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CANADIAN FORESTRY MAGAZINE

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CIRCULATION

Vol. XVIII

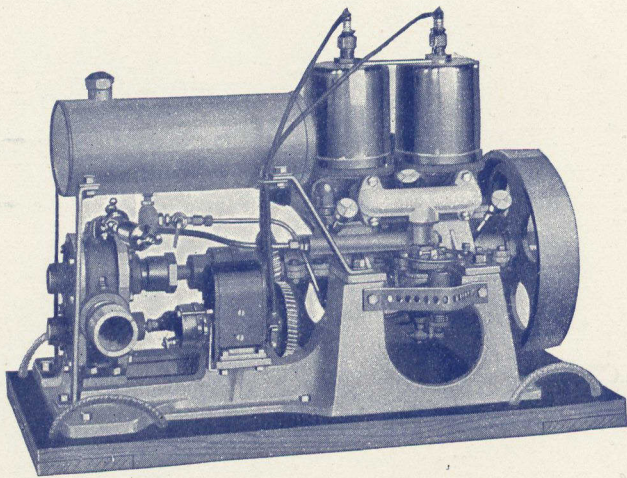
OTTAWA, CANADA, MAY, 1922

No. 5.



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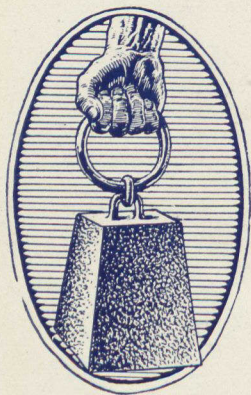


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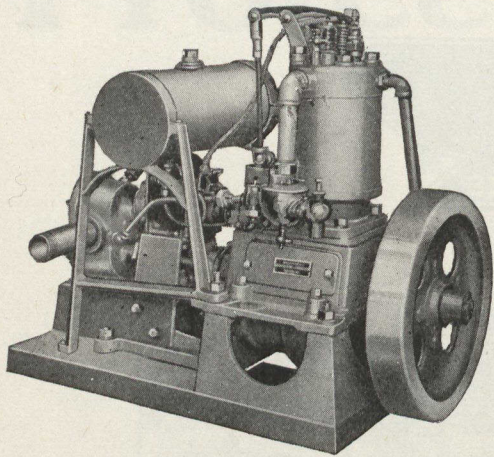
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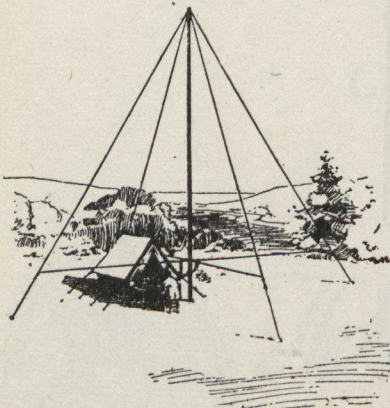
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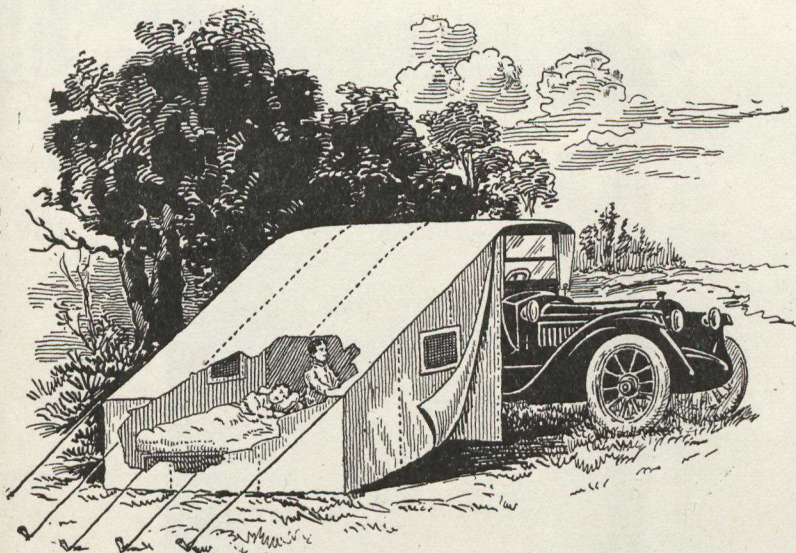
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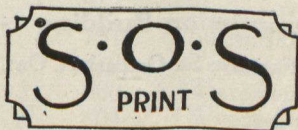
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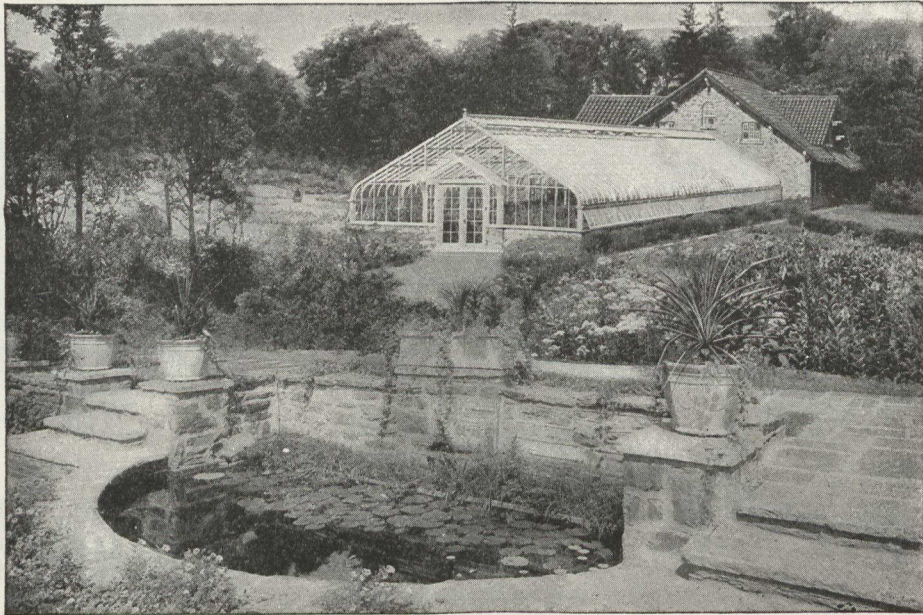
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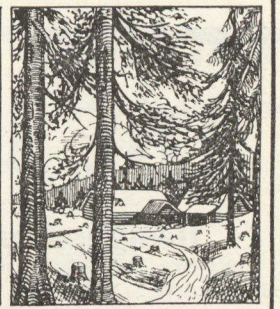
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A Monthly Publication, National in Scope and Circulation, Devoted to the Conservation and Development of Canada's Forest Resources.

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No. 5

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TABLE OF CONTENTS

	Page		Page
Spotting Fires from Look-out Stations (Illustrated) by E. H. Finlayson	763	Roads of Remembrance	783
Canada's Forestry Conditions and Problems (Illustrated) by Dr. C. D. Howe	765	Practical Forestry of Mr. Barnjum	785
Month's Activities of Canadian Forestry Association	767	Beautifying Canadian Roadways by J. Henry Moore	788
In the High Woods (Illustrated) by Frederick Niven	768	AERONAUTICAL SECTION	
Specializing on Forest Protection (Illustrated) by W. N. Millar	770	Forest Survey from the Air (Illustrated) by Ellwood Wilson	790
Curb Setter, Spare the Trees!!! (Illustrated) by Samuel Newman Baxter	773	Winter Flying in Canada's Far North	792
Reel Fights with Real Fighters (Illustrated) by Irene Todd	776	Air Board Statistics	794
Les Forêts de l'Alsace-Lorraine	778	Wireless for Aircraft Services	795
Editorial	780	FINANCIAL SECTION	
The Logging Tractor as a Money-Saver (Illustrated) by J. S. Innes	784	The Investment Field (Especially written)	796
		Personal Mention	798

INDEX TO ADVERTISERS

(Alphabetically arranged)

	Page		Page
Betty Brand Milk	804	Imperial Tobacco Co. of Canada	802
Bovril	794	Instruments Ltd.	804
Business and Professional Directory	786	Klim	791
Canadian Explosives Limited	783	Laurentide Air Service	762
The Canadian Fairbanks-Morse Co., Ltd.	Inside Front Cover.	Linn Logging Tractor (Mussen's Ltd)	760
Canadian Fire Hose Co., Ltd.	804	Lord and Burnham	758
Canadian National Railways	Inside Back Cover.	The Marconi Wireless Tel. Co. of Canada, Ltd.	803
Canadian Pacific Railway	801	Kenneth McDonald & Sons, Ltd.	799
Can. Woodlands and Pulpwood Agency Reg'd.	789	Province of Ontario	787
The Crabtree Co., Ltd.	795	Pulp & Paper Companies	796
Delco Light	785	Royal Bank of Canada	798
The E. B. Eddy Co.	783	Semmelhaack-Dickson, Ltd.	759
Ericson Aircraft Ltd.	794	Sampson Office Service	759
Ford Motor Co. of Canada, Ltd.	757	Simmons, Ltd.	793
Globe and Rutgers Fire Ins. Co.	783	Sutherland & Parkins	793
Grand Trunk Railway System	800	Tobacco Products Co., of Canada	Outside Back Cover.
Grant-Holden-Graham, Ltd.	804	Waterous Engine Works Co.	795
Gray Rocks Inn, St. Jovite, P.Q.	795	Windsor Hotel, Montreal	758
Greenshields & Co.	797	Wonder Pump and Engine Co. Ltd.	759
Hardinge Bros. of Canada, Ltd.	782	Woods Manufacturing Co., Ltd.	785
		Woolsey, T. S. Jr.	785

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Spotting Fires From Look-Out Stations

Some Details of How this System is Working out Satisfactorily in British Columbia Dry Belt.

By E. H. FINLAYSON, Dominion Forestry Branch.

NOWHERE IN CANADA are topographic and other conditions so favorable to the operation of a fire look-out system as is the case in the dry belt of British Columbia, and in that part of the dry belt which is under Dominion control, the Dominion Forestry Branch has gone farther in intensive look-out development than has been done in any other part of Canada. The only serious difficulty met with in the operation of these look-outs occurs during periods of prolonged dry, hot weather, when fires are numerous and the resulting pall of smoke tends to "blind" the look-outs.

Several of these specially constructed and equipped look-out stations have been installed, and within the next year or two it is anticipated that complete look-out control of all territory within the dry belt will be available. The accompanying photograph gives a very good idea as to



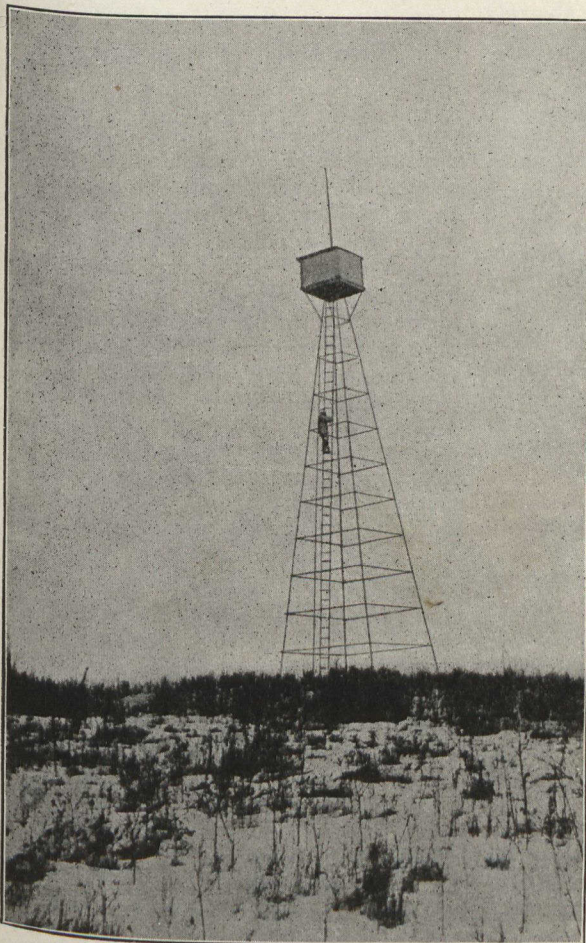
Green Mountain Look-Out, B.C.

the type of building used for the purpose, the most essential feature of which is, from the standpoint of visibility, the extensive use of glass on the entire four walls of the building. As these buildings are generally

located on exposed points, it is necessary to have them protected against lightning by use of arresters.

In one of these small look-outs the look-out man goes to work in the Spring of the year, and his duty for the entire fire season is to stay on the job at the look-out, spotting and locating fires. Although the immediate location of fires is of importance this information would be of only very restricted use if it were not possible for the look-out man to communicate the information rapidly to the officers responsible for the suppression operations. Consequently, all look-outs are connected up by telephone with the Forestry Branch and government telephone systems, so that at all times a look-out man is in direct communication with other officers of the protective staff.

Inside the look-out the main equipment used, in addition to the telephone, is a pair of field glasses and an

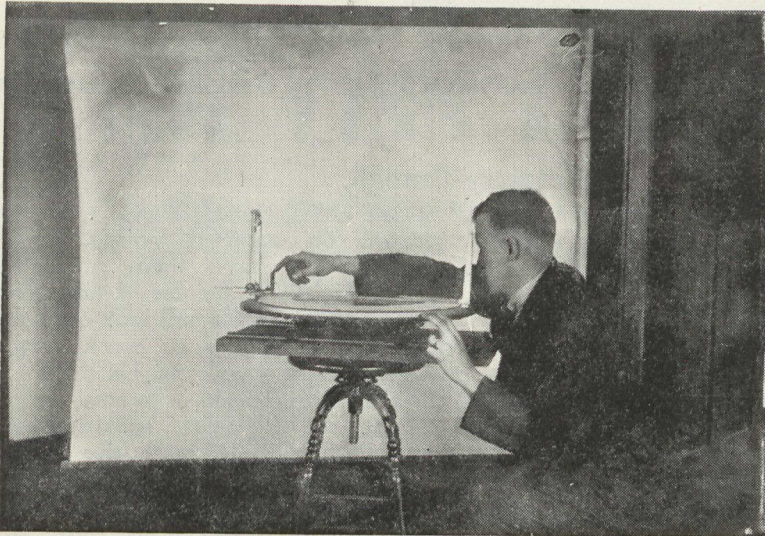


Roblin Steel Look-Out Tower.

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Other
Types
of
Look-Out
Towers



Look-Out on Pines Forest Reserve.



ABOVE
—
Fire-Finding Apparatus
Used with
Very Satisfactory Results
in
Look-Out Stations.

instrument known as the Osborne Fire Finder. The use of the former is manifest, while the functions and use of the latter it is desired to describe, so that persons interested may have some comprehensive idea as to the scientific methods being applied in the location of fires.

Osborne Fire Finder

The Osborne fire finder was invented by W. B. Osborne, of the U. S. Forest Service at Portland, Oregon. It consists of a heavy circular metal base graduated near the outer edge. This base is supported below on four short metal legs, or points, which rest on two solid metal rods. The rods are screwed to a board and act as a track or guide upon which the points can slide back and forth. This sliding device is for the purpose of overcoming any nearby obstruction which may be in the line of sight as, for instance, an upright or a window-frame in the look-out station itself.

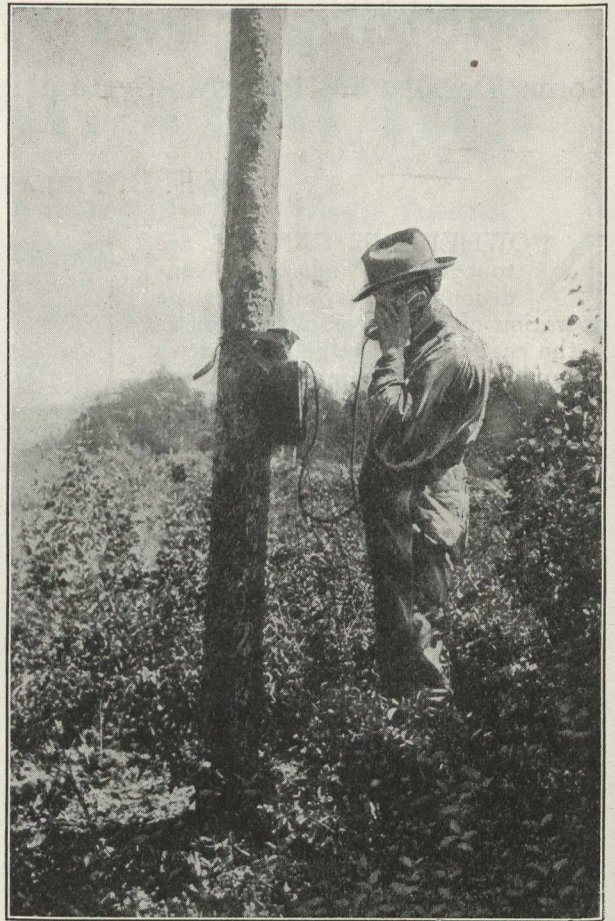
Attached to the graduated circular base and lying flat upon it is a detachable circular disk of sheet metal. Mounted on the surface of this metal disk is the map of the country, surrounding the look-out station. The map is so mounted that the position of the look-out station on the map is exactly in the center of the disk. The whole map and disk are covered with a transparent shellac, or varnish, to preserve it and prevent it becoming marked or weathered.

Fitting on top of the graduated base piece is a sliding metal ring of a slightly smaller diameter than the base and which may be turned through 360 degrees in either direction. To this sliding ring are attached two upright sighting pieces;

also a handle, or grip, for the purpose of turning or sliding the ring. The sighting is done through a small slit or a peep-hole in the eyepiece upon a vertical horse-hair in the object-piece.

A horizontal horse-hair is also stretched between the two sighting pieces. Stretched with edge up between the two uprights and just above the map is a flexible metal tape. It is graduated into inches and fractions of inches from the middle toward the ends, and by means of it the distance from the look-out station to any point on the map may be read. Attached to the sliding ring, at the base of the upright eyepiece, is a vernier for the purpose of reading the angle through which the line of sight is turned.

The instrument also includes an attachment for the sketching of a panoramic profile of the surrounding country. A paper circle is laid over the map. Then, by following with the "point" the outline of the mountains and hills as they exist, their profile is automatically transferred to the paper. The thumb-screw imparts a horizontal movement to the pencil at the same time that it moves the point in a vertical one. The complete instrument weighs about fifty pounds.



AT RIGHT
—
Fire-Ranger Telephoning
in
Report of Fire.

Two Reports Necessary

If a piece of country is to be properly controlled by look-outs it is desirable and necessary that for practically every point in the tract there should be visibility from at least two look-outs. Immediately a look-out man spots a fire he uses his Osborne instrument to determine the location. With his general knowledge of the country and with the good topographic map with which he is provided, he is able to tell fairly accurately the location of the fire from his station. This information is communicated to headquarters. Similarly, another look-out man, spotting the same fire, telephones the direction, the approximate distance, and the approximate location, to headquarters. With two such reports on the same fire, it is a comparatively simple matter to apply the intersection method and to locate the fire to within a quarter section. The writer recalls an instance in Kamloops last season when the same fire was being reported simultaneously from two look-outs on two telephones at the district office. It will readily be seen that with look-outs functioning to this degree of efficiency, it makes it possible to get the necessary man-power and equipment on the fire within a very reasonable time.

Canada's Forestry Conditions and Problems

The Evolution of the Wood-Using Industries, their Importance to the Empire and Some of the Perils with which they are Beset.

By DR. C. D. HOWE, Dean of the Faculty of Forestry, University of Toronto.

A DETACHED OBSERVER, looking upon the affairs of men, would note the occurrence of definite periods of confidence and fear, boastfulness and humility, periods of enthusiasm and high endeavor, periods of depression and futility. These periods recur quite regularly in cycles; they recur in cycles in the individual's life and in the nation's life. The causes are not well understood: they may be environmental or they may be psychological or both. Too often they may be chiefly psychological. Since the psychology of the industries is largely the psychology of the people concerned in them, they, too, exhibit cycles of buoyance and flaccidity, of prosperity and poverty, cycles of aggressiveness and timidity.

With these general observations in mind, let us turn to our wood-using industries, or rather the sources of supply of raw materials for those industries, the forests, and inquire through what periods the attitude of the people, the national psychology, has passed with regard to them.

In the first place, we are all familiar with the fact that the forests must give way to agriculture. In the early days the pioneer and the forest were enemies because at that time the settler could not get the necessities of life from the forest, but the products of the farm were entirely sufficient for his simple wants. The quickest and easiest way to get rid of the forest was to burn it. What a story it has been! What a record of achievement! When one beholds the wide, rolling uplands of Ontario, the fertile meadows of the St. Lawrence valley, and the green fields in the provinces down by the sea, he is lost in admiration for the sturdy pioneer who destroyed the forest to create the farm. You know ours is a vast country with a small population and, therefore, we are still in the pioneering stage. Within less than 100 miles of Montreal one still finds the settler clearing the forest to make a farm. Within a few miles by rail from any of the large cities of Canada one may find the pioneer development of farms and mine on a large scale. Forest conditions have changed. The value of the forest has increased enormously in the past 100 years but unfortunately the mental attitude of



Dr. CLIFTON D. HOWE.

the pioneer has not materially changed. A large percentage of the destructive forest fires in Eastern Canada are caused by the carelessness of the settler and prospector. If we include those chargeable to the pioneer railways, then we may say that much the greater portion of the forest devastation is attributable to the pioneer spirit. Our forests suffer grievously from the inertia of a fixed idea.

Forest Conservation Measures

During the early eighties a remarkable wave of enthusiasm for forest conservation swept over Canada and the United States. It took the form of fire protection legislation, tree planting on arbor days, and the establishment of forest plantations. Among the leaders of the movement in Quebec were Sir Henri Joly de Lotbinière and Mr. William Little, whose names public spirited people still revere. At this period there was much discussion of the approaching exhaustion of the timber supply. One writer lamented the fact that the pine logs in the drives would yield deal boards only two feet wide compared with the logs of previous years that would square from two to three feet. Mark the dimensions, those of you who have seen the log drives of recent years! A prominent lumberman predicted that the supply of pine in Quebec would not last more than 25 years. Over 60 million feet were cut in the Pro-

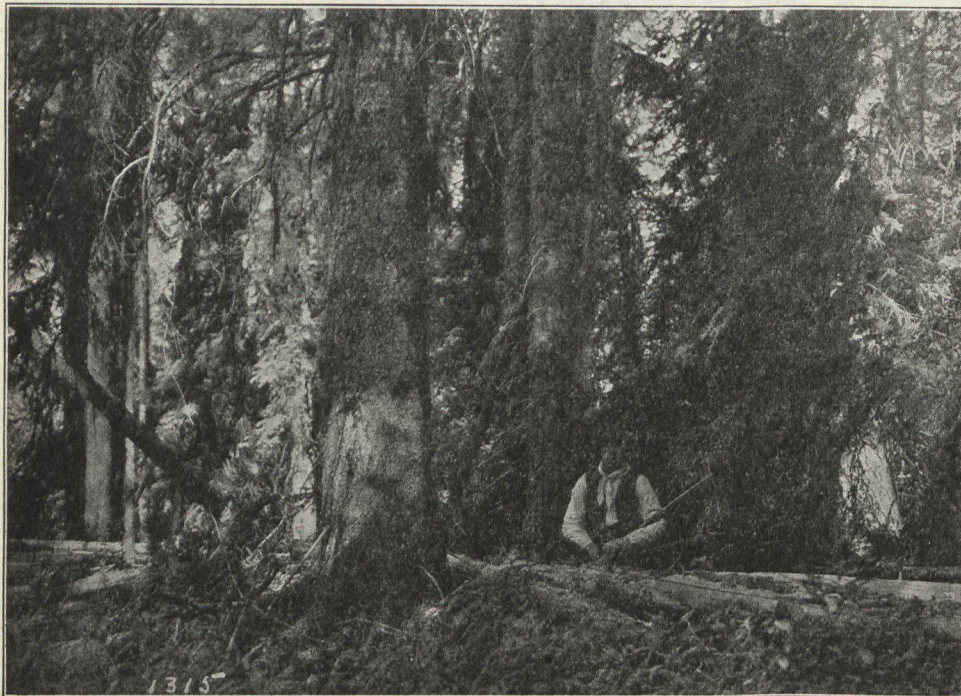
vince in 1920, which shows there is still some pine left. Yet the lumber man was right. Using the standard of his time, his prediction came true. Forty years ago only the largest and finest trees were taken. It apparently never occurred to him that it would ever be profitable to use trees less than two feet in diameter. He couldn't have imagined the use of small pine logs for laths and matches.

During the next period the pendulum of public opinion with regard to the forest resources swung far in the other direction. It was a time of great industrial development and of increasing prosperity. Owing to increasing demand, timber values mounted rapidly. Fortunes were made in timberlands, more often, however, by the speculator than by the actual operator. Yet, great business organizations were built up by sagacious and public spirited men. Their achievements stand high in the annals of Canadian industries. Quite naturally, however, there developed a feeling of over confidence with considerable expansion in the thoracic region. Our forests are illimitable and their supplies inexhaustible. Why worry? All talk of the necessity of husbanding the forest resources is the blank-edest nonsense. It was an unpopular thing to say aught to the contrary. Indeed, some of the prominent conservationists of the time were publicly accused of being unpatriotic and of attempting to check the industrial development of the country. Unfortunately, some of these unfounded conceptions have persisted down to the present time, having been kept alive by the unthinking but loquacious politician on the hustings and having been perpetuated even in school textbooks. Let me say, again, that our forest resources have suffered grievously and in the future will suffer still more grievously from the inertia of a fixed idea.

Commissions Appointed

Gradually the reaction from the feeling of over confidence with regard to forest supplies set in. The hinterlands were being explored and the notion that they were densely forested was exploded. The effect of the awful devastation by forest fires on future supplies was slowly soaking into the public conscience. This

"BEFORE"



Spruce on Shores of Highwood River Before Fire.

feeling of uncertainty as to the future was common to Canada and the United States and it culminated in the establishment of Commissions of Conservation in both countries in 1908 to 1909. The Commission in the United States was established before that in Canada, but ours lived longer, being strangled to death only last year. The leaders in the United States were such men as the then President Roosevelt, Gifford Pinchot, Judge Taft, and in Canada, the then Premier, Sir Wilfrid Laurier, Sir Clifford Sifton and the Late Senator Edwards. The period was characterized by a stock-taking of all resources—a very simple and fundamental idea, the first step in any private business organization, but one that for some obscure reason always meets with opposition, especially from politicians, when applied to public organizations. We shall never know what it is necessary to do for our forests, for example, until we know what we possess in terms of present capital stock and its rate of natural accretion in relation to the present and probable future harvests of timber and pulpwood. The late Commission of Conservation was the only organization that ever attempted such investigations on a Dominion wide basis—and it was cut down in the dark before its work was completed.

After the Great War we were very humble, but at the same time very proud of the Empire's achievements. We are finding out by sad experience in our industrial and social relations

that some of the most important results of the war were not the most obvious at the time of its cessation. Among other things the war taught us the value of the Empire's forests and, as you know, the Canadian Forestry Corps was a very important factor in winning the war. The importance of the forest as an auxiliary unit in warfare led Great Britain to establish a Forestry Subcommittee as a part of its great Reconstruction Committee that did such magnificent work in meeting the changed requirements of peace. The Forestry Committee reported

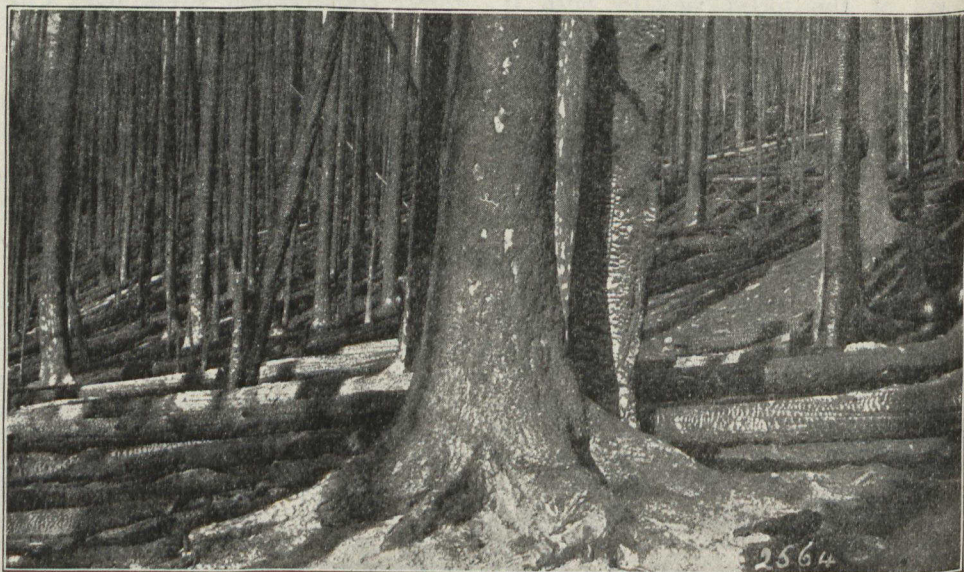
upon the forest conditions in all parts of the Empire and formulated plans for a great reforestation program, involving the planting of 1,700,000 acres and the expenditure of \$75,000,000. In the case of Canada, after pointing out the dependence of Great Britain upon the forests of the Dominion, especially those of Canada, describing the efforts of the various forestry organizations, and urging the extending and the speeding up of their work, the Committee makes this statement: "The forest capital of Canada is growing less year by year. This, we submit, is an Imperial question of first magnitude which deserves immediate attention of the Imperial and Dominion Governments." As the result of the recommendations of this Committee, an Imperial Forestry Conference was held in Great Britain in the summer of 1920. Six delegates attended from Canada, Quebec's representatives being Ellwood Wilson, Chief Forester to the Laurentide Company, and Mr. Bédard, Assistant Chief Forester to the Quebec Government. Among other things, the Conference recommended: complete surveys of forest resources in the various dominions and the gathering of data on the rate of growth and regeneration. It stated that such data were absolutely essential to rational and economic management of the forests.

An Imperial Question

The Imperial Forestry Conference marks another period in the history of our forest treatment. The direct interest of the Empire in how we

(Continued on page 800.)

"AFTER"



What Was Left of Highwood River Spruce after Fire.

Another Month's Record in Serving Canada

IT IS WELL that the members of the Canadian Forestry Association (which means practically every person reading this issue) should know the day-to-day programme of actual educational work carried out by the Association.

At the moment of writing (April 25th) our Forest Exhibits Car, "a forest protection school on wheels" has completed a tour of Vancouver Island during which very large crowds, running often to thousands daily, came 'aboard' and benefitted by the graphic instruction of the scores of exhibits. Every evening a motion picture demonstration and lecture was given by the combined efforts of Major Cowan of the B. C. Forest Service, and Mr. G. Gerald Blyth of the Canadian Forestry Association and still more thousands were reached with this highly effective form of anti-fire propaganda.

The Exhibits Car has passed to the Mainland and will cover scores of communities in the Coast and Interior areas, moving later to Eastern Canada.

IF YOU WERE to alight from a train at Bassano today (April 25,) you would see on the siding with flags flying and a crowd of men, women and school children about its doors, the Tree Planting Car which is the second such enterprise maintained by the Association. The Tree Planting Car is not an exhibition car, as is the special car now in British Columbia, but is equipped as a motion picture auditorium, with sloping floor and special seating. With Mr. Archibald Mitchell, Western Lecturer of the Association and Mr. Angus G. Cooch, assistant, this enterprise, now in its third year, is performing a sterling service. There is nothing like direct contact with the individual settler at his own door as a means of getting action in the planting of trees. The whole of Western Canada has given the heartiest welcome to the Tree Planting Car which is now almost a "fixed institution."

OUR NEWSPAPER publicity service is on a new and systematic working basis. There are several hundred newspapers of influence in Canada and scores of magazines. The business of our publicity bureau is to supply news articles and propaganda on forest fire prevention and tree planting. The Canadian Editor is counted as an unflinching friend of the Association's work and readily opens the door to a powerful source of public influence.

Nine Travelling Lecture Sets are moving from town to town each engaging one or more audiences in schools and churches, Y. M. C. A.'s, etc. Two sets deal with reforesting waste lands, two with British Columbia's problems, two with tree planting on the prairies and three with forest fire prevention. These lecture sets reach at least three hundred persons every week-day in various parts of Canada.

THERE IS NOT space here to enumerate the fifteen to twenty other forms of educational enterprise employed by the Canadian Forestry Association. A brief reference will suffice.

The School children of Canada are reached by forest protection talks supplied to the teachers.

The Boy Scouts in many districts are influenced as forest protectors by special editions of literature, badges, etc.

The churches willingly accept our forms of special addresses to the congregations on forest fire warnings.

A great many other avenues, such as the menus of dining cars, cigarette packages, etc., carry Canadian Forestry Association "sermonettes."

Hundreds of advertisers throughout the country substitute our special "fire copy" for their regular ads. in newspapers and magazines for months at a time.

THERE IS no avenue of proven value in the winning of public opinion that the Canadian Forestry Association does not adopt, up to the capacity of its staff and strictly limited revenues. Next month we will publish a statement relating to the Association's work during the month of May.

THE PRICE OF INDEPENDENCE

Dear Member:—

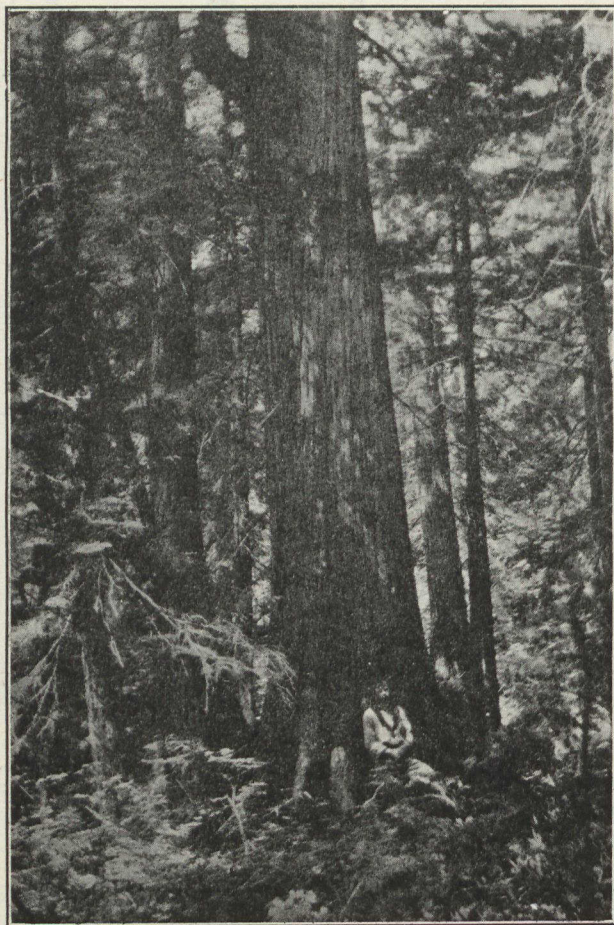
The Canadian Forestry Association is a citizens' institution belonging to no government or commercial interest. Its whole purpose is to uphold and press forward the cause of forest conservation. It is supremely a CITIZENS' CAUSE for the forest areas of our Dominion are public-owned to the extent of 85 per cent and it is primarily the Canadian people as a people who will reap the happy harvest of sane forest management or pay the disastrous penalty that follows the wrecking of the forest estate.

Supplementing our constructive educational work in the protection and proper husbanding of the forest resources, the tree planting campaigns on the bare prairie areas merit equal public attention and support.

Whether in winning the personal help of thousands of Canadians in the prevention of forest fires or in aiding thousands of prairie settlers to commence tree planting, our Association is a true servant of the Canadian people. Organized and maintained on a voluntary basis, the power and influence gained from our freedom from control by governments or commercial interests are focused upon a purely public service. Without independence, the Canadian Forestry Association would amount to little. The price of that independence is as positive as the price of a commercial commodity. It must be paid for in the loyalty and sacrifice of ten thousand citizen members, or the Canadian Forestry Association would go to the wall.

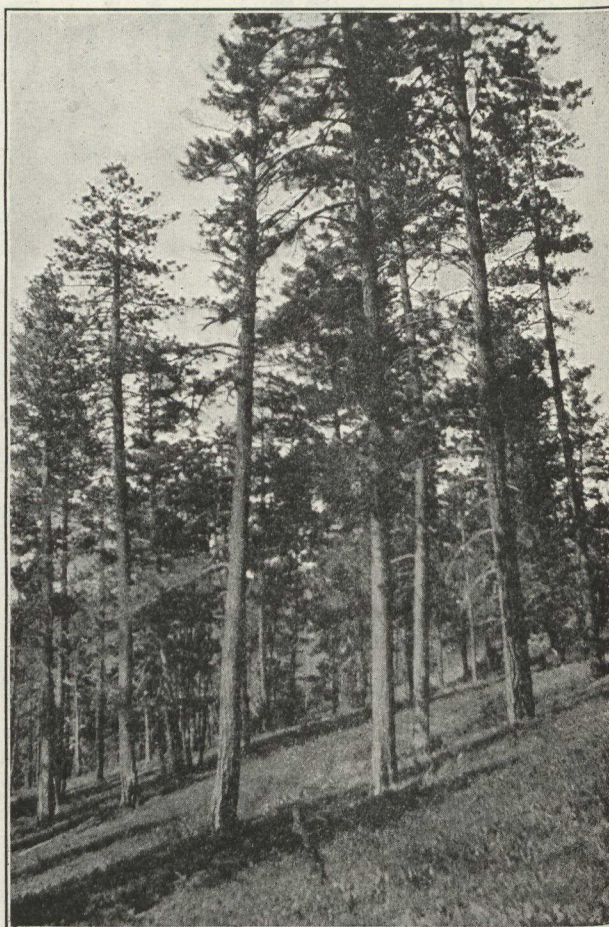
Read in the neighboring columns something of the actual programme of YOUR association.

ROBSON BLACK, Manager.



Western Cedar.

In the H i g h W o o d s



Prospect Valley, B.C.

By FREDERICK NIVEN

MERELY TO look up at the high woods from the trains passing through in the valleys, or soaring out a few seconds in space over a white creek, is simply not to know them. Seen from the train, or even from the towns in the Rocky Mountains, the woods are utterly different from what they are when visited. Those great and seemingly even humps of green that might be of moss, with a rock or two protruding, are then discovered to be fissured and wild mountains decked with trees of many varieties and, under the trees, gemmed with exquisite flowers. An ancient and eternal spirit seems to live there, terrible or consoling according to one's mood—but always luring. Trails, unseen from the car-window, or from town, wind through narrow brown ribbons of tamarack needles, soft and resilient as Wilton pile. By the trail edges simple stars of Bethlehem live their lives and fade, the blossoms of the thimbleberry and saskatoon bushes flaunt and wither, and speckled lilies, with a touch of the exotic in their hues, match the humming-birds that come up from South with the Summer.

The great green hush gets into one's heart; it is strangely broken by

the sweet sad trills of birds, trills without echo, muted by the world of leaves. Back with him, out of the woods, any average human traveller must surely take something beyond price, if it is no more than this in value in the shops; memory of a wild rose-bush tossing in a passing shower, as though agitated a moment, and in its agitation sweet, creating a little pool of scent among the rough odour of all the pines. Such as that are the memories carried away, to call one back. There are other memories. One can never again lunch in city restaurants in the old contented way, who has boiled the billy in these serene places, and had ground squirrels come and sit close by the while, in attitudes suggestive of devotion, bolt erect on their haunches, little forepaws touching as in prayer, chirping for crumbs—not really devoted, but perkily friendly.

In the density and vastness of the woods there is a hint of the terrible. Mile after mile of them cannot be traversed without aid of an axe to cleave a way, unless there is a trail through. The great hush is some-

times, in a thick forest, just on the verge of what some call spooky. But a ray of sun sweeping through between the faint undulations of a fir-branch, the gold lights, the green shadows, these invite almost indescribably. Occasionally, at night, in bed in a house, the terrible in them is accentuated in retrospect. There comes a feeling of dread. They are too wonderful. But in the morning the lift of them under a sailing cloud has its way; the grandeur and the beauty are more than terror. Though one may shudder at such gushing talk as "the mountains are my brothers," yet, without saying anything gushing about them, may a man feel that he just has to go back. In town are the smells of gasoline, face powder, cosmetics and so forth. Up there is the smell of balsam, of the tamaracks, of wild mint.

Sounds occur in the quiet, emphasising it, sounds strange at first but later explicable. Now and then is heard one that makes those who are new to the woods think that somebody, somewhere, is cranking a car, often and ineffectually. Where is he, that motorist? Is there a road not far off? So wonders the tender-foot. It is only the sound made by a

blue grouse drumming with its wings. Again it seems there must surely be a cart on one of those zig-zagging roads that take the slopes in long easy grades. A man might be willing to take oath that he heard the jolt of a wheel over a rock in a rut. He raises his head and listens. No! Nothing! Only the silence, and the roar of a creek that does not break it, muffled. Then again the jolt. Yes, a cart somewhere, he is sure. The sound not coming again, he decides that it has gone away from his neighbourhood on a stretch of grade. Then bump! bump! He comes to the conclusion that it is drawing closer again, climbing or descending on another reach of road zig-zagging near. But there is no cart. There is no road maybe. Old-timers explain that seeming ghostly or super-natural (though all, of course, is natural) phenomenon in this way: in the roaring of a creek, they say, many sounds are made as one, but in the leafy echoes they are dissevered. What seems a gentle noise of wind running in the trees may suddenly puzzle a wanderer in the high woods as he notes that the tree-tops are motionless. It is the echo of the gentler rush of the water he hears, a leafy woodland echo. The sound as of a wheel jolted over a rock, they say, is the echo of boulders rolled, bumped, clicking, in the downward pour of a stream. Yet to some the high woods remain inexplicably haunted. To come to an old cabin falling into dust by the trail side, and be chattered to by a squirrel on the roof, or chirped to by a chipmunk frisking in and out of the glassless window space, is an experience too. Out of the subconscious come all manner of memories, or old reveries, on the theme of houses built and fallen into decay, left to the sun and rain, and the derision of the squirrels. They are symbols, these old trappers' or prospectors' cabins, deserted, with no name-plate on the fallen door.

There are trails that, frankly, this traveller would rather not travel after dark, not because of any wild beast, not because of the danger of stubbing a toe on a root and crashing down, but just because of the still trees, and the hush, and the roar of the everlasting streams pouring down out of the mountains. A candle stuck in an empty punctured can is very pleasant when overtaken by night in these places. (The name of such a lantern out west is, by the way, a "bug".) The radiance it sheds is very consoling to a man, a creature higher than the brutes, yet not with the presumable knowledge (and answers to haunting human questions) of the angels.



In the High Woods.

In full day there come moments in the mountains when one has to restrain ecstasy so as to save the wearing of the nerves—full day with coloured butterflies flaunting past, feathery wrought leaves and lonely blossoms, that sweet sad trill of the birds, the harsh jeer of the jay, the dart of his blue among the green. There are few who manage to see the bear-cubs boxing with mother bear looking on, or coyote pups rolling

over each other and jinking and frisking. Their little puppy yelps at such play may be heard sometimes; but the old mother, scenting men, stops the game. One more often hears the breaking of the branches by the antlers of a disturbed deer than picks out its body from the mottled light and shade of its surroundings.

There are sights in the mountains that make some people shudder and understand the apostle who, in his dream, saw some beasts or creatures as clean and others as unclean. A queer soiled white web, cone-shaped, round the end of a forked branch, a bag of gauze all wriggled over by a cluster of caterpillars, several of them in great agitation, whipping back and forth, others quiescent, affects most with repugnance. Yet that bit of life and work and instinct on a branch end is just one of the many miracles that make the whole miracle of life. We are apt to think that all life is for us, deer to be venison on the menu-card, bees for our honey, beavers for our wives' muffs. Up in the high woods it dawns that it is not so. Many thoughts dawn. But the robust air, and the exercise of travel, prevent our restless thoughts from wearing us out. We have other causes of attention, distractions from trying to piece together what it is all for; we have to set firm, re-adjust the sagging pack; ford a creek; find a camp-place, and wood for the fire. Thus we retain balance among the majesty and great beauty of the high woods, and their hush, a hush not broken, just dabbled over if one may phrase it so — exquisitely, poignantly — by the sweet sad trills of the birds.



Douglas Fir, near Tranquille River, B.C.

Specializing in Forest Protection

Organization Consists Largely of a Stationary Staff, Each Member of which Functions Along Certain Definite Lines

By W. N. MILLAR.

AS APPLIED to forest protection, specialization involves two primary modifications of old style methods. These are, on the one hand, an extensive centralization of executive authority in the hands of certain field officers, who are responsible for the protection of certain clearly defined forest tracts and, on the other hand, a classification of the duties of the field staff into certain well-defined functions and the assignment of special men to the performance of these special functions. This is best understood, perhaps, by comparing the actual organization of the old style forest protection staff with the modern specialized staff. In the more primitive of the former the staff consists of a number of district chiefs or



Effect of Fire in Dense Stand.



Spruce Forest

Burned

14 Years ago

and again

5 Years ago.

All

Reproduction

Killed.

inspectors each of whom is responsible for the general supervision of the patrol staff in a certain area. These inspectors are most likely permanent employees. Under each is a number of patrolmen or rangers, assigned either singly or in pairs, to a certain subdivision of the inspector's district, called as a rule a "beat." Each of these rangers is responsible for his own beat only and within that area he performs all the functions of the fire prevention staff. The district chief or inspector is required to keep moving from beat to beat principally for the purpose of ensuring that the rangers are in the areas assigned to them and are performing their duties. In addition, he, being a permanent employee and presumably more skilled in those duties than the temporary staff, can assist the latter by advice and instruction. This extremely simple form of organization has, however, only one point in its favour which is that it can be employed where the field staff is wholly untrained or unskilled in modern protection methods while no other form can be so employed. It is, therefore, particularly adapted to regions where the subordinate protection staff consists of extremely low-priced labour, as in India where natives are largely employed for this work. Where our own standards of

wages prevail, such a system to be effective must be tremendously expensive. This is as inevitable in forest protection as it is in other forms of organized human activity such as manufacturing, transportation, or military affairs, from all of which in the modern world this system has long since disappeared.

Constrasted with this method of protection are the various more or less elaborated systems of specialization that have been developed by the leaders in forest protection. These developments differ in no material respect from those that have taken place in other large-scale activity but, owing to the nature of the work, they have followed more closely the methods of organization employed in military operations rather than those of most industrial activities. The most striking characteristics of a specialized staff is that instead of being a constantly moving patrol, each man confined to a limited area within which he performs all functions, it becomes very largely a stationary staff, each member of which performs only one function but may extend his activities over a large number of the old-time beats. Thus, instead of each man being individually responsible for detecting fires, certain men are specially assigned to this work and are located permanently on prominent lookout peaks or towers; instead of each man being responsible for putting out such fires as occur, special men, selected, equipped, and located with this one end in view are placed at strategic points and are despatched only to such fires as are discovered by the lookout men; instead of each man getting in his own supplies for himself or a fire-fighting crew, a special man operating over a large area with suitable equipment and assistants takes care of all the supplies and transportation. In short, to establish a specialized forest protection staff means nothing more or less than the extension of division of labour on the modern basis of function to the work of protecting forests from fire.

Communication

When we speak of communication in connection with forest protection we may have in mind one or the other of two rather distinct concepts. On the one hand, communication refers to the conveyance of materials or of men from one place to another. In this sense communication becomes a problem of transportation and lines of communication become roads, railways, trails, etc. With this type of communication, although it is of vast importance in forest protection, this article is not concerned.

Communication in the other sense means the conveyance of information from one place to another. Obviously this does not necessarily involve any transfer of material substance, and lines of communication become tele-

phone or telegraph wires, wireless installations, or signals of an almost endless variety. In this sense, communication is one of the prime essentials in specialized forest protection. Without well-developed means of transmitting information rapidly between all the numerous elements of a specialized force it is wholly impracticable to employ the distinctive features of specialized organization, and entire responsibility for all lines of work must necessarily be left in the hands of the patrolman, the least trained, and most poorly paid and equipped man in the whole force. This is obviously inevitable, however, in the absence of lines of rapid communication. At the same time it must be kept in mind that forest telephones and other modern devices for securing intercommunication do not of themselves produce specialization in a forest protection staff, but are merely a necessary mechanical device through the use of which functional organization and centralized control are rendered feasible.

It will be readily apparent that the duties and responsibilities of the supervisory officer in a specialized staff are much more extensive and call for a far more careful training than those of any grade of employee in a non-specialized force, or even in the other units of his own organization. He must be more carefully selected, more highly trained, and, naturally, better paid. His duties in connection with fire prevention are as follows:—

Direction of Permanent Forces

The maintenance of supervisory control over the entire prevention, detection, and suppression staff regularly employed in his district is of first importance to the supervisory officer.

To do this it is essential that he be able to maintain communication with all units of this staff. This is accomplished by the proper planning of the permanent lines of communication within the district and the skilful use of the portable and emergency equipment described in this article.

The supervising officer must organize and direct the mobilization of all the forces needed to form the main and supporting lines of defence in fire suppression. While the aim of specialized forest protection is always to handle all fires in the incipient stage this ideal cannot always be maintained and though delays in detection or reporting, faulty location or other failures, some fires will prove too formidable for the "smoke chaser" alone. There are few forest regions even in the more remote parts of Canada's commercial timber-belt

British Columbia's Fire Loss

NEARLY 70,000,000 feet of timber was burned by forest fires in British Columbia in 1921, according to figures issued by Hon. T. D. Pattullo, Minister of Lands. The number of forest fires fought during the summer of 1921 was 1,330, an increase of 6 per cent. over 1920. The fires burned over a total area of 145,800 acres, killing a total of 68,076,110 feet, board measure of which 39,500,000 feet is salvable. The net stumpage loss is valued at \$73,000. About three quarters of all fires were extinguished by provincial fire fighters before they had grown to ten acres. Thus, of the 1,330 fires fought, 554, or 41.6 per cent., were extinguished before they reached a quarter of an acre, 436 or 32.8 per cent. before they reached ten acres.

Further figures show that 1,160, or 80 per cent. of the fires were extinguished before they had done damage to the extent of \$100; 134, or ten per cent., before they did \$1,000 worth of damage, and only two per cent. exceeded \$1,000 damage. The total cost of fire fighting was \$98,500, as compared with \$257,126 in 1920, Mr. Pattullo announces. The average cost per fire is thus \$74 as compared with \$205 in 1920, and \$139 in 1919.

Campers are still chiefly responsible for fire outbreaks in the forests of the province, Mr. Pattullo's statement adds. Careless campers have caused 308 or 23.2 per cent. of the total fires. The remainder were caused by railroad trains, lightning and industrial operations in the order named. Slash destroyed during the year amounted to 74,800 acres, compared with 53,500 acres in 1920. During the year over 1,200 miles of trail were cleared and constructed.

where there is not some form of local settlement. Where agricultural settlers are not found there are still logging camps, miners, construction crews, or perhaps surveyors, tourists, summer residents, hunters, etc. The communication system must be planned to put the supervising officer in direct touch with all these sources of labour and he must organize this labour so that in case of emergency it may be called upon for assistance with a reasonable certainty of an immediate and effective response. This has been accomplished in several ways but probably the most successful has been through the organization of volunteer fire companies, organized with all the necessary officers and bound by agreement to report on call at designated points. Many factors and local conditions necessarily cause wide variations in the possibilities of developing these forces for use in fire emergencies.

In the more highly perfected organizations it is possible to distinguish three lines of defence or classes of forces behind the "smoke chaser." These may be called:—

(a) **Main line forces**, which are as a rule made up of all the available employees of the timber-owner;

(b) **Supports**, which consist of local residents usually scattered through or on the immediate border of the forest who are under definite contract to perform certain specified emergency fire duties; and

(c) **The Reserves**, which may consist of organized volunteer fire companies as outlined above or may be simply an available labour supply at some adjacent centre where arrangements for securing men have been made through labour agencies or other means.

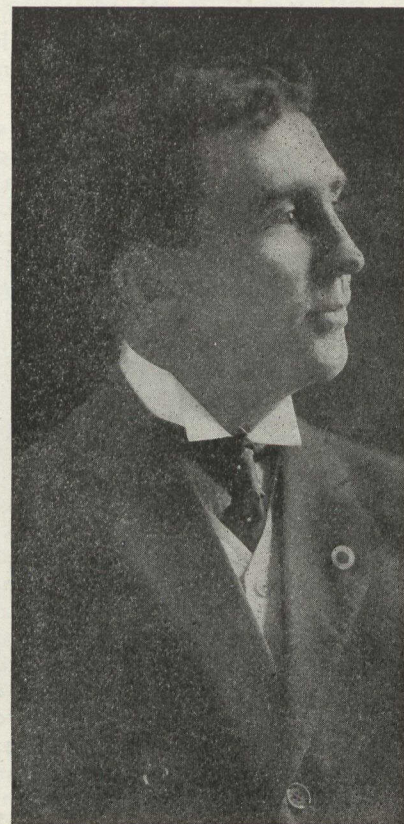
Whatever is the form and com-

position of the Supports and Reserves, the mobilization, equipment, and transportation of these forces to the fire-line must be handled by the supervisory officer and his staff. This is largely dependent upon the system of communication.

Finally, the supervisory officer must provide for the maintenance of his forces on the fire-line and the direction of the work of suppression by these forces. In this, his problems differ from that of the military officer in no material aspect except the merely rudimentary development of his medical service and the absence from his transportation columns of anything corresponding to the enormous quantity of ammunition required by modern troops. A complete discussion of this phase of the function of supervision might constitute the subject matter of a manual of forest protection and is beyond the scope of a manual on communication alone, but the main divisions of it may be very briefly considered. In doing so, however, it is necessary to recollect that although the object of all fire-protection forces is principally to prevent fires, nevertheless the supreme test will come in the actual handling of a dangerous forest fire and all organization must be based upon preparation for this contingency. This, of necessity, involves a somewhat elaborate organization which must be provided though it may never in practice be utilized for the purpose intended. From this it does not necessarily follow that a staff is held idle merely awaiting emergencies that no effort is spared to avoid. On the contrary, the skill of the organizer is shown by the way the necessary staff is secured for emergency work without continuous maintenance.

(To be concluded.)

Our Directory of Directors



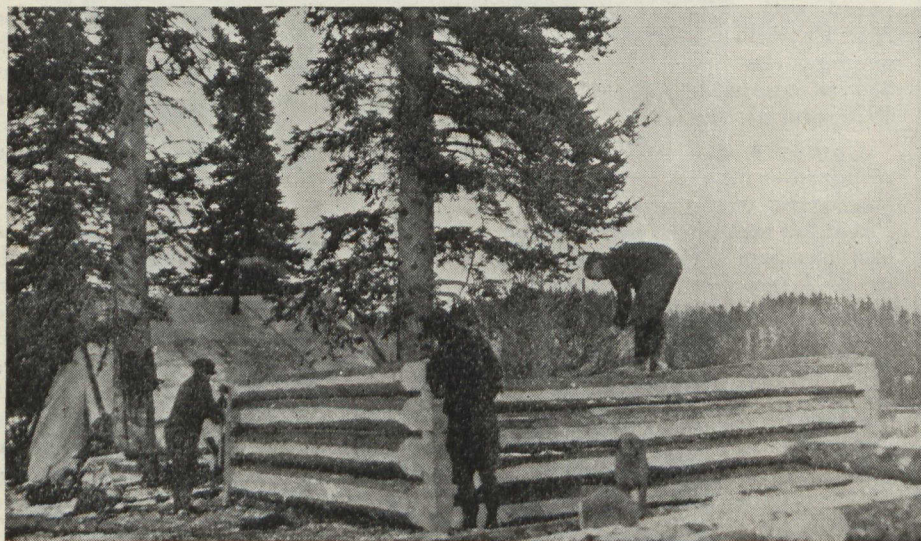
Mr. Walter C. CAIN,
Deputy Minister of Lands and Forests for Ontario.

Mr. Walter C. Cain, Deputy Minister of Lands and Forests for the Province of Ontario who was appointed to that position on October 1st, 1921, on the retirement of Mr. Albert Grigg, has recently been elected a Director of the Canadian Forestry Association.

Mr. Cain has been an employee of the Department of Lands and Forests for many years, and has a thorough knowledge of the work of the Department. He is also an authority on many of the complex matters of business connected with the administration of timber and mining resources of the Province.

Mr. Cain, who is still a young man, was born in the town of Newmarket, Ontario, where he always took a prominent part in athletic activities. Perhaps he was best known as a Lacrosse Player, and was one of the famous Dade-Henry combination on the Brantford Team when the Telephone City for the first time won the Senior Championship of the old Canadian Lacrosse Association.

Mr. Cain's promotion to his present position is the result of merit and was the subject of many letters of congratulation from his numerous friends throughout the Province.



Fire Ranger's Cabin in Course of Construction.

Photo by P. Campbell, Dom. Fire Ranger.

Curbsetter, Spare the Trees!

Advice from Philadelphia Arboriculturist as to Methods of preserving Trees on City Thoroughfares.

by SAMUEL NEWMAN BAXTER.

Photos and article reproduced by courtesy of American Forestry Magazine, Washington, D. C.

AN observer of tree life in cities would have no difficulty writing a book on the vicissitudes of street trees, so ample is the material on this subject and so manifold are the adversities, both preventable and unpreventable, to which trees are exposed when introduced by man to city life. Nature would never select a city sidewalk on which to rear her brood of trees, yet man, in quest of the shade, health and beauty which they impart, invariably expects Nature to care for her own under these artificial conditions and fails to give a helping hand by imitating Nature and providing natural conditions so far as is possible.

In this article we shall not attempt to cover all the vicissitudes but confine it to a chapter on desecrations by the curbsetter, illustrating how to spare trees from the ruthless work of this individual.

Not long ago a property owner appealed for help to restrain who were resetting curbing nearby, and working toward his direction, from cutting the roots of street trees. An inspector was assigned posthaste to see the offender and have him respect the ordinance for the protection of street trees. When reprimanded for cutting the tree roots—they happened to be sugar maples, a tree which resents abuse more than most trees—the curbsetter expressed surprise that he had injured the trees. "Why," said he, "I cut more than that from trees

up on ——— Street three years ago to set the curb and the tree is still alive." Yes, the tree he had cut was still alive. Being a rapid growing silver maple, it tried hard to survive the shock, but in submitting its photograph we leave to the reader how long it will live, or rather, how long it should be allowed to remain in its dangerous position.

Can you imagine greater stupidity than was shown by this curbsetter when he deliberately cut into one-third the trunk of this large silver maple that the curb might be laid? A side from its effect upon the health of the tree, the undermining has caused it to lean over the highway at a dangerous angle, a constant menace to passing vehicles and likely to be blown over in a high wind with the possibility of maiming or killing someone. Needless to say, Mr. Curbsetter learned his lesson and while his theory that a root may be cut and the tree yet live is not infrequently borne



AN UNUSUAL AND EFFECTIVE CURB TREATMENT

This curbing was raised into an arch to protect the roots of a beautiful Norway Maple before the road bed was laid.

out in practice, the same holds good in the amputation of a human limb. We prefer to retain all our members for life's battles, however, and so do trees.

Sugar maples when grown on sidewalks do not ordinarily reach the proportion of nine feet in circumference so when this old specimen was encountered in extending the street, the builder showed good judgment in retaining it despite the snug fit for the narrow planting strip.

The curbsetter insisted on plying his art and rather than omit the curb where the tree projected a few inches, off came a sliver from the base of the tree! True, he did make a neat, clean cut and even painted it, but longitudinal cuts of this sort do not heal over like those made crosswise, and so this monarch of an erstwhile forest must pass the rest of its days with its "heel" chopped off and give thanks from its leafy branches which tower high above the house top that man spared it.

Having observed these two cases—and they may be typical with every community—how not to do it, let us



PRACTICALLY RUINED BY CURB SETTING

This beautiful Silver Maple was ruthlessly cut at the base by the curbsetter, who "had no idea that it would hurt the tree."

note the application of measures to preserve street trees under similar circumstances on the page following.

A European horse-chestnut ten feet in circumference spared by a "break" in the curbing.

This is the simplest form of treating a tree in the line of a curb—a break in the curb—and one which should suggest itself to any curbsetter with common sense. Vehicles may scar the trunk but surely drivers will concede its right to the slight encroachment on the roadway, especially if they could see it in early May when thousands of white blossoms bedeck it and in their rigid upright forms cause the tree to resemble a huge candelabrum. This tree also serves as a hitching post, judging from the chain on the side, though this practice is

not to be recommended. How much better for the trees, and mankind, too, had the curbsetter adopted this treatment for the silver and sugar maples mentioned in the foregoing photographs!

The roots of the old Norway maple on the preceding page had forced the stone curbing out of line and so when a change of the grade in the street at this point necessitated the construction of a new roadbed and sidewalk, the roots were found to extend along the line of the proposed new curb. To divert the curbing would have been a simple matter but the foundation for the same would have jeopardized the roots. The engineers preferred to retain the straight line for the face of the curb and so a reinforced concrete arched curb was constructed to bridge the base of the tree and projecting roots. On either side of the arch it was necessary to build an extension or shoulder as shown in photograph to support the curb, along and under which the root extends for several feet. The top of the shoulder is flush with and forms a part of the brick gutters which have since been laid, and water in the gutter



HERE, AGAIN, THE TREE WAS CUT AT THE BASE

To maintain the straight line of the curb, quite a cut was made on this old Sugar Maple, a species peculiarly sensitive to injury.

may seep under the arch to the roots. Thus we have curbing and the roots, too! Note the wadding of newspapers to keep the concrete off the tree and provide growing space between the tree trunk and the concrete arch.



SAVED BY UNIQUE TREATMENT OF CURBING

This beautiful Japonica was left in its original position, the curbing being diverted to meet its requirements.

Here is another method of saving trees when in the line of newly opened streets, raising the grade to conform with old conditions and diverting curb and sidewalk that the root system may be preserved. Incidentally, this happens to be an uncommon though not a rare tree—**Sophora Japonica**, or Japanese Pagoda tree. Furthermore, it is the largest around Philadelphia and possibly in this country. The trunk measures three feet in diameter and the branches spread over an area of seventy feet. It may have been planted by the late Robert Buist, whose nurseries were not far from the home of John Bartram, who found and introduced that rare and beautiful flowering tree, **Gordonia pubescens**, or Franklin tree. The writer discovered this large **Sophora** when the street of which it is now a part was about to be opened, and recommended its preservation. The many stubs shown throughout the tree are evidence of its previous neglect, but since the photograph was taken these have been

removed in a thorough pruning and the tree is likely to live for many years, affording a grateful shade for the occupants of these houses which have sprung up about it. The bloom, too, will delight for it comes in large panicles, white, peashaped, and in midsummer when trees in flower are scarce.

These are but a few instances of the measures taken to protect street trees in Philadelphia since the Fairmount Park Commission assumed their control in 1912. In that year a systematic street census was taken, plotting and recording 127,300 trees, with information which has since been of infinite value in executing the trust of a tree loving city. Trees mean much toward a "City Beautiful" and with their worth recognized no city or town should be without its Shade Tree Commission or Tree Warden.



CURBING OMITTED—THIS IS OFTEN DONE

This old horse chestnut stood directly in the way of the curb, so the curb was omitted, in deference to its age and dignity!

©
 ROYAL
 SPORT
 ON
 THE
 NIPIGON



©
 TAKING
 OUT
 A
 6 Lb.
 TROUT

REEL FIGHTS WITH REAL FIGHTERS

The Gamy Nipigon Trout Furnishes Excitement and Sport for Those Who Seek to Pick a Bone With Him

By IRENE TODD.

"EVER BEEN to Nipigon? Gad, that's where you get real sport. I never saw such trout in my life—and fighters! The minute you think you've got one of those big fellows you find you haven't got him," said an old sportsman to a young man as they stood before a window in which were displayed rods of various kinds, reels, gaudy flies, lures and baits of every description meant to deceive the eye of the wary sportive speckled trout and his relatives.

"No, I've never been there but it sounds as if it might be just the place I'm looking for," he replied, "I'm planning a fishing trip for the first of June. What's it like and where is it?"

Nature's gentleman chuckled. "Well, I'm not much on description but to me it's one of the most beautiful spots on God's green earth, and, gad! those lakes and rivers are simply alive with speckled trout. But, they put up an awful tussle. Sometimes you land them and more often you don't. I remember one day seeing a chap wrestling away with a big ten pounder and my shouting at him to look for his tackle. "I never saw a trout yet that could break my tackle," he laughed, but just then—bang, splash! and Mr. Fisherman was left standing with nothing but the handle of his rod.

"Lake Nipigon lies north of Lake Superior and has a shore line of 810 miles. The water is as clear as crystal, the lake is studded up into charming little coves and bays. The Nipigon river known as one of the most famous trout streams in the world flows southward in one magnificent cataract after another into Lake Superior. It won't take you longer than a couple of days to get up there."

"Well, I guess its Nipigon for ours!" said the young chap "what would you call a good average sized trout up there?"

"The record trout weighed 14½ pounds and was caught by Dr. Cook of Fort William in 1915. The average is about 4½ pounds. There is plenty of pike, pickerel and white fish up there too. The standard flies used are the Paramachene Bells, Royal Coachman, Jack Scott, Montreal, and the Silver Doctor, and a 5-ounce rod gets the best results. There is a splendid trophy known as the Nipigon Shield offered each season by the "Canadian National Railways" to the angler catching the largest speckled trout in the Nipigon waters."

"Sounds good, but Jove! I was forgetting to ask you about accommodation. We'll have some ladies in the party. But if we have to rough it, I know they'll be game."

"Rough it! No you don't. There is a rustic hunting and fishing lodge set among the birch and poplars overlooking Orient Bay where you may obtain tents, guides and canoes and make any one of a dozen trips. Neil McDougall, the manager of the lodge is a big Scotchman, as fresh and breezy as the north woods, and to know him and hear his tales of adventure alone, is almost worth the trip to Nipigon."

So it happened that one starlit June night, armed with all kinds of fishing tackle, we left for Nipigon and the Canadian northwoods, arriving at Orient Bay one morning just before dawn, a few days later.

Neil McDougall, the manager of the lodge was there to meet us and there were two dusky Indians to look after our luggage. Then, what a walk we had through the woods in the freshness of the early dawn! The grass was wet with dew, the west wind was blowing, the poplar leaves were dancing and laughing and the birches bowed us a gracious welcome. High up in a tree top a chickadee called to his mate that answered from her nest nearby, and the song sparrows kept up a joyous jargoning while down on the shore the water splashed against the rocks in soft cadences; a squirrel scurried across our path and a little cotton tail was hunched up beside the trunk of a

tree. The thin sunlight crept through the woods; all nature was now awake and we had reached the lodge.

After having a good dinner the men looked over their tackle and flies. Then we started out in canoes down Orient Bay to the Pistagone River. We paddled about a mile up this stream to what looked like a good pool. Here we beached our canoes and the sport began. The men clambered out on the rocks and began casting. Bob had cast probably a dozen times before he made a strike. Then what a battle! We could hear his line singing. The trout darted down stream. Now he was tearing up stream again. Splash! he leaped two feet clear of the water. Oh! he was a beauty—twenty pounds surely! There was plunging and splashing! the trout was off down stream again. The line caught on a rock, but all was safe, the big fellow was working back up stream. Down stream it went again. This performance continued for half an hour and then Mr. Fisherman began to reel in, but the battle was not over, for in his excitement the line snarled—snap went the slender rod and away went trout, tackle and all. The other fisherman had a similar experience with his first trout but he managed after an exciting tussle to land his second one—a fine five pounder. By this time it was about eight o'clock and with our prize we paddled back to the lodge.

The following morning we were up at dawn and off in the launch with our canoes in tow, before the first shafts of the sunrise shot over the treetops. Down the mouth of the bay we sped with the cool wind in our faces, and out on the broad expanse of the lake passing the Virgin Islands and threading our

way among dozens of other islands and points until we reached Virgin Falls at the mouth of the Nipigon River. We portaged through a beautiful pine forest which brought us to the foot of the rapids where there are some excellent pools. Here we put on our waders, got right into the stream and began casting.

I had cast for the third time when hurrah! There came a flashing tilted nosed big fellow after my fly, but in my excitement, I jerked my line too quickly and off he darted. Soon I made another strike, however and he was off with my line as hard as he could go. It was an exciting moment. I heard one of the boys say "She's got him this time" but I shouted "No, I haven't, he's getting away." "No, he isn't, give him lots of line, they called, and I did. Splash! out of the water he leaped. My line was slack. He was making up stream now! They were all shouting at me "Keep on reeling in": I turned as fast as I could, I don't know what went wrong but snap went my pole and away went my trout.

"Oh, your darned old trout make me sick"! and I threw what was left of my pole into the river and waded to shore. The men apparently thought it intensely amusing and went off into gales of laughter while I was thoroughly disgusted.

"Oh no, you can't give up yet." "We've got to get one apiece before we have lunch," they said, and so, in a few minutes I was back, again. This time after an equally exciting struggle, with a little aid from one of the men, I managed to land my trout and then we had the most delicious lunch I have ever tasted. Never did trout taste like that trout!

So each morning at dawn we set out for the pools and whether we

landed a fish or not we always had a deal of fun in the battle with those gamy Nipigon trout. The evening hours, from just before sunset until dark, were always spent in the sport and when the blue mists of twilight crept over the woods and the water we could paddle softly up some quiet stream to watch the moose feeding on the lily pads. At night all the guests at the lodge would gather about the blazing fire in the sitting room of the main lodge and vie with each other in telling fish yarns. None, however, could outstrip Neil McDougall, our genial host.

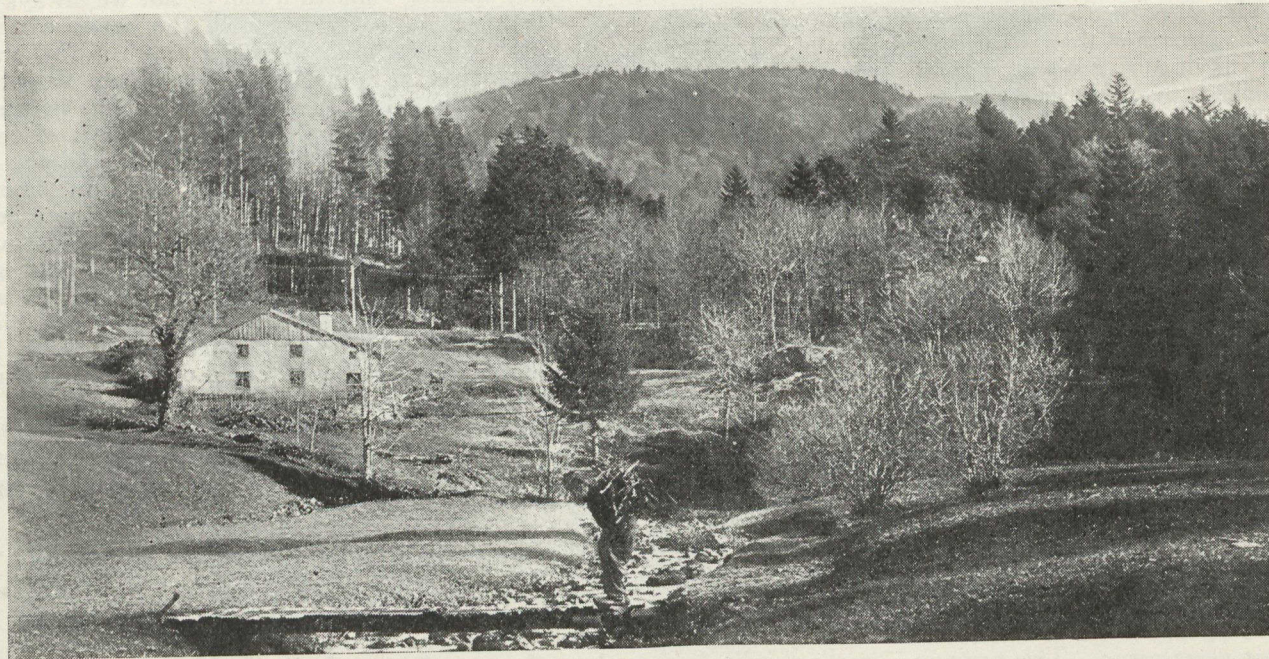
On our return journey there were four eighteen foot canoes each manned by two Indians and carrying two passengers and well stocked with provisions to last two or three days. The first day we ran the Miner's and Devil's Chutes and just before sunset made the quiet waters of Lake Emma, pitching our camp that night on the little Flat Rock portage. In the morning after a good catch we made for the gorge of the Nipigon where the turbulent waters gave even the sinewy Indians a rough battle, as the foaming current drove the canoes against one towering bluff after another until we reached the Long Lone Pine Portage. Here a trail leads for two miles through a beautiful pine forest, where the main camp of H. R. H. the Prince of Wales was pitched when he visited Nipigon three years ago.

At sunrise on the third day the flotilla glided through the gleaming waters of Lake Maria and on into Lake Jessie and reached the Long Portage past Cameron Falls before noon, arriving at Nipigon just in time to get our dozen fine trout packed in ice and catch the 6.30 train back to Toronto.



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"WHITE
WATER"
ON
THE
NIPIGON
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WHERE
GAMY
TROUT
GIVE
BATTLE
©



Les immenses forêts de l'Alsace-Lorraine, restaurées à la France par la fortune de la guerre.

Restored to France by the fortunes of war, the great forests of Alsace-Lorraine.

Les Forêts de l'Alsace-Lorraine

Par G. HUFFEL

(*"Revue des Eaux et Forêts"*)

SI L'ON compare l'étendue boisée au chiffre de la population on voit que l'on compte 23 ares de forêt par tête d'habitant en Alsace-Lorraine, chiffre presque identique à ceux de France (24 ares) et de l'empire allemand (22 ares). On peut en conclure, quoique les preuves statistiques fassent actuellement défaut, que l'Alsace-Lorraine, de même que les deux grands pays voisins, ne suffit pas à sa consommation en bois, un pays ne devenant exportateur que lorsqu'il renferme au moins 35 à 40 ares de forêt par tête d'habitant.

La Lorraine est sensiblement moins boisée que l'Alsace: le district de Lorraine présente 26,4 pour cent de sa surface à l'état boisé, ce qui est presque exactement le même taux de boisement que celui de notre département de Meurthe et Moselle actuel (25,5 pour cent). La Haute-Alsace a un taux de boisement de 34,3 pour cent et celui de la Basse-Alsace est de 33,6 pour cent; il n'y a que cinq départements en France qui soient plus boisés relativement: ce sont les Vosges, la Gironde, le Var, l'Ariège et les Landes. La richesse forestière de l'Alsace tient surtout au manteau de sapinières presque continu qui couvre la région vosgienne; les trois quarts de l'étendue

de la montagne alsacienne sont occupés par la forêt. La différence au point de vue du taux de boisement entre le pays alsacien et celui de Lorraine serait encore bien plus grande si les régions très boisées des pays de Bitche et de Dabo, qui géographiquement se rattachent à l'Alsace, comme étant en dehors du bassin de la Moselle, n'étaient politiquement rattachées à la Lorraine.

La région la moins boisée d'Alsace-Lorraine est la plaine de la Basse-Alsace qui ne compte que 17 pour cent de son étendue en forêt. La répartition des forêts est très logique dans l'ensemble du pays et conforme à l'intérêt général. Les forêts se trouvent reléguées, en général, sur les terrains les moins fertiles ou dans les régions où le relief du sol et la rigueur du climat rendent la culture agricole difficile, sinon impossible.

La contenance totale boisée de l'Alsace-Lorraine a peu varié depuis 1871. Les principales diminutions proviennent de défrichements pratiqués dans un intérêt militaire; 958 hectares de la forêt de Haguenau ont été défrichés pour l'agrandissement d'un polygone d'artillerie (transformé pendant la guerre en camp d'aviation) et plusieurs milliers d'hectares dans le pays de Bitche pour le même but. 697 hectares de riches forêts ont été

détruites dans l'intérêt de la défense de la place forte de Strasbourg. Ces défrichements ont été partiellement compensés par des reboisements de terrains vagues. D'assez importantes acquisitions de forêts particulières ont été opérées pour compenser ce que les défrichements, que je viens de signaler, ont fait perdre au domaine de l'Etat.

Les forêts de l'Alsace-Lorraine sont extrêmement variées, à tous les points de vue. Dans la plaine on rencontre surtout des massifs d'arbres feuillus, chênes rouvres ou pédonculé, hêtre, charme, bois blancs, etc., et de pin sylvestre. Dans la montagne prédomine le sapin, avec le hêtre, le pin sylvestre, le frêne, etc. L'épicéa ne se rencontre guère à l'état spontané que dans le haut de la vallée de Munster, près du col de la Schlucht. Un fait est intéressant au point de vue de la géographie botanique: c'est dans la plaine d'Alsace que le voyageur, venant du sud ou de l'ouest, rencontre pour la première fois des massifs spontanés de pin sylvestre en plaine. Cette essence, qui était très répandue, à l'époque quaternaire, sur la partie de la France à l'ouest des Vosges, y est actuellement devenue une essence de montagne; dans le Nord-Est de l'Europe le pin sylvestre est au con-

traire un arbre de plaine qui couvre d'immenses étendues en Russie, dans les pays scandinaves, dans la Prusse du Nord-Est. C'est dans les forêts comprises entre Strasbourg et Haguenau, et surtout dans la forêt de Haguenau, que se rencontrent les massifs de pin les plus avancés vers le Sud-Ouest dans la plaine.

Les statistiques estiment que les deux tiers des forêts de l'Alsace sont en feuillus et le tiers en résineux, ce qui les rapproche des forêts de la France à l'ouest des Vosges, où les feuillus occupent 73,6 pour cent de l'étendue et les différences de celles de l'Allemagne où les résineux couvrent 67,5 pour cent de la contenance totale. Le chêne y occupe à l'état dominant environ 11 pour cent, le pin sylvestre à peu près autant, le sapin près de deux fois plus de l'étendue totale. Les forêts de l'Etat sont plus riches en chêne, celles des communes plus riches en sapin que la moyenne.

En Alsace, comme en France, les forêts publiques sont en majorité communales; en Lorraine ce sont les forêts domaniales qui prédominent. Une particularité notable est que la forêt particulière ne représente qu'un cinquième de l'étendue boisée totale, alors que dans la France à l'ouest des Vosges elle en représente plus des deux tiers. Voici du reste comment se répartissent les forêts suivant la nature de leurs propriétaires:

	Haute- Alsace	Basse- Alsace	Alsace- Lorraine	Lorraine
Forêts de l'Etat.	18,6%	25,0%	45,2%	30,7 %
Forêts indivises entre l'Etat et des communes. "	"	9,4%	"	3,6%
Forêts des communes.	67,2%	45,9%	26,8%	44,8%
Forêts des établissements publics	0,2%	1,5%	0,8%	0,6%
Forêts des particuliers.	14,0%	18,2%	27,2%	20,3%

La distribution des forêts entre les différentes catégories de propriétaires est extrêmement remarquable, surtout dans le Haut-Rhin, où plus des deux tiers des forêts appartiennent aux communes, situation qui rappelle celle de la Suisse et a sans doute des origines historiques analogues. D'une façon générale on peut dire que l'importance du domaine forestier local est en relation avec l'intensité de la vie, le développement des institutions et des libertés locales aux temps anciens et surtout avec les habitudes de propriété collective. Celles-ci se sont conservées longtemps chez les peuplades alémaniques, qui se sont établies au Sud de l'Alsace, tandis qu'elles avaient disparu dès le début de la période historique chez les Celtes et les Romains et furent abandonnées par les Francs, établis

dans l'Alsace septentrionale, lorsqu'il eurent passé sur la rive gauche du Rhin.

Sur les 1698 communes d'Alsace-Lorraine les deux tiers (exactement 1097) sont propriétaires de forêts.

SAVING MONEY BY YOUR EYESIGHT



THERE ARE two direct messages between the covers of each issue of the Illustrated Canadian Forestry Magazine.

The one is the Editor's message—the other, the advertiser's.

The advertising pages of this magazine are packed with vital news for YOU.

Advertising identifies goods of unquestioned value. The manufacturer who puts his name on the goods mentioned in these pages stands behind his product. It never pays to advertise merchandise that is not sound. There are too many comebacks.

Similarly, the advertiser of a definite business or professional service in these pages is prepared to stand behind every representation. You may deal with such men in fullest confidence.

Read the advertisements as discriminatingly as you read the articles.

When you see in the advertisements something that looks like good business for yourself or your company, mark it or tear it out for further reference.

Le petit tableau ci-dessous donnera une indication précise de l'étendue de ces domaines communaux:

Etendue des forêts.	Nombre de communes propriétaires
1 à 10 hectares.	78
10 à 20 hectares.	67
20 à 100 hectares.	430
100 à 200 hectares.	238
200 à 500 hectares.	186
500 à 1000 hectares.	71
1000 à 2000 hectares.	22
2000 à 5000 hectares.	3
Au-dessus de 5000.	2

Les forêts de l'Etat proviennent en partie des domaines de souverains

locaux (comme par exemple les forêts duales lorraines) et surtout des forêts ecclésiastiques réunies au domaine national en 1789. Une seule forêt, actuellement indivise entre l'Etat et la ville de Haguenau, provient du Saint Empire; elle appartenait encore entièrement au domaine impérial au XIIe siècle. Ce n'est qu'après que l'Alsace se trouva de nouveau restituée à la France que Louis XIV, voulant mettre fin par un acte gracieux aux conflits séculaires entre l'Etat et la ville de Haguenau, usagère quasi-proprétaire d'une partie du massif, ordonna que désormais la forêt resterait indivise entre les deux.

Les forêts particulières sont presque toutes d'origine contemporaine et proviennent en majeure partie d'aliénations effectuées aux dépens du domaine de l'Etat et de cantonnements de droit d'usage. Un certain nombre sont d'anciennes forêts seigneuriales. La petite propriété forestière paysanne d'origine ancienne est rare en Alsace et paraît avoir fait défaut à peu près complètement au moyen-âge, bien que des documents plus anciens, comme le cartulaire de l'abbaye de Wissembourg par exemple, mentionnent souvent des forêts privées aux VIIe, VIIIe et IXe siècles.

En Alsace-Lorraine, comme dans le surplus de la France, ce sont les très petites propriétés qui prédominent en nombre dans le domaine privé. Celles de moins de 10 hectares représentent à elles seules 96 pour cent du nombre total. Si l'on considère ensemble les communes et les particuliers on voit que 96,2 pour cent du nombre total possèdent des forêts de moins de 10 hectares représentant ensemble, il est vrai, 7,1 pour cent seulement de la contenance totale. A cet égard la situation est plus avantageuse que dans la France à l'ouest des Vosges, où 1.445.800 propriétaires particuliers, soit 94,5 pour cent du nombre total, possèdent des massifs de moins de 10 hectares dont la surface égale 36 pour cent de la contenance totale des forêts particulières. Tandis que l'étendue moyenne de la propriété forestière privée est de 4 h. 2 dans la France en dehors de l'Alsace-Lorraine elle est de 6 h. 8 en Alsace-Lorraine, de 5 h. 1 en Bavière, de 5 h. 5 en Saxe et en Wurtemberg, de 13 h. 8 en Prusse. Dans le gouvernement prussien de Poméranie cette contenance moyenne est de 31 h. 7; les forêts privées dépassant 100 hectares y forment plus des quatre cinquièmes, et parmi elles celles de plus de 1000 h. 22 pour cent de la contenance totale.

E D I T O R I A L

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NOTICE TO CONTRIBUTORS

The Editor will consider for free publication articles, photographs and communications of general interest. Rejected matter can only be returned if the necessary postage is enclosed, and no responsibility is undertaken for the safe return of such matter. When payment is desired the fact should be stated. Letters and articles must be written on one side of the paper only. The views expressed by contributors writing over their own signature are not necessarily endorsed by the Editor.

Your House is Afire!

THE CANADIAN PEOPLE are the greatest forest owners in the world.

True, the United States contains three or four times as much timber as Canada, but the title to seventy-five per cent of it is vested in private persons.

The Canadian people own almost 85 per cent of the national forest area. Frequently, the timber growing on portions of that 85 per cent is leased to lumber or pulp and paper companies, but the fact of that lease does not diminish the significance of public ownership and control of the land on which the timber grows.

Practically every lessee of timber in Canada is legally subject to whatever reasonable conservation requirements the public interest from time to time may demand. In no other part of the British Empire is the public authority so unequivocal, and nowhere else is the responsibility for what happens to the forest resources so squarely placed upon the shoulders of the common citizen. The eyes and ears of most of us are so dulled by one-sided arguments on "alienated timber berths," and charges of slicing up the "public domain" that we quite overlook the fact that Canadians continue to rule all but about fifteen per cent of the forested area.

The weak spot in forest conservation in Canada is not that timber berths are leased to private companies but that the Canadian citizen himself **Where Citizens Are To Blame** burns down by wilful carelessness each summer fully five times as much timber as is cut on all the timber berths from ocean to ocean. Critical at times of the legality of com-

pany titles to a township of pine, he has not time to notice that 113 parties of Fishermen did their best to burn up the forests of the Ottawa Valley during 1921 or that 308 camping parties left nothing undone that would have turned British Columbia last year into a shambles.

To be able to say that we the people of Canada are the governors of our forest properties is a worth while boast, but it should not end with that. We shall profit from such an advantage only as we realize that we, the owners, are also the persistent destroyers; that we, the owners have great obligations which we can properly express through a deeper interest in our Government forest protective services, and by personal cautiousness with all forms of fire while in the woods.

• • •

The Prairie Province Forests

As these lines are being written, a conference between Western Provincial ministers and the Dominion Government is in session relative to the transfer of the natural resources from Dominion control. It now appears probable that a settlement of this vexed matter will be reached by which the legitimate ambitions of the prairie governments to rule over their own domain may be satisfied.

The one and only concern of the non-politically-minded citizen who comprehends the why and wherefore of forest conservation is that in any adjustment of title deeds conservative forestry policies shall not suffer.

There is no net revenue for any public authority in owning the forests of Manitoba, Saskatchewan and Alberta. Eighty per cent of the original forests of those provinces, growing on non-agricultural soils that constitute more than a third of the prairie provinces' area, have been destroyed by fire. The timber that once grew on those non-agricultural lands was established by a wise Providence to meet the wood-using needs of millions of settlers. We, the all-important Present Generation, however, have chosen to heap up difficulties for future population by burning down their forest endowment. The prairie province forests must be **rebuilt, reconditioned**, if they are adequately to meet the needs of new population. For, be it remembered, no prairie farmer can grow wheat, raise stock, or pocket a dollar profit unless he first draws on the forest for a farming "plant," his house, barns, fence posts, fuel, implements, wagons, and what not. Two thirds or more of all the timber cut in North America each year is used on farms. Such a statement may surprise our readers but the official facts stand behind it.

DEPARTMENT

The prairie provinces must have an abundant supply of forest products in order profitably to plant and harvest crops. If the lumber each farmer is obliged to buy, comes from his own provincial storehouse up north, so much the cheaper, so much the better for home industry. If it comes on long hauls from Ontario or British Co'umbia, so much the dearer for him and the less will be his operating profit. To restore the prairie province forest areas to anything like a productive capacity equal to a doubled population will require a spending programme on fire prevention and replanting in comparison with which the possible revenues cannot make a showing for at least 50 years. The Dominion Government, which now controls the forests of the prairie provinces, pays out for necessary forest administration each year much more than is received from all sources of forest and grazing revenue. For many years to come this toilsome process of fire prevention and restoration will have to continue, with little immediate prospect of extracting revenues comparable with the outlay.

* * *

Conditional Dividends!

The forests of Quebec, says one authority, are worth 600 million dollars.

The forests of Ontario are worth probably as much more.

If you live in either province you are a preferred shareholder in a 600 million dollar estate.

By all the laws of probability your property in ten years time will advance in value to a degree now unsuspected. Your lowered tax bill, the state of industrial development and increased employment will presently furnish the proof.

The only factor that can blight your expectations is the Forest Fire.

Nine out of ten forest fires are wantonly started by those who most need and most use the forest.

We who own the forests are the first to destroy them.

HE SEEMS TO LIKE US

Canadian Forestry Association, Ottawa:—Enclosed please find cheque for membership and subscription for 1922. I always enjoy the Magazine. The photos alone are worth more than the subscription price, and there are some splendid articles as well.

Yours truly,

R. E. Van FOSSEN,
Luseland, Sask.

YEARLY INDEX AVAILABLE

Readers of the Illustrated Canadian Forestry Magazine who have kept a file of the 1921 copies of this magazine may secure an Index to the contents, alphabetically arranged, by writing in to this office for same.

The Editor's Mail-Box

MORE ABOUT THE BUFFALO

TO THE EDITOR, The Forestry Magazine:—Mr. Moberly's letter on this subject in your February issue, is interesting, and no doubt correctly accounts for the disappearance of the Buffalo herds still existing in his time. In this regard one would not think of questioning the verdict of a gentleman of his experience. But the herds seen in 1869, vast though they may have been, were, after all, but the remnants of the myriads that once roamed the prairies of the West. The process of decimation took various forms, not the least of which was the ruthless slaughter by the Indians. But another and perhaps greater cause is exhibited in the following letter, written by John Macdonell, brother of Miles Macdonell, first Governor of the Red River under Lord Selkirk, and himself an old Nor'wester. This letter, which was addressed to another and younger brother in Boston, bears date, Montreal, November 16th, 1815, and refers to a period three quarters of a century before Mr. Moberly ever saw the prairies.

"To give you an idea of the numbers of buffaloes who occasionally frequent those parts, I shall relate that in May, 1795, I got on board of my canoe, at sunrise, left the forks of the river Qu'Appelle, and put up for the night at sunset the same day at a place called the Grand Bois, after having, from the canoe, counted 7,360 carcasses of buffaloes dead (i.e. drowned and mired) on the river and on its banks."

Such a sight, he adds, seldom occurred, and he had himself witnessed it but once, in a residence of twelve years on the Red River. But it must be remembered that he refers to one stretch of river front only, and that the famous glue-like brand of clay is not confined to the Red River. Macdonell's original letter, which was formerly in my possession, is now in the Library of Parliament at Ottawa, bound up with a copy of Lord Selkirk's own account of his experiences as Governor of the Red River.

Yours truly,

H. F. McINTOSH.

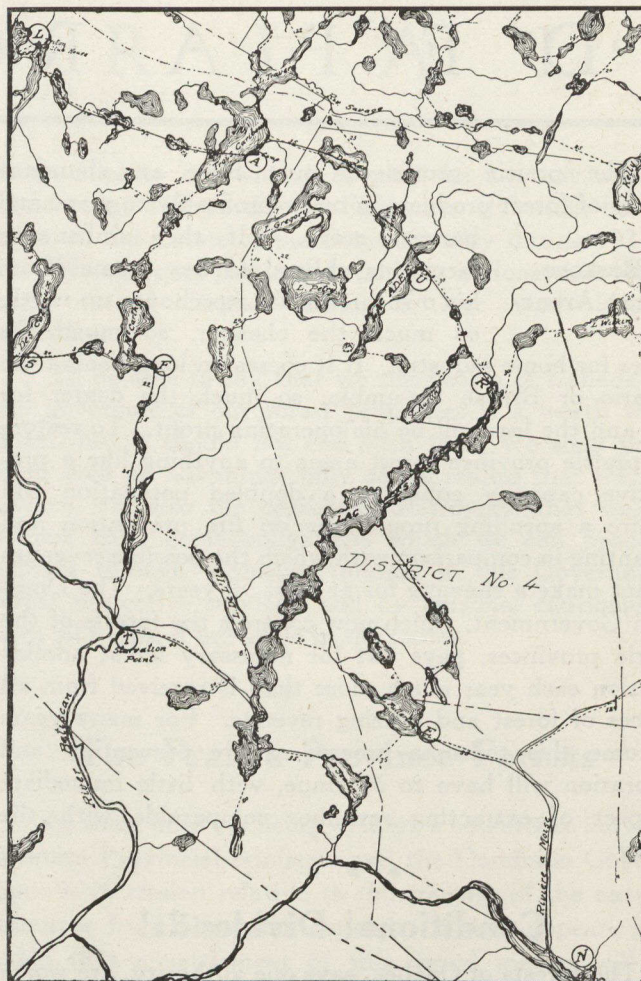
Toronto, [March] 22, 1922.

This Map

Shows the Route of a Fire Ranger in District Number Four of the Laurentian Forest Protective Association.

The Dial Below shows a record taken by one of their Rangers with a Hardinge Fire Ranger's Clock.

Hardinge Systems Give
Indisputable Records.



Follow the Ranger

September First:—The Ranger started from Triton Camp where the first Hardinge Station embossing the Letter "L" on the dial was located, proceeded across Lake Trois Caribou to Station Lettered "A," spending the night there.

September Second:—Left Station "A" recording as he left, proceeding to Lac Adee, Station "U," recorded there at night.

September Third:—Left Station "U" in the morning, proceeding to Station "R" located at end of Lac Des Passes. Arrived there at night.

September Fourth:—Left Station "R" to proceed to Station "E" on Lake Fullerton. Arrived there for night.

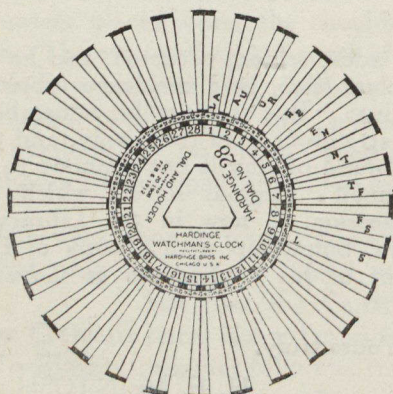
September Fifth:—Left Station "E," proceeding via Riviere a Moise to Station "N" arriving there for night.

September Sixth:—Left Station "N" in morning, proceeding to Station "T" at Starvation Point, arriving there at night.

September Seventh:—Left Station "T" proceeding to Station "F" located at the head of Lake McCarthy. Arrived there for night.

September Eighth:—Left Station "F" for Lac Des Coteau where Station "S" is located. Arrived there for night.

September Ninth:—Left Station "S" for Headquarters at Triton Camp, arriving there for night.



Hardinge Fire Ranger's Clocks are being used to protect hundreds of miles of Canadian Forests this season.

Write for Particulars

**Hardinge Bros. of Canada,
Limited**

50 FRONT STREET EAST

TORONTO, ONTARIO

Roads of Remembrance

IN ALL parts of Canada, the praiseworthy desire to commemorate the sacrifices of the Soldier Dead by the planting of trees in parks or along highways is taking hold rapidly. There is a tender and poetic appeal in the association of the names of valorous men with a noble and ever-renewing structure of Nature. A tablet of bronze or a column of stone may serve in their special place as a symbol of our gratitude and veneration but to remember the dead by serving the living, as our Governor-General happily observed, would appear even more appropriate. Moreover there is an inherent splendor in a gloriously crowned tree that gives vitality and cheerful meaning to the name-plate of the patriot that may be identified with it.

BY ALL means let us join hands to plant Roads of Remembrance. The plan is quite inexpensive and not the least of its virtues is in securing the personal participation of the thousands of men and women who lost their loved ones in the great conflict. How much better this would be than to pass a subscription list for a lifeless monument!

THE Canadian Forestry Association is sponsoring the Roads of Remembrance plan to the limit of its capacity. One of the primary difficulties of local societies, such as women's clubs, is to know how to proceed, what trees to plant, how to plant them, where to buy the trees, etc. The Canadian Forestry Association has now in preparation a booklet written by a practical expert which will give full directions in such simple illustrated form that any local body would meet with success. This will be available about the end of May.

PLANS should now be made to start an avenue of trees, each tree identified by a name plate with one of the fallen, so that action can be taken early next Fall. It is now, of course, impracticable to transplant trees in large numbers this Spring, since the buds have opened, but Fall planting is quite as successful as Spring planting.

EVERY READER is asked to rally about the Canadian Forestry Association in pressing forward the roads of Remembrance plan. Ask your local societies, such as the Daughters of the Empire, to communicate with the Association at 224 Jackson Building, Ottawa.

ON SATURDAY, APRIL 22nd, there was commenced at Montreal, a tree planting campaign along the line above suggested.

This was in connection with the inaugural ceremonies of "The Road of Remembrance" a memorial to the Men who fell in the Great War, which has been planned and is being carried out by the Montreal Women's Club. The Road of Remembrance consists of a double row of Norway Maple trees planted on Sherbrooke St. West from Claremont Avenue to Montreal West. Ultimately it is hoped to extend the planting throughout the island of Montreal and Bout de l'Île to St. Anne de Bellevue.

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The Logging Tractor as a Money Saver

By J. S. INNES.

IT OCCURS to the writer, as a result of close observation over a widespread forest area in Eastern Canada, and in the North-Eastern section of the United States, that our Woods Managers in Ontario, Quebec and the Maritimes will soon be making some definite and beneficial changes in their methods of handling their drives. Up to date, it appears to have been the popular method to dam small creeks and streams and create a landing or dump above the dam, and when the Spring freshet came, drive the logs to the main river or lake.

In some cases, this method may have been satisfactory, but as it seems a generally acknowledged fact that the ice in lakes and large rivers passed down before the ice of creeks and streams, the main force of the freshet on the main river, or the maximum rise of the lake, is lost, or passed down rather, before the operator can get his wood down his stream to the main water. Therefore, the delayed drive the sweeping of the creek or stream, and the cleaning up of the main water.

Logs Stranded in Late Summer

Last Summer, (in August) I took a trip a short distance up the St. Maurice River, only as far as Grand'Mere, but in that comparatively short distance, I saw a quantity of logs, which must have contained at least 100,000 cords of wood, stranded. It is true that the St. Maurice and its tributaries did not have a heavy freshet last Spring, and, never having visited the upper St. Maurice Valley, I do not know much about the tributary waters, but I feel safe in the assumption that, had these logs been all dumped on the St. Maurice, or the lakes in its course, no such amount of wood would have been anchored, high and dry, in late August.

And yet, heretofore, the wood operators could not have been considered at fault in their methods. Some of their creeks and streams were probably eight to fourteen miles in length, and as it would have been the height of false economy to haul their logs to the main river or lake by teams, they must, perforce, dump in the most convenient water, flowing in the right direction. However, a corrective element has arisen; where the horse could not be used to haul a paying quantity to the main water, the logging tractor can be relied upon to do so. It must be realized at the outset, however, that the log hauling tractor, if it is to fulfil its mission in the lumbering industry, must do the work of many teams, under all encountered conditions. In order to effect the desired economy it must, of necessity, possess the power and capacity for safely handling long trains of logs down steep sand hills, up such grades as are encountered in our woods, over lake and river ice and through deep snow.

Eliminating Small Streams

I have this Winter visited some operations in the Adirondacks, where tractors have been used, and I

found no dumps in small streams. The dumps were located on main rivers and lakes. True, the haul was sometimes as great as fourteen miles, but the method cut the cost in half. The cost of improvements on the stream or creek was saved; the cost of the drive on the stream or creek was eliminated and the expense of sweeping the main river was eliminated, and—pleasant to relate—the actual haulage cost with the Logging Tractor for the necessary extra distance, from six to fourteen miles, was only 72 cents per cord — no greater than the previous cost with teams, for the usual two or three mile haul to the landing at creek or stream.

Using the Main Stream

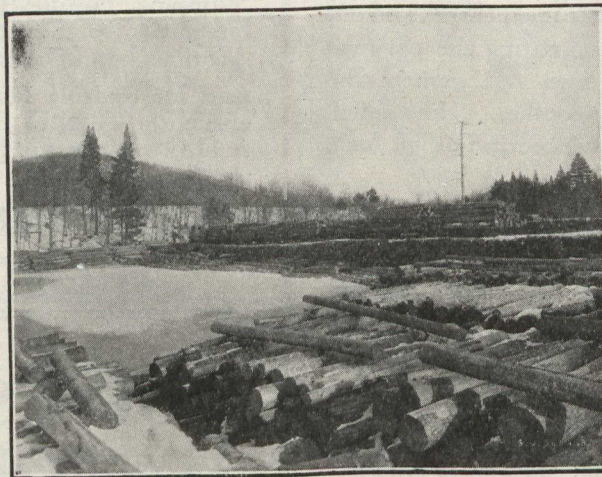
Last year, when they finished hauling they had in their dump on the river, 28,000 cords of spruce and hemlock. The freshet came in the night, and, in the morning, not a log was left at the landing. They drive fifty four miles, and in eighteen days, the entire 28,000 cords was at their mill storage, fifty four miles distant. Had they driven creeks and streams, they would no doubt, have been driving on into August, at any rate.

Eleven logging tractors were in operation on this limit. Five of the eleven logging tractors carried tanks for water, each tank being 14' x 8' x 6'. The summit yard is at the top about two and a half miles, seven and a half per cent. up grade. Each of these tank tractors hauled a train of six sleds, each sled being loaded with

five cords of spruce logs. The tank was filled at the foot of the up-grade, and when returning from the summit yard to the Rollways at the Camp, it watered the roads. The distance from the summit yard to the Camp, is a little over twelve miles. Six filling stations are located on the main hauls for tank filling. The remaining six logging tractors each carried a load of two cords on their own bolsters. Three of these took a train of six sleds from their camp and coupled on to an additional train of six sleds (hauled to the summit by tank tractors) and proceeded to the landing with the long train. All tractors returning, hauled back their empty sled train to the Rollways.

At the landing, solid log bridges were formed at the commencement of the hauling, nine of these being formed as rapidly as logs were brought to the landing. When the bridge was completed, the tractor pulled its train of sleds on to the bridge, and the landing crews emptied the train loads on to the ice. The tractor, of course, left its loaded train at once, coupled up with an empty train, and returned to the Rollways. Each tractor was compelled to make two complete round trips each day.

This system of reliable mechanical log hauling resulting in the feasibility of main river driving, I am convinced, offers the most logical solution of the problem of cost reduction now occupying the attention of so many woods managers.



Dump containing 9,600 cords of spruce and hemlock (20 logs to the cord) hauled, in about two weeks' time, a distance of twelve miles, by eleven Logging Tractors

Practical Forestry of Mr. Barnjum

MR. FRANK J. D. BARNJUM, Annapolis Royal, Nova Scotia, has further demonstrated his interest in practical forestry by prize offers announced by him as follows:—

There has been so much fruitless discussion regarding the conservation of our remaining wood supply, and re-forestation, and so little actually accomplished, and the situation is so alarming, owing to the tremendous devastation by the Spruce bud worm and forest fires, that I am moved by the urgency of the situation to make the following offers, applying in the Provinces of Nova Scotia, New Brunswick and Quebec.

\$1,000.00 Cash Prize.—Open to any citizen of Canada

A prize of \$1,000.00 divided as follows: \$500.00 first prize; \$250.00 second prize; \$150.00 third prize and \$100.00 fourth prize for the best essay on the regulation of the Forest Fire menace, with suggestions for the enactment of laws for the prevention of the same; or for any other methods for the protection and retention of our home grown forests for our home industries. Judges to be the two Provincial Foresters of Quebec and New Brunswick, the Dean of the Faculty of Forestry of the University of Toronto, and the Director of the Dominion Forestry Branch; essays to be mailed to my address on or before June 1st, 1922, prizes to be awarded and paid July 15th, 1922. For the help and information of those who are not familiar with this particular subject, I will mail my bulletins on conservation free on application.

In the Province of Nova Scotia

A prize of \$250.00 in cash for the best municipal or town forest plantation, plantations to be made this spring and prize to be awarded September 15th, 1922, the judges to be the Commissioner of Crown Lands of Nova Scotia and Professor M. Cumming of Truro.

A prize of \$250.00 in cash to the Chief Fire Ranger whose district shows the most efficient organization and best results, and showing proportionately the least fire loss as determined by his activity in fire fighting, and application of the best preventative methods, the prize to be awarded and paid on the 30th day

of November, 1922, and the judge to be the Commissioner of Crown Lands of Nova Scotia.

A cash bonus of \$2.00 per acre to the farmers of Nova Scotia for every acre of spruce or pine seedlings planted by them on their farms the coming spring of 1922, no one farmer to be paid a bonus on more than 100 acres, so as to distribute the plantings as widely as possible over the province. Location and method of planting must be approved by Government Forester of Nova Scotia if one is appointed, otherwise, by Mr. Barnjum's Forester, to insure satisfactory results.

In the Province of New Brunswick

A prize of \$250.00 in cash for the best municipal or town forest plantation, planting to be done this spring, and prize to be awarded September 15th, 1922, the Judges to be the Minister of Lands and Forests of New Brunswick, the Professor of Forestry, University of New Brunswick, and the Provincial Forester, of New Brunswick.

A prize of \$250.00 in cash to the Chief Ranger whose district shows the most efficient organization and best results, and showing proportionately the least fire loss as determined by his activity in fire fighting, and by the application of the best preventative methods, the Judge to be the Provincial Forester for the Province of New Brunswick prize to be awarded and paid on November 30th, 1922.

In the Province of Quebec

A prize of \$250.00 in cash for the best municipal plantation, planting to be done this spring, and prize to be awarded September 15th, 1922, the judges to be the Minister of Lands and Forests of Quebec, the Director of the School of Forestry, Laval University, Quebec, and the Chief Forester of Quebec.

A prize of \$250.00 in cash to the Chief or District Fire Ranger whose district shows the most efficient organization and best results and showing proportionately the least fire loss as determined by his activity in fire fighting, and by the application of the best preventative methods, the judge to be the Chief Forester of Quebec and prize to be awarded and paid on November 30th, 1922.

American Forest Regulation

READY IN APRIL

By Theodore S. Woolsey, Jr.

Limited edition, paper cover, \$2.75 net, \$3.00 postage prepaid; cloth \$3.25 net, \$3.50 prepaid; about 230 pp. (6" x 9"). Contains: introduction B. E. Fernow, LL.D. —13 chapters as follows:—

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The Normal Forest.

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(b) Area, and (c) Area-Volume Methods of Regulation.

The Cutting Cycle as a Determining Influence in American Forest Regulation.

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This advertisement inserted in the interests of forest protection by

The Spanish River Pulp & Paper Mills, Limited.

Beautifying Canadian Roadways

Planting of Shade Trees and Their Maintenance Until Established, has Been Found to Cost About \$2.25 each.

By HENRY J. MOORE, Forester, Ontario Department of Public Highways.

WHEN this article appears in print, shade-tree planting operations in southern Ontario may be practically completed for the spring. At more northerly points, however, it may still be possible to carry on the work, therefore the information contained herein may be of value.

Shade-trees which are indigenous (Native) to the particular locality where the planting is to be done should be employed. To introduce to purely country districts exotics or foreign trees would impart to our roadways an untypical appearance. If the roads are to be typically Canadian, native trees should be planted. Exotic trees may of course be properly planted at the approaches to municipalities and therein.

Trees for Various Soils

The Ontario bush lands afford a wealth of material for planting. The following trees are excellent for roadside planting and many others may be obtained therefrom. Perhaps, however, nursery grown trees may be preferred. That rests entirely with the would-be planter. The question as to whether the trees are hardy in his particular locality is one which also concerns the planter, as the choice must be left to him.

Good Sandy Loams.—Sugar Maple, Black Walnut, Pin Oak, White Ash, Red Oak.

Good Medium Loams.—White Ash, White Elm, Sugar Maple, Black Locust, Black Walnut, Butternut, Soft or Silver Maple, White Oak, Native Plane, Oriental Plane, Native Basswood, Norway Maple, Red Oak.

Good Clay Loams.—Soft or Silver Maple, White Elm, White Ash.

Low Lying Wet Soils.—Soft Maple, Pin Oak, Native Basswood, White Elm, Native Plane.

Swampy Conditions.—Native Willows and Native Poplars. Pin Oak if condition is not too bad.

Digging The Trees

If bush trees are to be planted carefully select saplings (seedlings) not growth which arises from old tree stumps. Saplings which stand out some distance from their neighbours will be best. Trees, eight to ten feet high will be a very convenient

and satisfactory size. Remove the branches of these to a height of about six feet to facilitate digging, then dig a trench around the trees at a distance of at least eighteen inches from the trunk, deep enough and wide enough to allow of the soil being excavated from beneath the root system so that practically all the root fibres may be obtained with all the soil possible thereon. The ball of roots and earth should be two and one half feet to three feet wide. Remember that you will fail in your tree planting operations if you chop off the fibrous roots. After digging carefully transport the trees to the holes which are ready to receive them, and do not expose the roots to the drying influence of sun or wind except during the actual work of planting.

Pruning the Trees

The crowns of the trees to be planted must be reduced by proper pruning to compensate for the loss of roots for even with careful lifting some will be lost. It will not harm a young tree to reduce its crown by one half, cutting the branches back to another branch or to a bud. The main stem or leader may also be shortened. The aim should be to leave the tree of conical form, leaving twigs or small branches protruding from the outside of the cone, the bottom of which should be somewhat rounded. Where pruning is not effected the large leaf surfaces will draw upon the moisture in the tree, and as the roots cannot adequately replace it, the tree may die.

Digging and Planting

The holes to receive the trees should be prepared before the trees are dug. Make these at least three feet wide and fifteen inches deep, throwing the surface soil on one side and the sub-soil on the other. Fork the bottom of the hole to facilitate and place therein a layer of fertile surface soil, sufficient to elevate the root system to the same relative elevation as it existed in the bush. In other words so that the roots will not be much, if any, deeper in the soil than they previously existed. An inch or so of soil over the roots will not harm, but to set the roots of a

young tree six or seven inches deeper than nature intended will certainly court disaster. The roots of a tree respire (breathe) therefore be careful you do not smother the roots and kill the tree.

It requires two persons to plant a tree satisfactorily, one to hold it in position and the other to fill in the soil. In all cases where the soil does not naturally adhere to the roots of the tree to be planted the roots must be spread out so that they radiate from the trunk. All broken ones should be removed by a sharp instrument making the cut from the underside and preferably at a point where two roots branches join. Having set the tree at the forementioned elevation and spread out the roots, fill in the fertile soil between and above them and tramp the area very firmly. Water the soil to make it settle around the roots and to refresh the tree, after which as soon as the soil is dry enough to cultivate make the surface concave (saucer-shaped) so as to retain all the water which will fall as rain.

Planting of trees should be discontinued as soon as the buds show the first sign of bursting, therefore the end of April normally may be regarded as the last possible date on which to plant deciduous shade trees in Southern Ontario, varying perhaps to two weeks or so later as far north as Ottawa and Parry Sound. From mid-October until the advent of frost is also a good time to plant hardy trees, but somehow or other enthusiasm seems to wane in the Fall, although this is perhaps the most advantageous time to undertake the work.

Staking the Trees

Trees should be staked. The objects are to hold them securely in position so that contact between their growing fibrous roots and the fine particles of soil will not be broken, and that they may remain upright and uniform in the rows. A stake six feet long, two inches by two inches square, or if round of two inches diameter, will suffice. This should be driven into the soil about three inches away from the trunk of the tree and to a depth of perhaps eighteen inches, and be set upright.



"Heeling-in" Jack Pine Seedlings.

Trees should be mulched with a layer of straw litter or of leaves, or a mixture of these, in spring after planting to conserve the moisture. The mulch should be removed two or three times during summer to allow cultivation, and during droughts water should be adequately applied. To a tree growing in a dry soil ten gallons at an application is not too

much. A slow and careful application is necessary so that the water will soak in properly.

The spacing of trees along roads should be such as not to cause a "still air area" one in which the snow will swirl and block the road causing disintegration of the surface. Under the Bonus System of planting in Ontario, trees may be planted as

little as fifteen feet apart, and certain undesirable kinds of trees are allowed to be used. This spacing is not sufficient along any road, or even in villages or towns; fifty feet apart is more like a proper minimum spacing. Along the Provincial Highways the spacing is 75 feet apart. Probably the Tree Planting Act will in the near future be revised.

The average cost per tree along the Provincial Highways of Ontario, including all replacements, is about \$1.25 per tree. This amount includes every operation from and including purchase, digging, digging holes, transporting, planting, staking and mulching.

The average cost of maintaining trees along the Provincial Highways is about 50 cents per tree, per year, for two years. This amount covers the cost of the necessary operations of watering and cultivation. During the third and later years the trees are usually sufficiently established to care for themselves. Except in the case, perhaps, of excessive drought where watering must be resorted to, perhaps one thorough application being given. During the first and second years four to five applications of water may be necessary.



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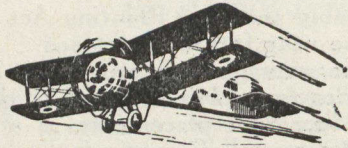
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A Forest Survey from the Air

Some Details of the Use to which Aerial Photographs Can be Put for Mapping, Estimating and Reconnaissance Work.

By ELLWOOD WILSON, Chief Forester, Laurentide Co. Ltd., Grand Mere, P.Q.

AS FORESTERS generally have shown much interest in the use of aircraft and aerial photography for making forest maps and estimates, reconnaissances and so forth, it is probable that a description of a survey as actually carried out may be of interest.

The area, about which information was wanted, was situated 102 miles in an air line from the air station and about 24 miles from the railroad, 16 over a wagon road, and the remainder by water. A site was selected for

grapher Townsend, Mechanic I. Vachon, and Rigger Hyde. The machine used was a Curtis HS2.L flying boat, No. G-C.A.A.D.

Previous to beginning the work, the chief of party of another survey crew, which was engaged in a survey and estimate of a fifty square mile tract about 45 miles south of the above base, was taken for a flight over the territory on which he was to work. He flew twice over the area with a map on which he made notations of the general lay of the land, the type of timber, and so forth, and this information proved of the greatest value in carrying out his survey.

The plane was moored out in the open during the duration of the survey, and in spite of rain, snow, and hail, suffered no damage and was continually on the job. Trips were made on cloudy and rainy days, and photography was carried on in winds up to fifty miles an hour. The boats used have been in commission for four seasons, and will be used again this year, showing that there is a reasonable life for aircraft.



"A Touch of Winter" for the Laurentide Air Cruisers

a base, and an air engineer, a cook, camp equipment and seventeen drums of gasoline were sent in by wagon and boat. Two tents were put up, one for sleeping quarters and the other for a mess tent. This was on the shore of a bay, and the site selected for an anchorage was sheltered from all winds, and the water was deep enough to bring the nose of the plane up on the sand without endangering the hull. The beach was sandy and flat, and by a little easy digging a small channel was formed into which the plane could be drawn so that the engineers could easily get at the rigging and engine, and also re-fuel. The crew consisted of Pilot Maxwell, Forester-Photo-

Reported Forest Fire

One interesting side line of this work was the discovery and reporting of forest fires. On September 1st, a fire was sighted 18 miles away from the plane at 7.30 p.m. and the plane landed at the nearest telephone station and reported it. It is practically certain that the ground patrol would not have discovered the fire at this time of day, and it would probably have assumed quite large proportions before being discovered the next day. Another fire was reported on September 3rd, and on September 8th, a report having been received that a fire had occurred on a certain lake, the plane was sent to investigate, and reported that there was not, and had not been, any fire. On all flights reports were made of fires burning, and areas already burnt were sketched and sent in to headquarters. Sketches made from the air were afterwards checked on the ground, and found to be almost as accurate as to areas as the ground surveys.

The total time spent in photography was 12.8 hours, and the area mapped was 140 square miles. This shows a performance of 10.8 square miles per hour of useful photos. The work was done at, as nearly as possible, an altitude of 5,000 feet, which gave plenty of detail for the interpretative work. In making a mosaic it is necessary

to have the pictures overlap on all sides, and this was found difficult in high winds, but in ordinary weather went well. The photographer directed the pilot on his course by hand signals, and there was perfect co-operation between the two. No reconnaissance flights were made strictly for that purpose, but in test flights a considerable amount of reconnaissance work, sketching, and oblique photography was carried on.

Maps Easily Read

There was already an accurate map of the water courses and lakes on the area, and when the photographs were finished, the areas in the various timber types were transferred to it and the areas plani-metered. The ease with which these could be read from the photos, and their boundaries ascertained, was remarkable. The types were divided as follows: coniferous, containing eighty per cent or over of conifers, spruce and balsam or jack pine, conifer-hardwood, containing 60 to 80 per cent of conifers, hardwood-conifer, containing 60 to 80 per cent of hardwoods, barren, heath or treeless swamp and second growth, where young timber was coming in after burns. It was seen on the pictures that there were very many places where blow-downs had occurred running from one to fifty acres or more. Most of these would not have been discovered by a strip survey with the strips located a quarter of a mile apart, but when their aggregate area was measured, it was found to be of importance. The percentage of the various types, as ascertained from the photographs, was as follows:

Conifer, 35.7 per cent; Conifer-hardwood, 56.1 per cent; Hardwood-conifer, 2.4 per cent; Barren, .4 per cent; Second growth, .7 per cent; Water, 4.7 per cent; Scattered blow-down, 2 per cent of timbered area.

By comparing the photos with those taken in sections where the amount of timber per acre had been carefully determined an approximate estimate of the timber was made, and sample plots for ground study were picked out as representing fair averages of the stand. These plots have now been studied on the ground and check up well. There was no difficulty in locating the areas, picked out on the photos for study, on the ground and counts of the number of trees in quarter acre plots on the photos, when checked on the ground came within two to four trees. The photos of these sample plots and full descriptions of the timber, number of trees, heights, diameters, condition, and so forth, have been mounted on cards and can be used for estimating other sections by comparison.

In the area under consideration, many balsam firs have been killed by the spruce bud-worm and other insects in the last five years. Most of the attacked trees are dead and down, and their loss has resulted in opening up the stand. This lessening of the density of stocking shows up well on the photos. Sample areas laid out on the photos and having the unstocked areas carefully plani-metered showed an average loss of stocked area of about 28 per cent.

The Question of Cost

I am, unfortunately, not permitted to give cost figures for this work, for business reasons, but I can state positively, that if the latest costs for estimating the sample plots mentioned above are taken, and added to the inclusive costs for the aeroplane work, salaries, fuel, insurance, depreciation, making of pictures, (all on a basis of all the winter costs included), the final cost will be twenty dollars per square mile less than that charged by a large firm of consulting foresters for a big tract of land much more favourably situated and easier of access, and thirty dollars less than figures of one of the large companies for work done in 1920.

Paying for Results

MANY Government Departments and private Forestry interests have already made use of Aircraft in various ways, and in every case where proper types of machines were efficiently operated, the results have fully justified the cost of what was in many cases undertaken as an experiment.

Operation of an Air Station involves comparatively large fixed charges which when spread over the limited operations of any one interest greatly increase the unit cost of results and involve the operators in a considerable investment and further liabilities for operation.

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Winter Flying in Canada's Far North

Four Flights from Cochrane to Moose Factory on Hudson Bay Successfully Accomplished in Avro Machine.—Pilot's Story of the Experience.

DURING the past Winter a most interesting flying operation has been carried out by Canadian Aerial Services, Limited, Montreal. Four flights were made from Cochrane to Moose Factory, Hudson Bay. This operation was undertaken for the purpose of locating oil, reported in the vicinity of Moose Factory. The personnel and equipment were—W. R. Maxwell in charge; J. H. St. Martin, assistant; W. H. Cannon and J. Hyde, mechanics. The machine used was an Avro with a Le Rhone 110 H.P. rotary engine.

Aeroplane on Skis

The aeroplane was shipped from Montreal, January 19th, 1922, and arrived at Cochrane on January 28th,



Avro Aeroplane, Flown by Canadian Aerial Services' Pilots, just after landing at Moose Factory in the Far Northland. Note sled runners replacing wheels in landing gear.

equipped with skis which had been previously tested and found satisfactory under conditions at Montreal. On arrival the type of skis with which the machine was equipped was found unsatisfactory due to peculiar snow conditions. Due to extreme cold, snow falling in the Far North is in the form of sugar snow, i.e., particles of ice, not large soft flakes as in more southerly regions. This form of snow does not pack, with the result that a person walking upon it sinks immediately through almost any depth to the ground and it is very difficult to walk even with very large snow shoes. On the aeroplane being set up it was found that the skis had been built very much too narrow to permit the machine taking off, as the machine in taxiing would bury itself to the fuselage in the snow. New skis were therefore designed 14 inches in width and boxed in at the sides, to prevent side slipping into the snow. These skis having been tested and found satisfactory the machine was ready for the first flight on February 5th at 3.45 p.m. The engine was warmed up to get the oil circulating properly; baggage and equipment was checked over, consisting of the following: A double sleeping bag; provisions for two for one week; snow shoes for two; four gallons oil; twenty gallons gas; engine spare parts; complete tool kit. The story of the flight is best told in the words of Capt. W. R. Maxwell, the pilot in charge, whose report is, in part, as follows:—

Story of the Flight

"We took off into the North and climbed steadily until we reached the Abitibi River, at an altitude of 3,000 feet. The Temiskaming & Northern Ontario Railway are building an extension to the railway from Cochrane to Moose Factory. Their engineers are at present on location work, as far as New Post, half way. As we followed the River we noted below, the various snow shoe trails of engineers, and of trappers. Darkness was creeping down on us so we landed at New Post just at dusk. This was the first visit of an aeroplane to this Hudson Bay Post. On arrival at New Post it was found that the Abitibi River had been frozen to such an extent that the water being unable to float beneath the ice was overflowing with the result that the river was covered with a soft slush. On landing in this slush our left ski



Moose Factory Residents Visit Canadian Aerial Services' Avro Aeroplane which is Something Entirely New and Strange to Them.

was damaged. The snow caked up in front of the runner splitting it. The ski was taken off and an old Indian sewed the broken members of wood together with moose thong. A very enjoyable evening was spent at New Post. The old Indian chief who had repaired our ski drew and indicated on our maps many lakes to the East of New Post, none of which are shown on the Government maps.

"After refuelling in the morning from gas we were carrying, we had the Indians snow shoe a track some one hundred yards long, this on account of wet slushy snow. We took off without any difficulty and followed the river again. As we approached the Moose River, low clouds were encountered and we had to descend to five hundred feet. We circled Moose Factory and landed in the clearing just in the rear of Hudson Bay Store. Our arrival certainly surprised the inhabitants as many of them had not even arisen, it being Sunday morning.

"We were given quite a reception. In the evening we had a very nice game of bridge. Our total flying time in, was two hours and ten minutes. This trip by the ordinary method of travel, i.e., dog team, occupies on an average of eleven days each way. We refuelled in the afternoon, ready for our return flight.

"The Hudson Bay Factor at Moose Factory reported a very mild Winter with but fourteen inches of snow.

The river was particularly smooth and even had it been very rough, channels between islands lend themselves splendidly for landing of machines, on skis, with plenty of protection against wind and storm.

The Return Flight

"Monday noon after getting all the information necessary and having secured the mail from Revillon Frères, we took off toward the North, circled the Post once and headed South up the Moose River. Clouds at one thousand feet prevented us from making the long hops across points. Some forty miles from the Junction of the Abitibi and Moose Rivers the engine started to vibrate and a landing was necessary. A repair was made to a broken push rod and we took off again. It was snowing and the wind was from the South-East. We flew low over New Post dropping several cakes of soap and the Bay mail. While at New Post we had been advised by the Hudson Bay Company's factor there that the Post had been without soap for a considerable period of time and requested that if possible we get a supply from Moose Factory and drop it at New Post on our return trip. On arrival at Moose Factory we reported this shortage to the factor there and secured a supply. On our return trip we carried mail from Moose Factory for New Post. This mail and the soap were tied in packages to which we attached small balloons. On arrival over New Post on our return journey we circled low and these packages were dropped, landing directly in front of the Hudson Bay Company's house. After leaving New Post we flew for a short distance and found it was necessary to land and refuel. The snow was deep and a flying start was necessary. After the machine was in motion we hopped in and took off. The weather had changed to a clear sunny day and at the last bend on Kettle Falls on

the Abitibi we cut across to Cochrane. Our flying time on the return flight was two hours and thirty-five minutes.

"The Abitibi, the Moose and practically all of these rivers lend themselves beautifully to Winter flying. The new skis functioned well. We suggest the use of improved boxed skis. These would prevent the machine from slicing in when taxiing on turn. We found that oil if properly heated and engine members also heated before flight function quite well even under severe cold weather conditions. Snow shoe trails could easily be detected on lakes and rivers from a height of 3,000 feet. The engineers on extension to the T. & N. O. Railway could be seen at work above rapids.

Other Flights Made

"Following this flight, three additional flights were made from Cochrane to Moose Factory and flights were carried out around the shores of James Bay, the temperature varying from zero to forty-six degrees below. These flights were carried out without mishap with one exception. Pilot J. H. St. Martin had a forced landing due to a broken connecting rod, sixty miles North of Cochrane, necessitating a snowshoe tramp over this distance to secure spare parts to effect repairs. This trip, and the return trip from Cochrane by dog team occupied four days; the machine being ready for flying on the morning of the fifth day. The trips were carried out without any accident to personnel, and though considerable hardships, due to cold and exposure to extreme weather were experienced, on the whole the various trips were enjoyed by all concerned."

Commenting on the operation, an official of Canadian Aerial Services, Limited, said: "We feel we have every reason to be proud of the manner in which the operation was carried out. It was pioneer work but it has de-

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monstrated that flying can be successfully carried out in extreme temperature and over unsettled country without undue risk to equipment and personnel. We feel the experience gained on this flight will be of great value in future work of this nature and have no hesitation in saying that, in the future, rapid communication between extreme outlying points of civilization and large centres will be effected by the use of aircraft both for the transportation of travellers, supplies and mails. The operation was completed just before the break-up on the Abitibi River. On the last trip from Moose Factory to Cochrane it was noticed that in several places on this River, notably at Kettle Falls, there was a considerable stretch of open water. While we had planned additional flights it was felt that we were not justified in taking the risk of flying over this country with a machine equipped for landing on snow and with a prospect of the ice going out of the River, thus leaving no landing ground. The machine was therefore dismantled and shipped back to Montreal."



Air Board Machine Landing Supplies for Fire Rangers in North Country.

Air Board Statistics

THE following statistics with reference to Civil Aviation certificates and licenses issued, cancelled and renewed for the month of March, 1922, are given out by the Air Board.

Private Air Pilots:—Lapsed, S. H. McCrudden, Toronto; Renewed, A. N. Vose, Winnipeg; A. S. McLerie, Toronto.

Commercial Air Pilots:—Issued, L. S. Breadner, Ottawa; L. F. Stevenson, Winnipeg; J. G. P. Cleland, Montreal; R. I. Van der Byl, Victoria, B. C.; A. M. Anderson, Toronto; C. C. Casewell, Saskatoon; C. St. C. Guild, Musquodoboit Harbour, Nova Scotia; J. H. St. Martin, Montreal; G. W. Gorman, Edmonton; C. C. Caldwell, R. Duncan, Winnipeg; G. D. Roberts, Edmonton; T. W. L. Burke, Yorkton, Sask.; S. W. Holt, Medicine Hat; R. Leckie, Toronto.

Commercial Air Pilots:—Renewed, J. Simpson, D. P. Roberts, O. Radford, Winnipeg; William Young, Regina; Duncan Black, Lewis Taylor, Angus, Ont.; E. G. Hamilton, Detroit, Mich.; G. D. Gosnell, Santa Cruz, Cal.; L. F. Stevenson, Winnipeg; Percy Handford, Innisfail, Alta.; Alfred Day, Winnipeg; A. L. Corson, Welland; John Sherbourne, G. C. Johnson, Toronto; Earl Leslie McLeod, Atcheltitz, B. C.; W. H. Brown, Victoria; C. H. Fitzherbert, Vancouver; N. R. Anderson, Hanover; C. St. C. Guild, Musquodoboit Harbour, Nova Scotia; A. G. McLerie, Toronto.

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AN APPRECIATED INNOVATION

THE progressive and enlightened course of the University of Saskatchewan in including in its system of extension lectures at a score of outlying points in the province, addresses on shelter belt planting by Mr. Archibald Mitchell, Western Lecturer of the Canadian Forestry Association, has met with a hearty public appreciation.

Mr. Mitchell, who is now and for the remainder of the year, will be engaged by the Canadian Forestry Association in carrying on hundreds of public meetings to advance the cause of tree planting on the bare prairie areas, has met with an excellent reception wherever he has appeared under the flag of the University of Saskatchewan. By the extension lecture programme of the University of Saskatchewan the benefits of university experts in many lines is brought practically to the front door of the prairie farmer who, while unable to sit in a college class room is eager for information that will assist him in his farm operations.

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Wireless for Aircraft Service

System Evolved by Marconi Company has Produced Good Results

OBVIOUSLY the success of air lines and aerial fire patrols will depend on rapid and efficient communication between aircraft and the ground and to a lesser extent between aircraft in flight. Wireless provides the only means by which this can be achieved. It enables the ground staff to provide pilots with information concerning navigation, thus making for safety and reliability even more than is the case at sea. Also modern wireless developments provide passengers with a means of communication as well as an assurance of safe and speedy travel. The Marconi Company, long recognized as the pioneers of trans-oceanic and maritime wireless services, have evolved an aircraft wireless telephone system, giving commercial aviation just those benefits which are essential to its development. This service has long passed the experimental stage, and air telephone communication is as easily effected as that between subscribers to the ordinary Public Telephone Service.

Direction-Finding Apparatus

Enormous difficulties had to be overcome. It was recognized that speedy results with comparatively unskilled operators were of primary importance. Wireless engineers had to produce apparatus to withstand constant vibration and to be unaffected in its operation by the noises of engine and machine. Space and weight were also of paramount importance. Further, though operating under adverse circumstances it was not practicable to inspect and test the gear whilst flying, test flights forming an expensive item. A reliable system of direction-finding was also important in order that the pilot might be informed of his exact position at any moment.

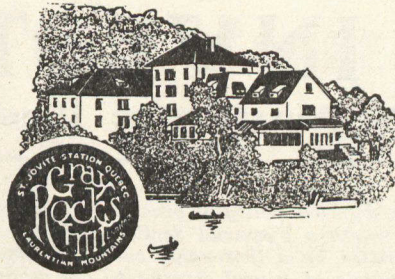
As between direction-finding in the machine or transmission to the pilot of bearings obtained from the ground, the needs of today are best fulfilled by the latter method, mainly because the ground station unit is larger and has a more efficient aerial system. The Marconi Company have in addition developed a new portable direction-finder of exceedingly small dimensions which is specially suited to aircraft work.

Provide Complete Service

Today the Marconi organization offers wireless telephonic communication to any aircraft owner or transport company under a scheme whereby instead of selling apparatus, a complete service is provided at a standard rate per flying hour on a sliding scale determined by the number of machines equipped and the number of flying hours. The Company provides the apparatus, arranges for its installation and maintains it, supplying all spares and expendable stores, and training the pilots or mechanics in its operation. No charge is made for unsatisfactory communication resulting from faulty apparatus.

The maintenance staff, as the result of training and experience, are competent to deal with all problems of aeronautical wireless. The testing of the apparatus is done in most instances without special flying, which is an outstanding achievement. Test conditions are arranged so as faithfully to reproduce conditions met in actual flying.

Before leaving the ground the pilot connects the telephone ear-piece fitted in his helmet to the apparatus itself by a plug and socket, the microphone and adjusting gear being ready to his hand in the cock-pit. Reception and transmission are carried out alternately by means of a simple change-over switch, communication being thus kept up during the whole journey.



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THE INVESTMENT FIELD

Specially Written for the Illustrated Canadian Forestry Magazine

In line with our policy of broadening the scope of The Illustrated Canadian Forestry Magazine, we publish this month a Financial Section in which various phases of the Investment field are reviewed. This Section is written by a thoroughly competent and entirely reliable financial authority who will each month prepare an article of special interest to our readers. Needless to say, the department will be conducted along purely informative and educative lines, without any attempt to influence our readers unduly in their financial undertakings.—EDITOR.

THE remarkable success achieved by the Minister of Finance in floating a \$100,000,000 loan for the Dominion of Canada in New York is the most favorable factor that the present year has developed for the investor. The low rate paid for the loan was a surprise even to veteran financiers in Canada, who had been looking for a $5\frac{1}{4}\%$ yield, and more likely, a $5\frac{1}{2}\%$ yield on a domestic bond issue. This was only natural, with the 1934 taxable bond holding around par, and providing a yield at that of an even $5\frac{1}{2}\%$ per cent.

The immediate effect of the issue was to reduce the discount on Canadian funds in New York to little more than one per cent. with the consequent advantage in meeting financial obligations there and lessening the cost of raw material. It seems hardly possible that a rate lower than 3 per cent. can be maintained for some time yet, but the establishment of the low rate even temporarily has a beneficial effect on the ruling rate for the future. Far more important, however, is the impetus extended to the downward movement in the rate of interest, which is referred to later, when New York taxes our bonds at a yield, net, of about 5.15 per cent., the day of 5 per cent. money in Canada is brought immeasurably nearer; that is for a 25-year issue as the new bond seems likely to be.

It seems probable now that no Dominion loan will be offered investors until next Fall, and only then if it can be floated here at a rate much lower than $5\frac{1}{2}\%$ per cent. The prospect of such a loan has served to focus attention more than ever upon the outstanding Victory bonds as our basic and central form of investment.

Probably only those in intimate touch with investment houses have come to realize the extent to which the country-wide campaigns of 1917, 1918 and 1919 instilled in the public mind an intelligent conception of the nature and value of a first class bond as a receptacle for their savings, and a guarantee of a regular income at almost double banking interest rates. The field thus made ready, in great part by sentiment, and later on by beneficial experience, has been cultivated assiduously by bond dealers since, with securities of widely varied merits, but it is a field to which the Minister of Finance can look with confidence in June or in the Fall, when he must prepare to refund the first maturing Victory bond issue,—the five-year offering of December 1, 1917, which during the past year or so has been reduced from \$194,842,100 to \$182,835,500. For this was not provided for even in part, it seems likely, by the New York loan.

May Be Long-Term Issue

The question as to whether the next issue will be a long term one or not is of great importance; not only in relation to bonds, but to the higher grade securities in the form of preferred and common stocks. An official of a wealthy Canadian corporation that has many millions a year available for investment is on the outlook now,—and will be—for long-term investments. His theory is that interest rates are falling steadily. Where municipals sold

one year ago to give a yield of $6\frac{1}{2}\%$ per cent., the present rate has fallen pretty well to $5\frac{1}{2}\%$ per cent., and will come down to $4\frac{1}{2}\%$ per cent. or even lower in a few years. His policy is to bridge over the "lean" years of interest rates by investments at the present fairly high rates, to cover 15, 25, 30, 40 or even 50 years. By that time, he believes, the cycle of declining rates will have come to an end, and the upward trend will have begun.

Interest Rates in Steady Decline

This is a point that investors should bear in mind. This is why the long-term Victories have risen above par, and why the 1933's and 1937's should go still farther up: this, and their tax-exempt feature of course. This is why a reasonably safe bond that pays 7 or 8 per cent today should see higher levels in the next year or two, moving up above par, in order that the yield to the purchaser at the time may be in conformity with prevailing returns. Just at present the 1934, taxable Victory bond is selling at par, thus giving a yield of a straight $5\frac{1}{2}\%$ per cent:

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when the prevailing rate on high class bonds drops below this—and this will come very soon—the 1934 issue will sell above par, and the yield will consequently, drop below 5½ per cent. At 105-106 the 1937 issue is practically on a 5 per cent. basis, while at 102.85-103 the 1933 (tax-exempt) Victory gives a yield of about 5.20. This, too, should soon rise to net a 5 per cent. return.

As indicating the recent rise in Victory bonds—with the corresponding lower return—it may be of interest to compare prices and yields for the past three years:

VICTORY BONDS OVER THREE YEARS

Due.	1922		1921		1920	
	Price	Yield	Price	Yield	Price	Yield
1922 (Tax-exempt) . . .	99.75	5.70	98 ⁵ / ₈	6.17	98	5.85
1923 (Tax-exempt) . . .	99.60	5.70	97 ⁷ / ₈	6.24	98	5.80
1924 (Taxable)	99.35	5.70	96	6.58	96½	6.10
1927 (Tax-exempt) . . .	100.85	5.20	97½	5.94	99	5.50
1933 (Tax-exempt) . . .	102.50	5.20	98¼	5.67	99	5.50
1934 (Taxable)	99.90	5.48	94 ⁷ / ₈	6.03	96	5.80
1937 (Tax-exempt) . . .	104.75	5.08	99½	5.53	100	5.40

The 1921 and 1922 prices are in contrast with those of 1920 which were arbitrarily fixed. The 1922 show a big advance, especially in the long-term maturities over those of 1921, twelve months before.

Bank of England Rate at 4 Per Cent.

Two events of great significance in the investment world, as well as what may be termed the distinctly financial, occurred the latter part of April: the Bank of England reduced its discount rate four 4½ to 4 per cent. the lowest rate since the war began, and the lowest in the world today with the exception of the Bank of Switzerland, and the United States authorities were welcomed by an over-subscription to a six-months' loan of \$150,000,000 at 3½ per cent. Time money in New York is plentiful now at 4½ per cent. and "call" money at 4 per cent.

The 4 per cent. rate in England drew an immediate response from eager bond buyers. In the States, the success of the 3½ per cent. loan shot up four out of five Liberty issues to par, for the first time since the date of issue, and the bond market fairly boiled. Huge sums of money are available both in Canada and the United States for investment with commercial activity far below normal, and continued strength in the bond market, with further advances seems to be assured. The investor should make sure of his choice, then purchase, as there seems no likelihood of anything more than a very temporary and almost negligible set-back in the present level of prices.

Implicit belief in the theory of further declines in prevailing rates of interest and in the superiority of the long-term bond for an investment is held by John Moody. In an April letter he makes an interesting comparison of rates that have been paid by various groups of issues since 1914—indicating the rise from 1916 to a high in the second half of 1921, and the substantial drop since that time. For instance in 1916 the average yield of new municipals was 3.97 per cent. This rose to 4.22 in 1917; to 4.62 in 1919; to 5.20 in 1920; to 5.61 in the latter half of 1921, and then fell to 4.71 per cent. in the first quarter of 1922.

Rails rose from 4.75 in 1916 to a high of 7.07 per cent. in the first half of 1921, and dropped to 5.68 per cent in 1922.

Up and Down

Public utilities rose from 4.46 to a high of 7.85 per cent in 1921, and then fell to 6.92 per cent.

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Industrial bonds from 5.26 per cent. to a high of 7.96 per cent., and thence down to 7.17 per cent. Price of capital, from 4.98 in 1916 to a high of 7.24 in 1921, and down to 6.50 in 1922.

The theory of a greater advance in long-term issues as interest rates fall is borne out by an estimate that a 5-year 6 per cent. note in falling from a 6½ per cent. basis to one of 5½ per cent would necessitate a rise of 4.27 points in the market price, whereas a 20-year 6 per cent bond in falling from a 6½ per cent yield to a 5½ per cent. would force a rise in the market price of 11.57 points.

The rise in the bond market has been followed by a sustained advance in the "stock market," in Canada and the United States. Indeed the strength displayed has been impressive, after due allowance has been made for all manipulation. It cannot be taken for granted that the recent advances in many groups represent the immediate improvement in business prospects registered by that group. The speculative element prevents usually, an orderly, systematic advance or decline. Prices generally are above or below their intrinsic value. Stocks soared too high in 1919 and early in 1920, just as in 1921, they reacted too far below their real worth. At present they are recovering rapidly from that reaction, and as day after day passes the impression grows that the low prices of last year will not again be touched for years and that 1922 will see much higher levels reached in scores of securities.

The very strength of the market is a little puzzling. "The Bache Review" of New York remarked: "The stock market is registering much more than seems probable in business revival—even six months further on; that is, judging by the present condition and prospects of business in this country. . . . There is not much doubt that such influences as are supposed to move the stock market, comprise not only the prospects of trade

revival here, but also, and perhaps even more important, the tendencies of events affecting the well-being of Europe." It continues: "The influence of a rising stock market is important to the business of a country, because it generates a spirit of hopefulness in the business situation, even if the current movements of business are not themselves productive of prosperity. A certain pessimism is evident in some quarters as to the future of business based on the fact that the spring revival has not developed widely."

Be that as it may, the stock market advance has generated a more hopeful feeling in industrial circles while at the same time it reflects to some extent improved prospects.

Undoubtedly this is true of the newsprint industry, in which readers of this magazine, are largely interested. It is clear now that the reaction in paper stocks went too far. Instead of a recurrence of lower prices and a demand far below capacity that looked likely early this year to be applicable to the second, third and fourth quarters, Canadian mills have been able greatly to increase their production until now it is running, not only well above last year's, but above the previous high record of 1920, while the price continues firm. This is probably the most remarkable recovery recorded in any Canadian industry.

The recoveries in stock market quotations since the first of the year have been sharp also in some of these securities: Abitibi, 20 points; Brompton 7; Laurentide 13-14; Spanish, common, 14; Spanish preferred 17; Wayagamack 16.

The textile, the milling, public utility and steel stocks are four other groups that have experienced substantial improvements in prices. For investors who hold stocks in which business prospects are favorable, it would seem wise to retain possession even after the present rise, while those who contemplate investments in approved stocks should be careful not to wait for any more than the slight, temporary reaction that is the natural accompaniment of a fairly sustained rise.

Personal Mention

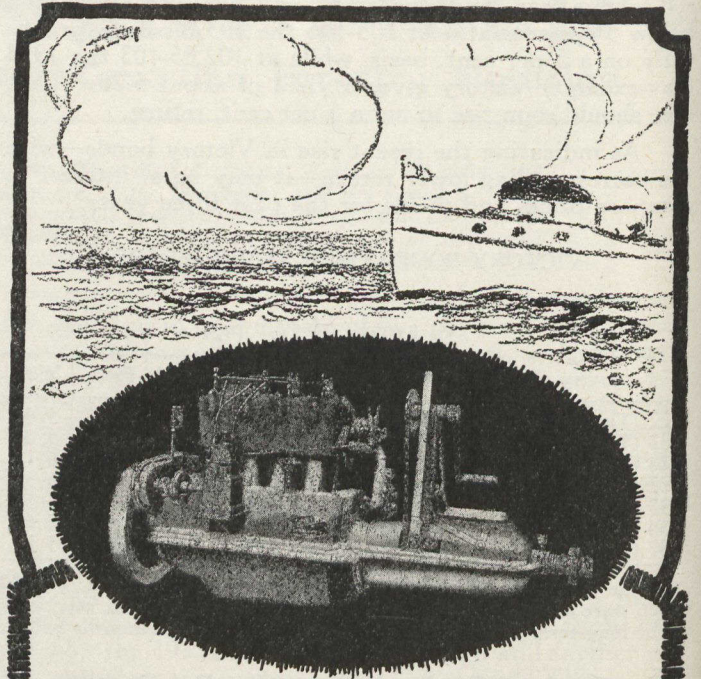
Mr. Dan McLachlin, Arnprior, Ont., president of the Canadian Forestry Association, was honored by election to the second vice-presidency of the National Wholesale Lumber Dealers' Association, at the recent convention in Washington, D.C.

Mr. J. R. Booth, Canada's veteran lumber king, on April 5th, celebrated his ninety-fifth birthday by turning in a good day's work at his Ottawa plant. Mr. Booth received scores of congratulatory messages from all parts of the continent and his natal day was suitably remembered by the staff of the Booth plant with a basket of roses, one for each year of his age.

Mr. Louis S. Rolland, Montreal lumber exporter, who has recently returned from a two month's trip to Great Britain, where he was accompanied by his bride, is of the opinion that there is little indication of any immediate improvement in the Canadian export trade, to be obtained from conditions now existing in the Old Country.

Hon. T. D. Pattullo, Minister of Lands and Forests in the British Columbia government has spent some time recently in the East, having visited Toronto, Ottawa and Montreal, where he conferred with various representatives of the lumber interests in these districts.

Mr. I. W. Killam, managing director of Royal Securities Company, Limited, and a director of several pulp and paper companies, was married on April 5th at St. Louis, Mo., to Miss Dorothy Johnston of that city.



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Canada's Forestry Conditions and Problems

(Continued from page 766.)

manage our forests; that is a very significant thing, capable, if sustained, of far-reaching consequences to the advantage of the forests and consequently to Canadian industries.

The characteristics of the present period developed gradually, however. The war had an accelerating effect and linked Canada up with the Imperial forestry needs. The beginnings of the present period were indicated some years ago in the management of extensive forest areas in the West by the Dominion Forestry Branch, in the employment of foresters by lumbermen and pulpwood companies, and in the development of reforestation programmes. The Province of Quebec took the lead in the two latter. The first private companies to employ foresters are in Quebec. The first companies to begin planting operations on a commercial scale are in Quebec. The Provincial Forester was perfecting his plans for co-operative planting on pulpwood limits before the Imperial Conference took place. I am informed that certain pulpwood companies are making the necessary investigation of reproduction and rate of growth preliminary to restricting the annual cut to the amount accumulated by the annual growth. Similar studies are being made in New Brunswick. Within the past few months, the Prime Minister of Ontario has announced his adherence

to a reforestation programme that calls for the planting of 10,000 acres a year for the next sixty years.

Now, why is it that private companies are going into the business of forest planting on a large scale? Why is it that Ontario is planning to reforest over a half million acres of waste lands? Why did the British Reconstruction Committee say that forest conditions in Canada presented an Imperial question of first magnitude which deserves the immediate attention of the Imperial and Dominion Governments? Let us hastily examine into our forest conditions to see if we can find a satisfactory answer to these questions. Before we proceed, however, let me point out a mistaken conception quite generally held by the public. People think that, if an area is covered with a forest of some kind all is well. In our climate, they say, nature will always give us trees of a sort. Let us take what nature gives and not worry about the future. This assumes that all trees are so alike in their physical and mechanical properties that they can all be used, if necessity requires, for the same purpose. Any farmer or wood-user knows this isn't so, yet I have often heard the idea expressed by otherwise intelligent people who ought to know better. Quite likely they talk that way because of the emollient properties of the idea. As a matter of fact, there are forests and forests; there are trees and trees. It does not follow that an area covered with forests is commercially valuable

because of their presence, or that one tree is as good as another for the various purposes of the market. In the neighborhood of 70 different kinds of trees have been used in this country in the wood and timber trade, but a very few species contribute the greater portion of the output. About four billion feet of lumber are cut in Canada every year. Their value as rough lumber is approximately \$122,000,000. When time, labor and thought have been expended upon them they become worth around \$250,000,000. Thus our forests in terms of the manufactured lumber products increase our national wealth a quarter of a billion dollars each year. Over two-thirds of the above are contributed by six different kinds of trees. The comparatively few kinds of trees in our forests that are utilized in large quantities are still more strikingly shown in the case of the pulpwood. Of this material around four million cords are cut each year, valued in the rough at \$45,000,000, and from which pulp and paper products are produced to the value of over \$200,000,000. More than 90 per cent of these values is furnished by the wood of four kinds of trees.

These few trees enter so largely into the products of the forest not because they are plentiful and accessible, but because they meet the market requirements better than any others. Because of certain inherent mechanical and physical properties, no Canadian wood, for example, is so well adapted to such a variety of uses as that of the white pine. The commercial supply of this species is fast disappearing. Owing to this fact we are already using poorer woods as substitutes—with little or no difference in price. And again, no wood fibre is so well adapted for paper making as that of spruce. Notwithstanding all that has been said and done with regard to employing various vegetable fibres as substitutes for woodpulp, little has been accomplished or probably ever will be accomplished because of the quality, adaptability and cheapness of production of wood fibre and among wood fibres those of spruce stand supreme as the result of certain inherent characteristics. When the supply of spruce is gone we shall be compelled to use poorer—but not cheaper—grades of paper.

Canada's Forest Areas

Now we will turn to our forested areas from the standpoint of the commercially valuable trees. In the first place, of the 3.5 million square miles of land area in Canada, 1.6 million square miles, over 40 per

cent, are too cold or too high or too dry to produce trees of sufficient size to interest lumbermen. Around 100,000 square miles should be deducted for agricultural lands outside the grasslands of the West, they having been included in the above. Even with these deductions, we have enormous areas covered by forests, some 1,900,000 square miles, (over a billion acres), and again having their utilization value in mind, let us ask: What kind of forests; what kind of trees? On at least 500,000 square miles climatic conditions are such as to produce only trees of pulpwood size, practically no trees of sawlog size, that is, 12 inches and above in diameter, except in the immediate river valleys.

Destruction of our forests by fire has been incomprehensibly great. The amount of saw timber thus destroyed has been much greater than the amount removed by logging or farming operations since the settlement of the country began, in fact probably greater than all that has been cut in the past plus all that could be cut today. There is little doubt that from one half to two thirds of the forested area of Canada, or in other words around one million square miles (640,000,000 acres) have been burned within the past 75 years and because of such fires do not today contain forests of sawlog size. This reduces the areas containing trees of sawlog size to about one quarter of the total forested area, that is around 500,000 square miles, or approximately 12 per cent of the land area of the country. If we had the population of the European countries or of the United States, this percentage would be far on the wrong side of the factor of safety. In fact, our supply of sawlogs would last the United States at their present rate of cutting not over fifteen years.

Effects of Forest Fires

Just a little more about forest fires and their effect: Much of this million square miles has been burned not once only, but two, three or even half dozen times. These repeated fires on the same area make abortive nature's attempt to reclothe the old burns with commercially valuable trees. Whole townships that once supported magnificent forests of pine or spruce are now because of repeated burnings covered with worthless brush or with trees of no market value. It is reported that in Quebec there have been about two thirds of a million acres burned so severely that they are not producing the kinds of trees now being used for lumber or pulpwood. Such areas in Ontario are still larger



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according to reports. Bear in mind that these are merely estimates. They are not based on actual surveys, although surveys of the burned-over areas are being carried on in both provinces. I fear, however, we shall be simply appalled when the results of such surveys are made public. It is a matter of public record in Ontario, being disclosed by recent investigations, of which you may have heard, that certain pulp and paper mills are finding it difficult to replenish from crown lands their waning supplies of spruce. And the reason is—repeated forest fires. This forest devastation by fire is not a thing of the past: It still continues practically unabated, except in wet seasons, in some of the most valuable forest regions of the country. Over a million and a half acres of forest fell prey to the flames in Eastern Canada last summer, but it was an exceptionally dry season.

Even on the areas which have been lumbered and have escaped burning inferior trees usually take possession after the removal of the valuable pine and spruce, especially where they were mixed with hardwoods. I could show you areas both in Quebec and Ontario where old white pine stumps occur abundantly beneath the present stand of hardwoods or of mixed forest with practically no young pine trees to be found. The pine could not maintain itself after the logging operations. The conditions are considerably better where spruce has been removed, but not nearly as good as they should be

in order to produce a succession of future crops. You will see at once that in order to harvest a crop of trees on the same area, let us say at intervals of ten years, a sufficient number of trees must be ready at each interval to pay the lumberman for cutting them. When he cuts the 12-inch trees, for example, enough 11-inch trees should be left to refurnish the next crop, enough 10-inch trees to yield a profitable crop at the third cutting, and so on down through the diameter classes, but with an increasingly larger number of trees in each diameter class downwards because the highest death rate is among the smaller trees. This is what foresters call the proper gradation of diameter classes and it is the basis of successive yields on the same area. Now, investigations have demonstrated that such proper gradation of diameter classes, especially in the smaller diameter classes, is lacking in the cut-over pulpwood forests of the mixed type (hardwoods and softwoods mixed) in Ontario, Quebec and New Brunswick as revealed by intensive study of small representative areas. The trees that remain after the first, second and even third cutting belong to the virgin forest. They might be called the virgin surplus. When the lumberman cuts over an area ten years after his first cut, he thinks he is cutting the growth that has accumulated in the meantime, but he is not; he is simply cutting the virgin surplus, a part of the virgin forest that he did not take the first

time because it wasn't profitable for him to take it. In fact, since the lumbering operations began in this mixed hardwood-softwood forest, say 50 or 60 years ago, there has not been enough regeneration of spruce eventually to replace what has been removed. In other words, the spruce as a tree of future commercial importance is being gradually crowded out of this mixed hardwood-softwood forest

Disease Amongst Trees

Under normal conditions forest trees die of disease. Very few die of

old age. There is scarcely a healthy tree in a mature forest. Unfortunately, lumbering methods have been such as to increase rather than to decrease the susceptibility of trees to disease. Periodically there comes a combination of man-made and nature-made conditions that produces an epidemic in the forest. Just now the Eastern forests are being swept by a real scourge, the spruce budworm, which has already destroyed about 30 years supply of pulpwood, according to Dr. J. M. Swaine, at the present rate of production. The destruction of wood material through

such epidemics, however, cannot be adequately measured by the trees killed at the time because the after effects continue for years. The weakened trees become susceptible to fungus diseases to which they were previously resistant. The fungus bodies are like cancers. They dissolve away the tissues of roots or stem at the base of the tree until it is overturned by the wind.

Our forests, particularly the older stands, are rotten with fungus diseases. The number of trees that die before their allotted time is enormous and this has an important economic significance. This is an enormous waste of sawlog and pulpwood supplies that will be largely eliminated when conditions are such that our forests can be really managed. Balsam is one of the most susceptible of the softwoods to fungus diseases. Dr. Faull, I believe, has found over 20 different kinds chewing at the vitals of balsam. This is the reason that we cannot depend upon this species as a source of pulpwood supply in the future.

We do not know as much as we should know with regard to the rate of growth of our forests. If the annual increase is as great as the annual loss, then the forests are self-sustaining and we have nothing to worry about. The chief object of all a forester's efforts is to get the area over which he has charge into that condition. Only by procuring a sustained and regulated yield can he furnish a continuous supply of raw material to the wood-manufacturing industries. That is what your Provincial Forester is trying to do. That is what the foresters of pulpwood companies, of which you have such splendid examples in Quebec Province, are trying to accomplish. That is what the foresters all over Canada are striving for—the furnishing of an endless succession of wood crops for the lumbering and the pulp and paper industries.

The Rate of Growth of Trees

Let me tell you some of the things we do know about the rate of growth in our forests. There are many misconceptions as to how fast trees grow in the natural habitat. Some one notices a fast growing forest tree in his field or garden, or in an open pasture and he concludes that trees in the forest grow at the rate. In the one case, the tree is more or less cultivated and is not subjected to competition by neighbors; in the other case it is subjected to a severe struggle for life from the day it is born, and this expresses itself in retarded growth. I have made



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growth studies on several thousand trees in the mixed hardwood-softwood type in Ontario, Quebec and New Brunswick, and I find that in the shade of the over-topping hardwoods it requires about 30 years to make a spruce tree 1 inch in diameter; the average 4-inch tree is 60 years old; the average 8-inch tree is 120 years old, and the average 12-inch spruce tree is 160 years old. This is in nature's forest undirected by man. Human intelligence by the proper manipulation of conditions in the forest could reduce the time required to make a merchantable tree. That is the function of a forester. By planting the trees in old fields he could shorten the period to a much greater extent.

Now, with regard to the growth of the forest itself. Such studies as have been made are not encouraging. It has been found, for example, on areas in the mixed softwood-hardwood type, that have been cut-over several times, spruce wood is accumulating at a much slower rate than it has been cut. In some cases as much spruce has been cut in the past 40 years as it took nature 250 years to produce. In other words, the annual growth in the past 40 years has been only one sixth as great as the harvest.

It has been stated that if a single spruce tree 8 inches in diameter died on the average acre each year, the loss in wood volume thus ensuing would offset the average annual growth on certain cut-over pulpwood lands in Quebec. The Provincial Forester of Ontario estimates that the annual growth on the average acre of white pine forest in that Province has been only 15 board feet per year for the past 100 years. This is the yield in board feet of a log 10 inches in diameter and 10 feet long according to the Doyle rule used for scaling logs in Ontario. He also estimates the annual cut of pine to be about one third greater than the annual growth. In fact the Government of Ontario paid back into the treasury \$900,000 from the revenues derived from the forests on the assumption that at least that value of material had been taken from the forest capital stock and did not therefore in reality represent current revenue. The published reports indicate that certain pulpwood companies in Quebec have been doing a similar thing for the past few years, a transaction that can be interpreted as an acknowledgement that they are cutting their forests faster than they are growing. It

will be seen, then, that such data as we have on the rate of growth in our forests indicate that the annual toll taken by the logging operations, by fire, disease and wind far exceeds the annual accretion of wood by the natural processes of growth.

Intelligent Effort Needed

Briefly, our forest conditions present this problem: Shall we accept for our lumbering and pulpwood industries the wood of constantly decreasing quality which nature unguided produces when the equilibrium in the forest has been upset by fire, disease or logging operation or shall we exert intelligent effort to maintain our pine, spruce and other valuable forests and thus supply the forest industries with wood of incomparable quality particularly adapted to their needs?

It is both a challenge to human intelligence, a necessity from a business standpoint, and the part of patriotism to keep the natural forest areas continuously productive in terms of commercially valuable trees—trees whose products annually increase the wealth of the country by nearly a half billion dollars.

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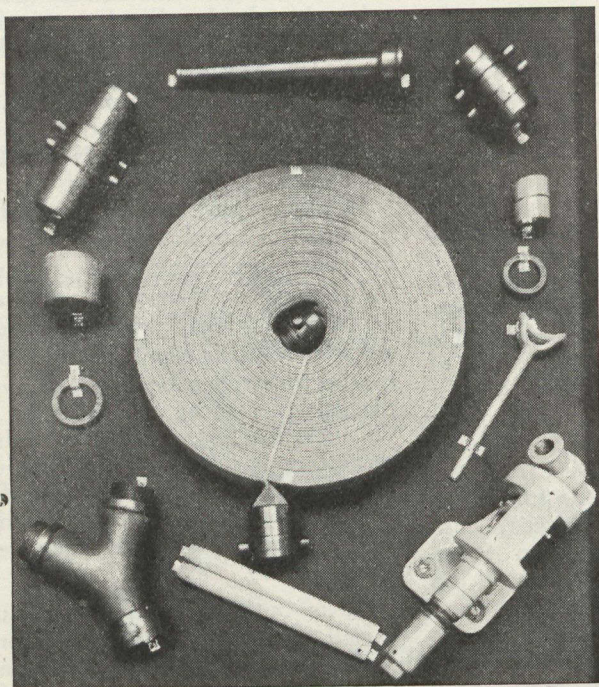
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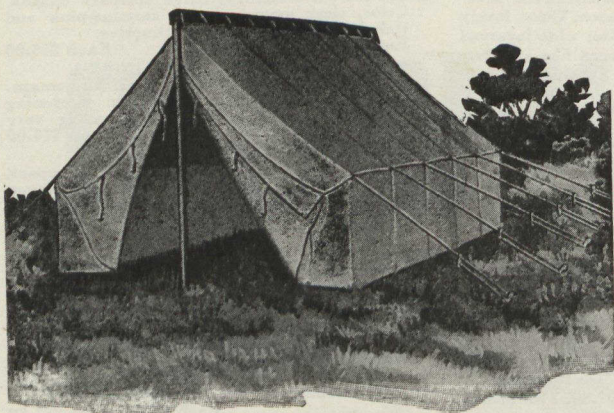
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