is not so clear cut and definite as in the case of the wheat fields. Similarly the services of the birds which help protect the forests do not receive the general recognition given the birds which help protect our crops of farm, orchard, and garden. Yet, it is far more difficult to devise artificial methods of controlling forest insects than it is to devise means to protect other crops.

The loss suffered through insect attacks on forests is even more difficult of estimation than the loss caused to other crops. Dr. A. D. Hopkins, of the United States Department of Agriculture, estimated the annual loss caused by insects in the forests of the United States to be \$100,000,000. Certainly Canada's loss is as large. Our own Entomological Branch of the Dominion Department of Agriculture has a Division of Forest Insects and under the direction of Dr. Swaine, who is the Chief of this Division, ways and means of controlling these pests are being evolved. The enormous scope of such an undertaking is indicated in the article entitled, "Fighting Western Pine Beetles," by J. N. Miller, which appeared in the "Timberman."* We learn here that more than one billion feet of pine have been killed during the past 10 years on about 660,000 acres in Southern Oregon.

The epidemics vary in the amount of loss caused.

Passing speedily over the control methods suggested in this article which are expensive and not always satisfactory we find that in the discussion of this

paper a Mr. Alex. Polson reported a serious decrease in Woodpeckers during the past 40 years. While these birds cannot, in their limited numbers, exert a great effect upon widespread epidemics of such noxious insects of the forest, they can and



Highwood River, southwest of Calgary, Alberta.

* "Fighting Western Pine Beetles," by J. N. Miller, Bureau of Entomology, North Fork, Cal. "The Timberman," November, 1921. pp. 40-41.

do form a part of the natural control which keeps these pests within bounds and they may thereby prevent incipient outbreaks.

WOODPECKERS AND TREES.

Perhaps the outstanding Woodpecker of the forests of Canada is the Pileated Woodpecker, known also as "Cock of the Woods," and erroneously as Woodcock. His time is always spent in the real timber, and he is powerfully equipped to deal with borers, beetles and other pests. How is his work respected by us? He is almost as big as a crow and is a mark for almost every one who goes into the woods with a rifle. I have good reason to believe that this bird suffers from wanton shooting more often than almost any other insectivorous bird in Canada. The forester of Canada can do good service to this ally of his by issuing instructions to protect him whenever found.

Like two brothers of a family the Downy and Hairy Woodpeckers can be considered together. They look like a large and small edition of the same bird. In mid-winter they are hard at work in the forest, although they sometimes come about the buildings, and if you have not thoughtfully put out suet for them, they do not disdain to search out a bone that the dog has hidden and to clean off the particles of flesh and fat that cling to it. Our Woodpeckers in Canada are not fair weather birds as a general thing, all but two or three species occurring throughout the year. In the depth of winter, I have found Hairy Woodpecker hewing the bark from a dead stub in seeking insect prey, and so intent was he on his work that he allowed me to approach within a few feet of him.



On Chehalis River, British Columbia.



The Downy Woodpecker, a very useful and innocent bird. He should not be confused with the Yellow-bellied Sapsucker, which does harm by boring rows of holes in the bark.

Two species of Canadian Woodpeckers, both eminently birds of the forest, have only three toes. These are the Arctic and American Three-toed Woodpeckers. The former has a solid back, while the latter, which I have not found to be common, has white barring on his back. The Arctic Three-toed Woodpecker is a bird of the forest, excavating his nest more often than not, so that overhanging roof will provide shelter for the doorway. The babies seem to be always clamouring noisily for grub, and can be heard at some distance.

An Act of Fidelity.

Once, while I was fighting a fire in the Timagami Forest Reserve, I found a pair of these birds busily carrying food to their young. The fire had burned away the underbrush and was still smouldering about the nesting tree,—the tree itself was charred, but the faithful old birds remained true to their task and as the fire was under control soon afterwards I have reason to hope that success rewarded their faithfulness.

The Flicker is a true Woodpecker, but his habits tend more to hunting ants in the open country than to strictly forest protection work. He has followed settlement on the prairies, and there, often excavates his nest in telephone posts and buildings—so he too, has an effect upon wood products which is not always appreciated by those whose property he happens to pay such attention.

The Yellow-bellied Sapsucker does harm to trees by boring rows of holes in the bark. Apple trees and ornamental trees may be seriously injured by them. The holes bored by this bird serve a variety of purposes—the bird doubtless eats some cambium, consumes some of the sap which flows, and likewise secures insects attracted by the sap. The effect



Waste land at the head of Chehalis River, Lower Fraser district, B.C.

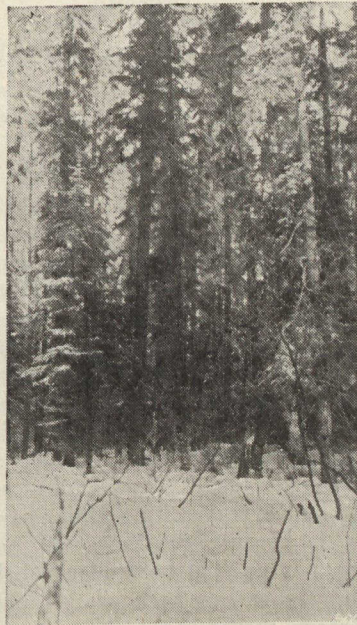


Winter in the woods of Quebec. Photo taken in the Lake St. John district.

of this disturbance in the cambium layer is shown in the lumber cut from trees so attacked, and as a consequence this bird is in somewhat ill repute with the forester. Great care should be taken to distinguish this bird from some of its more beneficial neighbours before taking any steps to keep it under control. As a rule it will be best to let well-enough alone, but should damage become serious permits to destroy this bird may be secured from the proper authorities, for it is protected with the other woodpeckers by the Migratory Birds Convention Act. The loss occasioned by this bird may be serious. Sapsucker work having been found according to Beal and McAtee, in the wood of 174 species of trees. In Western Canada two allied species occur, the Williamson's and Red-breasted Sapsucker, as well as a Western Sub-species closely allied to the common Eastern bird which is known as the Red-naped Sapsucker. Possibly the control of these birds to the west of the mountains which has been exercised because of their fondness for fruit and fruit trees has had some effect in allowing insect pests to gain a better foot-hold in the forests, for all of the sapsuckers are in part insectivorous.

Birds as Timber Savers.

So far we have talked of the Woodpeckers, but there are many other groups which consist of eminently forest birds. The Chickadees, Nuthatches, and Brown Creepers, diminutive little balls of flesh and fur, though they are, help preserve that delicate, but exceedingly complicated thing spoken of so briefly as the balance of nature. Mr. John D. Tothill, of the Dominion Entomological Branch, credits the chickadees and other birds of similar habits with being important factors in the control of the forest tent caterpillars which periodically create such havoc. In their winter wanderings this little group of species, so often found together, do an enormous amount of good



Saskatchewan's inheritance; standing timber on the Porcupine Forest Reserve.

in devouring the eggs and chrysalids of insects. In the summer woods they continue their work, but at that season they are assisted by a host of small birds of many kinds that spend the summer with us.

Many kinds of wood warblers spend the summer in our forests. There must be millions of individuals in fact, and all devote their entire time to searching for insect food. The Vireos build their cunning nests in the shade trees or forest trees, and likewise devote the summer to the ever pressing quest for food. The appetites of birds are enormous, and such active species as the warblers and vireos eat tremendous quantities of insects gleaned from the foliage.

Quiet flycatchers are also found in the summer woods, and their insect toll may be added to the grand total.

Some of our thrushes are true birds of the forest. Among these are our finest singers and they are seldom heard except in the gloom of the evergreens or the cool depths of the hardwoods. What bird songs can take their places—Truly the one whose duties call him to the forest in summer is favoured by the birds.

Forester Birds.

Many kinds of birds plant trees! The thrushes that migrate through my yard

(Continued on p. 590.)

Annual subscription to "Canadian Forestry Magazine," with membership in Canadian Forestry Association, \$2.00. 224 Jackson Bldg., Ottawa.



MAKING "SHIP KNEES" FOR NOVA SCOTIA'S WOODEN SHIPS. A scene in Yarmouth County where the axemen are carefully felling a tree, taking a portion of the curved root which forms the bow of the boat.

ILLUSTRATED

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ROBSON BLACK, *Editor and Manager.*

TAKE THE PUBLIC INTO ACCOUNT!

The first relations of the State to timber management in this Dominion were fragmentary and casual enough. An Imperial order reserving white pine for masting and oak for naval hulls constituted the earliest recorded act of government regulation. In those days one firm of British merchants received a cutting license covering the whole of the area of Quebec and what is now Ontario. Gradually developed a public conscience on forest preservation. Fresh knowledge of the havoc of forest fires and of the high advantages of export trade in forest products, the spread of information concerning the European forestry systems and the conviction that forest areas can be handled as a self-perpetuating capital stock, brought into play not alone the patriotism and self interest of progressive lumbermen but of tens of thousands of Canadian business men who, in the latter case had usually no personal stake in timber or wood manufacture whatsoever.

To-day, after years of patient spread of corrective information, public sentiment in Canada has fairly well grasped four facts:

That lumbering or forest utilization generally, is not a way station to agriculture, standing as a milestone between the original wilderness and the eventual wheat-field;

That eighty per cent of the area of Canada is non-agricultural and has to be kept under timber or be wiped off the slate of Canadian resources.

That there are more acres in Canada, once growing timber, that have been mistakenly cleared and must be restored to timber in order to pay a profit, than there are acres now under timber that can ever be profitably cleared for farming.

That the bulk of the northern section, at least two-thirds of Ontario and Quebec, and more than that of British Columbia,

New Brunswick and Nova Scotia, either retains timber industries or goes to the wall and that to anchor the timber industries, the timber towns, the timber and paper traffic for our railways, some way must be found to anchor the forest resources themselves.

The job of forest conservation is being taken up rapidly by Canadian business men as a people's job—men who are convinced that the enforcement of forest protection and conservative operating has ultimately to be supervised and directed by the state. They believe, too, that the state will take it seriously only when public pressure, that peculiar pressure that large masses of voters only can exert, comes to the surface.

Public Safety the Motive.

This new interest on the part of men who may or may not own timber is inspired by a conception of forest conservation as something vital to public safety and as fulfilling a present obligation of citizenship to the future residents of this country. It may not be rash to predict that in the next ten years the problem of what must be done to put the forest resources on a basis of continuous production will easily match the tariff and good roads on the political platform of all parties. The reason there is to-day a wide gap between the forest protective policies, as supplied by governments, and the basic needs of the timber situation as recognized by everyone, including governments, is because the power of public opinion has not yet been placed behind forestry as it has been placed behind good roads, workmen's compensation and mothers' pensions. The day that public opinion, the opinion of cobblers, fruit growers, school teachers (not primarily foresters or limit holders), says that forest protection is a vital necessity establishing the prosperity or the bankruptcy of Ontario or New Brunswick that day forest protection and constructive forest management will win its great victory. It cannot come until the people shout for it.

Now does this not introduce a definite question to be answered by every lumberman, pulp and paper man, every limit holder? Is this public movement to sweep along to decisions and legislative actions with the logger and the limit holder, the lumberman on the bandwagon of leadership or as an observer by the roadside? The question is not an idle one. In the Pacific Northwestern States, the same crisis came. The operators had to answer whether forest conservation as a public cause was to count the operators in or out. With wise foresight, the wood industries decided to be counted in. To-

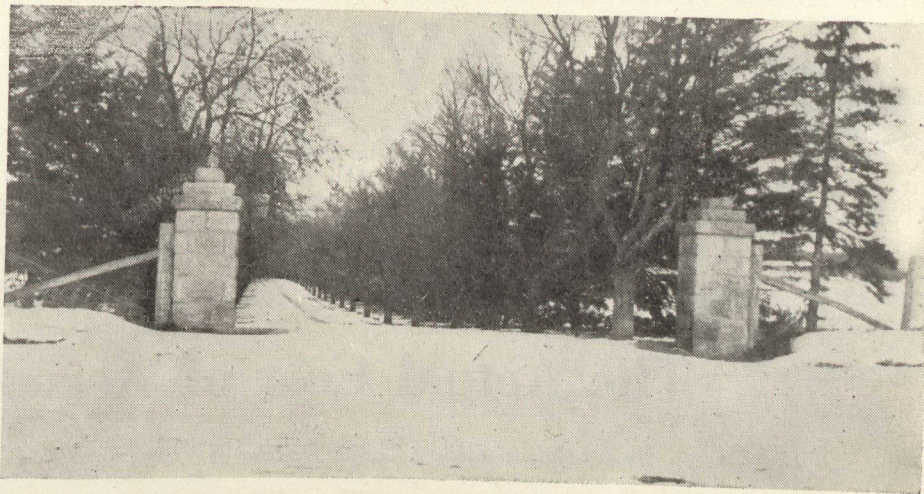
day, the basic principle of the Western Forestry and Conservation Association, which is the administrative fire protection body of those American States, is that no progress can be made unless the State authority, the people of the State, and the limit holders march together arm in arm. With them the day of purposeless scrapping and vituperation is over, because it has been shown to get them nowhere.

Right now in the United States, Congress is considering a bill, with good prospects of passing it, whereby the nation at last faces the fact that forest preservation is a public problem of first magnitude. That bill, when passed, will give public needs priority over "private rights," and, most of the commercial timber stands of the United States are owned privately, land and timber, in direct contrast to the situation in Canada. The demand behind the bill comes primarily from tens of thousands of American citizens, some of them operators and timber owners, most of them not in that class. They say, in effect, the annual growth of our forests (without considering forest fires) is not one-third of the annual cut. The future is too precious to be thrown away. It is our business as a people to apply the remedy now.

Who For Leadership?

The point of these two illustrations from the United States is that forest conservation is becoming an anxious public issue, and will be pressed forward to a solution. Both in the United States and in Canada, fortunately, the truly progressive lumbermen and pulp and paper men are actively promoting forestry, not invariably as a company proposition so much as a national cause. The great danger is that unless all lumbermen, all limit holders, and paper manufacturers, actually declare themselves and align themselves and their firms with the forest conservation movement, leadership will pass to the layman and industrial confusion may result. The movement therefore requires a bridge and to act as that bridge is the ambition and design of the Canadian Forestry Association. Right now, in more than one province, the industries, the limit holders, stand in a bristling camp. The Forest Service may stand in another. The Governments regulate and legislate sometimes without that advance consultation, without the full array of facts and points of view absolutely necessary to fashion intelligent, workable and fair measures. In Ontario, recent events have aggravated this separation and apparently put farther apart the elements that must work in harmony before a forest policy becomes possible. In this crisis, the Canadian For-

stry Association is able to assert a highly valuable role. On its board of directors sit government foresters, lumbermen, paper company managers, deputy ministers, railway men, newspaper editors, farmers, live stock men, financiers, etc. The Association commands public confidence. It has the confidence of newspaper editors, of boards of trade, of agricultural societies and of governments. It does influence public opinion in considerable force. It comes as an umpire, a practical and unprejudiced adviser breaking down through its propaganda the old prejudices against lumbermen as such, against limit holders as such, and setting in its place a new idea of the value of forest industries, and the utter need for a working partnership between the wood-using industries and the public administrators of forests.



(Courtesy of Mr. Allan Campbell.)
THE "STORM PORCH" OF A PRAIRIE FARM.

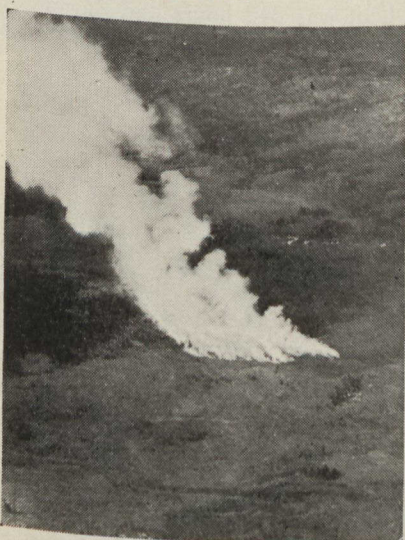
Here we see a beautiful relief from the common array of fence posts and barbed wire? Photograph depicts an avenue of spruce and maple leading up to the buildings of the Dominion Experimental Farm, Brandon, Manitoba.

Offsetting Bad Years by Tree Planting

(From Evidence given before the Alberta Farm Survey Board at Lethbridge.)

T. Hammond, of Summerview, had farmed north of the Old Man River since 1906; had suffered since 1918 from soil drifting. Winter wheat, by reason of the better price, was a better crop than winter rye, although he had not raised any since 1912. Part of his district needs assistance now, that is the north-east corner. Seed grain would be needed in the spring in that section. In his section the farmers carried considerable cattle, but the pasture was disappearing and the number of stock since 1919 had been reduced 100 per cent. If 1922 were a wet season he favored the distribution of grass seed to the farmers in order that a part of the farms could be returned to sod.

The witness testified to the value of trees. The government should force homesteaders to plant trees. Trees would be a permanent solution to many of the problems.



The start of a forest fire on the Clearwater Forest Reserve, Alberta, as seen from a patrolling plane.

TREE PLANTING MAY PLAY A PART.

Edmonton, Nov. 8.—Premier Herbert Greenfield, on behalf of the Provincial Government, has announced the personnel of the "Southern Alberta Survey Board," an independent commission of four to fully investigate and report upon the conditions in the dry areas of the south and the most feasible policies to adopt in regard to permanent remedies of the problem. The board will consist of C. A. McGrath, chairman; Judge J. A. Carpenter, of the Public Utilities Commission of Alberta; G. R. Marnoch, formerly of the Board of Trade at Lethbridge, and W. H. Fairfield, of the Dominion Experimental Farm at Lethbridge. Headquarters of the commission will be located at Lethbridge, it is stated.

PAPER MULCH TO GROW PINE-APPLES.

The system of paper mulching evolved by C. F. Eckart, former manager of the Olaa plantation, Hawaii, for increasing sugar production, and patented, has been applied to the growth of pineapples and is revolutionizing that industry, according to a statement made by the Hawaiian Pineapple Company.

A roll of paper is laid out on the ground and rows of pines are planted through holes in the paper. The process is simple and the company claims the paper prevents all weed growth adjacent to the plants, saving much labor and leaving the cultivators free to pass between the rows. It avoids the necessity of hoeing the plants, saves the leaves and roots of the plant from being broken or bruised, protects and shades the ground, preventing

its becoming baked or washed away, prevents evaporation, keeping the ground about the plants moist, giving the roots good feeding ground, absorb the sun's heat, gradually transmitting it to the earth, keeping the ground warmer, especially in the night during cold weather.

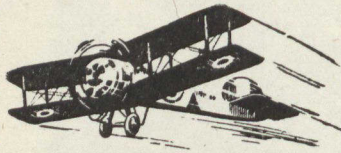
Three Tons Increase.

J. L. Whitmore, acting manager of the Hawaiian Pineapple Company, said experiments on their plantation had increased the production more than three tons to the acre.

Mr. Whitmore announced that the company had an option on the patents for their use in pineapple culture in the islands and that he considered it almost certain that the company will exercise the option. They may sub-license to their competitors as a part of their policy.

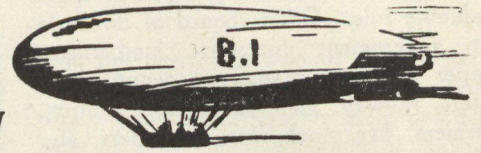


Winter in the woods of Quebec. Photo taken in Lake St. John district.



AVIATION

IN FOREST CONSERVATION

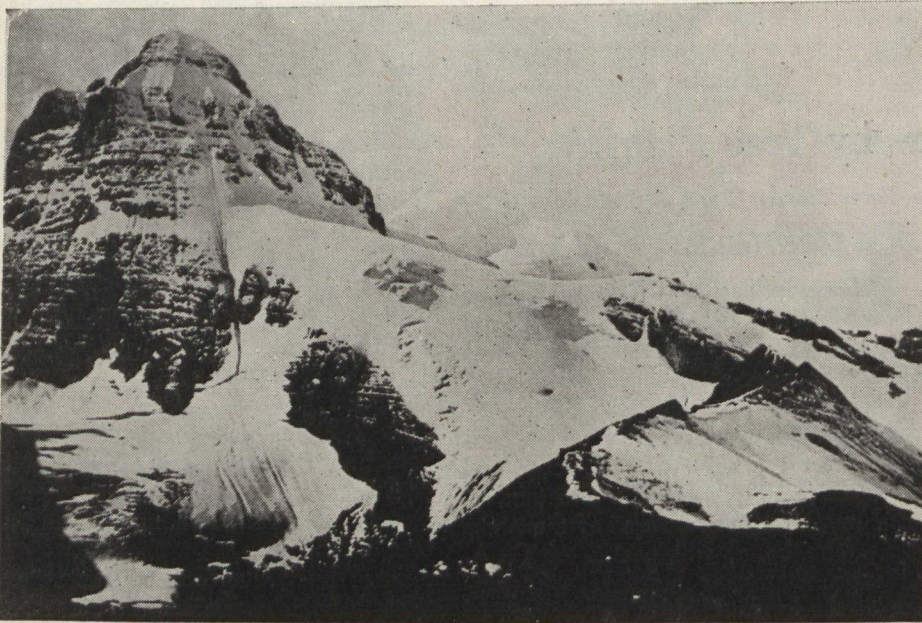


A Department Devoted to the Discussion and Promotion of Civil Aviation in Canada

Edited by George A. Mackie.

The Actual Cost of Aerial Cruising

By Lt.-Colonel Robert Leckie, Director of Flying Operations, Air Board, Ottawa.



An unnamed peak, Maligne Lake, Jasper Park, Alberta, photographed from an aeroplane.

From time to time articles have appeared in this and other magazines dealing with flying operations in various parts of the Dominion. These articles have, as a rule, dealt only with the method of operating and the results obtained, but have not made mention of the cost. It is the purpose of the following article to lay before the public the cost incurred by the Air Board on account of a representative flying operation.

It is generally known that at the conclusion of hostilities the Imperial Government gave approximately one hundred aeroplanes and seaplanes, together with running spares and technical equipment, such as a workshop machinery, transport, etc. As a result of this magnificent gift, expenditures on capital account by the Air Board have, for the past two seasons, have been negligible. It is necessary, however, that the value of this material should be shown in statements of costs so that the figures should not be misleading. This has been done by making out statements showing:

(1) Actual cost. (2) True cost.
Under No. 1 is shown expenditure from

vote, i.e., the actual money spent by the Air Board on the operation.

Under No. 2 is shown what the cost of the operation would have been had it been necessary to purchase the equipment at list price. (See opposite page.)

The example used is that of the Mobile Unit stationed at Sioux Lookout, consisting of three H. S. 2L Flying Boats, and a

staff of fourteen. The Unit was housed in four box cars in which the personnel lived and which contained the gear and equipment necessary for the conduct of the operation. The work on which the Unit was engaged was exclusively forestry, chiefly sketching in timber types and making a reconnaissance of the country bounded on the north by the English River waterways, Lac Seul, Root River and Lac Joseph; on the south by the C. N. R.; on the east by the waterways at the east of Lac Joseph, and on the west by the Manitoba Boundary. Detached operations were carried out from Allanwater and from Banning.

It is not the purpose of this article to deal exhaustively with the work of the Unit, suffice it to say that 6,400,000 acres were "air cruised," reasonably accurate sketch maps made within an area of 10,000 square miles, several types of timber defined, burns located, 2,800 vertical photographs and approximately 375 obliques secured.

During the period of operations, fires were reported and on several occasions fire rangers transported to the fire and assistance given in the work of suppressing it.

Flying commenced May 20th and finished October 7th. The flying time for the Unit was 312 hours and 23 minutes. There were no accidents of any kind whatever.

Seaplanes for Manitoba's Forests

By H. J. Stevenson, District Inspector of Forest Reserves, Winnipeg, Man.

From my observations, I am thoroughly convinced that Flying Boats are very far ahead of our present method of patrols. We could always see from 30 to 50 miles on either side of the plane, and it would be no difficulty to locate the smoke at this distance. When you compare this with a canoe travelling up a river with high banks, where it is impossible to see more than 100 yards in either direction, and where the patrol would be unable to notice smoke unless it were driven down over him, the advantage is entirely on the

side of the plane. By reading the diaries of the fire rangers, I find that in a great many instances, even though they see smoke, they spend days in locating the fire, and I am convinced that half of the fires which occur are never located or reported. On the other hand the aeroplane is able to fly directly to the scene of the smoke and land on a nearby lake. We have already proved this conclusively, as we have observed smoke, located the fire, taken men into the fire district and extinguished the fire in five cases already east of Lake Winnipeg.

No. 1—ACTUAL COST.

From 1st April, 1921 to 30th September, 1921, \$25,419.25.

No. 2—TRUE COST.

1st April to 30th September, 1921.

CAPITAL COSTS.

Equipment:—	
Aircraft.....	\$7,752.45
Aero Engines.....	5,544.63
Transport.....	1,080.00
Photographic.....	2,312.15
Wireless.....	
Tools.....	414.26
"Q".....	1,840.95
General.....	734.26
Lands:—	
General.....	
Hangars, Slipways and Moorings.....	\$1,095.83
Wireless Buildings.....	
Photographic Buildings.....	
Stores Buildings.....	
Barrack Buildings.....	13.40
Workshops.....	
Other Buildings.....	5.00
Water, light, heat and power.....	
Total Capital Costs.....	<u>\$20,792.93</u>

Equipment has been taken on ledger charge either at actual cost to Air Board or, if gift material, at catalogue prices.

OPERATIONAL COSTS.

Equipment:—	
Aircraft.....	\$13,216.41
Transport.....	145.35
Photographic.....	1,760.00
Wireless.....	
Tools.....	12.16
"Q".....	8.50
Printing and Stationery.....	66.77
General.....	245.43
Lands:—	
General.....	133.25
Hangars and Slipways.....	17.67
Wireless Buildings.....	
Photographic Buildings.....	43.96
Barrack Buildings.....	200.94
Workshops.....	
Stores Buildings.....	273.15
Other Buildings.....	3.06
Water, light, heat, power.....	
Undistributed Salaries.....	6,108.52
Undistributed Wireless Salaries.....	
Travelling Expenses.....	800.78
Telegraph, telephone and postage.....	86.92
Freight, express and drayage.....	4,147.54
Rentals.....	1,377.50
Miscellaneous and Contingencies.....	132.20
Total Operational Costs.....	<u>\$28,780.11</u>

Includes mechanics' time, spare parts, petrol oil, grease and all consumable stores.

Includes salaries of Station Superintendents, Pilots and Photographer. Forestry Observers supplied by Ontario Government and their salaries are not shown on this statement.

Includes freight on machines and equipment from Halifax to Sioux Lookout where machines were erected.

Includes rental of box cars and small building at Sioux Lookout.

OPERATIONAL COSTS.

Salaries, Equipment, etc. -----	\$28,780.11
20 per cent Depreciation on Capital Costs of Aircraft, Aero Engines and Transport, \$14,377.08-----	2,875.41
10 per cent Depreciation on Buildings, Wireless, Photographic and General Equipment of, \$6,415.85-----	641.58
	<u>\$32,297.10</u>

The subject of depreciation of aircraft has been dealt with exhaustively in Air Board Bulletin No. 1, which may be obtained upon application.

Total Flying Hours, 312 hours, 23 minutes.
Average Cost per Flying Hour, \$103.38.

Reference is made to the fact that there must be added to the above statement the charges contingent upon the housing, overhaul and repair machines during the winter months, and also the pay of Technical staff during that period. At the end of the fiscal year more complete statements can be presented showing the total cost of the Unit for twelve months.

Exploration by Aeroplane in Jasper Park

A new sphere of usefulness for aircraft was demonstrated during the month of September from the High River Air Station, Alberta, when at the request of the Dominion Parks Branch, Department of Interior, an aeroplane was despatched by the Air Board to Jasper Park in the heart of the Canadian Rockies and three experimental flights carried out over that area for the purpose of exploration and photographic reconnaissance. A flight was made on each of three successive days with gratifying success, and the possibilities of the use of aircraft for exploration in mountain regions and in the administration and general maintenance of the Park systems were proved without a doubt.

At the conclusion of the operation Colonel Maynard Rogers, the Park Superintendent, who was taken as observer on each of the three flights, expressed himself as being highly pleased with the results obtained and with the rapidity with which it was possible to reach any part of the Park, as compared with making a similar trip by trail. In the seven odd hours flying over the Park he claimed to have travelled a greater distance and seen more country than he could possibly have done by trail in six weeks to two months, travelling hard. Colonel Rogers also stated that he believed sufficient flying had been done to demonstrate to him the absolute necessity in future of having machines of a suitable type stationed at Jasper Park to continue this exploration and general reconnaissance work, as well as for the purpose of forest protection.

The following direct results of the operation may be mentioned as worthy of special note:

(1) Several hitherto unknown lakes and river valleys were discovered and accurately located and valuable information secured as to the possibility of breaking new trails over such regions.

(2) "Close up" reconnaissances were made of well known peaks, valleys and

mountain passes, and photographs taken of same.

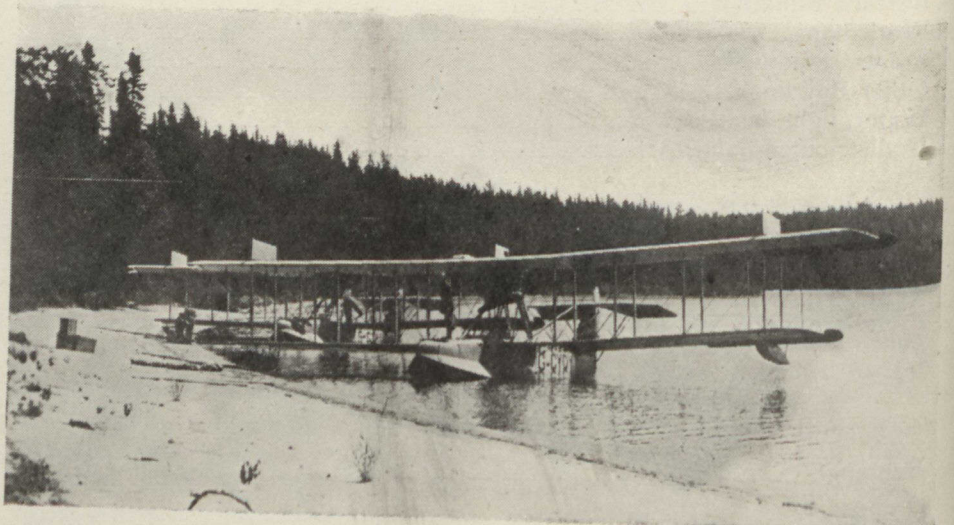
(3) Valuable information obtained as to extent and character of the timber in various portions of the Park and best methods to adopt in providing adequate fire protection.

(4) On several occasions messages were dropped to construction crews working on new trails who were ordinarily at least two days travel from the nearest telephone communication.

1,247 Airmen Trained This Year in Canada

September 30th marked completion of the first year of the Canadian Air Force, since regular training was started at Camp Borden on October 1st, 1920. The results accomplished and the measure of success achieved during this initial year of

organization have been satisfactory. A total of 407 officers and 840 airmen have received training to date at Camp Borden, involving a total flying time of 3,158 hours or the equivalent in distance covered of approximately 250,000 miles.



Two H.S. 2L Flying Boats of the Air Board landing supplies for fire fighting crews at Stacker Lake, Quebec.

With a Canadian Observer in Scandinavia

A Popular Description of the Power of Public Sentiment in Building National Forest Policies

By Edward Beck, Manager, Canadian Pulp and Paper Association
(Recently a Special Commissioner to Scandinavia)

The one thing that impresses a Canadian visitor in Scandinavia bent on enquiring into forest administration and management is the widespread knowledge and understanding among the people of all classes as to the economic value and the social importance of this great source of natural wealth. From the children in the primary schools to the professors in the universities, and inclusive of all sorts and conditions of people in between, everyone in Sweden and Norway—and the same may be said of Finland—is apparently imbued with due respect for the forests and possessed with an adequate appreciation of what trees and their conservation and cultivation mean to the lives and prosperity of the people. Enquiry reveals that this respect and appreciation are instilled into the minds of the Scandinavian in his plastic childhood days, are impressed upon him in his riper years and are kept alive throughout his maturity. Sweden has a motto, "The future of Sweden lies in her forests," and everybody one meets there seemingly believes and lives up to the truth therein expressed.

With such a body of public opinion to work with it is, perhaps, not at all surprising to find practical as well as theoretical forestry in an advanced stage in these countries, although no one there claims it to have arrived at a state of perfection or anything like it.

Private Owners' Obligations.

Prof. Gunnar Anderson, of the Commercial High School at Stockholm, and a member of the Swedish parliament, traced the history of Swedish forests and their economic status and said that it was not more than thirty years ago that Sweden really began to realize the importance of revenue since the middle of the nineteenth century. "The awakening," he said, "increased in strength as by degrees the value of the forests grew. The knowledge of how to preserve our forests has steadily spread. We have now a society which compels even private individuals to take care that new trees are grown as soon as the old ones have been felled and which prohibits the cutting of young forests in full growth. "Sweden," he said, "in our days is in the course of becoming a systematically cultivated land of forests, where the rational production of all the wealth of the forest is becoming an industry equal to agriculture and will perhaps some day be of far greater importance."

Public Opinion Did it.

Prof. Anderson, when I talked with him in Stockholm, united with other authorities in ascribing whatever progress has been made in his country in forest development to the existence of an enlightened public opinion.

"The people," he said, "realize that a considerable portion of their prosperity and well-being depend upon the forests and they don't have to be driven into doing what is necessary for their protection. Self-interest is the impelling force."

It is because the chief mission of the Canadian Forestry Association, as I understand it, is that of arousing public opinion in Canada to a realization of this country's forest necessities—that makes this point of pertinent interest here. In every country I visited this last summer—in Sweden, in Norway, in Finland, in Denmark, in France and in Great Britain—the forest authorities were all of one mind that without public opinion to back them up they could accomplish nothing. Admitting, therefore, that the first essential towards the creation and inauguration of a rational forestry policy for the provinces of the Dominion is an aroused and sufficiently informed body of public opinion, and, acknowledging the efforts that are being put forth in that direction by the Canadian Forestry Association, it may be desirable and profitable to enumerate, briefly, and without wearisome details, what these countries in Europe are accomplishing on the basis already set forth, always keeping in mind, however, that the forestry experts themselves in these countries are most modest about their accomplishments and by no means given to boasting about them. The most that any of them will say is that they have made a fair beginning.

To begin with, then, let us take that greatest enemy of the Canadian forests—Forest Fire. Forest fires which play such havoc in our country, have no counterpart in Sweden, Norway and Finland. They are not without danger, of course, during the summer drought, which last year was unduly severe, but the protection is fairly adequate and the annual losses from this source are almost negligible. The Swedish law makes it incumbent upon every citizen between 16 and 60 years old to turn out and fight a forest fire when called upon. The military are also at the command of the forest

authorities for similar service when required. Good roads give easy access to the woods and a careful system of observation and quick communication makes detection of incipient fires easy and the summoning of help practically instantaneous. The public doesn't have to be warned, furthermore, as in our country, against the danger of starting promiscuous camp fires or of dropping lighted matches in the woods. They already know better than that. The result is that Sweden's fire loss is estimated at not more than one-half of one per cent of the standing timber in any one year, or something less than a quarter of a million of dollars estimated in money value. Norway and Finland are equally fortunate.

It is not proposed here to go into a description of the forestry methods employed in these countries. They are described at some length in a pamphlet issued by the Canadian Pulp & Paper Association, of which copies are available for any who desire them. They are also to be gone into more fully by Mr. G. C. Piche, Provincial Forester of Quebec, who has had recent opportunity of observing them. Suffice it to say that their forestry experts, as in our own country, differ widely as to the most desirable methods to be employed but appear to be uniformly successful in achieving results no matter what particular methods are employed.

Where All Join Hands.

An outstanding feature of forest administration in Sweden is the spirit of co-operation that exists between the State and the private forest owners, the willingness of the former to provide the necessary means and the desire of the latter to co-operate with the State first in drafting proper regulations for the control of the forests and next in submitting to and helping to enforce the regulations when once adopted. There is, it is believed, a lesson here for some of our own provinces. Unfortunately, it is the practice here for some of our authorities arbitrarily to adopt timber regulations without any regard to the views of the limit-holders and, too often, in conflict with what the latter believe to be their best interests or in the best interests of anybody concerned. The Swedish method is to call the forest owners or lessees into a conference with the Forest Service before any changes are made in the laws. A

thorough discussion follows and the proposed new regulations are modified or extended, as may be, to meet the general acceptance of both the Service and the owners. The result is that the law when promulgated already had the approval of those chiefly affected and meets with their ready acceptance and compliance, which is much better than inviting opposition and provoking antagonisms by want of confidence.

Sweden's forest areas cover some fifty-five million acres, two-thirds of which are owned privately and the other third by the government, either federal or local. The same laws in respect to cutting, replanting, etc., are made to apply to both private and publicly-owned woods.

The public forests are managed by the Swedish Forest Service, operated as part of the national Department of Agriculture. The Service is governed by a director general and six assistant directors, with district foresters, assistant foresters, forest engineers, etc., for each of the several districts into which the public forests are divided. The Service is organized on semi-military lines. It has a distinctive uniform and a very pronounced esprit-de-corps. Its personnel includes young men of high social standing of whom the remuneration paid is probably not the first consideration.

What Public Supervision Means.

The Forest Service has complete control over the State and either supervises or manages those owned by counties, villages and parishes. Many of the latter derive considerable income from the proceeds of their forest possessions. The Service charge of the execution of the laws governing the management of all forests and of cutting and all other regulations. Its officers inspect private as well as public forests to see that the laws are being observed.

An official estimate made in 1908 placed the value of the State forests at that time at \$62,000,000; of other public forests at \$21,000,000 and of private forests at \$334,000,000, or a total of \$417,000,000. These values are said to have advanced from 25 per cent to 35 per cent in the meanwhile.

Taxes on private forests have risen considerably during and since the war and now amount, in some instances, to as much as 40 per cent to 45 per cent on the income derived from them. There is, however, no important tax imposed on standing timber, as it has been thought that such a tax besides being an inducement to unnecessary cutting might deter private capital from being employed in reforestation.

The State Forest Service derives its revenues from the sale of standing timber and in other ways. It shows an an-

nual surplus. It expends about 50 per cent of its income on forest improvements and upkeep which is in marked contrast to what is being done by Ontario and Quebec in support of the Crown land forests.

Local forest commissions play a considerable part in upholding the laws and in supervising the administration of the forests. These commissions, which are answerable to the State Forest Service, are usually made up of a representative of the State, one of the private owners and one of the immediate districts concerned. Besides enforcing the law and arbitrating disputes, they maintain forest nurseries and distribute plants and seeds for purposes of reforestation. They encourage the planting of idle lands and promote local interest in tree culture. Their expenses are met by means of a small tax imposed on the stumpage values of the timber cut in their respective districts.

Training Their Staffs.

Not only in Sweden, but also in Norway and Finland, much attention is given to the education and training of practical foresters and rangers. Colleges and schools are maintained for the purpose and embrace in their curriculum everything that might contribute to the mental and manual equipment of the man in the woods whether he be a forest-master or merely a ranger.

Finland and Norway have patterned most of their forest legislation on that of Sweden and what is said of one country, generally speaking, applies to all three.

Finland's total area comprises approxi-

mately 144,250 square miles, of which about 17,000 square miles, or 11.75 per cent consist of inland waters. More than one-half of the land area is made up of forests. There are about 73,000 square miles which produce merchantable timber, of which about 58,000 square miles are classed as highly productive. About one-third of Finland's land area lies north of the Arctic circle and includes most of the less productive forests.

The State owns about 38 per cent of all the land, including 20,000 square miles of productive forests. Private companies own a greater proportion of the best forests, their holdings approximating 38,000 square miles. The State sells the standing timber on its holdings by methods similar to Sweden's and makes adequate provision for its replacement. Private owners are restricted as to the uses of their forests and are not allowed to cut in any manner that is considered injurious to future development. When they cut the land clean, as they sometimes do, they are obliged to replant it.

Selective cutting is generally practiced, the trees being taken out with due regard to the effect produced on those left standing. Drainage is resorted to for the purpose of increasing production, and thinning is carried out in a scientific way.

During recent years the Finnish government has increased its forest holdings by purchases from private owners, a policy adopted with a view to restoring the productivity of lands exhausted by reckless cutting in the past and of raising the general standard of economic forestry in the country. State supervision



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and control, as already noted, have been responsible for great improvement in forestry practice and the increasing value of timber has gradually forced a higher standard of efficiency in lumbering methods and the utilization of timber for industrial purposes. In some remote districts there is said to be still much waste of timber by reason of careless lumbering and from fires and other sources, but these are in a fair way of being eliminated.

Timber and water powers constitute Finland's chief national asset, and the lumber, pulp and paper industries are and must continue to be the foundation of the entire economic life of the country. The present population of Finland does not exceed 3,500,000. Although 55 per cent of the people are classed as dependent on agriculture, the country as a whole is not self-sustaining as to food. Many peasant farmers engage in lumbering during the winter season and the sale of timber from small peasant holdings constitutes an important part of the annual cut of timber. The growth and present importance of the timber industry is of prime importance to the national welfare. The fact that the Government and the people as a whole fully realize this is shown by the manner in which the forests are now being maintained as well as by the steps that are being taken to ensure their future.

Active Steps in Norway.

Norway owes a great deal to the Norwegian Forestry Association which has been in existence since 1898. This Association is perhaps more of a practical body than is its Canadian counterpart although it began merely as a propaganda organization. It is sustained by public grants as well as by private subscriptions. The parent association is divided into subdivisions representing every province, and embracing 15,000 individual members, and is constantly expanding. It distributes large sums for use in planting, sowing, ditching, experimentation, instruction, etc. Its annual budget amounts to 500,000 kroner, one-half of which is provided by the government. Up to 1920 it had brought under cultivation some 100,000 acres; had planted 150,000,000 trees, sown 5,000 kilograms of seed, and constructed 6,000,000 meters of ditching. There are in Norway, both State and private forests. The latter largely predominate. Altogether, the forest lands comprise about 28,000 square miles, or about 23 per cent of the country's total area which consists of about 124,450 square miles. Compared with Canada's forest area that of Norway appears almost insignificant, yet Norway regards her forest possessions as of the utmost importance and spares neither money nor effort to keep them in a state of constant production.

In Norway, as in Sweden and Finland, much attention is given to the education of foresters, and the personnel of those in charge of the forests—the forest-masters and engineers—is very rich. The State maintains a number of schools for the development of engineers and rangers, the courses including practical forest experience combined with theoretical instruction in the class-rooms. A university course in higher forestry is about to be established. Twenty-two years ago Norway had only a score of trained foresters who had been through the high schools, and most of these came either from Ger-

many or Sweden. At present the Norwegian high school of forestry has over 500 graduates to its credit. In addition, the State maintains nine subsidiary forestry schools, whose average attendance is about 500 pupils, farmers as well as intending foresters taking advantage of the courses to obtain a practical knowledge of tree culture.

It is not only in Scandinavia and Finland who, because of their considerable dependence on their forest resources may be supposed to be more greatly interested in forestry problems, that the public opinion has become aroused as to the

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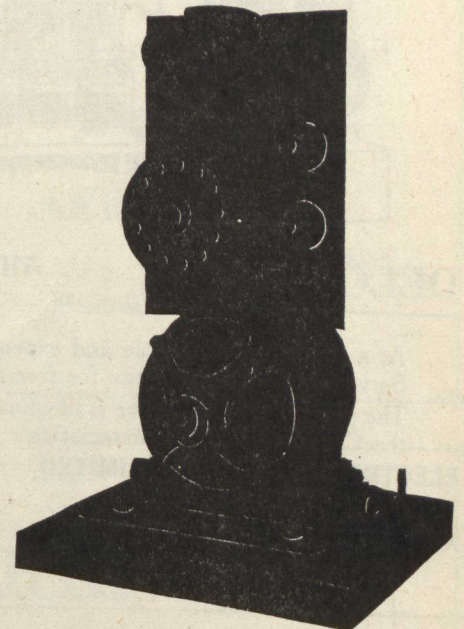
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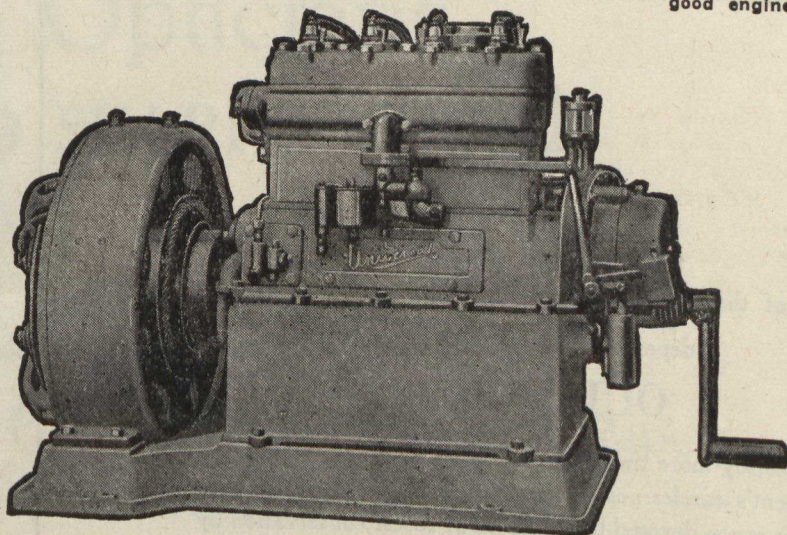
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necessity of cultivating trees for timber and other purposes. The investigator who goes to Great Britain and to France finds a similar situation in these countries.

Great Britain's Forward Steps.

The Forestry Commission of Great Britain, of which Lord Lovat is the head, and which was brought into being by an Act of Parliament passed in 1919, as a direct result of the enormous inroads made into Britain's standing timber during the war, has made much headway during its brief

existence and now had an extensive forestry program well organized.

A preliminary grant of 3,500,000 pounds sterling was voted by Parliament for the purposes of the Commission. This sum is intended to cover a ten year period. The program to which it is to be applied includes the afforestation of 150,000 acres of new land by direct action of the State; assistance to local authorities and private owners for the afforestation or re-afforestation of 110,000 additional acres; the purchase and reconstruction of hardwood

areas; the education of forest officers, landowners and land agents, working foresters, and foremen; research and experiment, and the encouragement of forest industries.

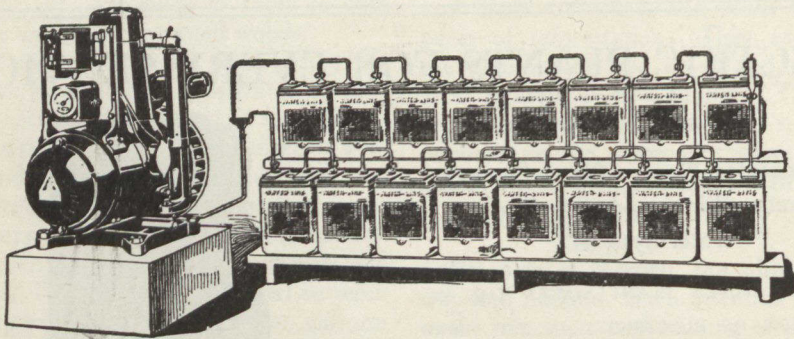
The Commission has added to this programme the work of obtaining a survey of the entire woodlands resources of Great Britain in which they have enlisted the assistance of private organizations and individuals and which is to be completed within three years. This survey which is estimated to cost 80,000 pounds sterling, is expected to give essential facts and figures with a sufficient degree of accuracy as to enable Parliament to come to a decision as to the country's permanent forest policy, when, it is anticipated, a still more generous financial arrangement will be made for carrying on the work.

The Commission now owns 103,100 acres, of which 68,000 are classified as plantable. The area already under cultivation covers 8,000 acres. Work is progressing by well-developed steps. The programme contemplates an average annual expenditure of £400,000 to £420,000 a year; the acquisition of 260,000 acres of afforestation land by 1925 and the planting of 60,000 acres of the same; preparations for planting an additional 21,000 acres in 1926 and 24,000 acres in 1927. The Commission estimates that it will be obliged to purchase seed in 1926 sufficient to supply upwards of 70,000,000 seedlings for the planting season of 1929 as well as to acquire some 50,000 additional acres of land by that year.

Helping the Land Owner.

That the British Government recognizes that forest conservation is largely a matter of state concern and not one with which private capital, unaided, may be expected successfully to cope is shown by the fact that the Commission is offering assistance to private landowners and corporate bodies, during the initial ten-year period in reafforesting at least 50,000 acres of old woodland as well as in planting 60,000 acres of newlands, at an estimated cost to the Forestry Fund of £237,000, of which £137,000 is allotted to proceeds-sharing schemes between private individuals or corporate bodies and the State, and the remainder to the bestowal of grants and loans. The grants contemplate the payment of £2 per acre as an inducement to private owners to replant felled areas and to extend the area of their operations.

Members of the Commission and practical foresters working under their direction all agree that their achievements would have been impossible unless the public press and the influence of private organizations quickened by the alarm caused by the destruction of Britain's forest resources during the war, and whose



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accumulative appeals forced parliament into taking action.

In France, where reforestation is being carried on at feverish speed to rehabilitate the forest lands devastated by war, no one questions the duty of the State to carry on this most necessary work. Impoverished as she is, France is expending much money and no little effort on these labors.

The Water and Forest Board has been entrusted with the supervision and direc-

tion of the work of reconstructing the forests, and for that purpose has set up a special Forest Reconstruction Service. In each department which suffered from invasion there has also been established, independent of the usual forest inspections, a special so-called "Forest Reconstitution Inspection," each with a special staff with definite duties all relating to the restoration of State, parish and privately-owned forests as well as to re-wooding.

The work of the State forests is done

entirely at public expense. In the case of the parish and private forests the French parliament has set up a Fund, budgeted as "Forest Reconstruction Works," upon which the parish and private owners may draw for the means to re-establish their woods. These funds enable the Forest Board to effect restoration works, in agreement with private owners, in the latter's forests, the outlay eventually to be recouped, it is expected, out of the indemnities received for war damages.

Nurseries have been established by the Forest Service nearby the places where new planting is going on. Many sources, including Canada, are being drawn upon for the necessary seed. Delivery of plants and seeds has also been claimed from Germany as compensation in kind. Restocking is being carried on in accordance with a plan carefully elaborated by the Forest Board with special reference to the mutual adaptability of the soil to the seeds and with regard to ensuring a maximum yield of timber in a minimum period.

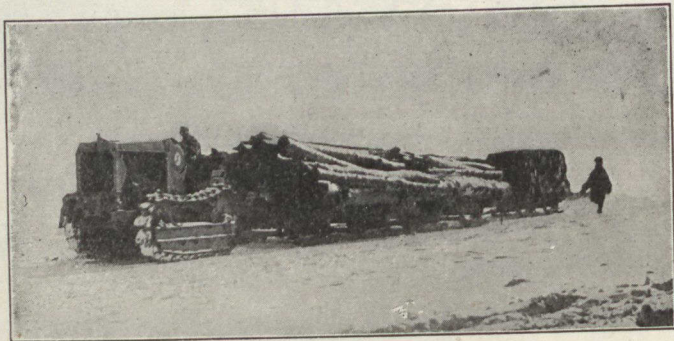
There is a law in France, known as the "Audiffred Law," passed in 1913, which permits and provides for private forest owners, who so desire, to entrust the State Forest Department, with the entire management and administration of their forest property. Few owners, it is said, have taken advantage of the law, preferring to retain their own control, but in instances where it has been applied it is said to be working satisfactorily and the State is now engaged in propaganda intended to impress upon private owners the benefits involved in the system.

The French People a Unit on Forestry.

French Forest authorities, when asked if the people at large were behind this work and sufficiently appreciative of its necessity and importance, declared that their countrymen were beyond the need of education along these lines and they were inclined to marvel when advised that in Canada there were still people who lacked interest in or were skeptical about the feasibility of forest conservation.

In conclusion, and speaking for the Canadian Pulp & Paper industry, whose interest in forestry matters is much more than merely academic, I can assure the Canadian Forestry Association that our people are keenly alive to the good work you are doing. They believe that your efforts along the line of popular education are already bearing fruit and their message to you is to keep on as you are doing, since upon the success that crowns your efforts to awaken and arouse public interest in Canada on the importance of a forward-looking forest policy depends not only much of the permanency of their own industry but also much of our national prosperity.

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Growing Trees for The Prairie Market

By W. A. MacLeod, Editor of Publications, Saskatchewan Government, Regina

Starting in a very small way in 1911 with only a few acres under cultivation and struggling along for a couple of years without making much progress, The Prairies Nurseries, Limited, of Estevan, Saskatchewan, has grown to be the largest commercial nurseries in Western Canada, leading the world as a grower of Caragana and Russian Poplar.

The business has been built up by carrying into practice a theory held by the managing director of the company, T. A. Torgeson, that the sole cause for the slow progress in tree planting on the Western prairies has been the lack of capable salesmen who could not only convince the people on the prairies that they could and should grow trees but would show them how to lay out their grounds, what trees to plant and how to plant and care for them after they are planted. Thousands of small plantations, of thriving farm orchards, with small fruit gardens, are scattered all over the prairie provinces, living and growing proof that the treeless plains may cease to be treeless if people will only take the same pains in planting and caring for their tree crop that the good farmer takes in growing his grain crop.

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plants which are grown in such profusion. There are four hundred acres in the tract of land, practically all under cultivation.

Shipments of considerable size were made last year to nurseries in the United States, these including 140,000 Caragana and 80,000 Box Elders or Manitoba Maples. Trees are shipped to retail customers as far east as Fort William and as far north as the Peace River country. Nurseries in British Columbia and Ontario also purchased considerable nursery stock from the Prairie nurseries last year.

Shelter Belts before Fruit Trees.

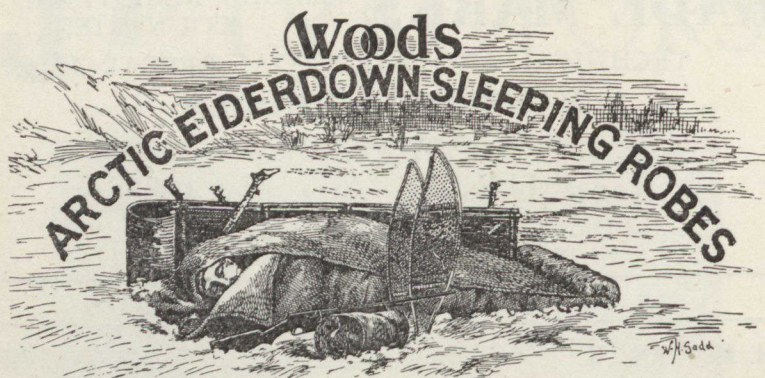
The greater part of the nursery is taken up with plantations of the hardiest trees and shrubs, Russian Poplar, Laurel Willows, Manitoba Maples and Caragana taking up the greater part. A beautiful new hedge shrub, the Russian Olive, as well as Buckthorn are also grown largely for hedges but the Caragana is by far the most popular and about 3,000,000 Caragana seedlings will be grown this year. The management strongly discourages the planting of any fruit trees till a proper shelter has first been set but a large stock

of the hardiest apples, plums and cherries and small fruits is grown with the demand increasing rapidly each year. All the salesmen are instructed to insist as the first essential on any farm the planting of a shelter belt with windbreak, snow trap and grove a short distance from the farm buildings and orchard and small fruit garden, giving ample protection against the severe conditions present on the prairie.

The demand for fruits and ornamental shrubs is taxing the utmost resources of the nursery, especially with currants, raspberries and strawberries which are so hardy as to need little protection.

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Schools are held each year giving instruction to the salesmen in landscape gardening and horticulture with special attention to the planting and care of nursery stock. Close watch is kept on the growth of stock sent out and varieties which have been found uniformly to give the best results are grown in the largest numbers and only varieties that prove absolutely hardy in the prairie provinces are offered for sale.

Manitoba Maple, Russian Poplar, North West Poplar, Laurel Leaf Willow, Elm and Ash are the trees principally grown for shade and shelter belts. Caragana has proved by far the most popular for hedges and each year an increased proportion of the nursery is planted to this very hardy and quick growing shrub. The trees are planted in long rows, the ground thoroughly cultivated so there is hardly a weed to be seen and trees of all the hardy varieties of varying ages to suit all classes of customers cover practically every available foot of ground.

Care in Selection Essential.

Mr. T. A. Torgeson, managing director of the Prairie Nurseries Limited, declares that the reason there are not millions more of trees now growing on the Western Prairies is the lack of care in selection, planting and cultivation and that the service of the company in instructing the purchasers of trees how to properly select, plant and care for plantations is a very important part of the work.

"We have demonstrated in our nursery," stated Mr. Torgeson, "and it has been amply demonstrated by many farmers in all parts of Western Canada that a great variety of trees can be grown with entire success in the west and that in addition, with a little care, every farm home could be supplied with small fruits from their own gardens. If the people buying trees follow the instructions given and are satisfied to grow only the varieties that have been found best adapted for prairie conditions, their plantings are certain to pay them large returns in the increased value of their property and in the pleasure derived from such plantings."



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Roads of Remembrance

The Roads of Remembrance Association last year at the Speaker's House, House of Commons, Westminster, as part of its propaganda since the War, seeks to promote,—in Canada it is to be hoped no less than in the home country,—the planting of trees along suitable roads and other prominent places, as tribute to those who have distinguished themselves by courage and nobility in the emergencies of civil life no less than in war.

In this way the supporters of the R.R.A. wish to foster local patriotism, to simplify the conception of a tribute or memorial, and to link these scattered tributes together. Further, to extend the beauty of the countryside where too often, and especially along the highway approach to towns and villages, it has been marred by ill-kept or even ugly homesteads. Put otherwise, it is hoped to cultivate consideration for the pleasure and safety of wayfarers.

Many existing highways could be transformed to the dignity of Roads of Remembrance by bringing some imagination and sentiment as well as practical good sense to bear upon the subject of wayside tree-planting and tree culture; and in these ways originality is more possible in Canada than in England where space is often much restricted. At present the usual plan of campaign, excellent in its way, is to enlist the services of wide-spreading, long-living trees usually of one kind without any regard for variety and to deploy these on a long and open front so many inches apart.

How many brave deeds that win our homage in times of peace and which deserve the counterpart to the V.C. would be wisely proclaimed for their example value by planting on the highway and with some ceremony, one tree, or a group, or an avenue and marking one or the other with a commemorative tablet. The more simple and unobtrusive this is the better provided, of course, that the lettering is clear and readable at the eye level.

Trees as Memorials.

Think of the small London lad who, (and it was not his first bit of chivalry to prevent kids being run over) seeing a pair of horses bolting in the absence of the driver snatched at the reins to stop them, was carried away and dashed to death against a lamp-post. The deed is now commemorated within the walls of the school he attended, which is good; but it would have been better, we submit, to beautify with flowering trees the dreary street where he lived, committing their care to his school-fellows. It is certain that boy honour would have guarded every twig from harm.

But, it is not sufficient merely to plant. After-care and occasional re-planting are necessary, a trust that would be fittingly discharged by others than paid officials. With this in view it has been urged in the

English Press by the Roads of Remembrance Association that in future years the celebrations of the Armistice should be linked with a Civic Beauty or Tree Day,—Tree being a better word than "arbour," and that the programme should include an improved modern counterpart to the

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old old English custom of Beating the Bounds.

For lack of a Civic Beauty or Tree Day, and for lack of beating the bounds how much interesting topography, biography and history, some of it of Dominion as well as local interest has passed and is passing from the living and romantic consciousness of inhabitants into oblivion or into the semi-oblivion of some matter of fact guide-book.

Turning to speculation and speaking in a vein other than that of the foregoing one submits the following for criticism.

Whether or not the time is ripe for asking people to back with public money any scheme to raise an Imperial or British American Memorial it is surely desirable, in order to avoid further blunders that the subject should be considered. And this is specially urged since there is a proposal to add another church or shrine to London, which, on the other hand, contemplates transplanting to growing centres of population several of these structures which are superfluous where they stand. In other words, there is now a sensible drift back to the country from London

which for the last century has been marked by an excessive centralization.

So it is suggested that the Memorial of the English-speaking world should take the form of a land light-house in granite set in the midst of a "cathedral-forest" which would serve also for pleasure, which may be of use for a school of forestry for the Empire, and which would certainly afford excellent placement for any sculpture that genius may inspire.

For local habitation choose the heart of rural England within the magic country of Shakespere who is supremely the link between all who speak the language moulded by his plays; and preferably at some spot where, if it is possible, important highways converge.

The flame at the summit of the light-house would not only be of meaning to aviation but would have a symbolic significance to people of varying faith. Means could be devised to safeguard birds from hurt.

Each respective Dominion or Colony would give its name to and be responsible for one or other Avenue radiating from the Centre, sending its own characteristic trees to be planted by representative men, women, or children. Canada would have her own sector. The care of the encompassing avenues would belong to the people, and in particular to the children, of the home country.

M. H. MORRISON,

Honorary Secretary,

Roads of Remembrance Commission.

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GROWING FUEL IN SIX YEARS.

Many of the species which can be used on the prairies are very rapid growers, for example, cottonwood, willow, Russian poplar, and Manitoba maple. It is safe to say that wood large enough for fuel can be grown from any of these trees within six years. After that time a plantation will increase in value and productivity year by year and will prove one of the best investments on the farm.

On the Nursery Station at Indian Head, Sask., a plot three-quarters of an acre in extent was planted out to Russian poplar in 1906, trees spaced four feet apart each way. In 1913 the average height of these trees was twenty-three feet. In the fall of 1913 half the plot was cut down and yielded six and three-quarter cords of quite fair fuel. This at the rate of about eighteen cords per acre in eight years. The soil was a medium clay loam. The labor cost and planting was \$5.86 per acre and cultivation for two years about \$6 per year.—N. M. Ross, Supt. of Tree Planting, Dominion Forestry Branch, Indian Head.

FORESTRY IN FRANCE.

One hundred years ago the Landes, some two million acres in extent, was a barren waste, grazed by a poor and unhealthy type of sheep, aptly described by a local writer as swampy, fever-ridden and desolate. This area, by intelligent co-operation between state, communes, and individual owners has been turned from the poorest district in France into two of the richest departments of that country. In that happy district practically no local rates are paid, firewood can be had almost for the asking. Individual peasants own up to 100 to 300 hectares (250 to 750 acres) of what was once barren soil, and no wis forest land worth £100 per acre, and bringing in a steady revenue from turpentine and from pit props for the British market. The wages in the district are high, and the shelter and humus given by the trees allow the once sandy waste to be used for vine culture and cereal crops.—Lord Lovat, at Empire Limber Conference.

FIGHTING BORERS WITH CEMENT GUN.

An effective method has at last been found for preserving piles from the attacks of the teredo, limnoria, and other wood borers found in salt water, as described by Robert Campbell in "Popular Mechanics." It consists in coating the pile with a three-to-one sand-and-cement mixture, which is driven against the wood with such force as to penetrate all crevices and render it completely impervious to water. No form of animal life can then enter.

Two lines of hose lead to the gun. A stream of water is forced through one of them and the dry sand and cement mixture through the other. The two meet at the nozzle, where the cement is driven through a fine spray or mist, gathering moisture for sticking at the point of contact.

Canada's Fur-bearing Animals—The Mink

By William MacMillan.

Wandering through the woods summer or winter one is sure to see either the little brown coated fellow himself or at least some marks of his passing, for the Mink is a busy individual and is continually on the move. A flash of brown along a fence-rail, a whisk of his tail and he is gone. Though much like the weasel in build he is a great deal larger and heavier, and no whit less courageous, for he will attack almost any creature, big or small, that menaces his safety. Lying on his back he does terrible damage with his fearfully sharp claws or leaps with

the speed of light at the throat of his adversary so that one is not surprised at the wholesome respect with which he is regarded by his enemies.

A good swimmer the Mink can plunge into the waters of lake or stream and give successful chase to the nimble muskrat or even the swift Trout and Salmon. Every bit as deadly in his assault on the people of the tree tops. He can climb with the speed and agility of the squirrel and prey upon the birds that make their homes in the trees of the great forests.

When pursued a mink has little diffi-



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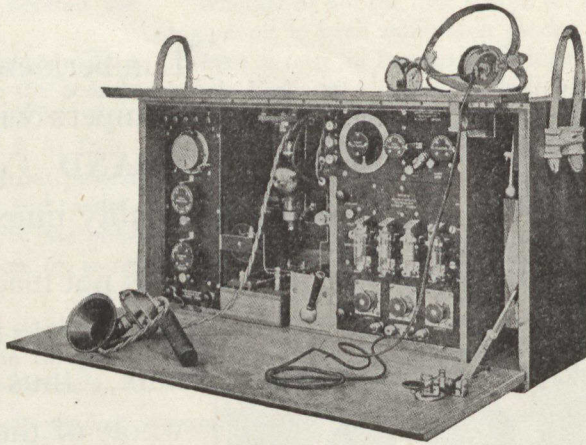
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culty in escaping. A tiny hole hardly large enough for a rat will afford him ample refuge, while few animals can out-speed him in getting there.

The Grouse, Partridge, Hare, and various small animals constitute his daily fare and should a farm house happen to be near his home he will take his fair share of the fowl around. His favorite plan is to slip in quietly along a depression in the ground till he comes to a pile of lumber or some other such debris that litters the average farm; here he lies patiently in wait till some unsuspecting chicken wanders too closely to the spot. A flash, a choked cheep and the adventurous little fellow makes off with his favorite meal. Should he by any chance fail to nail his victim quite likely he will be back in a few hours for another trip.

A good husky mink is about twenty inches over all. The sharp little face looks exceedingly wise and cunning, the legs are fairly long and the tail takes up about six inches of his size.

The color of his coat and the quality of the pelt depends largely upon the section of country from whence he comes. The throat and chest is usually a little lighter in color than the other parts.

Labrador produces about the finest of Canadian Mink. Skins from that section usually being small and exceedingly dark.

Eastern Quebec and Central Ontario oftentimes gives up to the trapper Mink pelts every bit as dark and full furred.

The deserted home of the Ground Hog, the damp sweetness of a swampy bed will attract the curiosity of a passing Mink and he loves to poke his dainty nose into just such places and perhaps make his home on the spot.

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These resourceful creatures are on the hunt at all times, day and night. Darkness and what it covers has no terrors for him and he hunts best at just such times. The young, numbering from one to three "Find" their legs with wonderful rapidity their legs with wonderful rapidity and when cold winds of Autumn sweep through the leafless trees a peculiar restlessness comes over them and breaking away from their parental home they make for new hunting grounds. Quite a number of ranchers have proven that Mink thrive fairly well in captivity.

A good dark skin has a value of from six to ten dollars.



A Canadian Mink.

A CIVIC PLAN FOR SHADE TREES

A recently published memorandum of the Ottawa Horticultural Society on the subject of a municipal tree planting plan should interest our readers in other centres.

That uniformity is the key-note of successful street planting, all authorities agree—uniformity as to species, size, spacing, and alignment. Controlled planting the only method of insuring that street trees will be planted in such a manner as to beautify our streets to the fullest extent, and at the same time lessen the disadvantage of too dense shade for lawn and dwelling, unhealthy and misshaped trees, the breaking up of side walks, and the obstruction of other utilities by tree roots.

The Committee regards street trees as a public utility, and maintains that their planting, protection and upkeep should be entirely in the hands of the city. They

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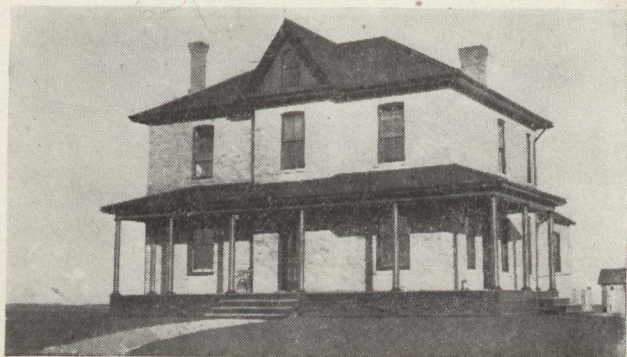
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A PRAIRIE HOUSE BEFORE TREE PLANTING.

The residence of the Superintendent of the Tree Planting Division at Indian Head, Saskatchewan, in 1904, before any attempt at beautification had been made.



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therefore make the following recommendations:—

(1) That the planting and care of all street trees be assumed by the City and be performed exclusively by the civic authorities.

(2) That only one species of tree be planted on a street.

(3) That the species and varieties used for street planting be limited to the following:—

Species	Variety
Maple	Hard, Red, Silver, Norway.
Oak	Red
Ash	White
Elm	American

(4) That the following be the minimum planting distances:—

Maple	30 feet apart
Oak	35 " "
Ash	30 " "
Elm	45 " "

(5) That in cases where the front of a lot is to be planted, the distance from the side-walk shall be not less than three feet for species other than elm, which shall not be planted near than 4 feet.

(6) That steps be taken to plant as much of a street as possible at the one time(using trees uniformly headed at the required height.

(7) That the present offer of planting by the City at a charge to the property owner of so much per tree be continued and extended to all trees planted.

(8) That, in laying out new residential streets, the plan of allowing a strip of boulevard between side-walk and roadway be adopted wherever practicable.

(9) That the City enter into an arrangement with the Ottawa Civic Improvement Commission for the establishment of a joint nursery, looking to a future supply of street trees of the varieties recommended.

(10) That a permanent committee be formed to assist voluntarily, in an advisory capacity, the civic department charged with the work of planting and caring for street trees.

Has British Columbia an Inexhaustible Forest?

By P. L. Lyford, of Clark & Lyford, Forest Engineers, Vancouver.

(An Excerpt from an Address before the Canadian Forestry Association's Convention.)

Probably all of us will agree that there will be found as much as 350 billion feet of timber in British Columbia. I fear, however, that the impression has gone forth into the public mind that we have 350 billion feet of timber of the **kind** and **quality** and **availability**, such as characterizes the timber which is being logged to-day, and will be logged in the next decade.

A careful study of the Commission of Conservation report will reveal that the estimated increment from natural growth depends on complete protection of the young growth from fire. It will also be noted that no attempt is made in this report, to determine the amount of timber in the Province which would interest a logger on the basis of the lumber prices prevailing for the past five or ten years. Failure to present the picture complete and in all its details leads to misunderstanding. Anyone with a knowledge of timber and logging, and the lumber business, who stops to think, will realize, of course, that a very large part of this 350 billion feet is timber quite different from that which is being logged to-day; is, in fact, timber of lower grade and more remotely situated, and more difficult and expensive to log. Most people, however, do not stop to think this far, and for them, the idea of this truly large supply of timber, when coupled with the statement which has been made from authoritative sources, that there is a growth and replacement of 5 to 7 billion feet per year, and the knowledge that the annual cut in the Province has never very far exceeded two billion feet. This idea, I repeat, is more than likely to dispel any thought in the public mind for conservation and re-forestation; for what is the need of avoiding waste, and for replacing the forest if the supply is not only inexhaustible, but increasing faster than it is being used, or likely to be used for the next decade?

I bring this matter up, not through a desire to enter into a controversy, but in order to stimulate fuller discussion and explanation of the **facts**, so that no one may labor under misapprehensions of any sort.

And do not forget these three things:

(1) The Pacific Coast has barely en-

tered upon its career as a great timber and lumbering region.

(2) British Columbia, especially the coast districts, will be called upon to develop her natural forest resources in the next 10 or 15 years to a degree scarcely

appreciated by most of us, and hardly at all by the general public.

(3) There is a very real need for taking thought to avoid waste, and for that important function of the Government of a great forest Province,—Re-forestation.



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BIRD GUARDIANS OF OUR FORESTS

(Continued from p. 566)

have planted dogwood and elder berry there. I think it was the thrushes. Berry-bearing shrubs and trees provide food for the birds and the birds repay by scattering the stony seeds of these plants far and near. I do not know that many of these are important trees, but certainly

the wild cherries have importance, and the Robins must plant thousands of them. Some birds such as the Downy Woodpecker, and the Crows plant poison ivy for which we can scarcely thank them.

It is said that the Blue Jay plants acorns in the ground, doubtless with a view to returning for them later. Certainly he hides nuts and acorns in all sorts of crannies, and in this way must scatter them over considerable areas. If he really helps to plant forests it would be a good point in his character for it is not of the best otherwise.



JAMES SMART PLANT

Brockville, Canada.

Ducks That Nest in Trees.

The Hooded Merganser, the two species of Golden-eye and the Wood Duck all nest in hollow trees. Sometimes where hollow trees are scarce the Golden-eye will nest in an unused chimney and the Wood Duck will nest in suitable bird boxes. The beautiful Wood Ducks are reported to be increasing in the Ottawa vicinity. They are given special protection under the Migratory Bird Treaty, their rapid decrease in the past having caused fears for the safety of the species.

Bird Boxes in the Woods.

The present winter season will be a good time to plan ways and means for making the woods about the house and even the larger wooded tracts more suitable for birds. One of the first items should be to protect the valuable bird life which finds a home in the shelter of these woods and then perhaps you will want to put up some bird boxes to increase the number of your feather tenants. The response on the part of the birds will certainly be remarkable.

FACTS ABOUT CANADA.

Few people realize that 26,445 Canadian ex-service men have been established on the land and are nearly all making good; that Canada's water-power development represents an investment of \$475,000,000, while the power produced would otherwise require 18,000,000 tons of coal yearly; or that nearly 88 per cent of the world's supply of asbestos comes from the Province of Quebec. The Natural Resources Intelligence Branch of the Department of the Interior, has just issued a revised edition of "Compact Facts," which contains in concise form, information regarding Canada; its area, population, trade and industries; their extent, capital invested, wages paid, values of live stock, principal crops and amounts produced; mineral resources and present production; also forest resources and forest products. Copies of the booklet are available on application to the Superintendent, Natural Resources Intelligence Branch, Department of the Interior, Ottawa.



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British Columbia's annual timber cut is about two billion feet. We have a large but variable market on the Canadian prairies; a large and steadily growing outlet in Eastern Canada and the Eastern States, but we look to overseas markets for much of our future growth, and we do not think we are looking in vain.

Our overseas trade has grown from 43 million feet in 1916 to 146 million in 1920, and returns for the first six months of 1921 gave 72 million feet, which is satisfactory considering general world trade conditions. In 1920, the United Kingdom and the Continent was our largest overseas buyer, with 61 million feet, Australia was next with 32 million, and China third with 15 million. India, New Zealand, South America, Japan, Mexico, Straits Settlements, West Indies and the Philippines absorbed the balance.

We have four pulp and two paper plants, and production has grown from practically nothing in 1912 to an output of 136,832 tons of newsprint, 9,792 tons of wrapping, 5,300 tons of sulphite, and 9,000 tons of sulphate pulp in 1920. With abundant water-power, supply of 180 billion feet of timber saw-log sizes of species suitable for pulp, large stands of young growth working day and night from spring to fall to attain pulping size, and splendid harbour facilities, this industry is capable of enormous development.

Five new pulp companies are preparing to start operating, and more will follow. Pulp stands in Eastern Canada and the Eastern States are being rapidly depleted, and the attention of the manufacturer and the capitalist is turning to the West.

DOUGLAS MALLOCH, THE AUTHOR.

By an inadvertance, the poem published on the Editorial page for December, entitled, "The Christmas Tree," was not credited to Douglas Malloch, the Lumberman Poet, as should have been the case. The magazine regrets the omission.

PORTUGUESE TREE SAYINGS.

In many places where timber trees are to be found in Portugal, one sees the following inscription:

"Ye who pass by and would raise your hand against me, harken ere you harm me."

"I am the heat of your hearth on the cold winter nights, the friendly shade

screening you from the summer sun, and my fruits are refreshing draughts quenching your thirst as you journey on.

"I am the beam that holds your house, the board of your table, the bed on which you lie, and the timber that builds your boat.

"I am the handle of your hoe, the door of your homestead, the wood of your cradle, and the shell of your coffin.

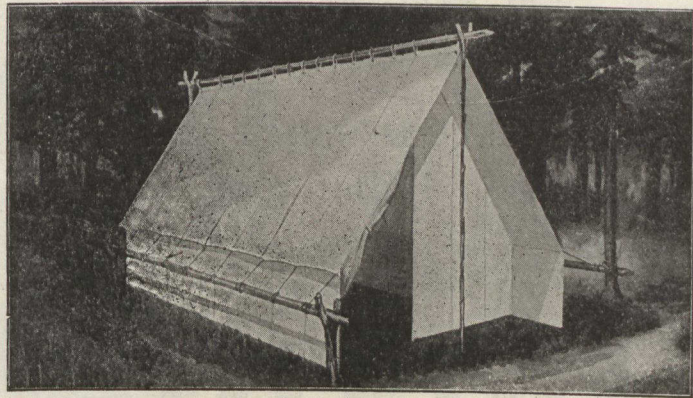
"I am the bread of kindness and the flower of beauty.

"Ye who pass by, listen to my prayer; harm me not."

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Wireless a Great Power in Rapid Action

By Paul G. Redington, District Forester, San Francisco.

A very important part of the air patrol programme is efficiency in communication. As soon as the planes land at the bases or sub-bases they report all fires discovered en route, and these reports are telephoned or telegraphed to the proper Forest officers. The periods of flight, however, are often two hours or more in length, and the bases are out in the valley, necessitating the transmission of reports by tele-

graph or long distance telephone. This often consumes another hour, so that if we depended alone upon the reporting of fires after the planes land there would be a delay of two to four hours in getting the reports to the men who actually fight the fires. It is necessary, therefore, to have a direct and continuous means of communication from the planes to the ground. This is accomplished by having

all planes equipped with wireless transmitting sets which are operated by the observers. There are ground wireless stations at all the bases and sub-bases, and in addition radio receiving stations are maintained at all the Forest headquarters throughout the State. The latter are manned by operators employed by the Forest Service who are usually well qualified amateurs, including schoolboys and others who wish to get out on the Forests during their summer vacations and who are particularly enthusiastic and ambitious on radio work. The observer on the plane reports regularly to the ground stations at intervals of fifteen or twenty minutes. If he discovers any fires he reports them; if not, he merely gives his location and anything else that he may have observed of interest. As he passes over one forest and out of range of the radio station there, he picks up the radio station on the next Forest, and is thereby in continuous touch with the ground forces. The forest supervisor is enabled to trace on a map in his office the exact location of the plane as it flies over his forest by the radio reports he is receiving at these regular intervals. If any fires are burning he knows immediately; if not, he has the assurance that everything is safe.

The radio has proved its efficiency as a medium of communication in work of this kind; and not only is it valuable for transmitting messages direct from the planes to the ground, but I believe we could make very good use of it for communication between ground points where we do not have adequate telephone service. Of the fifteen forest stations in California this season there are probably three or four that do not render satisfactory service, due to being located in canyons or to other reasons that can be remedied next year. We also have found that we can get amateurs—boys and young men from 16 to 25 years of age—who are well qualified, ambitious and interested in the work, for a reasonable salary for the summer period, and that if necessary they will furnish their own equipment.

**10 to
20 times**
the amount taken

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It makes other foods nourish you

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CARDBOARD

FORESTRY MEETINGS AT MONTREAL.

A number of meetings connected with forestry interests will be held in Montreal during the week of January 23. The Province of Quebec Limit Holders' Association will meet in the Windsor Hotel on Wednesday, January 25, while meetings of the Quebec Forests Protective Association, Limited, St. Maurice Fire Protective Association, Limited, will be held on the same day and at the same place. The annual meeting of the Woodlands Section of the Pulp and Paper Association is fixed for Thursday, January 26, and the annual meeting of the parent association of the following day.

PULP MILLS IN ALBERTA?

Edmonton, Alta.—Whether or not a pulp industry can be established in this province, using spruce and poplar timber from the near-north country, will be the aim of a series of experimental tests to be made under the auspices of the Alberta Government's advisory scientific research council. Great stretches of small timber all over the north country and in the western foothills will be turned to profitable account if the experiments work out successfully.

The pulp-making value of poplar timber has never been tried out in a large way, but it is believed that either clear or mixed with spruce it will produce a good marketable article. Much of the wooded area of Northern Alberta is covered with small-growth poplar, which so far has been of no use other than as firewood for the settlers, and if the proposed tests are successful it is likely that pulp mills will be built at one or more points like Fort McMurray and Peace River.

The research council has set out to explore the industrial possibilities of the province in various new directions, one of the most important of which is the utilization of the Athabasca tar sands. To these investigations will now be added the pulp tests, which are to be commenced as soon as arrangements can be made.

A PENNSYLVANIA VIEW.

(From "Forest Leaves")

A liberal estimate puts the present value of the 13 million acres of largely devastated forest in this state at not over 200 million dollars. This land restored to producing forest will be worth not less than 1,300 million dollars. This forest property will be yielding a tax income of 13 million dollars annually before the end of the century unless this generation proves recreant to its responsibilities. You have already heard of the great additional contribution of this forest property to our health; to the alleviation of floods and water conditions; to our recreation; to the protection of our rich river bottom farms and the channels of navigation.

Our people do not sense the size of the thing! Here is an area equal to the entire improved farm area of the state in need of upbuilding. An area about three times the entire area of New Jersey. The larger capital returns will be far in the future. The contributory returns—health, water, wild life, recreation—will begin to pay dividends at once!

Civilization progresses only as capital is saved and applied to produce tenfold in the future. The vision of future crops prompts the planting and care of an orchard. The vision of coming centuries of saving in transportation costs led to the building of the Panama Canal. It is this

harnessing of the powers of nature that yields civilization its horn of plenty.

China starves because she does not look ahead—does not develop her coal beds, irrigate her vast plains, reforest her stripped and gullied mountains that pour destruction on her valleys below.

Fredericton, N.B.—A forest nursery to be operated co-operatively by the Forest Service Branch of the Department of

Lands and Mines and the Forest School of the University of N.B., may be located in the city limits of Fredericton on University property, if the negotiations between the Department and the University which are being considered, result satisfactory and successfully.

It is understood that the nursery would be planted with seeds and seedlings and the Forest School of the University and the Forest Service of the Province would co-operate in the upkeep.

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To Save Ontario's Pine Supply

(Continued from p. 569)

To a large extent these wood lots have been severely culled and opened to grazing, so that the character of the growth is very inferior.

We have throughout this agricultural region large areas of sandy soil, which were unwisely cleared in the early days. Many of these areas are not only lying waste, but through sand dune formations, are becoming a menace to surrounding country. In many of these sand formations futile attempts are still being made to carry on farming.

The reforestation problem of Ontario divides itself into two outstanding questions, namely:

1. *The problem of improving private woodlands and replanting the waste areas of Southern Ontario.*

2. *Reforestation on the cut over Crown lands of the Laurentian Plateau.*

The Farmer's Part in Forestry.

The private wood lots of Southern Ontario aggregating three million acres present a difficult problem. Legislation has been provided for the remittance of taxes. Educational propaganda through bulletins, farmers' institutes and clubs, has been undertaken; free planting material is being supplied, and yet the farmer's wood lot is not seriously considered by the majority of owners. The influence of this class of woodland on local wood supplies, on the question of protection to crops and buildings from wind and on the provision of shelter for bird life combine to make a solution of the problem imperative for the welfare of agricultural Ontario.

In Southern Ontario where diversified soil conditions exist there are few farms which could not advantageously support some forest crop. The writer believes that no education or propaganda equals the actual demonstration of forest plantations. Through the distribution of forest nursery stock during the past few years plantations have been established in every county of older Ontario. Some five million plants have gone out and these demonstrations are just beginning to have their educational effect. The plantations are usually upon the poorer soils. Some of the more important ones are upon city watersheds, and upon blow sand areas along main highways where sand was continually encroaching upon the road.

The larger waste land areas, situated in the agricultural portions of older Ontario, present a problem, the solution of which depends upon municipal and provincial enterprises.

In 1909 a forest station, now comprising 1,800 acres, was established in one of these areas in Norfolk County in the Lake Erie district. This Norfolk sand formation, originally covered with pine and oak, was particularly cleared for farming and then abandoned. Forest nurseries were established which provide planting material for distribution to other parts of the Province as well as supplying the local needs.

Five hundred acres of plantations have been made at this station on blow sand ridges, abandoned fields and in scrub oak lands. Tree species used in this work have been white pine, red pine, Scotch pine, jack pine, European larch, red oak, chestnut and Carolina poplar. Some plantations where soil conditions warrant have been made with mixtures of the more valuable hardwoods.

Time will not permit a detailed description of the plantations, but the following shows the results on some of the oldest:

How Plantations Grow.

The Scotch pine and jack pine plantations are on bare sandy ridges; the red and white pine on sandy fields.

Species.	Age in years.	Average Height in feet.	Average Diameter in inches.
Jack pine----	12	21.15	3.50
Scotch pine--	12	19.61	2.72
White pine---	11	12.	----
Red Pine----	8	9.42	----

The results have been very gratifying, and investigation of the work by prominent Government officials and municipal officers from other regions, has assisted greatly in placing reforestation beyond the realm of academic discussion. The local effect is interesting as considerable skepticism existed regarding the initial plantings upon the blowing sand. At present our greatest demand from farmers for planting material is from the region about this forest station, proving that actual demonstration is the best form of education.

The nurseries at this station have been enlarged to a capacity of several million plants per year. We now have five acres in seed beds with an overhead, automatic watering system supplied from a 20,000 gallon tank with a four inch main. At present these seed beds contain about seven million, one year old seedlings, com-

prised chiefly of white pine, Scotch pine, jack pine and spruce.

Believing that demonstration forest stations in Southern Ontario will greatly assist in solving our problem in this region, the Government is now arranging for the establishment of several stations at strategic points in the Province. During the last season a forest station was started in Prince Edward County on Lake Ontario, where the Province owns about 500 acres of sand dune formation. In this area experimental plantings with willow and poplar were carried out on 100 acres. These dunes are moving badly and the above plantings were made for protection, preparatory to the introduction of coniferous species.

Municipal Forests.

In addition to the provincial projects numerous municipalities have become interested in reforestation. Last year, legislation was enacted whereby co-operative arrangements can be entered into between municipalities and the Province for the reforestation of municipal areas. The municipality purchases the land and the province undertakes the planting and management. These projects will embrace small ten acre demonstrations along main highways as well as the larger problems of municipal waste areas. This coming spring, work will be commenced in Simcoe County where 1,000 acres of cut over pine lands have been secured by the County.

Provincial and municipal forest stations in Southern Ontario will assist in securing a future wood supply; will provide forest planting demonstrations and will prevent futile attempts at agriculture on worthless soils.

I come to the problem of reforestation on the cut over Crown lands in the Laurentian Plateau with a certain hesitancy, knowing the prevalent belief that nature will provide regrowth in this region if we give her a chance and protect her from forest fire. As estimated earlier in this paper, I am convinced that our annual regrowth or increment is far below the present annual cut. With regulated logging and perfect fire protection we cannot hope for adequate crops of pine timber unless natural regeneration is supplemented by artificial planting.

The long time element in producing a forest crop makes calculations and estimates speculative, but I propose a plan which I feel is possible of attainment and which should insure our future needs.

Ontario's Replanting Plan.

Forest stations should be established at suitable locations in the older portions of our cut over regions, where the factors of fire protection could be most easily solved.

Thousands of square miles exist of such land, in the Trent watershed, in the Eastern Reserve Country, and in many parts of the old pine bearing districts. These stations located near settlements where labour would be most available would develop forest nurseries to supply planting material. A planting program could soon be organized to meet our needs. Five of these stations, each with a planting program of 2,000 acres, would insure the reforestation of 10,000 acres annually. These stations with buildings and nursery equipment could be established by a capital expenditure of \$100,000. Annual maintenance should not exceed \$50,000. The annual planting budget of 10,000 acres would not exceed \$150,000. At an expenditure not exceeding \$200,000 per year we could annually reforest 10,000 acres, which in 60 years should produce at least 400 million board feet of lumber, or 50 million board feet more than our present average annual cut.

In Ontario's financial statement last year over \$900,000 of the forest revenue was classed as capital revenue, as it was felt that we were at present cutting into our forest capital. With the forest planting program as briefly outlined above this amount could be safely transferred to the credit of ordinary revenue.

We are not venturing in the realm of speculation, as this problem has been

solved in many older countries. The Government has this policy under consideration, and it is expected that a planting program will be established as a part of our forest policy which will utilize the

waste lands; insure protection to our watersheds; permanency to our wood-working industries, as well as provide for the foundation of a permanent, provincial revenue.



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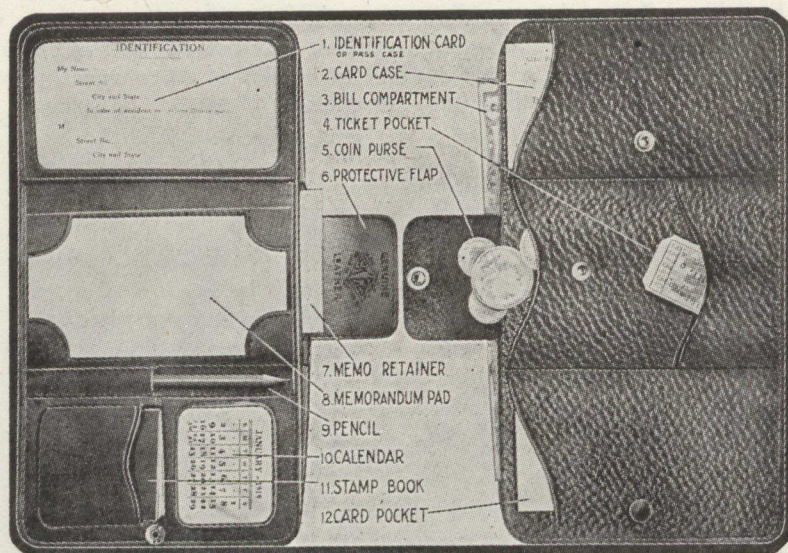
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THRIFT IN THE FOREST.

(Montreal Star)

Apart from the fires in cities, there is the wicked destruction of large areas of our forests by fires. The forests are valuable beyond all computation and their preservation is a matter of national concern. The most abundant proof has been adduced that a very large percentage of forest fires is directly traceable to carelessness on the part of settlers, hunters, railways and others. Those who gather about camp fires and march away leaving embers aglow deserve to be indicted for criminal carelessness.

Surely if better economic conditions are to prevail there must not only be curtailment in extravagance in living, but curtailment also of our astounding fire losses.

PLAYING WITH FIRE BRINGS FINES AND JAIL.

A little reminder from the mailed hand of law is now and then necessary in maintaining public respect for the forests. Very vigorous work has been done by the Ottawa River Forest Protective Association this year in prosecuting offenders whose gross carelessness threatened the security sometimes of hundreds of miles of timber. Of the results of these cases the following were typical of thirteen judgments:

21st December, 1921.

1. Samuel Milford, Danford Lake, Que., fined \$25.00 without costs or two months in jail, for burning slash without permit. He paid.

2. Dolphis Theriault, River Joseph, Que., fined \$25.00 and costs or two months in jail for setting fire to slash without permit. He paid.

3. Hermas Chantigny, Maniwaki, Que., fined \$25.00 and costs or two months in jail for leaving lunch fire unextinguished. He paid.

4. Edmond Leveiller, Maniwaki, Que., fined \$25.00 and costs or two months in jail for leaving lunch fire unextinguished. He paid.

5. Noe. Duquette, Maniwaki, Que., fined \$25.00 and costs or two months in jail for leaving lunch fire unextinguished. He is now serving his time in jail at Hull, Que.

6. Edward Owens, squatter, Danford Lake, Que., fined \$25.00 and costs or two months in jail for burning slash without permit. He is now serving his term in jail at Hull, Que.

7. Louis Langlois, squatter, Wright, Que., fined \$25.00 and costs or two months in jail for burning slash without permit. He is now serving his term in jail at Hull, Que.