

51611/56/6-5714

# Canadian Forestry Journal

VOL. XV.

OTTAWA, CANADA, OCTOBER, 1919.

No. 10



Forestry's recreational side. Health-getting on a Dominion Forest Reserve.

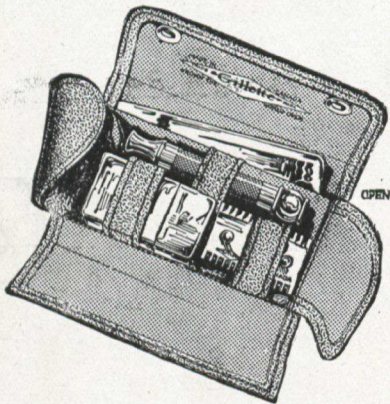
# Gillette

## Safety Razor

---

A Shaving Service for Everyman - - Everywhere

---



TAKE A  
GILLETTE KIT SET  
(No. 20)  
WITH YOU

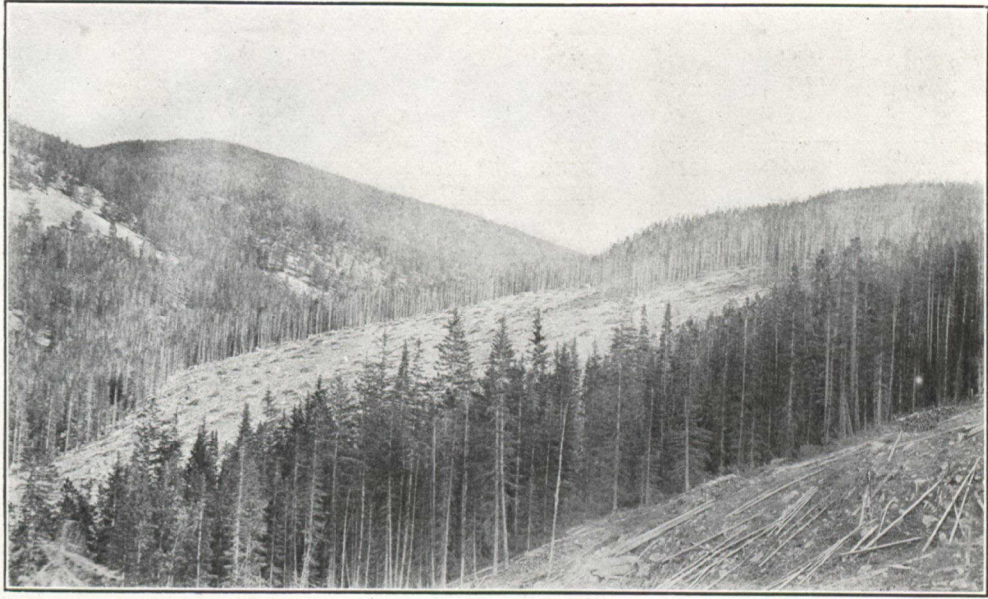
There is much comfort in small space in the Gillette Kit Set No. 20. Do not deny yourself the certain luxury of a Gillette shave, when you can stow away the necessary equipment in so small a space.

Whether you go away for two or three days' hunting or as many weeks, you will appreciate the daily five minutes with the keenest of keen edges.

\$5.00 is the price, and to-day's the day to buy.



The Gillette Safety Razor Co. of Canada, Limited, Montreal, Que.



Cutting for reproduction. The strip method in a U.S. national forest.

## CANADA'S FORESTS AS A CROP

*By Clyde Leavitt, Chief Forester, Commission of Conservation.*



### Essential Supplies for Industries Not Maintained Under Present Methods of Woods Management



Too much emphasis can not be laid upon the importance to Canada of her forests, in the support and development of her commercial and industrial life. There is, however, great danger of inadequate attention being paid to the perpetuation of this great resource, so that it may always be available, and to an adequate extent, for supplying the needs of the home population, as well as for further building up the great export trade in forest products which already means so much in our business life.

The forest is a crop, like other crops, the principal difference being the long-time element involved in growing it, and the fact that it is at home on non-agricultural lands, largely valuable for no other purpose. Thus far, our forest industries have largely been supported by the exploitation of virgin timber stands—the free gift of Nature, grown without man's intervention or care. The formerly prevalent idea that our timber supplies are of inexhaustible

extent is now known to be a dangerous myth—dangerous because such an idea tends largely to discourage the effort necessary to the perpetuation of the forest on cut-over lands.

In the United States, intelligent citizens are already becoming seriously alarmed at the growing shortage of timber supplies, and much discussion is taking place as to what can be done about it. According to Chief Forester Graves, of the United States Forest Service, the dissipation of the forests in that country still goes on with no let-up. He points out that “exhaustion of local forest supplies, the closing of industries dependent on them, the embarrassment for supplies of the pulp mills and other consumers using special classes of forest products, the generally mounting prices to consumers, are other factors which are calling sharp attention to the effect of forest destruction, and are causing increasing public uneasiness. Leaders of the southern pine manufacturers state

that the bulk of the original supplies of yellow pine in the south will be exhausted in ten years and that within the next five to seven years more than 3,000 manufacturing plants will go out of existence. Already paper manufacturers are embarrassed for supplies. Hundreds of communities are suffering because the resource supporting their chief industry has been exhausted. Sawmills and woodworking establishments close, subsidiary interests can no longer exist, the population moves away, farms are abandoned, roads and other public improvements deteriorate, and whole townships and even counties are impoverished."

#### CANADA'S ADVANTAGE.

It must, of course, be recognized that the situation in the United States is fundamentally different from that in Canada, in that the great bulk of the timber in the former country is on lands held in private ownership and therefore not thus far subject to restrictions as to cutting methods, while in Canada, all but a comparatively small proportion of the forests are on Crown lands, and are therefore subject to such cutting regulations as may be prescribed by governmental authority.

In this lies the hope of the future for Canada, since forestry is, as a general rule, primarily a matter for governments rather than for individuals or even corporations. Since, however, pulpwood can be grown in a much shorter period of time than saw-timber, progressive pulp and paper companies are already considering it to be good business to prepare for the systematic growing of at least a portion of their necessary supplies for the future and are proceeding accordingly. This, by the way, is indisputable evidence that the shortage of pulpwood supplies over considerable areas in eastern Canada is already upon us, were such additional evidence required.

It certainly requires no great powers of observation to determine that in eastern Canada, for example, are enormous areas of cut-over lands which are in an absolute or relatively unproductive condition. These lands are, of course, generally speaking, the most accessible to existing transportation, where stumpage values would be highest and where the existence of a permanent supply of timber would be of the greatest value to all concerned.

#### THE SEARCH FOR LOGS.

Studies made by the Commission of Conservation, in co-operation with the Laurentide, Riordon, and Abitibi pulp and paper companies,

and in collaboration with the Provincial Forest Services of Quebec and New Brunswick show conclusively that the productiveness of the forest is not satisfactorily maintained by present methods of cutting.

Companies are continually having to go farther and farther afield to secure necessary timber supplies, and the cut-over lands they leave behind are, for the most part, not left in a condition that promises the possibility of a second cut within any reasonable length of time.

If a reasonably satisfactory forest stand is to be produced on lands to be cut over in the future, particularly in the mixed forests, some way must be found by which it will be possible to so modify present methods of exploitation as to favor the reproduction of the coniferous species. Protection from destruction by fire is not sufficient, though this is of the first importance, and is a matter in which great progress has been made of late years. Millions of dollars of damage is being done by the spruce budworm and other insects in the pulpwood forests of eastern Canada. The loss of balsam is particularly severe, the spruce suffering less, though still seriously. The withdrawal from prospective utilization of the large volumes of timber so destroyed only serves to make more urgent the necessity for recuperative measures.

One aspect of the problem involves utilization of the hardwood species, at present comparatively valueless, particularly on the more remote limits, but whose increased spread and growth is consistently favored through the continuous removal of the conifers. Our mixed pulpwood forests are rapidly being turned into hardwood forests as a result of this process. The solution of the problem involves finding some method by which the hardwoods can be transported to market and there utilized. Heavy loss from sinkage in stream-driving is the greatest difficulty, though experiments by the Riordon and other companies show that hardwood logs can be driven successfully up to 90 miles. Presumably this may be increased if some feasible method of first partially drying out the logs can be demonstrated. Possibly, also, the use of tractors for log-hauling may assist in solving the problem. New railway construction will assist in some cases.

#### THE HARDWOOD PROBLEM.

At any rate, pulp and paper companies must find some means of transporting and utilizing their hardwoods if they expect to retain their mixed forest lands in a productive condition.



An area logged according to one of the modern silvicultural methods.

Already, it has been shown, by the Laurentide Company, for example, that birch can be successfully used in mixture with spruce and balsam in the manufacture of groundwood pulp for newsprint. There is also a good market for hardwood lumber.

The determination of what cutting regulations are necessary, in order to ensure the adequate reproduction of the forest on cut-over lands, is a problem which will tax the best efforts of both the forestry profession and the operators. While the problem still awaits solution, it is being attacked by the Commission of Conservation, the Dominion Forestry Branch, the Quebec Forest Service, the New Brunswick Forest Service, and by a number of the more progressive pulp and paper companies, such as the Laurentide, Abitibi, and Bathurst concerns. The first three of these companies are, in addition, taking time by the forelock, by initiating extensive planting programmes, to supplement the natural growth on cut-over lands. The inauguration of similar work by other concerns is more than likely.

Canada's forest industries have experienced a phenomenal growth. The value of the products of the lumber industry was, for example, \$115,884,905 in 1917, an increase of 68.40 per cent over 1915. The payroll of employees on salaries and wages amounted in 1917 to upwards of \$21,000,000, according to the Bureau of Statistics. Census figures for the pulp and paper industry show that in 1917 there were 83 mills in operation, with a production of \$96,340,327. The total cut of pulpwood that year was 3,122,188 cords, of which approximately one-third was exported to the United States, presumably cut from freehold lands. In the face of this large exportation, valued at approximately \$8,000,000, and the exportation to the same country in the same year of 473,849 tons of wood pulp, valued at \$23,049,292, the provinces of eastern Canada are faced with a demand from United States interests holding Canadian timber limits, for a modification of the present restrictions upon the exportation of pulpwood cut from Crown lands.

#### DRAWING ON CANADA'S STORES.

Already the United States supplies one-fifth to one-third of its pulpwood requirements and over 11 per cent (1917 statistics) of its wood pulp requirements through importations from Canada. If these growing requirements are to be met continuously, in addition to meet-

ing the increasing demands for pulp and paper from Great Britain and other European countries, it is obvious that steps must be taken to retain our forest lands in a continuously productive condition. Canada is a pulp and paper country par excellence, and the amount of business she can do in the future will be limited only by the supply of raw material.

The importance of this viewpoint is also indicated in the matter of provincial forest revenues. Quebec, for example, derived in 1917 a revenue from her Crown timber lands aggregating \$1,568,157. The corresponding figures for Ontario were \$1,695,703, and for New Brunswick \$443,848. All these may be greatly increased, if adequate attention is given to maintaining the cut-over lands in a productive condition, and if sufficient care is given to the important matter of scaling methods.

In the solution of the problem, every consideration must, of course, be given the economic aspects of the situation, so that the remedies shall be practical from the viewpoint of the operator, as well as correct from the technical aspect. The problem is by no means solved, but there is at least great encouragement in the fact that it is being attacked by the combined efforts of both timber-owners and governmental agencies.

#### BEETLES ARE KILLING THE YELLOW FIR IN BRITISH COLUMBIA.

Dr. J. M. Swaine, Chief of the Division of Forest Insects, Dominion Entomological Branch, visited Victoria in the latter part of August, and conferred with officials of the Provincial Forest Branch with a view to securing provincial co-operation with federal effort in destroying insects noxious to timber.

Bark beetles, Dr. Swaine stated, had been killing the yellow pine in the interior for some years. The federal authorities, however, had been working out a suitable and practical method of control, the object being to secure, by proper logging operations, the removal at once of certain infected trees, to clear out the beetles and so prevent them from spreading into the green timber. Conditions in Stanley Park, Vancouver, Dr. Swaine asserted, had greatly improved following the adoption of methods of insect control by the Vancouver Park Commissioners, after he had made an exhaustive report some years ago.



Threading seedlings into planting boards in portable cabins.

## WORKING FOR POSTERITY

*By Allan Donnell, of the Editorial Staff of the Commission of Conservation.*

### Through Private Initiative a Start Has Been Made in Regeneration of Eastern Canadian Forests

Making posterity the goat was long a habit of municipal, provincial and federal governments in Canada. It provided an easy way for them to get utilities that they could not pay for and it prevented troublesome criticism by those who did the voting. Of course it was impossible to obtain posterity's assent to this practice, but that little democratic principle caused almost no concern. Surely a dutiful posterity would feel honored in being called upon to assist its forebears in obtaining luxuries that were beyond their means and, besides, if the former were lucky, it might have the use of the second-hand utilities in due time. So it became a common thing when a new street was deemed necessary to charge a generous portion of the cost of posterity. Or if political considerations suggested a railway through an unsettled section of country, or across the continent, posterity was blunderbussed into helping

to pay for it. Perhaps this delightful fashion of "passing the buck" might have been "put over" had not posterity's most honorable ancestors exploited and pillaged vast portions of the virgin resources which would be required to liquidate the debts of a prodigal past. Forests were slashed and burned with a recklessness that made Nero's little show look like a nickel movie. Inefficient farming resulted in the literal mining of the fertility from hundreds of thousands of rich farm lands. Inadequate methods of mining minerals and coal frequently led to the permanent loss of millions of dollars worth of these products. Even the fish of the sea and inland waters were wasted by the scowload because of insufficient markets, or because certain species did not appeal to the epicurean tastes of generations of improvident spend-thrifts.

Of course, it would be expecting too much to hope that such practices were only of the past. Inherited tendencies die hard. The iniquities of the fathers are often continued into the third and fourth generation. But Dame Nature has her own methods of making naughty nations be good. The truth in the story of the prodigal is as old as human history. Spendthrift nations, like spendthrift individuals, sooner or later come to the time when they must face about, admit their errors and seek a fresh start, or perish in their sins. In so far as the gifts of nature are concerned this turning about is synonymous with conservation, or working for posterity. It is the antithesis of the policy of charging the cost of the night's orgy to the future. It is simply recognizing that everyone must eventually pay in some form for his own fun.

#### A CHANGE IS COMING.

Fortunately, there are indications of just such a change of heart in the treatment of certain natural resources in Canada. A generation ago the vast spruce and balsam forests of Eastern Canada were considered to be inexhaustible. Because men wished to think so, it was the common opinion that good-natured, generous Nature would provide a new forest long before all the virgin stand was converted into gold. It was argued, therefore, that a very sizable spruce could be grown in about thirty years ago, natural reproduction would provide new forests in plenty of time. *No investigations had been made* of the growth of trees in Canadian forests. Instead, the work on European forest plantations which was not a parallel at all, as well as forecasts of natural reproduction in the Adirondacks, carried out by leading American foresters were applied to Canadian conditions. Time has shown that such applications were not in any way justified and as if to make the error still more glaring it is now known that the Adirondack estimates of twenty years ago were, like the report of Mark Twain's death, greatly exaggerated.

In addition, the appearance of hardwoods on cut-over lands, the effects of plant diseases and forest insects, and the awful wastage due to forest fires were left out of the reckoning altogether. The result is only an illustration of the futility of guessing where accurate, painstaking research should have been applied. Nature never unfolds her secrets to half-hearted, dilettante students, or to the unobservant woodsman. And so, although the day of Canada's virgin forests is already far spent, definite

action has at last been taken to carry out such essential studies in pulpwood forests. Naturally many years will be required to obtain conclusive results, for trees are not products of a single season.

#### PRIVATE COMPANIES TAKE THE INITIATIVE.

It is rather a striking circumstance that perhaps the most comprehensive studies now being undertaken in Canada are largely the result of private initiative. Forestry, on account of its long-time elements, has been viewed as being properly a state activity. But the governments concerned failed to take adequate action in time. Hence such companies as the Laurentide Company, the Riordon Pulp and Paper Company, and the Abitibi Power and Paper Company have commenced, in conjunction with the Commission of Conservation, a series of such studies on their pulpwood limits in Quebec and Ontario. Mr. Ellwood Wilson, forester of the Laurentide Company, and a close student of European forestry methods, has been a prime mover in this important work. Coincidentally, a policy of reforestation has been adopted. During the spring of this year the Laurentide Company planted approximately 1,000,000 seedlings and the Riordon Company 750,000. The greater proportion of these are Norway spruce grown in American nurseries from seed imported from northern Europe. The provincial nursery at Berthierville also furnished large numbers of these seedlings. It is unfortunate that native spruce seedlings could not have been obtained, for Norway spruce have never been grown except as ornamental trees in Canada, and their behaviour in forest stands is problematical. Close comparison of conditions in the natural habitat of the Norway spruce and those in Quebec encourage the hope that the imported seedlings will develop satisfactorily. A ready market could be found at the nurseries for seeds of the native spruces, but so far there has been no attempt at collecting them in a large way. Small areas of white and Scotch pine were also planted on land where the soil conditions seemed most favorable for their growth. The planting was done in rows four or five feet each way, by gangs of forty to fifty men with the same number of boys to "drop" the seedlings as the holes were made. Such gangs planted from 25,000 to 30,000 seedlings each per day during the short planting season in May. Judging from the results obtained on small plots in previous years, it is expected that from 75 per cent to 90 per cent of the seedlings will grow.



## A BIG NURSERY BEGUN.

One of the obstacles in the way of planting forests in Canada is the scarcity of comparatively cheap labor. In this particular the Quebec companies at least, possess an advantage, for they are in a position to obtain labor at reasonable rates of wages. The planting season is necessarily short, so the companies endeavor to provide their labor with other work during as much of the year as possible. To a limited extent the forest nursery at Proulx, Quebec, assists in this, although, of course, the outstanding purpose of the nursery is to ultimately supply the annual planting requirements of the Laurentide Company with, possibly later on, that of other companies as well. This nursery

of moisture. The seeds were planted in rows two or three inches apart in small beds, much the same as seeds in a vegetable garden. An abundant water supply was obtained by pumping water from nearby springs into a large tank, from which it was piped to all parts of the nursery. Irrigation was used but sparingly in order to increase the hardiness of the seedlings. The tender young plants were kept carefully shaded from excessive direct sunlight and the beds were covered with canvas and straw throughout the winters.

## HOW THE SEEDLINGS ARE HANDLED.

During the second year the tiny seedlings are carefully "lifted" from the beds and transplant-



Plantation four years old in a Quebec sand area.

was established about three years ago and is at present under the general supervision of Mr. Ellwood Wilson with Mr. R. W. Lyons, a graduate in Forestry at the University of Toronto, as resident forester in charge.

Twelve acres of land were carefully stumped and the ground thoroughly cultivated. Owing to the inferior nature of the soil, fertilizer was necessary and was obtained by mixing farmyard manure and bog-muck in equal parts and allowing it to stand under cover for a year before it was applied to the land. This produced a well-rotted fertilizer which mixed well with the soil, without leaving the latter too open and, therefore, subject to too ready evaporation

ed in rows ten inches apart by five inches in the row. This transplanting requires careful supervision. As it is a much slower operation than that of "lifting," the plants are "heeled in" in wide, shallow trenches as soon as they are taken from the beds. This makes it possible to keep the roots thoroughly moist, without delaying the "lifting" process. The transplanting is done mainly by boys and girls with the aid of a few men to dig and fill in the trenches. The seedlings are carried from the heeling-in beds to portable cabins placed near the transplant beds. Here they are "threaded." For this purpose planting-boards, about eight feet long and five inches wide and provided with

notches on one side at intervals of five inches, are used. A seedling is placed in each notch with the roots projecting over the edge of the board. A second board is then clamped on snugly and a boy, or a girl, conveys them to the trenches where the earth is pressed firmly against the roots, the clamps removed and the process repeated. The portable cabins are necessary to protect the tender seedlings from too much sun drying. No seedlings are removed from the nursery for final planting until they are at least three years old.

#### PLANTING STOCK AVAILABLE.

Already this nursery contains 3,500,000 seedlings and transplants, chiefly Norway spruce, white pine, jack pine and Scotch pine and balsam fir, with a few other species intended mainly for ornamental purposes. About fifteen acres are being added to the nursery this year and in 1921 it is expected that the company will be able to obtain from it two million transplants and from then on to plant out each year at least that number; nearly twice as many trees as are removed to feed the pulp mills at Grand Mere. It is not unlikely that other companies will co-operate with the Laurentide Company in this work, so that in a few years the Proulx nursery will play an even more important part in reforestation in Quebec.

Such a policy is a complete reversal of the old plan of making galley-slaves of posterity. Men now living can hardly hope to harvest the trees that they plant. The whole embodies a principle that merits adoption by everyone who is developing our natural resources, for such resources are not only *ours*, but they are the property of the future as well. When that is realized, posterity will have greater reason for pride in and gratitude toward its forebears and, if necessary, will pay some of their little bills with better grace and fewer grimaces.

#### PULPWOOD AREAS DISCOVERED BY AIRPLANE

A recent despatch from Curling, Newfoundland, states that cruising in airplanes over Labrador disclosed great timber lands, from which millions of cords of pulp wood could be cut and rolled to streams for direct shipment. This information was given out by members of a Boston expedition which spent a month in Labrador and which landed at Curling from the steamer Grenville on the return journey. The

head of the expedition was Captain Daniel Owen, R.A.F.

The expedition, which included in its equipment three airplanes, and comprises a personnel of twenty persons, among them five aviators, operated seventy miles north of Battle Harbor. Two million acres of timber land was explored by air and by the ordinary methods of timber cruising. Picture staken from the air were said to show dense growths of pulp material in such manner that the most available places could be located readily. This use of the airplane was looked upon as opening a new field for commercial aviation. The planes cruised inland for more than 100 miles, flying at heights of 2,000 to 9,000 feet.

#### ROADSIDE TREES

##### Some Aspects of the Subject

##### *Their advantages—*

As memorials to our soldiers and sailors.

As making our highways and byways beautiful.

As furnishing shade and preventing dust.

As improving certain kinds of roads.

As preventing growth of roadside weeds.

As producing food for man, beast, and bird.

##### *How to secure them—*

Reserving and protecting trees both young and old already growing.

Planting young trees.

##### *Where to secure them—*

From the fields or woods.

From reliable nurseries.

##### *Desirable and undesirable kinds—*

Desirable: Long-lived, beautiful trees, such as oaks, elms, ashes and hard maples.

Undesirable: Short-lived, quick-growing trees, such as cottonwoods or soft maples.

The newspapers of the United States consume 2,000,000 tons of newsprint every year, of which Canada supplies, approximately, one-fourth.

The total annual output of the Canadian pulp and paper industry exceeds in value \$85,000,000. It gives employment to 25,000 individuals. Its annual payroll exceeds \$15,000,000. It has sent more than 3,000 men to the war.

## FIRE PROTECTION ON CROWN LANDS

*Address by Mr. D. Roy Cameron, District Inspector of Dominion Forest Reserves in British Columbia, before the Western Forestry and Conservation Association, Portland, Oregon, Oct. 6, 1919.*

### How the Dominion Forestry Branch Organizes to Meet the Fire Hazard—The Results

In addressing an audience of this kind it might be pertinent to explain at the outset what is meant by the term "crown lands."

In the British Empire all unalienated lands are legally considered as being the property of His Majesty the King. In the case of self-governing peoples within the Empire such lands are designated as being lands of His Majesty in the right of the Dominion, Commonwealth, Province, or State as the case may be, and of course the administration and disposition of such lands are entirely under the jurisdiction of the governments concerned.

In the Dominion of Canada we have provinces which own their own lands and public land provinces in which the Federal government controls the lands; similar to conditions extant as between private and public land states in this country.

The Dominion Forest Service, with which I am connected, deals with the administration and protection of timber on lands in the right of the Dominion of Canada. The province of British Columbia owns its own lands, but, as a result of the carrying out of one of the terms of Confederation, the province deeded certain lands to the Dominion including a strip twenty miles on each side of the Canadian Pacific Railway known as the Railway Belt, which area comprises the country under my jurisdiction. This strip, containing some eleven million acres, is in reality a section right across the province. It contains representative areas of practically all the timber conditions to be found on the northern Pacific slope, including the heavy rain forests of the coast proper, the yellow pine, semi-arid region east of the Coast range, and the secondary rain forests of the eastern ranges, where cedar, hemlock, spruce, and white pine are the principal commercial species. Being the area first settled, due to its relation to the pioneer railway line, it holds the densest population and consequently has perhaps the highest fire risk in the province.

Being practical-minded men, I presume you will be more interested in a statement of what has been accomplished and what remains to be done to insure adequate forest protection, than in a mere statement of the organization of our service. However, in order that you may have some idea of the nature of our activities it is necessary that I should say a few words with reference to our organization and the status of the lands with which we have to deal.

#### CANADIAN TIMBER LANDS NOT ALIENATED.

In the first place the timber lands under Dominion control, and the same may be said of provincial lands, have not been alienated on disposal of the timber thereon, as has been so frequently the policy in the United States.

The Dominion procedure has been to issue renewable licenses to cut timber on which the licensee pays a yearly ground rent and a royalty per thousand at the time of cutting. On this basis you will see the government retains a direct financial interest in all uncut timber to the amount of the royalty collectable. For this reason the protection of timber lands has remained a governmental function, so that we have not the development of private timber protective associations found here. Indeed on Dominion lands, with which alone this paper deals, the government assumes full responsibility and levies an annual charge of half the cost of protection against the timber licensee based on the proportion of his holdings to the total area protected.

Naturally only the more valuable stands of accessible merchantable timber have been taken up under license, approximating 11.5 per cent of the total area of forest lands. On the remainder the timber is still the property of the Crown.

Of the total area of unalienated lands in the Railway Belt approximately 1,760,000 acres or 18 per cent have been set aside as permanent forest reserves similar to the national forests of the United States, and some 720,000 acres or 7.4 per cent in addition are established

as Dominion National Parks. These last are not under the jurisdiction of the Dominion Forest Service.

#### BASIS OF ORGANIZATION.

The legal basis of our administration is, so far as forest reserves are concerned, a Dominion Forest Reserve statute, and regulations established thereunder: Outside of reserves, Dominion forest officers enforce the British Columbia Forest Act. Under an arrangement made with the provincial government the Dominion service has taken over the responsibility of fire protection on alienated lands within the Railway Belt, and our men issue the brush-burning permits required by the Provincial Act under special *ex-officio* appointments as provincial fire wardens. The only exception to this is in the case of certain long-settled areas in the lower Fraser Valley, where exemptions from permits have been granted.

In conformity with the status of the lands protected the Dominion Forest Service is separated into two main divisions, namely a forest reserve organization, similar in plan and functions to the United States Forest Service, and a fire ranging organization which, as I have said before, replaces the private protective organizations found in this country. Distinct field organizations have been built up in each of the public land provinces, but the general supervision of both is united in the office of a District Forest Inspector in each province. In addition an inspection service is carried on of railway patrols conducted by the railways themselves under the orders of the Board of Railway Commissioners, and the District Forest Inspectors are appointed officers of the Railway Board with wide powers, for this purpose.

#### QUANTITY AND CHARACTER OF TIMBER

The total stand of timber in the Railway Belt is estimated by the Canadian Commission of Conservation to be approximately twenty-one and a half billion feet. The important commercial species follow in the order of their occurrence:

Douglas fir	31 per cent.
Red cedar	26 " "
Western hemlock	14 " "
Spruce (Englemann and Sitka)	13 " "
Yellow pine	5 " "
Balsam (several species)	4 " "
Lodgepole pine	3 " "
Western white pine	2 " "

Owing to the proximity to settlement and transportation the forests in the Railway Belt are particularly valuable in view of their strategic position with regard to the further development of the timber industry in British Columbia. The Dominion Forest Service realizes the responsibility laid upon us to see that all possible protection is given these resources.

These then are the conditions under which we operate. What then of our record? Systematic fire protection was inaugurated in 1912 when the first forest service office was opened. We did not get into our stride before 1914 and subsequently have carried on under the double impediment of decreased allotments and absence of practically the entire supervisory and a considerable percentage of the field staff overseas. Six of our men made the supreme sacrifice for liberty and justice.

#### THE FIRE RECORD.

For the five years, 1914 to 1918 inclusive, the average number of fires reported was 375 with average percentage of causes as follows:

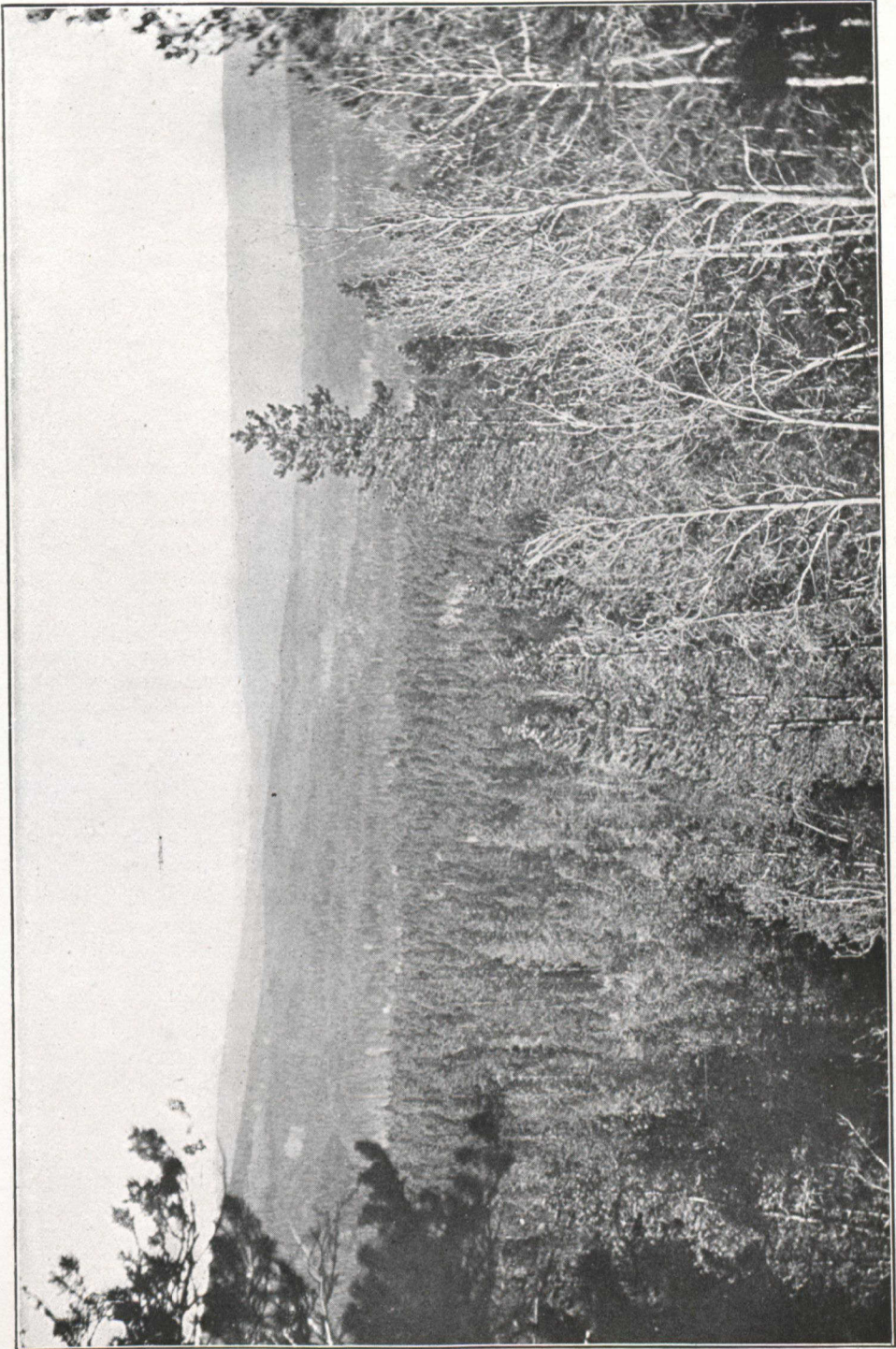
Unknown	27.5 per cent.
Campers	20.0 " "
Lightning	12.0 " "
Railways	12.0 " "
Settlers burning	11.5 " "
Saw-mills logging	6.5 " "
Incendiary	3.0 " "
Careless smokers	3.0 " "
From U. S. A.	2.0 " "
Miscellaneous, known causes under 1 per cent each	2.5 " "
	100 " "

The average proportion of large to small fires was 17.5 per cent.

The occurrence of these fires gives an index of the nature of the fire hazard in a normal season. The average is as follows:

April	2 per cent.
May	16 " "
June	13 " "
July	23 " "
August	24 " "
September	19 " "
October	3 " "
	100 " "

The May fires usually come early in the month during a period of warm dry weather which is generally followed by intermittent rains until about July first. The ensuing summer heat, normally unbroken by rains of any conse-



What the lookout man sees from his tower. Lodgepole Pine forest Western Canada.

quence, induces a cumulative hazard which increases in intensity until early September when early fall rains may be expected. These are followed by another dry period, but the danger is decreased by longer nights, greater humidity and lower average temperatures. Considering the Railway Belt as a whole the fire season terminates usually more through decreased temperature and increased atmospheric humidity than by reason of heavy rains.

The total area burned over during the five year period amounted to 133,344 acres, or an average of 26,670 acres per year, which works out at approximately one-quarter of one per cent of the total area patrolled. Of this area an average of 4,360 acres was merchantable timber, loss of which has averaged approximately twenty million feet B.M. per year, or one-tenth of one per cent of the standing timber. Young growth has also been destroyed at the rate of approximately 10,000 acres per year. The remainder of the burned area has been in slashings, old burns, grass land, etc. Loss of private property has averaged something over \$10,000 per year.

To obtain these results we have spent on patrol work an average of \$64,000 per year which works out at .64 cents (sixty-four one hundredths of a cent) per acre. Improvements have cost \$15,900 per year or .16 cents (sixteen one hundredths of a cent) per acre, so that the total expenditure has averaged eight-tenths of one cent per acre per year.

The average area of the district patrolled by one man is, in forest reserves, 88,000 acres, and in the fire ranging organization 107,000 acres.

#### FIRE FIGHTING EQUIPMENT.

These figures are in proportion to the degree of protection afforded all around which is about 25 per cent more intensive on forest reserves than outside. On the reserves our protection plant is nearing completion. It includes ranger headquarter buildings, cabins, tool caches, roads, trails, telephone lines, and lookout stations. Of the latter, two are equipped with Osborne Fire Finders, the success of which is marked. As soon as maps of sufficient accuracy can be secured the remaining stations will be supplied with this instrument. Our plans call for three additional lookouts which will complete the detection system for our present reserve area.

These lookouts naturally serve the fire ranging districts outside the reserves as well and owing to the fortunate presence of a very complete

system of rural telephone lines also owned by the Dominion Government, they are of extreme value. Even at the present time our detection system is on a more efficient basis than our suppression, which needs additional personnel and further organization.

We believe in a national forest policy as the best means to secure adequate protection and proper administration of our forest resources on a permanent basis. Our policy aims at development based on the continuous extension of the areas under national forest, until practically all of the absolute forest land in the Railway Belt is included. The fire-ranging organization is properly considered as a temporary stage in the development of forest policy, holding the line until public opinion, which it serves to help awaken, will back the forest service demands for further permanent reservations. The fire-ranging organization is also a useful preliminary training ground for developing the personnel which extensions in national forests will require. In this connection I might state that we have specialized to a very large extent on returned soldiers in accordance with our general Canadian policy that they shall be given preference in Government appointments. Through an arrangement made with the Department of Soldiers' Civil Re-establishment, a forest ranger course has been established in Vancouver, a majority of the graduates of which have entered our service. Their records have been gratifyingly satisfactory, due, in large measure, to the valuable nature of the services given by their instructor, Mr. E. J. Hanzlik, Forest Examiner of the United States Forest Service at Seattle.

#### THE 1919 SITUATION.

Now, as to the 1919 situation which I have not discussed thus far. In the first place I must admit that our records at the time of writing are not compiled sufficiently to give a satisfactory summary. This is due to the fact that our worst troubles were concentrated in an area about fifty miles wide in the region of the Shuswap lakes all within one fire ranging district, where the expenditure on fire fighting will run close to \$50,000. Every ranger has had a series of fires to contend with all burning at the same time, and proper reports have not yet been received. This locality was practically without rain from June until August 31st, during which period, in addition, temperatures were above normal and dry lightning storms were frequent. One such storm caused twenty-six

separate fires, largely in timber. Also, most unfortunately, high winds at night were prevalent, so that the increased humidity usually encountered was lacking and fires progressed steadily night as well as day. As a result conditions got out of control for a time and con-

siderable destruction ensued. Elsewhere, despite adverse weather conditions, the situation was kept well in hand although we were forced to spend money freely. Altogether our fire fighting expenditure will probably exceed \$64,000.

## THE RETURNED SOLDIER AND FOREST JOBS

By Raphael Zon, U. S. Forest Service.



### Transient Life of Timber Areas Under Ordinary Exploitation Creates Transient Towns and Homeless Workers



The right development of our vast natural resources offers a field of opportunity to the returning soldier. In the past the use of our natural resources has failed even more than land settlement to develop permanent and contented communities. The mining camp, the lumber camp, and the construction camp, with their shifting population, are typical of the transitory character of the industries themselves. There is no more familiar sight in the region of our greatest development of natural resources than the "blanket stiff" going from camp to camp seeking a better job. The opportunities of the future, both for the returning soldier and for the people who live in the regions where there are great natural resources awaiting development, lie in the establishment of permanent industries and permanent communities. In mining operations, permanent communities providing healthful living conditions could be established because the life of the mines extends, as a rule, over a long number of years. This is particularly true where mining is carried on in the neighborhood of agricultural lands. In the case of the forest, which is a renewable resource, it is perfectly feasible to create healthy and permanent towns if the lumber industry itself is stabilized.

The lumber industry as it is at present constituted offers small opportunity for permanent and contented communities. It has passed over this country from ocean to ocean in a series of waves. It originated in Maine, moved to Michigan in the seventies, completed its highest development in the Lake states in the nineties, and is now flourishing in the southeast. There

it will be exhausted in a few decades and will then centre on the Pacific coast. As a rule it has not left permanent communities in its wake, unless the land was exceptionally suited to agriculture. The industry has been, and still is, conducted as a type of mining. A valley or logging unit is worked out; then the operation shifts to another location. In this way one valley after another has been cleared of timber and left empty and desolate. One region after another has been depleted of its forest stock.

Timber mining, being essentially migratory, breeds migratory tramp labor. Since the lumberjack must live in a camp and the man with a family is excluded as a worker, the lumber industry is an industry of homeless men. The conditions which are produced by the present methods of timber mining are well summarized in the report of the President's Mediation Commission:

The forests and lumber mills of the Pacific Northwest have a predominant war importance. The raw materials they furnish are indispensable to the execution of the aircraft and shipping programmes of the government. The entire industry employs about 70,000 men. The labor conditions in the lumber industry have their reflex upon all industry in that territory.

Social conditions have been allowed to grow up full of danger to the country. It is in these unhealthy social conditions that we find the explanation for the unrest long gathering force but now sharply brought to our



A big aid in forest protection. Corduroy road across a muskeg.

attention by its disastrous effect upon war industries.

Partly the rough pioneer character of the industry, but largely the failure to create a healthy social environment, has resulted in the migratory, drifting character of the workers. Ninety per cent of those in the camps are described by one of the wisest students of the problem, not too inaccurately, as "womanless, voteless, and jobless." The fact is that about 90 per cent of them are unmarried. Their work is most intermittent, the annual labor turnover reaching the extraordinary figure of over 600 per cent. There has been a failure to make these camps communities. It is not to be wondered, then, that in too many of these workers the instinct of workmanship is impaired. They are—or rather have been made—disintegrating forces in society.

The Commission found that the life of the average camp did not exceed three and one-half years. With migratory forest industry it is financially impossible to construct residences for workers, because the annual depreciation charges of 25 per cent or more would be far beyond the ability of the worker to pay from wages. On a \$1,600 home the annual charge would be \$400 for depreciation, and average of about \$50 for interest and perhaps \$50 for

maintenance, a total of \$500 per annum. This means a monthly rental charge of between \$40 and \$50, which is far beyond the reach of the unskilled worker as he is now paid. With the continuous operation extending 25 years or more, depreciation on such a residence would be reduced to about \$64 per annum, and since maintenance and interest would not be much affected, the annual charges would be only \$164, or less than \$14 per month.

#### THE IDEA OF PERPETUATION.

These unsatisfactory conditions in the industry can be rectified by transforming it from an industry which uses the forest as a mine to one which treats it as a renewable resource. Such a transformation is difficult on private lands. A few private owners may be found now ready to change their method of handling their timber resources and thus provide opportunities for permanent communities. As a rule, however, such a transformation will not take place without the people first securing control of the large timber holdings. For the purpose of providing for the returned soldier we must, therefore, look to the national forests. These afford immediately opportunities for creating permanent forest communities in connection with logging operations on them. Assuming that only two-thirds of the forest area within the national forests, or 100 million acres, is actually forest-bearing land, this area, when



fully developed could, at a conservative estimate, support a permanent population of 300,000 families, allowing each family \$800 a year in wages, or about 1,200,000 persons in all.

The management of forest resources on a permanent basis is even less of an experiment than rural development with government aid. In Europe sustained production of the forest forms the backbone of an economic system of small holdings, especially when dealing with poor agricultural land. In Switzerland a forest of 10,000 acres with an adjoining area of 3,000 acres of agricultural land supports a prosperous permanent community of 1,500 people. About 81 per cent of all the workmen employed in the woods and mills in Europe are small holders of land within or adjacent to the forest. The parishes of La Teste and Caseaux in the southwestern part of France in the Landes, which have been reforested for the last sixty years, contained before reforestation a population of 1,600 people. Since the forests were established these parishes support a population of 14,000.

There are now about 12,000 lumberjacks composing the tenth and twentieth Forest Regiments. There must be also a large number of lumbermen in the general draft furnished by the lumber industry. These men, when they return to civil life, will naturally look for work

in the woods and, having learned in France the benefits derived from the stability of the forest industry, will expect similar practice here.

The task of organizing our national forests into small units on a strictly continuous yield basis is not as difficult as it may seem and is not beyond the strength of the existing organization in the Forest Service. It does not mean tackling the regulation of 100,000,000 acres of forest at once, but organizing here an area and there an area as the ever-widening circles of economic life come into contact with them. Intensive forest surveys are ahead of, rather than behind, present needs. The objection that the national forests do not always control sufficiently large units for sustained management should not present an insurmountable obstacle because co-operation of the public and private owners in the management of natural producing units can be secured in most cases on a basis satisfactory to both. The further objection that the lumber industry is overdeveloped and it would be economically unsound for the government to undertake the construction of new sawmills is not valid. The overdevelopment of the lumber industry does not prevent the constant appearance of new sawmills, often operating in government timber. In many cases government control of private logging operations on the national forests would be all that would be needed, the government merely pro-



Always on the job. Ranger's house in the centre of a western reserve.

viding ahead a series of cuttings within definite periods and locations, and enforcing measures essential to the maintenance of permanent communities. The logging and milling operations can be carried out as at present under timber-sales contracts.

Lumber companies which operate on a large scale naturally are interested especially in the distant national or even international markets and, as a rule, pay little attention to the local needs. That this policy works to the disadvantage of local development is shown by the experience of many co-operative agricultural organizations, fruit and orange-growing associations, etc., which, although surrounded by public and private forests, find it difficult to secure box material for packing purposes except at very high prices. The government would be able to ameliorate this condition.

The railroads of the country now under government control are using in the neighborhood of six billion feet annually. Our army and navy also use large quantities of wood. Much of this demand could be supplied from the national forests. If the public forests can satisfy the government needs efficiently and economically, and at the same time broaden the opportunities of the people and provide conditions for permanent forest communities, it would be contrary to the national interests if they were not used for that purpose. Such use will merely serve as an illustration of how the

forests in private hands can also be handled so as to widen, instead of gradually to narrow, the opportunities of labor in the industry.

#### TOWNS THAT STICK.

The basis for each forest community would be the area within whose radius an annual cut may be permanently maintained. A sawmill suitably located within the area and continuously supplied with timber from the growth on land tributary to it would form the basis of a sawmill community which could remain permanently in one location. The logging camps which may have to change from time to time would still form a part of the entire forest community organization. The lumberjacks who are now in France engaged in logging and milling operations on government and private forests would be admirably fitted for similar logging operations on the national forests. Possibly a great deal of the logging equipment which is the property of the United States Government may be available upon the termination of the war for this purpose.

The shortage of pulp and paper in this country and the presence of a large supply of pulp timber available on the national forests opens another way for meeting the unemployment problem. The pulp industry, more than the sawmill town, provides opportunities for creating large village communities with healthful social life.

---

## LOSS OF LIFE THROUGH FOREST FIRES

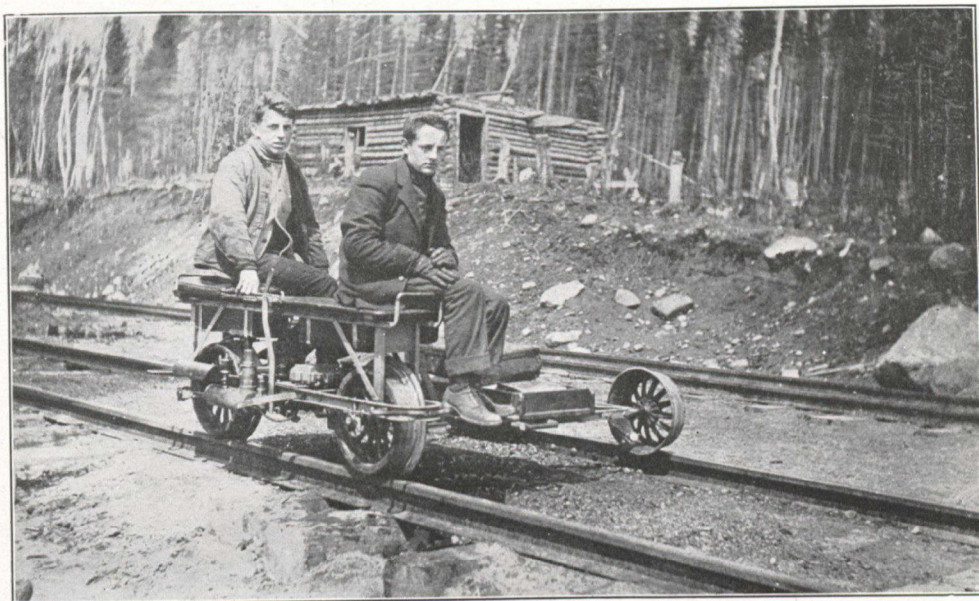
---

W. M. Graham, commissioner of Indian Affairs, has received a report from the Onion Lake district, and has been informed that eight Indians were burned to death, and fifteen others injured, some of them seriously. The report indicates that the sufferers are recovering with the attention which has been given them. Supplies are being rushed to destitute Indians whose homes were destroyed by the forest fires.

The party who made the trip to Cold Lake and Onion Lake in the reports sent to the commissioner, state that the fire sprang up so suddenly that the victims had no chance for their lives, being caught in the burning inferno without a hope of getting out. The injured

managed to rush to a little lake nearby and jumped in the water to put out the fire which had already started to consume their clothes. Even in the water the flames did their deadly work, for they swept close and those unfortunates who were near the shore in shallow water had to dip under to avoid being burned. One of the Indians in the water who had been badly burned before reaching the lake nearly perished but was assisted by a young girl, who kept rolling him in the water.

Supplies have reached the sufferers and at present they are well cared for. More supplies are being sent to them, special delivery being effected by hiring farmers of the district to haul the necessities on the overland trail.



Chasing spark-throwers. Railway velocipede for following up trains.

## THE RIGHT WAY TO CUT THE FIRE LOSS

The following excerpt from a recent report by Mr. A. B. Connell, Supervisor of the Pasquia Forest Reserve in northern Saskatchewan, will be found of particular interest and significance in view of the heavy fire losses sustained during the past spring on all the neighboring forest reserves in that part of the west, and confirms the wisdom of thoroughly equipping the reserves with protective improvements so as to embody to the fullest possible extent the saving principle of prevention.

### SUMMARY REPORT, PASQUIA RESERVE, SPRING FIRE SEASON, 1919.

"The spring fire season on this reserve is now over, and it proved to be the most dangerous season since the reserve was organized. A large number of fires started at different times, but the staff succeeded in holding each fire in check and in getting it out before any material damage was done to the reserve.

"The fires started from a variety of causes, which is natural, when the country was in such a dry condition. In fact the starting of fires in such a dry season is difficult to prevent, but our experience this year has proved beyond doubt that all fires which start can be successfully handled and put out before any damage

to the reserve results, provided the organization is properly maintained. It was necessary to fight several fires at some distance from the reserve to prevent them getting out of hand and coming into the reserve, and the expense of handling all the fires was rather large. The fact that a disastrous fire was prevented however, when conditions were so unfavorable justifies the expenditure, which, after all, will be nearly covered by the revenue from the reserve for the present year.

"I have been expecting and preparing for just such a season as this ever since the fire season of 1915, when several townships in the reserve were burned owing entirely to lack of organization and preparation. This season was much more dangerous than that of 1915, and I ascribe our success in handling the situation to the following factors:

1. The improvements constructed during the past three years, particularly the Mistatim Telephone Line, which has paid for itself many times over this spring, and the lookout towers and trails. Of all the improvements the telephones proved to be by far the most useful as by their aid it was possible to get at the fires immediately.

2. The organization of the ranger staff. The proper location of the ranger headquarters and the providing of one or two assistants on each district was a great help in the handling of the fires. The greatest credit is due to all concerned for the manner in which the work was handled.

3. The equipment purchased. The rather complete equipment which has been supplied to the reserve was one of the main factors in holding the fires in check. The tools on each district were found to be entirely adequate for all demands and all of our crews were easily, completely and quickly outfitted. The motor velocipede which has been in use for four or five years and maintained in good repair proved indispensable, and particular mention should be made of the service rendered by the

gasoline pumping engine received last fall. This pumping unit proved to be invaluable and in one case saved the situation, when there was danger of both Hawkes mill and the village of Hudson Bay Junction burning.

"Finally, I have no doubt whatever but that the worst of fire seasons can be successfully handled on this reserve provided that the temporary patrol staff is greatly increased and the improvement programme is carried on from year to year as in the past. In a season such as this at least three extra patrolmen should be placed on each ranger district and used on improvement work, when the fire season is over. I believe that the fire situation would be better and much more cheaply handled by this means, i.e., by prevention, and better satisfaction obtained all around."



The portable telephone in operation. One of the greatest aids in forest protection.

### "RECREATIONAL FORESTRY"

Syracuse, N.Y.—A radical innovation in vocational education was announced recently by the New York State College of Forestry at Syracuse, when plans were made public for the inauguration of the first course ever given in America in recreational forestry. Students will be given technical training in the proper use of the nation's forests for camping, touring, hunting, fishing, and general recreational development. No such training has ever before been given,

but scientific use of the forests as playgrounds has come to be a demand, and New York will be the first state to offer such a course.

This announcement was made upon the return to Syracuse of Prof. Henry R. Francis, after he had completed a 10,000 mile tour of the forests of the great western states, studying the problems of recreational forestry, as a basis for formulating a course of instruction. On this tour he travelled 8,000 miles by rail, 1,200 miles by auto, and 650 miles on horseback or foot.

## THE FORESTER—A SKETCH

*An address presented at a meeting of the Sault Ste. Marie Branch of the Engineering Institute of Canada, by W. F. V. Atkinson, Forester.*

What is a forester? A forester has sometimes been called a "tree farmer" and failing a more concise description we will let it go at that. The farmer is a producer, so is the forester. The farmer produces at a low cost or he cannot subsist by his labors. To do this requires a knowledge of his work. The more knowledge he has, and the more use he can make of that knowledge in his work, the better success he is. He needs to know his soil, climate, irrigation, drainage, and fertilization, the most suitable grains, roots, and other crops including fruits and fruit trees, their various qualities, productiveness, and diseases, methods of preparing land for them and harvesting, and lastly the available markets and how to get his products to them. In all this work he has to deal with human nature, machinery, transportation, trade and its requirements. If he is an idealist he can also grow for his personal use and satisfaction some things not necessarily marketable.

The general lines are somewhat parallel to forestry, but forestry is not, as is frequently supposed, confined to arboriculture or even to silviculture. A forester though often an idealist has from his training been taught that values are the final test whether these are present or future. His whole training has been the apportioning of these values correctly, and the allotting to each subject its proper place in the scale and expressing these in dollars and cents. For the purpose of this sketch it is not necessary to go into the training and studies required by a forester at the university, but rather to deal with his general work.

The chief object of his work is to produce the woods required by trade at least cost and to continue to do so. Some of the woods now in demand were of little or no market value years ago, and some which are at present of no market value will undoubtedly be of value in the future. Thus, the history of forestry including the wood trade is essential. The first work required in the practice of his profession is to locate the various species of trees in the district placed under his charge, and to learn how these are producing wood and the conditions affecting this production. This necessitates surveys of land including topography, and of soil, and also clim-

atic records, hence, the necessity for accurate history and current records of meteorological conditions. Type maps showing the production of certain species and their inter-relationship is a second step. The accessibility of woods required to the means of transportation, such as roads, streams, and railroads, and the respective cost of each method is part of this study, as well as how to eventually harvest those trees which are not under present conditions and situation commercially available. A course in logging practice in the woods, which can only be acquired by personal experience in the actual work both in the camps and on the rivers, is necessary. If the local conditions should necessitate a change of methods when his work takes him elsewhere, his experience and training will most likely enable him after close observation to recommend improvements in road-making, tools, and camp paraphernalia generally, all tending towards the most economical methods. Thus, logging engineering is one line of a forestry training, and includes a certain class of railroad construction, steam and cable hauls in some parts of the country, road and bridge building, as well as the more primitive methods. Stream flow control and improvement, for which actual experience in river "driving" is necessary, is a further part of this work. The various methods employed in logging from the tree to the mills differ in each locality. Custom and the methods employed for many years are retained with a wonderful tenacity by the workman, and new ideas take a long time to appeal to those who are really skilled in local methods. I have seen suggestions made ineffectively time and time again and later, when adopted, become as much the logger's creed as their former methods were.

But if the administrative position is the forester's lot, he will have to leave this most fascinating part of the work for the larger idea. The engagement, control, and supplying of logging gangs is not the object of his training, but he can assist this work by tactful co-operation with the superintendents and foremen, and should know that the logging outlay is proportionate to the quantity of wood to be produced in each operation, amongst other matters, that the cost of buildings, and particularly roads



Lake Joseph, Muskoka Lakes. Grand Trunk Railway System.



Head of Fraser Lake, Central British Columbia. Grand Trunk Railway System.

and bridges, are proportionate to the required tonnage of same, both immediate and future. I believe that a great change will be made before many years in the methods of control and direction of logging operations.

Amongst the forester's first duties is to know if the demand for certain species will be regular and continuous, and whether this demand is not for such quantities and dimensions as are inimical to the best results from the available source of production, that is to say, the forest under his charge, and what percentage of loss is entailed in producing the specified timber, in the forest, in transportation, and in the manufacture. This entails inspection at all stages and places of the work.

Measurements at all points therefore are of interest and these are not only of bulk, board measure, cubic feet, cords, or otherwise, but also of the weight of the material.

If the demand is fixed as to quantity and quality and defined as to species, then from his type maps and topography, growth studies and volume tables, he can fix working plans of the areas, and for the required quantities, with regulations as to selection methods in sizes and species. The plan of a total clean-up (clear cut) is not usual in this country and thus like other drastic methods must be undertaken only when the whole forest policy is fixed, including tenure, dues, rents, taxes, interest rates, and prospective costs at all stages, etc.

If the annual demand is not greater than the area can produce under accelerated and improved growth conditions, he can fix upon rotation cuttings of the required timber; growth increment in untouched forests is not often greater than the natural losses. A rotation of cuttings under the present conditions in this country is not a fully accepted idea by the timber owners, but it is the ideal, and it is the method accepted in countries where foresters are considered a necessity. Where the cuttings must be annual, as is usual in Canada, and the production required is large, timber areas must be extremely large to establish a rotation; thus protection and assistance to the immature crop becomes an important branch of the work. In this respect drainage, light by thinnings, and protection from fire are amongst the larger issues. On these points many interesting facts which have been noted would surprise the non-technical observer.

Again, the immature crop can be augmented by judicious planting, making a greater yield per acre, and per mile of haul. This should only be done for commercial purposes where the soil is suitable and the logging inexpensive. Further, there is the method of acquiring really suitable ground for a new forest of the required species, laying it out in roads and sections for the purposes of cheap logging, and afterwards planting it with the most suitable species in point of growth rapidity of the wood required for the purposes in view. Seeding in the forest for this purpose is not sufficiently certain or rapid to be satisfactory.

The introduction and use of new kinds of wood in the different trades is another line of investigation. Our forest products laboratories have helped the forest administration very greatly in this respect. This work is also a line of specialization.

From these remarks it will be seen that forestry opens many avenues for work and study; that it aims like the farmer to produce material required for the use of man. The number of cubic feet of wood used (per capita) is increasing continually. The exact quantity, however, is hard to estimate in a country like this which exports large quantities of the manufactured products of the forest, and where waste, owing to ignorance of the rapidly diminishing supply, is so great.

The forester is continually in touch with the civil engineer, as these few remarks show, and from his work and accumulated data has also special advantages in regulating the waters in the rivers draining his districts, and which supply not only the means of transport for such woods as will float, but also supply the power where his "civil" confrere has constructed his mills or power-house. The maintenance or change of forest cover are no small factor in stream control. A great deal of the information acquired by the forest engineer should be of use to civil engineers undertaking new developments, and those will generally be found minutely and carefully charted as the use of curves for tree growth, volume tables, and other purposes is the general method. Speaking for the profession I may say that co-operation, lucidity, and professional etiquette are points on which all foresters are united.

## BIG COMPANIES TRY OUT FORESTRY METHODS



### Establish Experimental Plots to Test Local Value of Many Logging Schemes



Propaganda for the better treatment of our woodlands has always carried a prominent and noteworthy characteristic in the sympathy and co-operation of the lumbermen. The meeting of foresters and lumbermen in frank and open discussion of their problems invariably excites comment of admiration and envy from the visiting foresters from other countries. A striking characteristic has been friendly co-operation—in discussion. Foresters and lumbermen have met and talked and made resolutions on the advisability of doing certain things for the benefit of the forest. They have separated to meet again next year to talk and make more resolutions. They have been doing this for thirty years and they have accomplished much in an educational way. But in reality the forests can be improved only by action in the forest, not in the office chair, not in the hotel corridor, not even at the banquet table. However, the more progressive foresters and lumbermen have realized this and so it has come to pass that theories are to be put into practice. Indeed, the only way to determine whether or not a theory will work is to try it—a self-evident fact lost sight of by other men than those interested in the welfare of the forests.

The Bathurst Lumber Company in co-operation with the New Brunswick Forest Service is carrying on experimental cuttings on 500 acres of undersized spruce on the Nipisquit river. A portion of the area is being cut under the strip system. Strips from one chain wide to three chains wide are cut clean, with strips two chains wide between, uncut or lightly culled. A portion is being cut clean in more or less circular patches of various sizes, comprising one-quarter acre to two acres in extent. Other portions are being thinned by cutting to 10, 8 and 6 inch diameter limits respectively. The slash on one-half the area of each cutting system is to be burned and on the other half unburned. The Provincial Forest Service furnishes a forest engineer who, in co-operation with Mr. Lordon, of the Bathurst Lumber Company, will carry out the plans of the cutting.

The Laurentide Company in co-operation with the Quebec Forest Service will undertake similar experimental cutting in a stand of 300 acres, mostly culled for pine only, on Cache lake, whose waters reach the St. Maurice river at Rapid Blanc. The area contains a peat bog, a merchantable black spruce swamp, balsam and spruce ridges, a merchantable stand arising from an old burn, and mature spruce and balsam in various degrees of mixture with hardwoods, so that most of the types in which logging operations are being conducted in Quebec are represented on this comparatively small area. The Logging Department and the Forestry Division of the Laurentide Company and the Provincial Forest Service will co-operate in carrying out details of the cutting.

On both areas a careful record will be made of the cost of slash burning.

The Commission of Conservation at Ottawa has the task of measuring and recording the results on each of these experimental areas. Sample acres will be laid off and the volume of wood fibre and rate of growth under the present and past conditions will be ascertained and will be used as the standard to measure the results of the various methods of cutting in terms of future growth. The investigations will include the effect of cutting to various diameter limits upon windfall, diameter increment, volume accretion, the growth of the young trees already established in the stands, and the reproduction of the commercial species after the cutting. The areas upon which the slash is burned and those upon which it is unburned will be used for a comparative study of the effects of these two conditions upon reproduction and, in co-operation with the Dominion Entomological Branch, upon the prevalence of insect diseases. These areas (burned and unburned) will also be studied in a comparative way by an expert from the standpoint of breeding ground for the various heart-rot diseases of spruce and balsam.

This work will be carried on during the logging operations and will doubtless occupy a



small investigation party during the coming summer. After that it is planned to visit the areas periodically for a number of years to measure and record results. In this way only can accurate and useable data be obtained from the experimental cuttings.

Negotiations are on the way between the Fisheries Branch at Ottawa, the Provincial Forest Service of New Brunswick, and the Commission of Conservation to establish an experiment station on 240 acres belonging to the Mirimichi Fish Hatchery at South Esk, New Brunswick. The area is badly infested by spruce budworm, and a special study will be made of this disease on the area by the Dominion Entomological Branch. The area is being cruised and plans drawn up for regulated cutting.

In this connection it might be mentioned that the Commission of Conservation and the Entomological Branch in co-operation with the respective companies have already established some 25 acres of permanent sample plots on the Laurentide Company limits at Lake Edward

and on the Riordon Pulp and Paper Company limits on Lac Tremblant, where a detailed study is being made of forest insects and fungous diseases; of the effects of the various degrees of cutting on the regeneration and growth of spruce and balsam; and particularly experiments are being inaugurated to determine the conditions for a more abundant natural reproduction of spruce after logging.

It is reported that the Riordon Pulp and Paper Company has under way plans for the establishment of an extensive experimental area, some 5,000 acres it is said, where not only different cutting methods will be tried but also experiments in broadcast seeding and in underplanting in the various conditions usually presented by logged-over and burned-over lands. Detailed and expert studies like those outlined above for the other cutting areas will be encouraged and facilities supplied for them. In fact, the plan is apparently to develop a forest experiment station where any investigator or investigative body of proved achievement may attempt to solve forest problems of economic bearing.



Forest survey party in the foothills of the Rockies.

## MUSK OX AND REINDEER INDUSTRY

A commission has been appointed to investigate the possibilities of the Canadian North as a permanent meat and wool producing area. The commission consists of Dr. J. G. Rutherford, railway commissioner, Ottawa; Messrs. J. S. McLean, manager, Harris Abattoir Company; J. B. Harkin, commissioner of Dominion Parks, and Vilhjamur Stefansson, explorer. Dr. Rutherford is appointed chairman. The commission is expected to report with the least possible delay upon the feasibility of the propositions mentioned in the memorandum which follows, together with recommendations in regard to the best methods to follow to bring about efficient development in case it is found conditions warrant action on the part of the government.

### THE MEMORANDUM.

Special attention has recently been directed to the potentialities of the Arctic and sub-Arctic regions of Canada as a grazing country. It is represented that in these regions there is an abundant growth of vegetation in the summer which forms nutritious food for grazing animals in winter as well as summer. It is estimated that there are at least a million square miles of such grazing grounds in northern Canada. The winter climate of these areas is too severe for ordinary domestic cattle, but musk ox and reindeer can graze there in the open the year round. The dimensions of the reindeer industry in Lapland and in Siberia and the great development of the reindeer herds of Alaska suggest that corresponding development can reasonably be anticipated with respect to northern Canada. In this connection it is pointed out that herds of barren land caribou aggregating, it is estimated, twenty to thirty million animals frequent northern Canada, and that biologically these animals are practically identical with reindeer.

Vilhjamur Stefansson, the Arctic explorer, is convinced that the musk ox can be readily domesticated and has urged that steps be taken in that connection with the object of developing herds for commercial purposes.

The development of large reindeer and musk ox herds in northern Canada will represent a very important addition to the meat production of the Dominion. The development of musk ox herds will represent not only an addition to the meat production, but also to the wool production. The value and attractiveness of reindeer

flesh for food purposes is well established. In regard to musk ox meat, Mr. Stefansson claims it is practically indistinguishable from beef.

In all parts of the world there is a constant reduction of grazing areas for field crops and in consequence the meat and wool problems are every year becoming more acute.

The Arctic and sub-Arctic regions of Canada lie too far north to be included in the lands suitable for the profitable cultivation of cereals and therefore may be regarded as permanent grazing areas.

In view of the foregoing the Minister considers that there are good grounds for believing that the Canadian North may become a great permanent meat and wool producing area and that a commission should be appointed for the purpose of making a thorough investigation into the subject from a business and national standpoint and to report their finding.

### DISAPPEARING FOREST WEALTH

In France and Germany there was established many years ago a system of reforestation. The law in both of these countries provided that no tree could be cut down without another being planted. Otherwise they would have long since been reduced to the condition of China with its alternations of sun-scorched plains and devastating floods.

During the war the forests of France have suffered severely, being either destroyed by the enemy or used by the French themselves for war purposes. The timber supplies of Belgium and Great Britain have also been to a large extent consumed.

All of these countries are dealing vigorously with the problem. They know that forests are an economic necessity, and are proceeding to replace the loss as fast as possible.

Unlike British Columbia, they do not propose to leave nature to do the work unaided. They doubt the efficacy of trusting to luck, without the intervention of human effort. They are putting forestry experts on the job, and giving them large sums to spend.

Which system is the better? Must British Columbia wait until its forest wealth is depleted before taking adequate measures and imitating the example of these older communities, which have already learned by experience?

—*Vancouver Sun.*

## WHAT STARTS THE FOREST FIRES?

### Dry Weather and Dry Electrical Storms Given as the Chief Causes

Everybody knows of the great forest fires in the northwestern United States and in Western Canada. What caused these fires is a question many thousand people are asking. In a letter to *American Forestry* H. H. Rutledge, acting district forester for District No. 1, which includes the National Forest area of Northern Idaho and Montana gives what he believes to be the causes. The fires, he says, were due to a dry year, the third in succession. Lightning, railroads, campers, and brush-burning started most of the 909 discovered on this forest area in July. Lightning was given as the cause of 240 fires. Almost one-fourth were due to unknown causes, and twenty-seven were incendiary. He writes:

"This is the third dry year in succession for District 1. The snowfall last winter was far below normal, and in many locations spring precipitation was insufficient, many places having been without rain for over three months. High winds have prevailed quite generally for some sixty days and the atmosphere has been charged with electricity to such an extent that dry electrical storms have been constantly occurring. As a result the forest floor is as dry as a powder-house, and because of excessive transpiration the leaves of coniferous trees have become so combustible as to be almost explosive when subject to ignition.

"While human agencies have been responsible for some of the fires this season, lightning has been by far the most prolific source of trouble. Dry electrical storms have started a great many fires in the most inaccessible part of the forests where it has been impossible to get men and equipment on the ground quickly. In numerous cases it has required from three to six days for fire-fighters to reach a fire from the nearest railway point. And when it is remembered that equipment and supplies for the men must be transported on pack-horses over rough mountain trails and kept on the line at all times, the difficulties of the situation will be appreciated. Under these conditions it can be understood readily how lightning-set fires in these remote places become raging conflagrations before the fight against them can be begun.

"Commonly fires due to preventable causes are near lines of transportation and communication and can be discovered and suppressed before they assume serious proportions, but the reverse is true where lightning fires occur. Not infrequently in the most inaccessible mountainous regions ten, fifteen, or twenty fires are started within a few minutes by a single electrical disturbance. Sometimes these blazes are scattered over quite a large extent of territory, often they are close together, and before it is possible to start the fight against them they coalesce and form one big fire which, if the wind is blowing freshly, soon reaches the tops of the trees and develops into a crown fire that defies human efforts to combat it so long as the wind continues.

"Detailed reports on file from the several national forests of the district cover the situation only up to the close of July 30. During the night of July 31 over fifty fires were started by one severe electrical storm that ran along the westerly slopes of the Bitter Root Mountains in Idaho forests. These fires have been merely reported by wire, their extent or precise locations not yet having been determined by the field officers. They were scattered over a territory embracing roughly 4,000 square miles. Does this single night's experience convey an idea of what the Forest Service fire organization in District 1 is contending with?"

On July 30 there were approximately 3,500 fire-fighters on the line, not including rangers, lookout men, smoke-chasers, and other regularly employed forest officers, numbering about 1,500 men.

F. C. Wilfong and his crew met with a trying experience during the Selmay fire on Crooked Creek on July 24. They were trapped where three fires met, and their camp was burned. The party saved themselves by lying in the Selmay river for thirty-five minutes with wet blankets over their heads. Only one of their thirteen horses was lost, but the pack-saddles were burned from the backs of the others. Mr. Wilfong says of his experience:

"There was no way out of it; we were cornered and we plunged into the water, keeping

our faces above the surface. We put wet blankets over our heads, for the heat was so intense that our flesh would have burned if we had not taken that precaution. The roar of the flames was tremendous, but we were comparatively safe.

"Once I raised the blanket a little to peek and see how the fire was going, and what do you think I saw? There was a big bear perched

on a rock right at my feet and looking over at me as if he was ready to jump. I guess he thought I was a rock.

"We exchanged glances for a while, and I am willing to bet that he wasn't any more scared than I was, but as soon as he recovered from the surprise, he turned tail and away he went. It was the last I saw of him."

---

## NEWFOUNDLAND NEEDS A FORESTRY POLICY

---

### Forests of the Ancient Colony Being Rapidly Depleted

---

That sound ideas on the need of a reforestation policy are abroad in Canada's near neighbor, Newfoundland, are evident from the following article in the *Curling (Newfoundland) Star*:

The insatiable needs of civilization are daily devastating the surviving great forests of the world; and in some countries the timber industry is becoming a very serious one—so serious that the eyes of capitalists are being turned to other countries than their own where the forests are in a primeval state.

In Newfoundland the lumber industry has for a number of years proved a valuable adjunct to other industries, and hundreds of thousands of dollars are put in circulation to-day from an industry that was in its infancy not so many years since.

There are yet many hills and valleys, thickly wooded with heavy timber such as birch, spruce, fir, white pine, and juniper, needing every possible attention that a discerning administration can bestow upon them for their preservation.

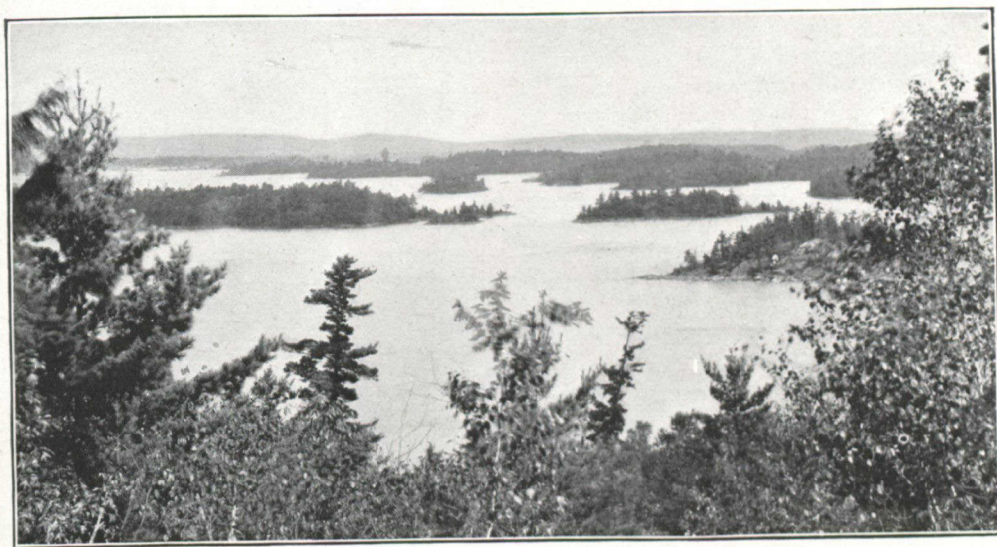
It is very essential for the future of our forests that a forestry policy be adopted by our government; and with this object in view it is necessary that a Department of Forestry be established. No one will question such an arrangement, for it is a well known fact that our timber areas are fast becoming depleted, and little or no effort is being made to conserve them, or to have a system of afforestation carried out.

There are three ways in which the forests are being swept steadily away: the decay of

mature trees, the manufacture of lumber, and destruction by fire. There may be differences of opinion as to the best method of preventing the destruction of valuable timber by forest fires; but it will not do to settle down to a do-nothing policy, and certainly not much has yet been accomplished in either direction.

To-day the people of England and Scotland are more than ever alive to the fact that the forests of the world (particularly their own forests) are fast being used up, and are giving great attention to the question of lumber supply. They are looking to the future requirements of the state, and are giving every possible encouragement for the afforestation of lands that have become depleted of timber. So keenly alive are they, that forestry schools have been established where both men and women are being taught scientific and practical methods of afforestation at the Forestry School at Dunkeld, near where the Newfoundland Forestry Companies (Newfoundland Expeditionary Force) were operating. They are working in the nurseries, and planting trees on the estate of the Duke of Atholl, which was laid bare by the axes of our woodsmen, so that their own country may profit by the knowledge thus gained.

What is our own government going to do? Will they make some declaration as to the policy they intend to initiate and carry out, not merely for the conservation of our present timber areas, but for the afforestation of the vast stretches of country that have been depleted of its great timber wealth?



In the 30,000 Islands of the Georgian Bay. Grand Trunk, Railway.

## SHADE TREE PROTECTION UNDER A COMMISSION

*By Walter D. Ludwig, District Forester, Johnstown, Penna.*

Without a doubt, one of the most potent and efficient methods of getting the average urban dweller interested in forestry principles and practices is to convert him into a shade tree enthusiast and by a proper system of educational training, hints, and suggestions, he will soon become inoculated with the virus of forestry and so an ardent advocate of the cause. Where it is not possible to carry the city man into the forest, it is possible to plant a tree in his yard or along the street in front of his home and cultivate his interest in its successful growing and care so that he will be but a few short steps away from a knowledge of trees in the aggregate and their relationships to our industrial and economic life.

Shade tree forestry then must take its place as one of the many methods of educational effort which are to be fostered and encouraged to bring about a more intimate knowledge of the care and protection of trees and their importance in the general life and actions of the people.

As a rule the condition of the average shade tree on the streets of the many cities, towns and villages is deplorable and shows an ab-

solute disregard of the proper methods of handling and caring for trees. The trees have been planted without any regard as to the proper species suitable for a certain condition, have been supposedly trimmed, but really hacked into a semblance of their former majesty and beauty by the greatest enemy of the shade tree in existence to-day, the "tree butcher" and have suffered untold but unmistakably plain evidences of ill-treatment.

The most important thing to be done is to see that careful and appropriate ordinances, by-laws and regulations are drawn up to give the necessary measure of protection to the shade trees and all the records of existing shade tree commissions should be searched thoroughly for the best features incorporated therein. Without these necessary things with which to give power to the commission, it is a waste of time and effort to take steps to create such a body.

Our ordinances in Johnstown, Pennsylvania, are rather drastic, but not more so than was indicated by the circumstances. Besides providing that written permits must be obtained for the removal, planting, or trimming of any tree in the public highway, and specifying penalties,

these ordinances contain provisions which will care for almost any contingency which may arise. And it might be added that they state specifically that "it shall be unlawful" to do so and so, and say nothing about what sort of evidence such acts shall constitute.

I should like to read these ordinances because of their value to other communities, which may be thinking of demanding a shade tree commission, but they are too lengthy for this paper, and I shall quote from only several of their more important provisions.

They provide for such injuries as may be caused by gas, hot water, steam, or other substance deleterious to tree life coming into contact with the soil around the trees, the penalty being \$50 for each tree so killed or destroyed. They specify that there must be maintained about the base of the trunk of each shade tree at least six square feet of open ground for a tree of three inches in diameter, and for every two inches of increase of such diameter, there must be an increase of at least one square foot of open ground. They make provision for injuries caused by any kind of electrically charged wire coming into contact with the branches of a tree. They provide for guards and stakes and for adequate protection from horses and animals and in the erection, and repairing of buildings in the city.

#### PERMITS ARE REQUIRED.

Nothing will so impress the people of the fact that there is some authorized body looking after the welfare and care of the shade trees as when they are asked by local officials whether they have a permit for such work as they are doing or having done to their trees. Too often the people, especially property owners, have looked upon the shade trees which they have planted in front of their own property as something with which they could do as they pleased and this old idea is hard to eradicate. Undoubtedly there are many cases where trees are trimmed without the knowledge of the local shade tree commission, but these infractions of the law become less frequent, if there is a summons to the magistrate to answer for the violation.

During the year 1918, the yearly report of the Johnstown commission shows that permits were issued for the trimming of 239 trees, killing of 9 trees, and planting of 17 trees, making a total of 85 permits for 265 trees.

As to the recognition of the supervisory work of the commission and its growth, the records

for the past spring nearly surpass by half those of the whole of the year 1918. Permits were issued so far in 1919 as follows: Trimming, 259 trees; removing, 53 trees, and planting, 78 trees, making a total of 390 trees.

#### TRIMMING 10 FEET HIGH.

Another matter which requires attention is the height of the lower branches of shade trees above the sidewalks. An open-grown tree will produce branches all along its trunk and unless systematic pruning is practiced, the lower branches will hang too low, thus preventing free passage to pedestrians, especially carrying umbrellas. To remedy this condition, the Johnstown commission has passed a resolution providing that all trees must be trimmed to a height of not less than 10 feet above the sidewalk.

#### "THE TREE BUTCHER."

The greatest enemy of the shade tree anywhere is undoubtedly the man, who takes a saw and an axe, and starts to cut and hack at the trees as though they were so much cordwood and to be disposed of as quickly as possible. Possibly there are no callings or professions in which there are so many persons engaged, who believe that they really know their business, and yet actually do not know the rudiments of such work.

Where it is at all possible, I would urge that all communities take steps to have the duly constituted authorities make a sufficient appropriation for the employment of a competent forester and shade tree expert to see that the work of the commission is carried out correctly and to the letter. I am sorry to note that we have not reached that stage in Johnstown yet, but we hope that this will be realized shortly.

In the meantime, we have issued our permits for trimming and other work, only after an investigation and report on the work done is submitted to me and the person who is to do such work has received my approval. In small communities, it is possible to get one man who will be responsible, but in the larger places, this is out of the question. After seeing the work of those who claim they are expert tree trimmers, I submit a report to the commission and they approve the work of those who qualify according to these standards. When a permit is asked for and the work is to be done by one of the accredited men on the qualified list, the secretary of the commission issues the permit.

#### TREE PLANTING.

Before any intelligent plan of planting can be adopted, it is essential that a tree census of

the community be taken. This should locate every existing shade tree, its size, species, general condition, treatment suggested, and other pertinent facts.

We have already taken such a census of several of the streets of Johnstown and these records are a permanent part of the shade tree work. The census will be extended as rapidly as possible, so that the whole city will be covered.

#### PROFESSIONAL SUPERVISION.

Probably nothing contributes to the success of the work of a shade tree commission so much as efficient professional supervision and it should be the aim of our foresters so to equip themselves by a course of study and reading that they may be in a position to render this sort of assistance. There are many pamphlets and circulars to be obtained from the various shade tree commissions and experiment stations and there are many excellent books published on the subject. With his broad knowledge of trees, supplemented by specific data as to the habits and behavior of trees under the adverse conditions of street planting, he will soon be equipped to render this service to the people.

Shade tree forestry and the ability to render assistance along this line is an important factor in general forestry work and our foresters must be prepared to meet these problems whenever they arise. By so doing, they will be furthering the efforts of the Department of Forestry to be of service to the people and to inculcate love and protection of trees, which will lead eventually to a clearer comprehension of the aims and purposes of forest.

### THE AIRPLANE IN FOREST PATROL

*By Milton R. Klepper,  
President Aero Club of Oregon.*

Late in July, outbreaks of fire in Oregon resulted in so much pressure being brought on the War Department, largely through the efforts of the Aero Club of Oregon, of which Governor Ben W. Olcott is an active member, that eight Curtiss planes were sent to Salem, Medford and Roseburg, and army flyers assigned to operate them. Two planes leave Salem each morning, one operating over the timbered area east and west of the Southern Pacific tracks as far north as Portland and the other south as far as Eugene. A similar service is maintained out of Roseburg, one of the planes covering a route

as far north as Eugene and the other as far south as Medford.

In the last few days, announcement has been made that de Haviland machines, with the Liberty motors, will be substituted for the Curtiss planes, which, by their longer range of flight, will be able to cover more territory.

Whatever may be the cost of maintenance and operation of airplanes in forest fire patrol work, it can never mount to the total of the annual money loss of forest fires. The individual machine represents an outlay of several thousand dollars; keeping it in shape for continuous services takes perhaps hundreds of dollars; salaries of flyers and mechanics are high.

In comparison with these high figures for equipment and personnel of any system of airplane patrol for forest fires is the annual charge of ten million dollars to destruction of marketable timber. Last year the forest fire loss on the Pacific Coast and Inland Empire is estimated to have been six and a half million dollars.

Detection of the fires which did this damage, when the blazes were in their incipiency, would have enabled the fire-fighting forces, federal, state, and private, to have prevented a good part of this loss. A half of it, a third, would have meant more to the owners of the timber, whether private or government, than the most thorough system of airplane patrol that could be worked out.

The cost of the work which is now in operation in California and Oregon, and for the extension of which into Washington and Idaho plans are under way, has so far been borne by the Air Service of the United States Army. During its experimental stage such an arrangement can continue, but the success of the patrol foreshadows the time, soon, when the cost of the service must be paid for pro rata by the owners of the timber protected.

In the two cities in Nova Scotia, Halifax and Sydney, shade trees are only permitted to be cut down or trimmed with the consent of and under the supervision of the civic authorities. In the towns and municipalities of the province the statute forbids any person or corporation to cut or mutilate trees upon the highway without his obtaining the consent in writing of the municipality or mayor of the town, and provides a penalty for cutting or trimming trees without such consent.

# RADIO-PLANES WATCH FORESTS AND RANCHES

## Airplanes Plus the Radio Detect Fires and Supervise Farming

Airplanes, plus radio-telephone equipment, have found a brand-new peace-time utility—watching for forest fires in the vast government timber preserves, and also for supervising the operation of large ranches, such as those embracing thousands of acres and found frequently in the great western farming regions. Some of these farms and ranches are so large that it takes a superintendent all day to make an inspection trip across the ranch, even with a high-powered automobile.

The airplane as part of a farm equipment is now a reality. It makes its appearance at Hartin, Mont., on the wheat ranch owned and controlled by John Pierpont Morgan and other New York capitalists. Erhardt Schmitt, former American army aviator, has been employed to operate the machine. His duties are to carry the ranch manager from one part of the 250-mile, 100,000-acre wheat ranch to other fields. A wireless telephone in the airplane enables the manager to keep in constant communication with the ranch headquarters.

Not only can the manager or superintendent immediately report back to the ranch headquarters, by radio-telephone, but he can give local orders to gang or section foremen by means of small radio receiving stations erected about the ranch. The installation and maintenance cost of these stations is relatively small in any case. They have also been so greatly simplified during the war that practically anyone can be instructed in handling the talking and receiving apparatus in a short time. Some of these sets work as simply as the ordinary telephone.

### AIRPLANES AND RADIO SERVE TO PROTECT NATION'S FORESTS.

Recently the use of airplanes to patrol the forests and watch for incipient forest fires was extended by the government and now the wireless telephone has been installed for an experimental trial. If found to be practicable the wireless will be extended to cover the great woods with an invisible net of communication.

The wireless is expected to be an improvement upon wires or cables for one very im-

portant reason. In the past great difficulty has been experienced in maintaining wire communication in the forests because of the interruption to the service caused by falling timber, especially in the stormy season. Snowslides have been another source of destruction to the wires. The use of wireless, of course, obviates all such difficulties.

For the purpose of the present experiment the Signal Corps of the army has lent to the Forest Service four combination sets of transmitting and receiving apparatus. One set of the equipment is to be installed on Mount Hood at an elevation of about 13,000 feet, and another at the nearest forest ranger station, about twelve miles away. Two other sets are to be placed in the Clearwater Forest region of Idaho, which is a very heavy wilderness country.

All of the wireless stations will be established at look-out points, where watch is kept for forest fires, and will supplement the regular service, which not so long ago was augmented by the addition of airplanes for patrol. Now two additional airplane routes for that purpose have been mapped out, both operated from Mather Field, near Sacramento, Cal. The other two routes of the airplane service are operated from March Field, near Riverside, Cal.

The first route from Mather Field will cover the northern parts of the Eldorado and Tahoe forests on the valley side of the Sierras. The planes will start from Mather Field each morning and proceed to Oroville by way of Placerville, Colfax, Nevada City, and Strawberry Valley. A landing will be made at Oroville, where a suitable field has been provided. The return trip will be made in the afternoon.

The second route from Mather Field will cover the southern parts of the Eldorado and Stanislaus forests. Starting from Mather Field, the route runs to Placerville, Grizzly Flat, Big Trees, and to a landing near Sonora and Tuolumne. In this case also the return trip will be made in the afternoon. Each of the Mather Field routes has a round-trip length of about 150 miles.



Forest Service reports tell of a successful trial patrol undertaken recently under test conditions. No difficulty was experienced in detecting fires in heavy timber at elevations of from 6,000 to 10,000 feet.

Peculiar interest attaches to the movement for conservation as affecting North Carolina, Tennessee and Kentucky, because of the potentialities involved.—*Electrical Experimenter.*

## DRINKING WATER AND TREE PLANTING

(A Letter in the *Globe, Toronto.*)

In a recent paper you very wisely advocate the reforestation of our lands which have been denuded of trees, by communities undertaking the work, as in Germany. Let me give you one instance of what was done by a private landowner in North Wales. After the demobilization of the British army which succeeded the battle of Waterloo, Sir Robert Vaughan of Narman Dalgetty, put the discharged soldiers of his regiment to plant a steep hillside with larch. This great wood, which lay near the popular watering place of Barmouth, was well known till thirty years ago by travellers on the Cambrian Railway. In the centre of it he had planted the date of the planting, 1818, in dark figures, so that it was visible for miles. His descendant felled the trees about 1890 and reaped an abundant harvest. One of the frequent travellers on that line was Mr. D. Lloyd George, and he must have had the forest in mind when he obtained from the British Parliament a grant for replanting of waste lands some years ago.

Now there is a magnificent opportunity to employ our discharged soldiers in the same way, which will serve two purposes. The county of Grey has a magnificent terrace of a million acres about seventeen hundred feet above the sea. It is the source of all the great rivers of Western Ontario. The snows are driven in from Lake Huron and in recent years lay to a depth of twenty feet in the magnificent forests of elm, tamarac, pine, maple, etc., which covered those lands fifty years ago. In the adjoining county, near Maple Valley, I remember magnificent maple trees of fifty feet and upwards in height, which still remained twenty-five years since as relics of the forest primeval. Now the forest is all gone, the rivers are drying up and the soil is being washed away, because the snows are swept over the summit, and suddenly melted in disastrous floods, instead of being retained long enough to fill that magnificent natural reservoir, the Artemisia gravel bed, which starts in the centre of Grey county and sends one spur down to Brantford. This

gravel bed is the chief source of the Grand River, and supplies all its feeders and springs with water all through our torrid summer, but it is being robbed at the source of the pure water which should save us from our scourge of periodic deadly epidemics due to our sewage-tainted supplies of river water served out to the cities of the Grand River Valley by the consent of the Provincial Health Board.

Now the Province of Ontario is the community which should tackle the job of replanting the forests of County Grey at once by making a provincial park on the Blue Mountains, at the source of the Grand, the Mad River, the Beaver, the Sydenham, the Saugeen and the Rocky Saugeen. The Thames is also fed from the same source.

Give the returned soldiers work by planting an enduring monument to our great victory, like Sir Robert Vaughan did in Wales a century ago.

As an illustration of what might be done we have in Brantford a magnificent elm planted on his homestead about 1830 by our pioneer, Mr. John A. Wilkes. It is 10 feet 6 inches in girth four feet from the ground, and fifty feet high. It runs twenty feet up without a limb. Near there, on the site of the old Congregational church, is a maple which exceeds 9 feet in girth, probably planted by the same gentleman after the church was built in 1836. If replanting were to become the fashion tree lovers like Mr. Wilkes would repair the slaughter of the last century by covering Ontario with woods and forests wherever waste lands, corners and steep hill-sides cry out for them. We of this generation have no right to foul rivers and streams with sewage or to leave deserts and swamps to our children to breed malaria as the Turks have blighted Mesopotamia and other lands, but we are doing just that like careless spendthrifts or decadent nations in the east.

John Robertson.

Brantford, Ont.

## CHINESE TREES GROWN IN CANADA

By A. Cosens in *Toronto Globe*.

Many of the trees, grown in this city for shade or ornament, have been imported from other countries. The European maples, the Norway and Sycamore, border our streets more frequently than do the native species. The Horse-chestnut from Greece and the Lombardy or Steeple Poplar from far Afghanistan are among the commonest of our ornamental trees. Clumps of Austrian Pine and of Norway Spruce are often planted as wind-breaks or for decorative purposes. In old-fashioned gardens and in cemeteries the Asiatic Weeping Willow was in the past a favorite tree for cultivation.

Among the aliens that have found homes in this country are two from China. The anomalies associated with that country are sufficient alone to arouse curiosity concerning these foreigners, but apart from their origin the trees themselves are interesting.

### THE MAIDEN-HAIR TREE.

The Ginkgo or Maiden-hair trees were first cultivated by Buddhist and Taouist priests, who found them growing wild in the mountains of Western China, and planted them in the Chinese temples. This was done so universally that it is apparent the trees were not introduced solely for decorative purposes, but because of some religious significance attached to them by the priests. Whatever this original stimulus may have been it has proven powerful enough to inaugurate an extensive cultivation of the trees in a country where every available foot of land is of necessity utilized.

Japanese priests brought the trees from China into their own country and planted them in the vicinity of their temples and shrines. In that country the wealthier class are now using them as ornamental trees. From Japan specimens were imported into England, where they found a home in Kew Gardens. The first Ginkgo was introduced into this continent in the year 1784 by Alexander Hamilton. As well as in the southern part of Ontario, the tree is grown successfully in the Eastern States as far north as Eastern Massachusetts and Central Michigan.

### BEAUTIFUL FOLIAGE.

The Maiden-hair tree is a very appropriate name for the Ginkgo, as it has the wedge-shaped leaves and the typically forking veins of the Maiden-hair fern. Like this fern, the tree has

a beauty of foliage peculiarly its own. The leaves, unfolding in the spring, soon assume a deep, lustrous green hue, which is retained by them throughout the summer. Even in autumn they are still attractive, but the color scheme is quite different. At that season the green of the leaves is changed uniformly to a bright, pleasing yellow.

After the fall of the leaves, the tapering top and vertical position of the upper branches become more apparent, and give the tree a close resemblance to the common introduced Poplar, the Steeple or Lombardy. It is, however, much nearer akin to the cone-bearing trees, the spruces and pines of our Canadian woods, but of a nobler and more ancient lineage.

### OF LONG DESCENT.

The Ginkgo is now the only survivor of its race, but its ancestors, in the far past, numbered many species, and formed dense forests through the dim aisles of which roamed the gigantic land reptiles of that age. Its fern-like leaves indicate a relationship to even a more remote type of flora, the beautiful fern allies of the coal period, and continue the hereditary line of the tree back almost to the dawn of plant life.

The Ginkgoes resemble many of our native trees and shrubs in having the two sexes represented among them. It is usually the male trees that are planted for shade or ornament, as the plum-like fruit of the female tree has a disagreeable odor. In spite of this objection to the latter, there is a well-known example of their cultivation in Washington, D.C. In that city the avenue, at the head of which stands the building of the Department of Agriculture, is bordered by them. It is only in Japan that any effort has been made to use the fruit. There the seeds of it are roasted and served at banquets as a delicacy.

### THE TREE OF HEAVEN.

The Ailanthus, or Tree of Heaven, attains, under favorable conditions, to a height of 70 feet. In comparison with our native pines and elms that often tower up over one hundred feet, this tree seems scarcely to merit its name, but in the Molucca Islands, where the word Ailanthus signifies Tree of Heaven, there may be less formidable rivals.

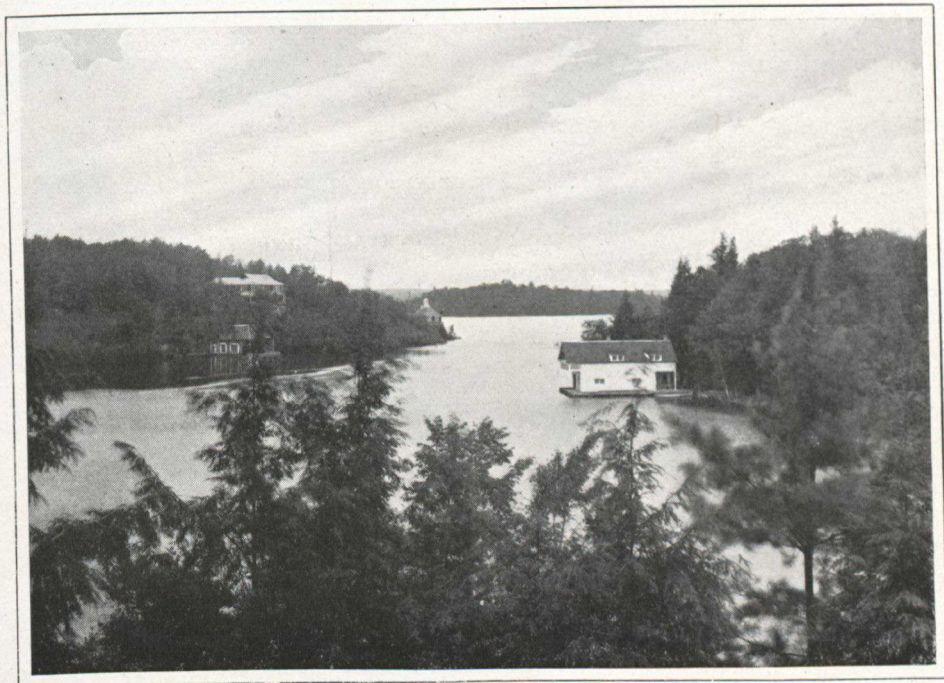
This Chinese tree, also, was brought to the notice of European tree-lovers by a religious sect. It was introduced into Europe about the middle of the eighteenth century by Jesuit missionaries, who believed it would serve as a suitable food for a certain species of silkworm. The purpose for which the trees were originally imported was never carried out successfully, but they soon became great favorites for ornamental purposes, and were grown extensively. Brought to the United States, they were planted at first near Philadelphia, and are now under cultivation throughout the Eastern States and parts of Canada.

#### A TROPICAL APPEARANCE.

As the flowers of the tree are inconspicuous, the beauty of its foliage is all the more striking. The leaves, often three feet in length, drooping over from the vertical branches, give to the tree a graceful and tropical appearance. The attractiveness of the leaves is further enhanced by their coloring, which is even more splendid

than that of the Ginkgo. The seasonal variations in the foliage tints of the Ailanthus are pleasing. As the many pairs of leaflets unfold from the opening buds, there is displayed an iridescence of bronzy greens, pale greens and madder browns, a gorgeousness of tinting truly oriental. When fully displayed, the leaves are vivid green in color, and their characteristic brilliancy they retain throughout the summer. In autumn, the bright, lemon-yellow color of the foliage contrasts beautifully with the deeper yellows and orange to reddish tints of the large, drooping clusters of fruit.

In addition to its beauty of foliage the Ailanthus has other characteristics that make it a favorite for cultivation. It never roots deeply, and, in consequence, is a very rapid grower. From the shallow roots off-shoots frequently spring up that can be readily transplanted. The seeds, also, provide an easy means for securing new stock, as a large percentage of them will germinate.



Indian River, Muskoka Lakes. Grand Trunk Railway System.

## REFORESTATION NOW NECESSARY

*Ellwood Wilson, Manager Forestry Branch, the Leurentide Co.,  
in Toronto Financial Post.*

### Cutting Arranged to Rotate Over Replanted Areas—Seaplanes for Surveys and Fire Protection

The man who invests in any business venture naturally wishes to know as much as possible about the various factors which make for the success of the enterprise. If he is buying bonds he wants to know that the security back of them is sufficient to reimburse him if the business fails. If he is a buyer of the stock he also wants to know what the chances are for earning the dividends which he hopes will be paid. The bond holder will look into the value of the buildings and plant, the real estate, the existence and value of good-will, if any, and everything else which might have a sale value. The stockholder is more concerned with intangibles than the bond-buyer. In addition to the physical side of the property, he wishes to know who the directors are and their character and financial standing; who the manager is; where and how large the market is for the product; where the raw materials and supplies are to come from, and what the shipping facilities are.

In both cases, however, the wise investor will be much concerned about the source and quantity and price of the raw materials which enter into the finished product. A plant which has only enough raw materials for a few years, or which has to face a continually increasing raw material cost, would not be considered a good investment. Only in the event of plans to set aside a certain amount each year for the complete amortization of the plant after a certain term of years, as in the case of a well managed gold mine, for instance, would the careful investor be satisfied to put his money into an enterprise which faced a shortage of raw material.

#### THOUGHT WOODLANDS INEXHAUSTIBLE.

The pulp and paper industry is one of the most important, perhaps from the point of view of trade balances and our exports the most important, and the person at present or prospectively interested in this business should look into the future supply of raw material, wood. In the beginning of this industry, when plants were

few and small, little thought was given to this question. We were supposed to have vast areas of timber. In the case of most mills, the supply was literally at their back-doors and they never troubled to ask about the future. In fact they operated their woodlands as though they were inexhaustible mines, except that no reserve was set aside for depletion. Explorations by trained foresters and studies of the rate of growth and yield of the different species have shown absolutely that the forests are not inexhaustible or even self-perpetuating. The fact that Canada has millions of acres of forests does not mean that we have unlimited supplies of timber. The trees may not be the kind we need, any more than a vacant lot covered with weeds is a vegetable garden; the trees we need may be so few in number on a given area or may be so difficult of access that the possession of forests of them may be of no more value than seawater, known to contain a small amount of gold, is to the gold miner, or rich coal deposits at the north pole to the coal operator. In all the countries of Europe, except Russia and Siberia, virgin forests have gradually been cut away and their place taken by planted forests or those which renew themselves under conditions controlled by man. The end of the pulpwood supply in the Eastern United States is in sight within the next fifteen years approximately, and the day when the available timber for any given mill in Canada will be used up can be predicted with reasonable accuracy.

#### PLANS TO SAVE LIMITS.

What shall be done to perpetuate our supplies within reasonable distances and costs of transportation and in sufficient quantity to keep our mills running? There is, so far as has been discovered, only one answer: so to operate our forests that not a particle of wood shall be wasted, and to begin planting operations at once. Plantations can be made on lands near enough to the mills to make fire protection much cheaper and more efficient than in the virgin forests; wastes can be eliminated; huge

storage piles which are needed for the winter months and which tie up large sums of money can be done away with, transportation and logging costs can be materially cut, and a better and more uniform quality of raw material can be produced. The cost is by no means prohibitive and the production per acre can be multiplied by eight.

The Laurentide Company, Limited, was the first Canadian company to investigate the question, and had farsightedness and courage enough to tackle the problem "man fashion," and others are following in its footsteps. A determined effort to eliminate forest fires was begun in 1908 by the formation of a special department for that purpose and when the construction of the National Transcontinental Railway was begun a co-operative association was organized to prevent fires along the right-of-way and this developed into the St. Maurice Forest Protective Association, which has so reduced the fire hazard that the loss of merchantable timber is now less than one-hundredth of one per cent.

#### USING TWO SEAPLANES.

This association is experimenting with two seaplanes, loaned by the Department of Naval Service, in the discovery and fighting of forest fires and in mapping timber limits, and the experiment so far shows that they will be of the greatest practical value.

In 1908 the first experimental plantations were made and these were continued on a small scale until 1914, when about 150,000 trees were planted. The nursery was enlarged in 1915, and each year since then, until now the number of trees for planting will reach two millions in 1921. This year one million trees were planted. It is planned to plant annually a little more than the number cut and to build up an area of approximately 400 square miles of planted timber which will be cut on a rotation of forty years, that is one-fortieth of the area will be cut each year and immediately planted; this will supply timber in perpetuity to the mill.

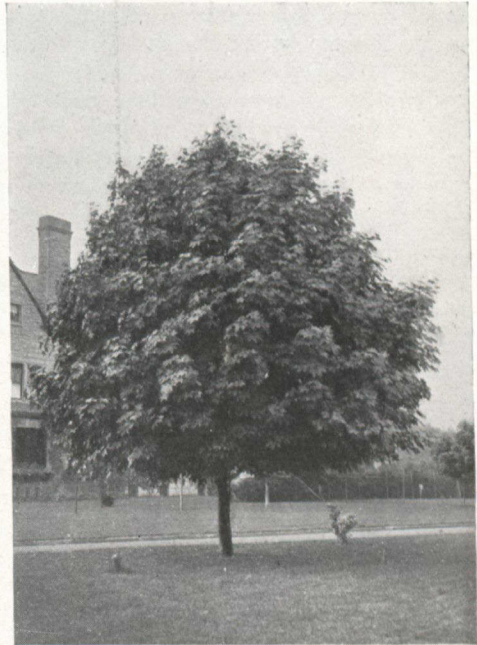
#### EXPERIMENTAL PLOTS.

As very little is known about the conditions of growth of the different pulpwood species on different soils, experimental plots have been laid out and planted and careful studies are being made of just what takes place. An experimental area has also been laid out in the natural forests and growth under natural conditions is also being studied. Experimental cuttings are also being made to find out the effect

of different logging methods and to improve them if possible. This latter work is being carried out under co-operation with the Commission of Conservation and the Department of Lands and Forests of Quebec, and much valuable information has already been secured.

"If we should begin to-day to protect our cut-over lands from fire and to use wholly practical methods of forestry to secure reproduction after logging, we could secure in the next 50 or 60 years an annual production of over 60,000,000,000 feet a year without lessening our forest capital. And this would be done without devoting to tree growth land that is not chiefly valuable for that purpose."—*Henry S. Graves, United States Forest Service.*

## TREES FOR MEMORIAL PLANTINGS



Special quotations on quantity lots of  
Shade Trees, Weepers, Evergreens, etc.

Send for Catalogue.

## STONE & WELLINGTON

The Fonthill Nurseries

TORONTO

ONTARIO

## REFORESTATION AS A POST-WAR POLICY

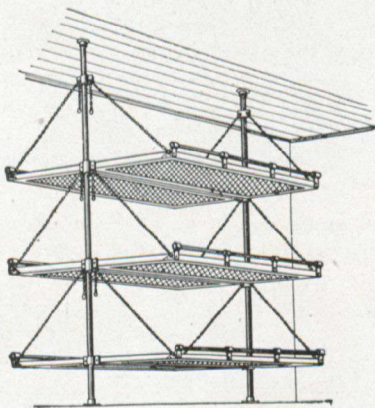
An important item of post-war policy in both France and Great Britain will unquestionably be an extensive programme of reforestation. Without the products of the planted forests of France, the prosecution of the war would have been handicapped to an extremely serious extent. It is hardly putting it too strongly to say that, had it not been for the French forests, the war could scarcely have been won—certainly not without an incomparably greater effort and much greater loss of life than has proved necessary. The limited timber supplies of the British Isles have also proved so vital a factor in connection with the home situation that plans are already being laid for a very extensive programme of reforesting waste lands at state expense or by state aid.

The economic importance to Canada of her great forest areas is no less apparent. The value of our primary forest products exported from the country during the past year totalled some \$200,000,000. The pulp and paper industry exports products valued at some \$85,000,000 annually. The importance of perpetuating a resource that assists so largely in redressing our unfavorable trade balance can scarcely be over-emphasized.

The first and most vitally necessary step toward handling our forests as crops, rather than mines, is, of course, the prevention of fires. Great progress has been made in this direction during recent years, though much still remains to be accomplished.

The next step should be the adoption and strict enforcement of improved cutting regulations in connection with all logging operations on Crown lands. The situation in this respect is least satisfactory in the province of Ontario and on Dominion licensed timber lands in the west.

Another step, toward which extensive plans should soon be made, is the reforestation of the more accessible areas of non-agricultural lands, on which the forest growth has been so completely destroyed by successive fires that regeneration of valuable species by natural means can not take place for a very long period of time, if at all. Such a policy of reforestation on Crown lands must, as a rule, be carried out by governmental agencies, on account of the long time-element involved before returns can be secured. Both Ontario and Quebec have provincial forest nurseries, from which many million young trees have been supplied to farmers and other private interests, including pulp and paper companies and, to a much smaller extent, to lumbermen. The forest revenue from Crown lands in both these provinces is so large that the annual expenditure of a moderate proportion of it on reforestation of denuded Crown lands would appear both feasible and logical. Experience indicates clearly that such a project can be made attractive from the view-point of a long-time investment.—*Conservation.*



### STEEL BUNKS FOR CAMPS

Included in the well-known line of DENNISTEEL factory, hospital, camp and ship equipment is the all-steel sanitary bunk illustrated. Take up very little room, are comfortable, hygienic and practically indestructible—a permanent investment. Write for particulars and folders on any of the following lines: Steel Lockers, Bins, Cabinets, Chairs, Stools, Etc. Standardized Steel Shelving (knock-down system), Steel Hospital Equipment, General Builders' Iron-work. Ornamental Bronze, Iron and Wirework. Wirework of every description.

**THE DENNIS WIRE AND IRON  
WORKS CO. LIMITED**

**LONDON  
CANADA**

HALIFAX MONTREAL OTTAWA TORONTO  
WINNIPEG VANCOUVER

## TAX THEORIES AND GROWING TIMBER

(From *American Lumberman*.)

Readers of the *American Lumberman* probably understand pretty well the basic theory of the single tax principle, which is very simple, namely, that natural resources rather than the products of labor should bear the brunt of taxation. The single taxers would levy upon the value of land, but not at all upon the value of any buildings upon it. Their idea is to discourage land speculation, the holding of vacant property for the increase of values brought about not by the owner, but by the increase in population, and they would encourage building improvements by exempting them from taxation.

This idea has found reflection to some extent in the taxation systems in many sections; although building improvements are not entirely exempted from taxation in most such instances, they enjoy a lower rate than do the land values.

The difficulty comes in applying this theory to such natural resources as are included in the title of land. Valuable timber may often have much greater value than the land upon which it is grown and the same may often be true of mineral wealth below the surface. The proposed Ralston bill recently discussed by the *American Lumberman* would impose a Federal tax upon land in holdings above a certain size

and makes no distinction between land itself and forest or mineral resources.

Some single taxers have felt that this plan as applied to timber did not produce the results desired, but rather the reverse. The late J. J. Pastoriza, of Houston, Texas, once expressed himself to the writer as favoring some exemption or modification of single tax as applied to timber. It, however, seems to have remained for a member of the United States Forest Service to point out the very obvious fact that while annual taxation of the land is justifiable because of the fact that land is imperishable and has annual rental value such taxation whether under our present form or under an application of single tax is basically unjust as applied to resources of mine and forest which can be used but once and are consumed in the use. He insists, therefore, that there should be a single tax upon such resources, levied and collected when they are harvested. The orthodox single taxer having as his basic idea that all natural resources must be taxed, and recognizing virgin timber as a resource, has failed to make this distinction, which when once stated is very apparent. Of course, when the virgin timber is replaced by a man-grown crop this is a product of human labor, and therefore, not taxable under any interpretation of the single tax theory.

### AIRPLANE LOCATES LARGE FOREST FIRE

The Victoria, British Columbia, *Times*, of Sept. 27, has the following interesting item:

For the first time in the history of this province an airplane has been successful in detecting a forest fire and reporting the location to the fire ranger. While the airplane Pathfinder No. 2 was flying over Duncan, Pilot Brown caught sight of a large amount of smoke issuing from a densely wooded country. He immediately proceeded to the spot, and on circling overhead ascertained the extent of the blaze and the exact location. On returning to Duncan he reported the matter to the fire ranger who took steps to check and extinguish the blaze.

For some time past the Provincial Government has been asked by the Aerial League of

Canada to institute an aerial forestry patrol, but so far nothing has been done. When Pilot Brown saw the fire he decided to show how quickly a fire could be located and information given for expeditiously subduing the flames.

### HEMLOCK BARK USEFUL

The feasibility of using waste hemlock bark from paper mill operations for tanning purposes has been further demonstrated in recent tests made by the Forest Products Laboratory, Madison, Wis. The product is satisfactory to the tanner, and can be prepared at a cost that will allow it to compete with leaf bark. The use of paper mill bark for tanning would mean a source of income to the paper mill from a material which is now of little or no value.

## DYNAMITING TREES TO SAVE THEM

Central Park, New York, is losing its trees. They have been dying off by thousands. The reason is now known to be the inability of the roots to penetrate the hard clay subsoil. The trees under these circumstances grow until they are too large to thrive on what water and nutriment they can get above the subsoil, and then they will wither and die. The available soil in Central Park is two and a half to five feet deep, and trees can grow in it to a diameter of two and a half to three feet. Beyond this they need deeper rootage, and this is denied them by the impenetrable clay. This clay it is now proposed to break up with charges of dynamite, so that the roots can get through it. Blasting of this kind, according to City Forester J. S. Kaplan, has been successfully used in breaking up bed-rock for orchards, and there is no reason why it should not succeed with hard clay, as in the present instance. Says the *New York Times*:

"Park Commissioner Francis D. Gallatin announced recently that the inability of tree-roots to penetrate the hard clay subsoil had been discovered to be the real cause of the death by thousands of all species of trees in the park and that this fall an attempt would be made to save the trees by dynamiting to shatter the clay and to allow the roots to penetrate deeper.

"After a great many theories had been put forward to account for the deaths of the trees by hundreds in recent years, the real explanation, Commissioner Gallatin said, was found when a new device for pulling trees and stumps, which was evolved during the war, was used in Central Park. This invention was a stump-puller, operated by hand, which lifted the tree and the soil attached to its roots out of the ground intact. The pulling of dead trees and stumps by this method began in January. It was found that the roots extended from two and a half to five feet deep and were then stopped short by the hard clay.

"When this condition was found uniformly, as hundreds of trees were pulled during the spring and summer, City Forester J. S. Kaplan came to the conclusion that the trees were dying because their roots did not go deep enough to take in a sufficient amount of water to keep alive trees of their size, and that the droughts and frosts of the last few years had been deadly to trees whose vitality was already impaired.

"The plan adopted by Commissioner Gallatin is that of setting aside a section of the southern part of the plot of about five acres with from thirty to thirty-five trees. . . . Holes will be bored with soil-augers to a depth of from four to five feet just under the outer foliage of the trees and small charges of dynamite set off. One blast will be used for small trees and two or more for the larger ones. It will require two or three years of observation thereafter to measure the success of this plan."

## CLOTHING FROM FOREST TREES

### Several Regions of the Earth Yield Dress Material

One of the strangest of myths is that which concerns the "deadly upas tree" of Java, whose poisonous exhalations were formerly alleged to kill any man or animal that ventured into its neighborhood.

Doubtless it had its origin in some traveller's tale, for the tree in question—rather widely distributed in southern and southeastern Asia—has no terrors for the natives of those countries who, on the contrary, find it extremely useful.

It is the only kind of tree in the world that produces ready-made clothing. The inner bark is a natural cloth, only requiring the removal of the soft cellular stuff from between the woven fibres in order to render it available for use. A cylindrical section of it from a small branch will furnish a leg for a pair of trousers or an arm for a coat, while from the bigger branch the body of the garment is obtained.

In tropical South America the inner bark of another species of tree yields an excellent cloth, the fibres of which are interwoven much as if the fabric came from a loom. All that is necessary is to wash and beat out the cellular stuff from the interstices and, when dried, it is light, flexible and altogether suitable for making up into garments.

The famous "tapa" cloth of Polynesia is made from the inner bark of the paper mulberry. When of the finest quality it is bleached to snowy whiteness and fine as muslin.

In tropical Africa the inner bark of a leguminous tree is utilized in the same way. Indeed, it is surprising to learn how widely tree barks are employed as materials for clothing the world over. And in the West Indies grows the "lace-bark tree," which yields a delicate tissue so like lace that many articles of feminine adornment are made from it.





## FOREST TELEPHONES

Make the life of the forester better worth living. They relieve him from the appalling loneliness. They help him to keep in human voice touch with foresters miles away.

In emergencies—fire—sickness—hunger—the speed with which they can summon help is marvellous.

Write for full particulars of how to install the Northern Electric Forest Telephone System. Address the Office nearest you.

*Northern Electric Company*  
LIMITED

Montreal	Toronto	Regina
Halifax	London	Calgary
Ottawa	Winnipeg	Vancouver

***Northern · Electric · Forest · Telephones ·***

## Foresters' Equipment

MOSQUITO AND INSECT PROOF TENTS  
WATER AND MILDEW PROOF BAGS  
FROST PROOF SLEEPING BAGS  
ALL "WOODS" QUALITY

## Woods Manufacturing Co.

DEPT. D.

OTTAWA

**TREES, SHRUBS and SEEDS**

HARDY NORTHERN TREE STOCK

**EDYE-DE-HURST & SON, DENNYHURST**

DRYDEN, ONT.

Shippers to H.M. Government.

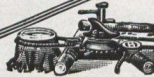
**Hill's Seedlings & Transplants**

ALSO Tree Seeds for Reforesting. Best for over half a century. Immense stock of leading hardy sorts at low prices. Write for price list and mention this magazine. Forest Planters Guide Free.

**The D. HILL NURSERY CO.** Evergreen Specialists  
Largest Growers in America.  
Box 503. DUNDEE, Ill., U.S.A.

**Try This Stump Puller at Our Risk**

The 5ml Stump Puller will take out every tree and stump by the roots, clearing from one to three acres a day, doing the work of twenty men. We want you to send for our 3 year guarantee against breakage and our free trial proposition. Address W. Smith Grubber Co. 11 Smith St. LaCrescent, Minn.



**GAGNON & MORISSETTE**

TIMBERLAND CRUISERS  
LUMBER CONTRACTORS  
FOREST INDUSTRIES

CHICOUTIMI, - - P.Q.

**LT.-COL. L. J. D. MARQUIS**

Forest Engineer and Mem. Can. Soc. of F.E.;  
Quebec Assoc. of F.E.; Former  
Mem. Que. F. Service

Timber Factors and Logging Costs  
Facts on Forest Growth and Future Products  
Forest Cruising and Mapping  
GIFFARD, - - QUEBEC.

**Timber Lands Bought & Sold**  
Timber and Pulp Wood Estimates.

**R. R. BRADLEY**  
CONSULTING FORESTER  
Globe-Atlantic Bldg. - ST. JOHN. N.B.

ASK



FOR



**Timber Estimating & Mapping**  
Management of Forest Properties.  
Supervision of Lumbering Operations.  
Forest Planting.

**COOLIDGE & CARLISLE**  
FOREST ENGINEERS  
BANGOR - - - - MAINE.

**Timber Estimates**

JAMES W. SEWALL

Old Town, Maine.



## FAIRBANKS - MORSE FIRE FIGHTING PUMP

These outfits are replacing many men and doing work impossible by any other method.

*Send for Information.*

THE CANADIAN  
FAIRBANKS-MORSE  
CO., LIMITED

Offices in  
Every large  
Canadian City.

## EXHIBITION CAR TOURING NORTHERN ONTARIO

The railway exhibition car of the Canadian Forestry Association is making a decided hit all through Northern Ontario. As many as one thousand visitors a day have called to see the various displays which are attractively arranged. The car is exceptionally well fitted up for the purpose and contains a multitude of exhibits showing the manufacture of pulp and lumber. There is also a model forest nursery, model lookout towers, forest telephone equipment, a working wireless system, a maple sugar bush, as well as a nexhibit of forest insects and their depredations. A motion picture lecture is given every evening in a local hall of each place visited and deals almost exclusively with the importance of the forest industries and the need of guarding their raw materials.

—Canada Lumberman.

## FOREST SEED FOR SCOTLAND

The New Westminster *British Columbian* reports: Mr. B. R. Morton of the Dominion Forestry Branch, has been on the Coast since July taking up again the work of supplying Sitka spruce and Douglas fir seeds to the Board of Agriculture, Scotland, for much-needed reforestation purposes. Mr. Morton initiated this work at the coast in 1917.

Mr. Morton is finding it difficult to secure good spruce seeds in quantity, according to his interview with the *Pacific Coast Lumberman*. However, he proposed to extend his search to the Queen Charlotte Islands and Prince Rupert. At first Scotland had asked for red cedar seeds only, but will now take all kinds as long as they are from the coast trees, the interior trees not being suitable.

Mr. Morton is now setting up in Kamloops a seed extracting plant. It occupies a stable building, and consists simply of racks, with trays to fit— $3\frac{1}{2}$  by  $2\frac{1}{2}$  feet having screen bottoms—and a furnace. The cones are spread out on the trays, and the room is heated to 100 degrees. In from two to five hours the cones burst open—except those of the jack pine and the lodgepole pine, which require up to 24 hours of this heating. The trays are shaken every so often, causing the seeds to drop through to the floor, where they are swept up. Afterwards the burst cones are thrashed for seeds that still remain in them.



**QUEEN'S**  
**UNIVERSITY**  
KINGSTON,  
ONTARIO

**ARTS**  
Part of the Arts course may be covered by  
correspondence.

**MEDICINE      EDUCATION**  
**APPLIED SCIENCE**  
Mining, Chemical, Civil,  
Mechanical and Electrical  
Engineering

**SUMMER SCHOOL      NAVIGATION SCHOOL**  
July and August.      December to April

26      GEO. Y. CHOWN, Registrar.

## UNIVERSITY OF NEW BRUNSWICK

FREDERICTON, N.B.

### DEPARTMENT OF FORESTRY

Established in 1908.

Best of facilities for definite instruction and supervision in Practical Forestry.

Surveying, cruising and construction work carried on in our own tract of 3600 acres, with Forestry Camp in the centre.

Competent men from the School at present in demand to take up Forest Survey work with the Provincial Crown Land Department.

For further information address:

### DEPARTMENT OF FORESTRY

University Calendar furnished on application.

C. C. JONES, *Chancellor.*

TABLE OF CONTENTS FOR OCTOBER, 1919

Canada's Forests as a Crop. By Clyde Leavitt.....	387
Working for Posterity. By Allan Donnell.....	391
Fire Protection on Crown Lands. By D. Roy Cameron.....	395
The Returned Soldier and Forest Jobs. By Raphael Zon.....	399
The Right Way to Cut the Fire Loss.....	403
The Forester—A Sketch. By W. F. V. Atkinson.....	405
Big Companies Try Out Forestry Methods.....	408
Musk Ox and Reindeer Industry.....	410
What Starts Forest Fires.....	411
Newfoundland Needs a Forestry Policy.....	412
Shade Tree Protection. By W. D. Ludwig.....	413
The Airplane in Forest Patrol.....	415
Radio Planes Watch Forests and Ranches.....	416
Drinking Water and Tree Planting.....	417
Chinese Trees Grown in Canada.....	418
Reforestation Now Necessary. By Ellwood Wilson.....	420
Reforestation as a Post-War Policy.....	422
Tax Theories and Growing Timber.....	423

FROM PINGARRA, WESTERN AUSTRALIA.

"Allow me to congratulate you upon the improvements effected in your excellent Forestry Journal."

A READER.

WANTED

**LIGHT RAILS**

State whether complete with  
splice or angle bars.  
Give size, quantity, location,  
condition and best cash price  
f. o. b. cars loading point.

Box No. B, Canadian Forestry Journal,  
Ottawa, Can.

**B. M McGRATH**

Colonial and Industrial Investments,  
Timber, Pulp Wood Areas and  
Waterpowers.

Newfoundland and Labrador  
Mines and Minerals.

*Reports, Plans and Estimates Furnished*

TRADE REVIEW BUILDING,  
ST. JOHN'S, NEWFOUNDLAND

**MOTION PICTURE  
MACHINES**

**STEREOPTICONS**

**We are fully equipped to  
supply projection  
apparatus on short notice.**

**LANTERN SLIDES and  
Motion Picture Film made  
up in twenty hours.**

Write for Catalog.

PROJECTION DEPARTMENT  
**SUPPLIES COMPANY  
OF CANADA**  
65 SPARKS STREET,  
OTTAWA, ONT.

# Everyone Who Bought Canada's Victory Bonds Made Money . . . . .

EVERY one of the million and a half subscribers to Canada's Victory Bonds knows that he can sell them to-day for more than he paid for them.

Every one who bought Canada's Victory Bonds has received 5½ per cent interest per annum—paid twice a year.

Over half a million Canadians who bought Canada's Victory Bonds on the instalment plan saved money that they would not otherwise have saved.

The guarantee back of Canada's Victory Bonds is the same as the guarantee back of a One Dollar or a Two Dollar bill. There is this difference, however, that you get interest on the Victory Bonds and you don't on the One or Two Dollar bill.

Canada's Victory Bonds will always be accepted as security for a loan.

Banks are ready to loan money on Canada's Victory Bonds.

Canada's Victory Bonds may be turned into cash at any time.

There is no other way in which you can invest your money with such absolute security—paying such a good rate of interest.

Canada will soon give her citizens an opportunity to buy Victory Bonds 1919. It will probably be the last chance to buy Canada's Victory Bonds on such favorable terms.

*Prepare to buy as many Victory Bonds this time as you  
now wish you had been able to buy the last time.*

## Victory Loan 1919

*"EVERY DOLLAR SPENT IN CANADA"*

Issued by Canada's Victory Loan Committee,  
in co-operation with the Minister of Finance  
of the Dominion of Canada.

IF YOU WANT A CHEW  
THAT WILL JUST SUIT

YOU ASK FOR

**STAG**

**CHEWING TOBACCO**

RICH AND SATISFYING.

IT IS ALSO KNOWN TO BE  
"EVER-LASTING-LY GOOD"



## Do You Require More Capital?

For ten years, Royal Securities Corporation has been associated with the development and financing of Canada's most successful pulp and paper enterprises. Among them are:

*Abitibi Power and Paper Company.  
Brompton Pulp and Paper Company.  
Mattagami Pulp and Paper Company.  
Price Bros. and Company.  
Riordon Pulp and Paper Company.  
Fraser Companies, Limited.*

Do you desire to pay off floating indebtedness; increase your plant capacity; or acquire additional properties? If so, why not let us suggest ways of financing your requirements? Our Engineering and Statistical Departments are at your disposal.

**Royal Securities  
Corporation  
Limited**

164 St. James St.,  
MONTREAL

58 King St. West,  
TORONTO