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CANADIAN FORESTRY

13,000
NATIONAL
CIRCULATION

MAGAZINE



"FIRE SWEEP."

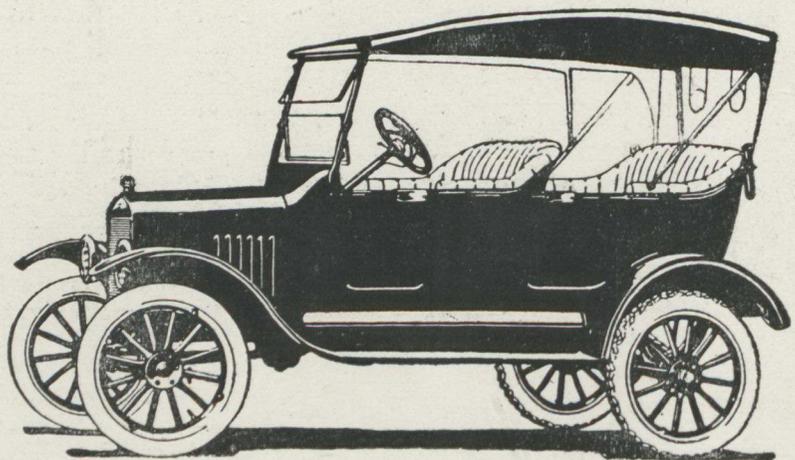
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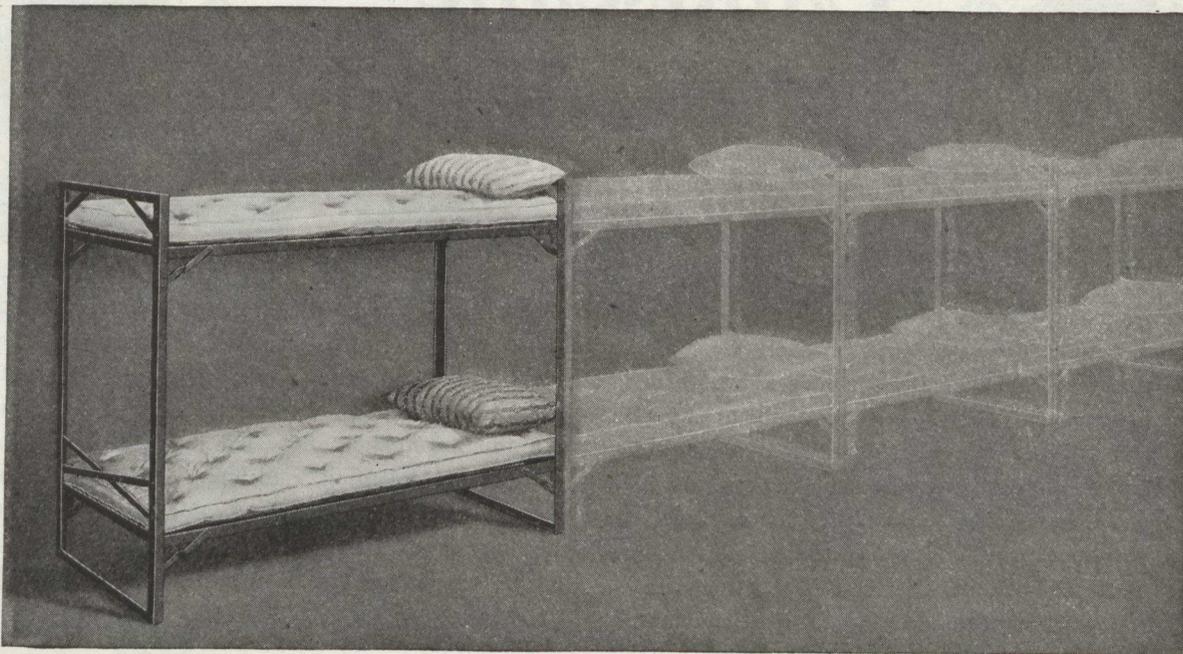
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THE
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**CANADIAN
FORESTRY
MAGAZINE**



Water—The Magic of the Prairie Farm

By E. F. Drake, Director, Reclamation Service of Canada

Forest conservation is a vital factor in irrigation development. The conservation of our forest resources can be justified on many grounds quite unrelated to irrigation; but irrigation as it is, and must be, developed in Western Canada, particularly in the prairie provinces, is very largely dependent upon the preservation of forest cover on the eastern slope of the Rockies, where rise most of the streams used for irrigation.

Practically all of the eastern slope of the Rocky mountains is now included either in forest reserves or in national parks, thus assuring the permanent reservation of this large tract of non-agricultural land for public purposes. But it is necessary to do more than merely reserve this land from other uses; the forest cover must be adequately protected—particularly from fire, its greatest enemy. This will serve two main purposes: the provision of a permanent supply of timber for commercial uses and the protection of the sources of water supply so essential to the agricultural development of the adjacent plains country.

An Old, Old Question.

There is some uncertainty whether forests have any material effect on precipitation over large areas and the available evidence seems to support the negative opinion; but it seems to be established that there is heavier and more frequent precipitation within forest areas.

That, however, is of relatively little importance. The most important effect of forest-covered watersheds is their retarding influence on local run-off.

Forest Cover a Great Equalizer.

As both the snowfall and the rainfall are heavier on these mountain slopes, whether forested or not, than on the prairies to the east, it is essential that the forest cover be preserved in order to retard run-off as much as possible. It has been asserted with some plausibility that cultivated farm land is quite as effective as forest cover in retarding run-off, but these mountainous regions are unfit for agricultural use and will, without tree growth of some kind, shed water almost as freely as paved roads. Forest cover delays the melting of snow in early spring, and thereafter, throughout the summer, prevents loss of moisture by evaporation. The forests, in short, act as retarding

reservoirs, the effect of which is to prevent sudden and violent floods and to equalize stream flow.

Without forest cover there would undoubtedly be more frequent and violent spring floods, with resultant periods of low stream flow in summer, when water for irrigation is most needed—alternate periods of flood and famine, in so far as stream flow is concerned. This cannot altogether be prevented. Forest cover will not wholly prevent floods, nor is it possible to conserve all flood water in storage reservoirs, but the preservation of forest cover will unquestionably have an equalizing effect on stream flow, and, in addition, much of the flood water can be held back in reservoirs against a time of need later on.

Quite aside, therefore, from all the other good reasons for the protection of our remaining forest resources, the settlers on the prairies are vitally interested in the protection of the sources of water supply upon which they are dependent, not only for irrigation development, but for domestic supply as well.

Crops From the "Dry Belt."

The "dry belt," comprising a considerable part of Southern Alberta, contains some 23,000,000 acres. Much of this is too high, or too rough, or is otherwise unsuitable for irrigation. No calculation has been made to determine just how much of this area could be irrigated,



A scene at the Gap, on Old Man River, in Southern Alberta, illustrating the class of country, unfit for agriculture or even grazing, where forest cover should certainly be preserved for its regulating effect on stream flow.



An exceedingly good crop of oats grown at Strathmore, Alberta, on carefully irrigated soil, illustrating the benefit of a regular supply of water for the prairie farm.

well run to \$100,000,000, or even more. There can, therefore, be no room for doubt as to the necessity of protecting the sources of water supply upon which this actual and potential development is dependent.

"THE TIME HAS COME."

"The time has come, it appears to us, to regularize the cutting on timber limits by fixing a maximum of the annual cut to prevent the destruction of the forests, and a minimum to stop speculation, and to assure us a reasonable revenue from the cutting rights.

"Reforestation should be immediately undertaken and encouraged with energy."
—Premier Taschereau, of Quebec.

because the water supply is the limiting factor and it is believed that even with the fullest measure of conservation it cannot be made to serve more than from two to two and one-half million acres—approximately ten per cent of the total area.

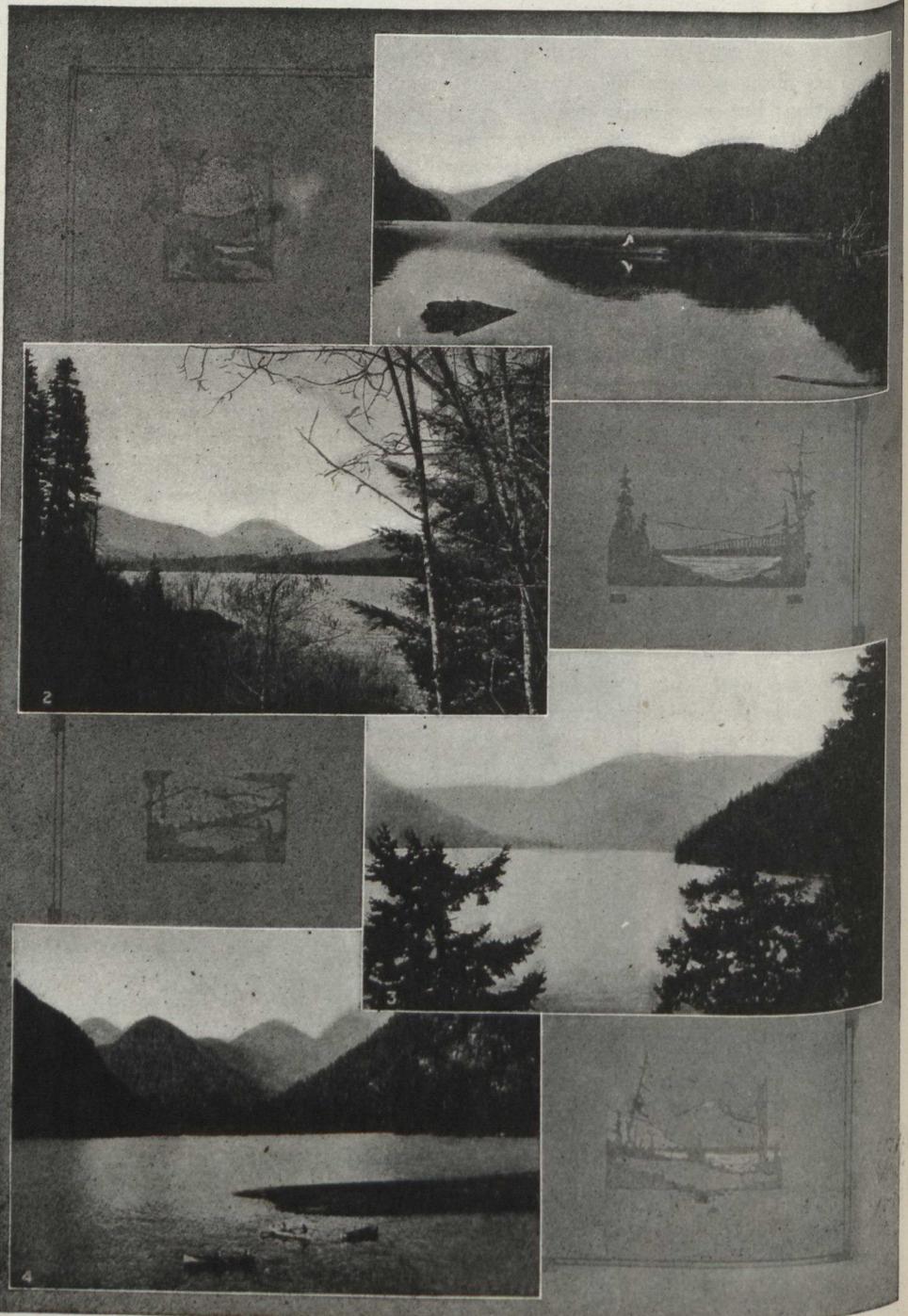
The lands that have already been, or are being, developed for irrigation in Alberta comprise:



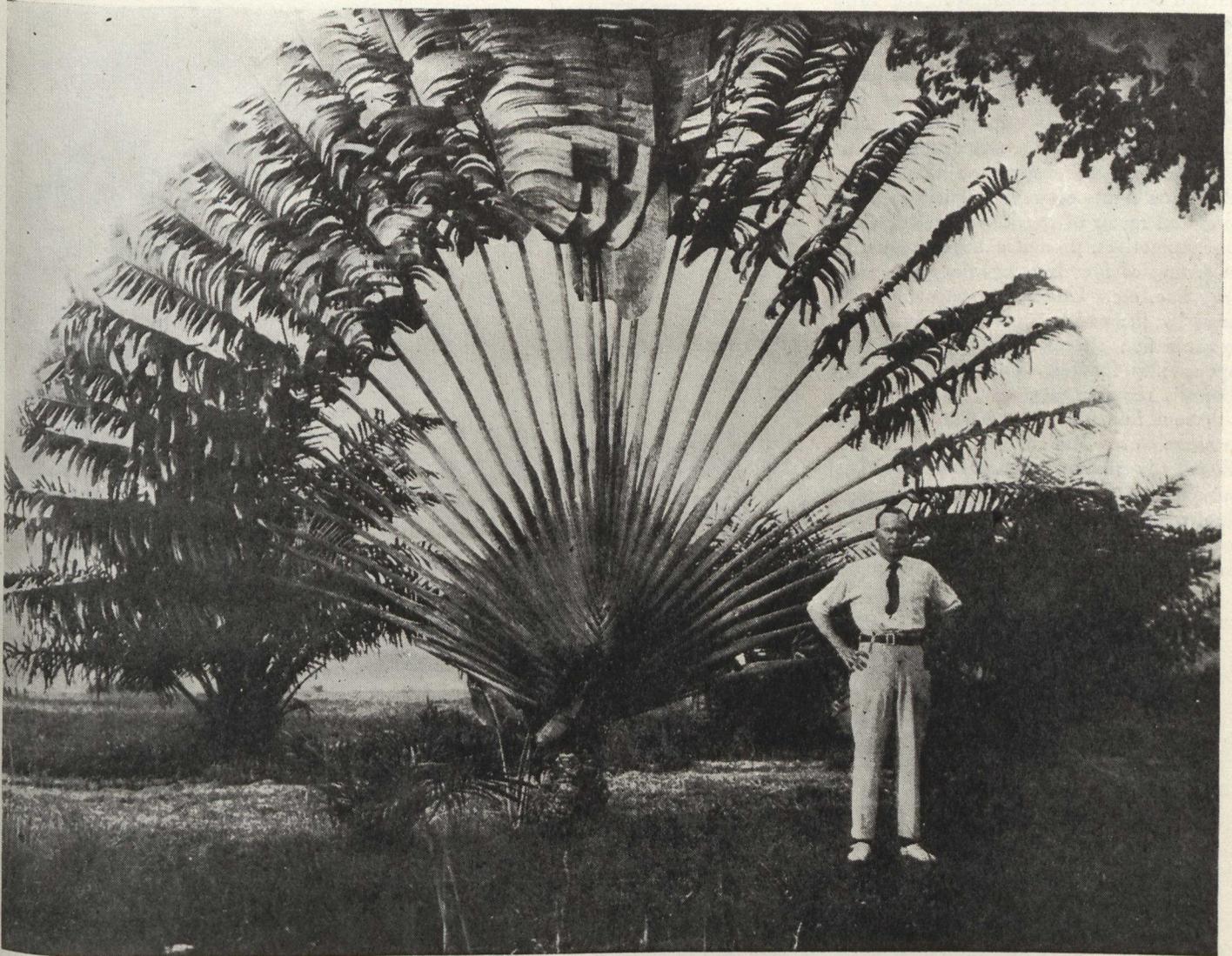
A crop (so called) of wheat, grown in the Coaldale district in Southern Alberta in 1918, without irrigation. The contrast between this picture and the one taken at Strathmore should sufficiently illustrate the advantages to be derived from the practice of irrigation in the dry belt of Western Canada.

	Acreage irrigable.
Small projects (267) ----	60,812
Projects constructed and in operation (4) ----	766,224
Projects partly constructed and operated (2) ----	307,640
	<hr/>
	1,134,676
Projects more or less completely surveyed and believed to be feasible (11) -	584,308
	<hr/>
	1,718,984

The present investment in irrigation works (canals, ditches, etc.), exceeds \$25,000,000; the cost of works to serve the whole area in the preceding schedule will approximate \$60,000,000, while if a further area of, say 750,000 acres is to be irrigated at some future time the cost may



THE GLORIES OF BRITISH COLUMBIA LAKES.
1. Great Central. 2. Sproat. 3. Cameron. 4. Head of Great Central.



A TREE THAT GROWS LIKE A PEACOCK.

This beautiful and remarkable palm tree is to be found in Nigeria, West Africa. It is known as the traveller's palm on account of the fact that a branch broken off would provide a good drink for a thirsty sojourner. An interesting feature of the tree is that the branches grow separately from East to West.

The Railways and Forest Protection

By Clyde Leavitt, Chief Fire Inspector, Board of Railway Commissioners

In discussions regarding the causes of forest fires, the railways have in years past usually been given prominent though not always honorable mention. The stage of early railway construction has been particularly destructive in this respect, with some notable exceptions, where intensive patrols were maintained by Dominion or provincial forest protection services, either independently or in co-operation with the railways.

During the past ten years, a notable change has taken place in the fire hazard due to railway construction and operation, partly due to the requirements of the Railway Commission, and partly to the

keener interest taken in forest protection by railway management on their own account.

As a matter of actual fact, the railways have now become a minor instead of a major source of forest destruction. While the number of fires reported as set by the railways may still appear alarming, it should be noted that the actual damage is nothing like so alarming, considering the great mileage of our railways through forest sections, the vast amount of highly inflammable debris on Crown and privately-owned lands immediately adjacent to the right of way, and the fact that even with the best available spark-arresting de-

vices in perfect order, locomotives will still set fires during periods of drought. The results secured by the railways in holding down fire losses prove conclusively that their entire organizations, from management to section forces, are working earnestly to prevent the occurrence of fires and to control the spread of those which do occur as quickly as possible.

How the Roads are Controlled.

The Fire Inspection Department of the Railway Commission was organized in 1912. Field inspection for the administration and enforcement of the Board's requirements in railway fire protection is

carried out in co-operation with the various Dominion and provincial forest protection services already on the ground. The requirements imposed on the railways under the Board's regulations include special patrols through forest sections on lines under construction or in operation, the safe disposal of inflammable debris on rights of way, frequent inspection and repair of spark-arresting devices on locomotives, prompt extinguishing and reporting of fires burning along the railway line, etc. Under the instructions issued by the railways, the entire railway organization shares directly in the responsibility for full compliance with the Board's requirements.

About four-fifths of the entire railway mileage of Canada is subject to the Board's jurisdiction and thus to these requirements. The Transcontinental and Intercolonial are not so subject, nor are certain minor railways holding provincial rather than Dominion charters. Such



Railway right-of-way in process of clearing. Note large piles of inflammable debris ready for burning. A clean right-of-way is an essential factor in railway fire prevention, but its beneficial effects are largely neutralized if the immediately adjacent lands constitute a fire-trap, through the presence of logging slash and other highly inflammable debris. The safe disposal of logging and other slash in proximity to railway lines should be strictly enforced, in the public interest and as a matter of fair play to the railways.



A fire near a railway line in Ontario. Note large amount of highly inflammable logging slash, constituting a fire-trap of the worst character. Fires spread very rapidly under such conditions and are difficult to control, notwithstanding efficient railway patrol organizations, the use of tank cars with pumping outfits, etc. Where such conditions exist near railway lines, the railways are subjected to an enormous and unfair handicap in their efforts to prevent and control fires.

lines are nevertheless playing an important part in forest protection, either independently or under provincial requirements.

Small Loss Due to Railways.

The fire season of 1921 was one of the driest and most dangerous of which we have record, and forest fire losses throughout the country as a whole were exceedingly heavy. Notwithstanding this, the total estimated damage caused by all fires in forest sections directly attributed to railways under the Board's jurisdiction was only some \$64,000. This damage was caused by 1,188 fires which burned over a total of 75,642 acres, of which 11,008 acres was timber land, 17,316 acres young forest growth, 24,151 acres slashing or old burn, and 23,167

acres other classes of land. Fires originating within 300 feet of track, due to known causes other than railways, totalled 106, burning over 18,247 acres valued at \$69,113. Fires of unknown origin originating within 300 feet of track in forest sections on lines subject to the Board totaled 245, burning over 9,159 acres valued at \$29,683.

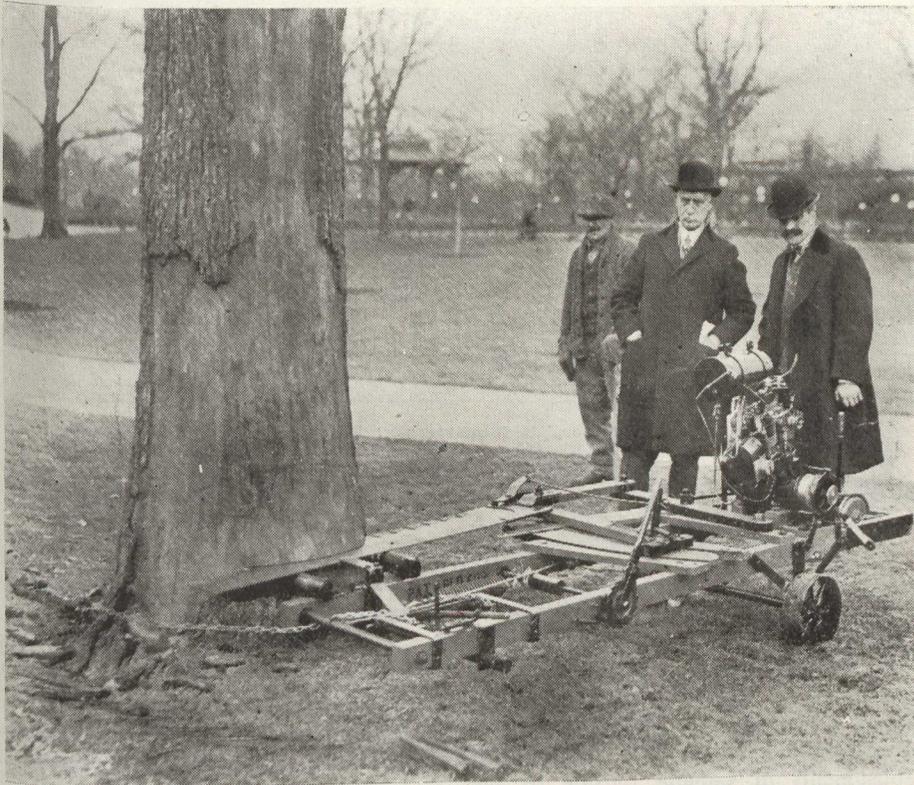
These losses are, of course, sufficiently serious, and continued efforts must and will be made to reduce them. Nevertheless, considering all the circumstances of the situation, they show clearly that the railways are making a very real and, on the whole, a very effective effort to prevent and control fires along their lines. They have, as a matter of fact, done a great deal in fighting fires for the origin of which they were in no way responsible.

The greatest handicap against which the railways have to contend in forest protection is the extremely hazardous condition created by the presence of vast amounts of highly inflammable debris on lands immediately adjacent to their rights of way. For the most part, these are Crown lands, upon which, to a considerable extent, logging operations have been carried on, with little or no provision for the disposal of the logging slash. Such areas constitute a fire-trap of the worst character, and are responsible for the rapid spread of fires in very many cases. In the interest of effective protection, adequate steps should be taken to give the railways a fair chance to control fires along their lines, by decreasing instead of constantly increasing the hazardous conditions on adjoining lands. There is already legislation along this line, but it has been made effective to only a small extent as yet.

An Unfair Handicap.

Nor is logging slash on Crown lands the only hazard of this character along railway lines. It exists also on privately-owned lands, whether timber berths or settlement lands; and is created as well by the construction of colonization roads, power transmission lines, etc., where the slash is piled in windows and left to constitute a fire-trap for an indefinite period of years. Where such hazards are deliberately created in close proximity to railway lines, the difficulties of the railways in controlling the spread of fires are immeasurably increased. Any program for the construction of such projects should obviously provide for the safe disposal of all inflammable debris in proximity to railway lines, to say nothing of other fire-setting agencies.

Questions and Answers on Forestry



TREE FELLING MACHINE TO SAVE LABOR.

A new machine, to be used in tree felling was successfully demonstrated recently. The machine does the work of 18 men; that is requiring exactly 1/18th of the time to cut the trunk of a tree that would be necessary by human hands. The photo shows a closeup of the machine, which will shortly make its appearance in lumbering districts.

Q.—As a school teacher I have been recently asked the question why a tree should ever die. Can you answer this for me?

A.—Theoretically a tree should never die, for while the old central part of the trunk may decay, this is of little moment so long as new layers are regularly put on at the circumference. The growth of a tree is entirely in the cambium layer at the outer edge and not at the heart. The fact is, of course, that trees succumb always to external causes. Insect, fungus diseases, fires, excessive cold or drought, are factors that limit the actual life of trees. The Redwood trees on the California Coast, some of them thirty feet in diameter, have attained an age of from three thousand to four thousand years. There are also trees on the island of Teneriffe, off the African coast, which are believed to be equally as old.

Q.—Some people claim that forest fires have actually increased the fur bearing animals in the far north. Is this true?

A.—The Hudson's Bay Company declare such a theory emphatically untrue. They state that repeated forest fires have gone far to extinguish for commercial purposes the fur-bearing animals such as fox, ermine, fisher, and others in Northern Ontario, which unlike the beaver and muskrat, are unable to take refuge from forest fires by entering the water. It is a

curious fact that the marten in face of a forest fire will climb a tree for safety and usually of course falls victim. Canada's fur trade is decidedly menaced by the present plague of forest fires.

Q.—Is there any way of finding the forest fire loss of Quebec Province in 1921?

A.—According to the Provincial Forester, Quebec lost twelve hundred square

miles by fire last year. This of course represents an enormous loss and it is the duty of every citizen who enters the forests of Quebec to join hands with the fire rangers in making a repetition of such loss impossible in 1922. The great majority of fires doing such damage to one of Quebec's great resources were due to human carelessness and the attitude of "don't care."

Q. Is there any way of estimating financially what a shade tree in good condition in front of my residence is worth? Has there been any court decision establishing such a point?

A.—In New York State the court established a record by handing down a verdict of \$500 each for destruction of trees by a construction company. In this case an arbitrary value was placed on the tree by means of its diameter, as for instance, \$2 per inch. That is, a tree eighteen inches in diameter would be worth \$36. There is a second method which takes in an arbitrary value per square inch of basal area taken at breast height or four and a half feet from the ground. In Massachusetts the usual figure used in this case is one dollar in which case a tree having a basal area of 254 square inches would be considered worth \$254; the latter figure, however, is generally regarded as being far too high.

Q.—As a resident of the Prairie Provinces I would like to know something about the Forest Reserves, their purpose, extent, etc.

A.—The Forest Reserves of the Prairie Provinces are 39 in number and nearly 35,000 square miles in extent. They are owned by the Dominion Government, and



The Water Prospector.

while called "reserves" are actually put to many and varied uses. They are of supreme value as storage capacity for the flood waters of the great prairie rivers. Practically the whole of the eastern slope of the Rockies is now in reserve, and upon this slope being kept under forest depends much of the fertility of the prairie country. The timber on the reserves is viewed as a growing crop held in trust for the people of the west. It provides timber and fuel for settlers and on the grazing lands within the reserve boundaries more than 100,000 head of stock obtain sustenance. Game hunting and recreation are other excellent uses of these forest reserves of the prairie provinces.

Q.—I am told that in the aeroplane forest surveys last year there was not a single fatal accident. Is it true?

A.—Almost. In 181,000 miles of flying by the Dominion Air Board last summer, only one man was killed and that was distinctly his own fault.

Q.—Is it a fact that Canadians sell more forest products to Uncle Sam than farm products?

A.—In 1920, Canada's sales of forest products to the United States represented \$8 per head of Canadian population. Our agricultural sales to Uncle Sam were only \$5.90 per head. Our mineral were \$4.50 per head, and fisheries \$2.10 per head. The forests of Canada have undoubtedly been the greatest power in stabilizing the exchange rate.

Q.—Has anyone managed to get Henry Ford interested in the practice of forestry?

A.—Some one evidently has. Mr. Ford is now a Forester, along with his other duties. He has bought a forest and is starting a system of scientific management that should keep the timber crop reproducing for all time to come. It is in Michigan near his iron mines. Mr. Ford recently stated that he is "convinced that the public interest demands a fundamental change in the management of our forest wealth."

Q.—I am told that artificial silk is made out of Canadian spruce wood. What is the difference between artificial and real silk?

A.—Artificial silk is practically the same substance chemically as natural silk, the retort and test tube of the chemist having been called upon to convert woodpulp into cellulose and then into silk by mechanical processes, just as the silk worm within its body converts the mulberry leaf into cellulose and then spins its cocoon. The artificial silk goods are sometimes harsher in feel-



Dominion forest rangers' headquarters at Fort McMurray, Alberta.
Photo by kindness of Mr. A. Rafton-Canning.

ing than the natural, but advanced manufacture is rapidly eliminating this defect.

Q.—How many men are employed in Canada's lumber industry and what are they paid in wages?

A.—There are about sixty thousand men and their wages run to sixty million dollars a year. There are approximately four thousand wood manufacturing establishments in Canada outside of the pulp and paper industry.

Q. Is it possible for this Ontario municipality to obtain free trees from the Ontario Government Nursery and to get free supervision of the planting work?

A.—At the last session of the Ontario Legislature, provision was made for supplying to any municipality which previously has come into possession of an area of waste land free tree stock from the Government Nursery and supervision of the planting work at the government's expense. It is also provided that the timber from such land at maturity shall be the property of the municipality. The government gets nothing out of it except

the performance of a highly important public duty.

Q.—Is there much likelihood of lumber and wood products in general becoming cheaper in the next five years?

A.—There probably will be variations in the present market but the prospects for what our grandfathers would call cheap lumber and cheap paper are rather dim. We are using up our forest wealth in Canada far faster than nature is growing it and forest fires are destroying many times what we annually cut. To keep our forests in productive condition more money must be spent upon forest protection, upon burning of debris, the combating of forest insect diseases and other constructive measures. The product of the forest must stand this increased cost so that it is very doubtful if we will ever see again Canadian lumber and pulp and paper products at old-fashioned prices. The trouble is that we Canadians have been living not on the annual increment or interest of the forest, but taking a large slice of capital as well. This of course must stop or the nation will face actual timber bankruptcy.



Forested Country on Peace River below Little Rapids.

Pulp and Paper Industry Requires Permanent Forests

By George M. McKee, President of the Canadian Pulp and Paper Association

In recent years much has been written and said regarding the perpetuation of our forest areas, and the reforestation of our waste and denuded lands. There are many reasons why this problem is attracting such wide-spread public attention:—The gradual but steady diminution of supply, the rate of cutting obviously exceeding the rate of growth; the increase of consumption with continuous corresponding increase in the demand on the forests with the complexity of modern civilization; and the desire of those using the forest for raw material to find some permanent and practical forest policy that will increase the yield of timber and at the same time perpetuate the forest.

Much of what has been written and said has been from theory or sentiment. Seldom do we hear from the man who stands between the shareholders and the payroll of our great wood consuming industries, not because he is not vitally interested in this problem but rather because the management of all our large pulp and paper industries have had and are having a desperate struggle to develop and advance these properties to a sound financial basis.

It has not yet been demonstrated, nor is it generally believed, that individual companies can consider it sound economics to use stockholders' money for extensive tree-planting programs, where it will require from fifty to sixty years before a return can be looked for on the investment. On the other hand there are, perhaps, many arguments that could be advanced to indicate that our Governments should go into reforestation on an extensive scale.

For a number of years all the pulp and



GEORGE M. MCKEE, E.E.
Managing Director, Donnacona Paper Co.,
Donnacona, Quebec; President, Canadian
Pulp and Paper Association for 1922.

paper companies have had trained foresters at work making a study of the various areas upon which they have operated, and upon lands that are to be cut in the future, with the view of determining how they could best work the forests and eventually devise a plan by which the Provinces, the private owners and the licensees of Crown Lands could co-operate in the making of forest regulations designed to increase the yield and at the same time perpetuate our forest areas. These foresters have now practically come to the unanimous conclusion that no hard and fast rules and regulations as to diameter for cutting can be laid down applicable to all areas to secure the best

yields and at the same time insure a continuation of a permanent forest.

It is now generally conceded by the company foresters, and is being considered by the Provincial authorities that the best results both as to yield and the perpetuation of the forest can be attained by careful preliminary work by the sending of trained foresters and engineers into areas to be lumbered, in advance of cutting, for the purpose of making detail working or cutting plans of all districts to be cut, these plans to be complete in every detail and to show the nature of the land, upland or lowland, mature timber growth, mixed growth, etc. This plan would perhaps indicate that certain sections are completely covered with mature timber and should be cut clean, leaving sufficient seed trees to insure natural reforestation. Under present regulations of cutting down to certain diameters, a large part of this mature timber would be left standing, to be blown down in a very few years, and become a complete waste. Perhaps this plan would also show a section of mixed hardwood and softwood, in which the forester would probably recommend that only the larger mature trees should be cut, there being sufficient protection from the hardwood growth to prevent the standing soft wood from going down with the winds. Much other useful information for cutting operations would also be shown.

With all operations in the Provinces worked out in advance, according to the sober judgment of our best foresters, we believe that a uniform policy could be devised which would be acceptable to the Provincial authorities, and which would be a big step toward a permanent policy.

My Experience in Growing Trees on the Prairie

By M. J. Stevenson, Morris, Manitoba

One of Canada's Most Successful Farmers and Tree Planters.

To me tree growing is one of the vital questions affecting the West to-day. Go where you will over this vast prairie land and you will find farmstead after farmstead as bare of trees and shrubs to-day as when the settler first located. No wonder the farmer's wife gets lonesome and homesick as she listens to the howl of the prairie winds day after day around the bare bleak farmstead, and sighs for the shady lanes and beautiful groves back East.

When we know how quickly these con-

ditions can be changed and a bare wind-swept prairie home made beautiful in its setting of trees and shrubs, we wonder the miracle had not been performed years ago. There are no home surroundings as easily changed as the prairie home. It has a distinct advantage in being bare of trees at first. When you plant, you will be able to place your trees and shrubs to the best advantage. There is no excuse for allowing the farmstead to go without its shelterbelt any longer. Success is assured from the outset if the

right varieties have been planted and the work done intelligently. Again, this Western prairie soil is absolutely hungry for trees. If the ground has been thoroughly worked before planting and the trees properly planted I know of no place where they will grow faster or give better results than right here in the West.

Varieties Advised.

In my experience covering over 35 years in the West I find it is always best for the beginner on the bare prairie to

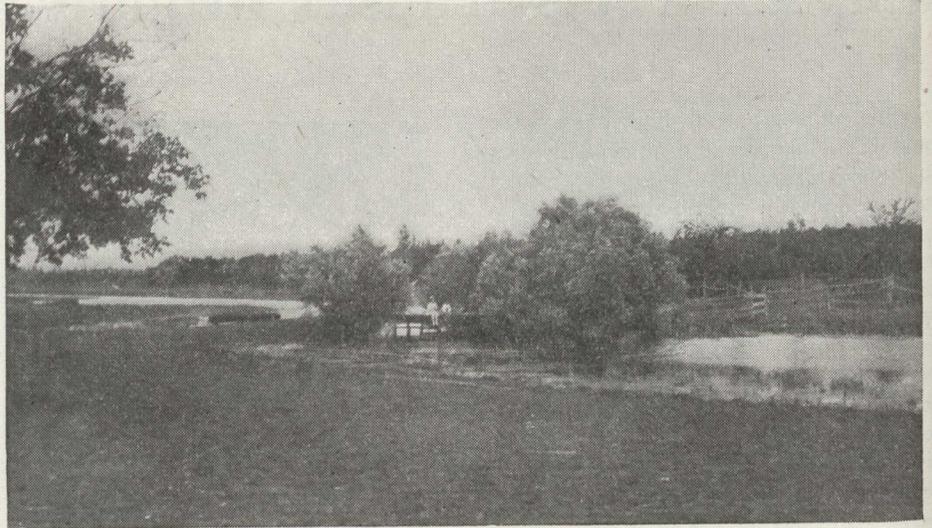
plant some of the hardier quick-growing deciduous varieties first. The white gray and golden willows are all good, grow fast, and are all perfectly hardy. They make a shelter-belt in the shortest possible time.

In all our prairie plantings we should provide a snowtrap. This is composed preferably of three or four rows of willows and cottonwood planted about five rods west and the same north of your main plantation, the object being to catch the main body of snow on the open space between. If this snow is allowed to drift into your main plantation it will sometimes pile in ten or fifteen feet deep and break down and ruin most of your trees.

The object of planting the cottonwood with the willows in the outer snowtrap is to provide an upper story, the cottonwood demanding full sunlight throughout its entire life, while the willow may be trimmed back and provide a thick hedge from the ground up. The main plantation may be composed of elm, ash, box elder, and any or all of the willows. The elm and ash should be distributed through the plantation so they eventually will command all the space; the others planted as nurse trees for the better and longer-lived species. With me, the native basswood shows great promise. It is a beautiful tree casting a dense cool shade and seems perfectly hardy anywhere in Eastern Manitoba.

The Evergreens.

Now we come to the trees, par excellence, for both shelter and beauty. Cover a piece of bare earth with these trees and the view is a perpetual delight both summer and winter. Some satisfaction to be able to say to the stinging north wind in winter, "this far shalt thou come and no farther," as we stand to the lee-side of a belt of native white spruce. And we marvel as we see these vast prairies lashed into a very demon of fury by the stinging blasts of the north wind. What might a man not accomplish on these prairies with this tree if he used a tenth part of his possibilities? But I hear someone say "the evergreens grow so slow we cannot afford to wait on them. The man who plants them will never live long enough to receive any benefit from them." When you ask for proof they invariably refer you to a poor starved little specimen struggling all its life with weeds and grass somewhere in the tough sod of the yard. The writer set out quite a plantation of evergreen eighteen years ago, composed of white spruce, black spruce, Scotch pine, jack pine, lodge pole pine, cedar, and balsam fir. While planting these trees a neighbor happened along and said I was very foolish to bother



This view taken from the front yard of Mr. Stevenson's place at Morris, Manitoba, shows a young forest of over 15,000 trees. A few years ago this site was bare prairie, not a tree or shrub of any kind was to be seen.

planting these trees. Said he: "You will be an old gray-haired man before they will be as high as yourself." This same neighbor visited me again this fall and found many of the white spruce over twenty-five feet high and with a foliage so dense the wind, however, strong, gives up at the first row.

Species We Can Depend On.

This is a broad subject, and the available list of absolutely hardy evergreens under all conditions simmers down to comparatively few species. For instance, we may plant a species and it may grow and do well for a number of years and then comes an unfavorable season when the tree goes out altogether, as a great

many of the Scotch pines did two years ago. While it is very necessary that some one experiment to find out which species are hardy, yet I think this is a government proposition as it is too costly for the individual.

Native White Spruce.

This is the tree for the millions that are yet to inhabit this great lone land. If you took every other evergreen from the list there is still locked within its cones possibilities enough to ensure comfort, beauty, and wealth for all future generations. No evergreen grows faster after it gets its root system established which takes from two to four years after transplanting.



As a direct and profitable result of planting a tree belt on his farm, Mr. John Craig, of Netherhill, Sask., finds no trouble growing strawberries and other luscious fruits which are denied the farmer whose place contains no shelter.

Black Spruce.

This is rather a pretty tree growing much faster under cultivation than it does in its home in the swamps. Its habit of holding its old cones for years gives it a somewhat ragged appearance in later life. But there is no question about this tree being hardy.

Balsam Fir.

This is a very beautiful tree in its home in the eastern and northern forests. Its sharp spirelike crown at once distinguishes it from all its associates in the forest. It does well under cultivation on

the prairie and soon grows into a very shapely tree.

Jack Pine.

This is the extreme limit of hardiness and will grow on sandy sterile soil where another evergreen could not exist. It appreciates good soil, however, and will soon grow into a solid forest through which the wind cannot penetrate. A plantation of this species planted nine years ago is now from twelve to sixteen feet high.

Lodge Pole Pine.

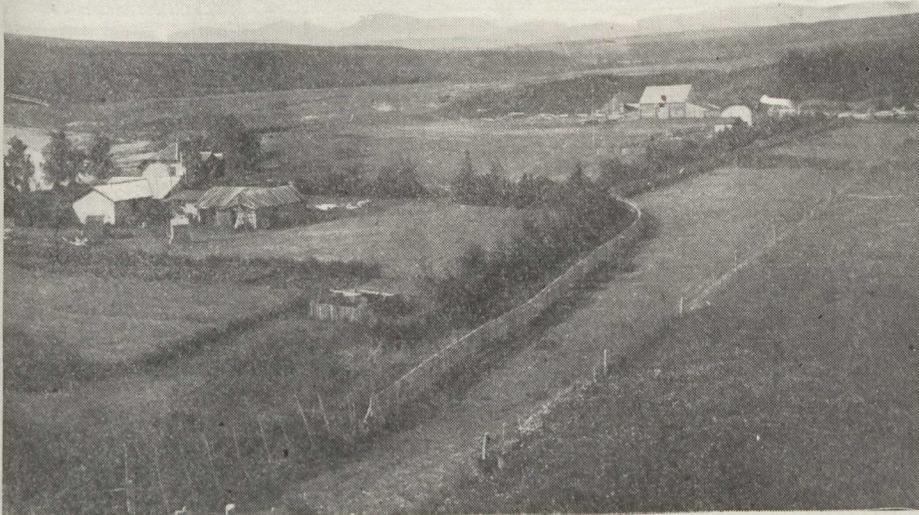
This Rocky-mountain tree has proven

quite hardy here. While not so fast a grower as the Jack Pine, it has a much better foliage and appearance. While this does not exhaust the list of hardy evergreens for the prairie by any means, yet it will be enough for a beginning and others can be added from time to time as occasion permits. I might say I have 26 varieties of conifers under test here. I might be able to give an account of their behaviour to the association at some future time.

M. J. STEVENSON,
Morris, Manitoba.

Box 12.

A Great Tree Champion of the Prairies



Mr. F. W. Godsal's ranch at Cowley, Alberta, lying along the Castle River. Read the accompanying sketch.

Russian Poplars were among the trees I grew at my ranch in Alberta, writes Mr. F. W. Godsal (of Cowley, Alberta, and Victoria, B.C.) to the Forestry Magazine, but have our experimental farms introduced elms from Turkestan, where conditions are similar to the dry portions of our prairies? I grew elms from the Experimental Farm, but not Turkestan ones, I think.

It occurs to me that you may like to

print in the Forestry Magazine enclosed photo of my ranch, where I was one of the first to plant trees and shrubs, which in those early days, about 1887, I used to obtain free from the Ottawa Experimental Farm, besides transplanting local cottonwoods, pines, etc. These have all now grown into trees, and many varieties of birds rewarded me by building their nests in them. I joined the Canadian Forestry Association as a Life Member at the beginning.

A Study in Canadian Bears

By Wm. MacMillan

Three clearly defined and distinct types inhabit this part of the Western Hemisphere.

The Polar Bear "*Thalarctos maritimus*," whose range covers mostly the far Arctic shores of the Province of Quebec, in the

Labrador, has nothing in common with the Black Bear that can be found in almost fifty per cent of all the States and Provinces in North America, and the fierce Grizzly Bear, that animal of tradition and story.

We will first take up the Polar Bear: This great animal shuffles along the ragged edges of the heaving, grinding ice floes and apart from man, his enemies are few and far between. One of the few animals that is excused from changing his coat with the seasons, the Polar stays in the same yellowish white coat the year round for literally living on the roof of the world as he does his fur stands him in good stead.

Rarely leaving the Sea shore this great animal grubs industriously for roots and without doubt is thoroughly uncomfortable during the short summer. In winter he plunges into the bitterly cold water apparently without discomfort, and he will dive and gambol for hours in the water when the mercury is hovering around the bottom of the thermometer. Seals are his game and many are the tricks a Polar will resort to in order to approach his victims unobserved. Fish of course he does not despise and there is no member of the finny people too swift for him. Captain Bernier, the famous Polar captain, tells us that the Eskimo eat his flesh but we can't imagine it to be very tender.

The average mature Polar stands about four feet high at the shoulder, is about seven feet long while the legs are much longer than those of the Black Bear. The paws are large, flat and wide. When he stands erect on his hind legs as he frequently does he is truly an imposing sight.

Colossal fights are pulled off between the males and many a battle-scarred skin has come under the author's notice.

The fur on the larger and older animals is usually short with a dark undergrowth, but the younger and smaller Polars have thick coats, white and of fine quality. The needs of the commercial world are usually supplied by Scotch whalers who while hunting the elusive Whales manage to secure numbers of Polars.

Polar Bear skins are only used for floor

rugs and when the head is properly mounted the whole effect is very attractive indeed. Raw pelts are worth from fifty to one hundred dollars.

Have you ever stopped to think of the few, the very few animals that have a coat of black? It makes one pause and ponder the reason of it. Better men than the author have attempted to prove the "why" of it so he will not add his suppositions.

The Black Bear of rhyme and story is not the Black Bear that roams through the blueberry patches in the depth of the great forests, for this great fellow is quite humble, while if we are to believe all that we hear he usually goes roaring around the countryside seeking whom he may devour. As a matter of fact if there is one inoffensive animal in the bush it is this self same Black Bear. Found in almost every corner of the continent only his habit in quickly slipping away from

danger has saved him from becoming an animal of the past.

Feeding on bugs, insects, roots and all sorts of green things he loves the taste of honey, and a Black Bear in the act of demolishing a bee's nest is one of the back woods comedies, for only on his nose and eyes can the angry bees make their stings tell and he is wise enough to protect them with his paws.

Graceful in shape and action he is as much at home on his hind legs as when stalking along on all fours. The fur is smooth and thick and of the same length all over the body. The face is brownish in color and of course he walks like all others of his kind with a peculiar shuffling motion that carries him over the ground at astonishing speed.

With the first sign of snow he seeks out a hole in rocks and here he will stow himself away for the winter. The snow comes and seals up the entrance and only the warm spring sun coaxes him forth. In

certain sections of Northern Quebec the Indians say that before hibernating they will swallow a number of round smooth stones which they keep turning over in their stomach throughout the winter thus keeping their "insides" in proper condition.

Upon emerging from their winter abode they are truly forlorn looking creatures, thin, gaunt and sorefooted limping around on a search for food that is difficult to find. A short time later the young are born, happy sportive little creatures they are too, and they can have more fun than enough with a branch or even a tin can.

The maternal instinct is strong with the Black Bears and her care for her young is proverbial.

The price of an adult bear is about fifteen to twenty-five dollars, while the fine cub skins which make the finer stoles and muffs are also worth from fifteen to twenty-five dollars.

Cleaning up Debris in Pine Forests

By Roland D. Craig, F.E.



No. 1—Area on which the logging slash was burned broadcast. Photo taken in Northwestern Ontario.

During the past summer I had an opportunity of comparing two methods of slash disposal in pine operations in Northern Ontario. The first, that of broadcast burning of cut-over lands, is the one most generally practiced, though not always intentionally. The second is that of burning the slash as it is made in small controlled fires.

Broad-cast burning of slash is often advocated as a means of preventing subsequent fires and of promoting the repro-

duction of pine. My observation of the results of broadcast burning showed that, in this type of forest at least, neither of these objects were realized. The accompanying illustration, No. 1, shows an area on which the slash was burned broadcast. Every young tree, shrub and herb was killed. The humus on and in the soil was destroyed and in many places, the scant covering of mineral soil is being washed away, leaving only bare rocks where heavy stands of pine previously

grew. The intense heat has apparently killed practically all the tree seeds in the soil, so that reforestation must come by the slow and gradual encroachment of the adjoining forests. The uncut timber in the distance was weakened to such an extent by a ground fire which spread from the slashing, that it is being riddled by borers the first season after the fire. The dead hardwood and undersized conifers left in the logging will soon fall down and create almost, if not as great, a fire hazard as the logging slash and will undoubtedly burn again in a few years, destroying any seedlings or sprouts which may have come after the first fire. The result of repeated burning is shown in illustration No. 2. There is not a coniferous seedling to be found among the charred pine stumps and even the poplar and birch have lost their power of producing sprouts. The grass has become so well established that there is practically no hope of the natural production of the forest.

A Direct Contrast.

The result of burning the slash as cut is shown in illustration No. 3. Here an advanced growth of white, red and jack pine, spruce, with some balsam and birch, is left unharmed. The ground is as clean as in a virgin stand and the danger of fire materially decreased. The water-conserving and soil-protecting humus is not destroyed and already in the first sea-



No. 2—The effect of repeated broadcast burning. All the trees killed, no reproduction and prairie conditions becoming established.

son after logging there are millions of young seedlings coming up. The opening up of the forest will result in an accelerated growth of the young timber and another forest crop will be available thirty or forty years sooner than if the slash had been burned broadcast. Nearly two years after cutting in this manner there was practically no windfall except of some diseased balsam.

Where the scenic value of the forest is of importance, this method of slash disposal makes it possible to utilize the mature timber without seriously impairing the beauty of the forest clad landscape.

Helps the Logging.

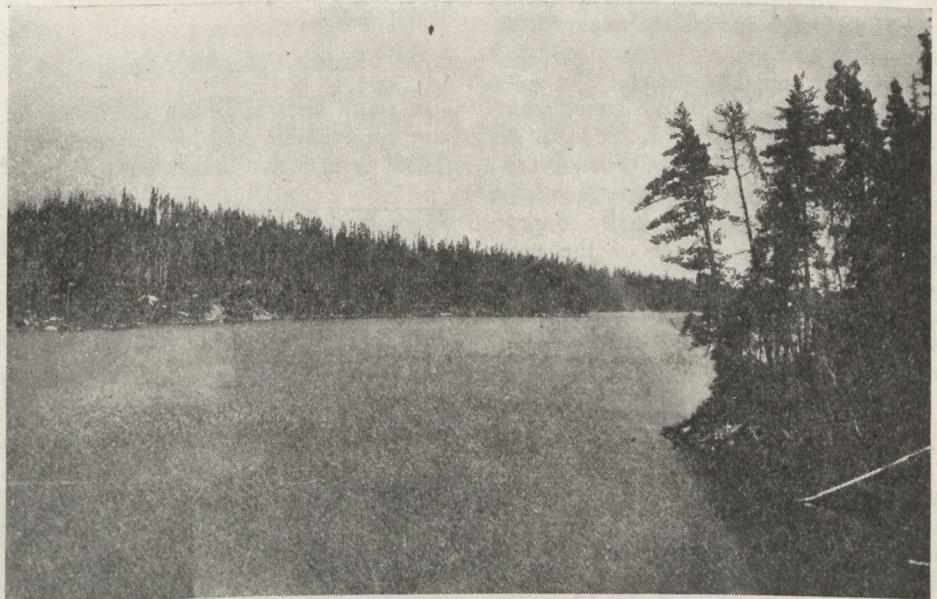
From a practical standpoint this method greatly facilitates the logging operations, especially in a heavy stand where the limbs have to be piled out of the way of the skidders and the extra cost of the burning is to a large extent, if not quite, offset by the saving in logging costs.

In spite of the general realization of the fact that our virgin forests in Eastern Canada are fast disappearing hardly any practical steps are being taken in the exploitation of these resources to promote their perpetuation. Our fire protection is centered on the "merchantable" timber and the destruction of a growth of 25 or 50 years is considered a negligible loss.

The forest industries are keenly competitive and operating costs must be kept down, but the time has arrived when every practicable means must be taken to insure the maintenance of the supply of raw material for the lumber and pulp industries, even if it entails some sacrifice in immediate revenues.

Forest conditions are subject to great variation and the methods employed to perpetuate the forest must be adapted to these different conditions but if more log-

gers would try this system of burning the debris as it is made they would find, as others have, that it is not so difficult nor so costly as it has been thought to be, especially when the improvement in the logging conditions and the insurance against fire are considered.



No. 3—Area from which the mature pine has been logged and the slash piled and burned as cut, without injury to the young timber.

THE MENACE OF FLOODS.

Washington, D.C.—Reforestation of waste regions in this country is absolutely necessary to combat regular recurring floods which yearly play great havoc along our rivers.

Unless our waste lands are planted with trees, says the American Forestry Association, river floods in the United States will in time cause disaster such as that now in the flooded regions of China, 10,000 square miles in area.

"Millions of dollars in property are de-

stroyed in this country every year," the association says, "because of spring floods. For some reason we take this as a spring habit of nature and give little or no thought to correcting this habit."

"This country needs a broad national forest policy directed by the United States Forest Service," said Charles Lathrop Pack, its president, "and when that forest policy is adopted we will make progress in the right direction as concerns denuded and deforested lands."

SPARK ARRESTERS.

The Forest Products Laboratories of the U.S. Forest Service has undertaken a study of locomotive spark arresters, which is being conducted by Mr. J. S. Mathewson, a mechanical engineer of wide experience. Many spark arresters at present in use are inefficient and comparatively little is known as to their relative value and efficiency. The results of the study will be of far-reaching value, particularly at this time when the impending scarcity of fuel oil is forcing many railroads to revert to coal for fuel.

SPEED IN PAPER MAKING.

The world's largest paper machine is now being operated. It makes a stub of paper 12 feet, 2 inches wide, 327 miles long every 24 hours, using 110 cords of wood.

THE HUNGRY PRESS.

3,500 acres of pulpwood are required to furnish the paper for one day's issue of all the newspapers in the United States.

Insect Armies That Follow in the Wake of Fire

By J. M. Swaine, Entomological Branch, Ottawa

Interesting relations exist between fires and insects in the forest. Fires of certain types and occurring in certain seasons of the year may provide a large amount of breeding material for bark and wood boring beetles and so favour the development of beetle outbreaks; while on the other hand large bodies of insect-killed timber encourage the rapid spread of fires that may occur within or near their borders.

Ground fires often burn the bark at the base of pine, spruce, balsam and larch, without injuring the upper two-thirds of the trunk, and if fire of this kind occurs in our eastern forests in the early season, before the end of June, the uninjured bark of the upper trunk will usually be entered by myriads of bark-beetles of some of the genera, *Dendroctonus*, *Polygraphus*, *Ips*, *Pityokteines*, *Dryocoetes*, *Trypodendron*, and others, within the next few weeks. With this abundant food supply the beetles are able to multiply enormously in one season and in the following summer the *Dendroctonus*, *Polygraphus*, *Ips* and *Pityokteines* are often abundant enough to attack and kill the weaker trees, or even at times many apparently thrifty trees in the neighbourhood. We have traced the origin of small or sporadic outbreaks of several of the barkbeetles definitely to the influence of ground fires, and while extensive windfalls and large bodies of slash are more usually connected with the development of the more serious bark-beetle outbreaks, ground fires are responsible for much minor injury which in the aggregate destroys a very large amount of timber.

How the Insects Operate.

It is notorious that in our eastern forests every ground fire occurring in the early season is followed immediately by an attack of pine and spruce sawyers, of the genus *Monochamus*, on the injured trees, wherever the bark has not been actually burned. The beetles deposit their eggs in the bark and the grubs bore for two years in the wood. Killed timber from these early season fires is almost invariably riddled by the tunnels of these borers within two years from the time of the fire; so that fire-killed timber must be utilized the first winter following the fire if it is to be of much value for anything but fire wood. If it were not for these sawyers the fire-killed pine and spruce would stand for years and still be valuable for lumber. When the fires occur late in the season the timber may not be injured by the borers, since the egg-laying beetles are not then present in the

forest and the bark often dries sufficiently by the following June, when the beetles again appear, to be distasteful to them for egg-laying purposes.

In the large timber of the Pacific Coast and the yellow pine of the interior of British Columbia this type of borer injury is inconsiderable.

When large areas of timber have been swept by insect outbreaks so that great quantities of dead and dry wood, either standing or fallen, are present throughout the forest, a fire, started through any agency, may develop with great rapidity into a conflagration entirely beyond human control.

Much of the country between Lakes des Quinze and Expanse and the Height of Land is at the present time literally grey with dying and dead balsam killed in the balsam outbreak. Within five years probably 90 per cent of all the balsam in that country will be dead and in part fallen. If a fire starts in that country under favorable fire conditions this great mass of dry wood will make fire fighting about an impossibility.

British Columbia's Case.

In south Central British Columbia we have considerable areas of lodgepole pine almost completely killed out by bark-

beetles. When a fire starts in this mass of dry pine it will surely burn up everything inflammable, on and in the soil, and leave the countryside barren rock, or, at best, range land for many generations. It is entirely possible that interrelations between fire and bark-beetles, the increase in the abundance of bark-beetles through large supplies of fire-injured trees and the development of great fires through large quantities of dead beetle-killed timber, have had an influence in producing the large unforested sections of central British Columbia.

It also happens occasionally that a fire sweeps over a section in which an insect outbreak is progressing and burns up the timber completely and rapidly enough to destroy most of the injurious insects and to check the spread of the outbreak, at least for the time. An extensive outbreak of barkbeetles in lodgepole pine in the South Kootenays was burned out in this way during the past summer. It is yet too early to determine whether there is sufficient infestations in the surrounding forest to develop again to serious proportions. While under certain very definite conditions a fire may have a beneficial effect in checking insect infestations, it is too dangerous an agent to employ deliberately as a control method, unless possibly under very exceptional circumstances.

Walnut Production in British Columbia

It is only as Canadian life progresses and experimenters and investigators of all kinds give their experiences to the world that the wide latitude of the possibilities the Dominion offers in all lines is revealed. The already wide extent of agricultural production is constantly being added to ever since it was first dogmatically stated that wheat would never be grown successfully in the Canadian North-West, and experience is making ceaseless revelations of new lines of production to which Canadian soil and climate prove admirably adapted.

Alderman Tisdall, of Vancouver, as an after-dinner treat to visitors at his ranch in the Fraser Valley, serves walnuts grown on the ranch, the high excellence of which invariably causes comment and a certain amount of astonishment at this fruit being grown so successfully within forty miles of the Pacific metropolis. These walnuts are indeed equal in appearance, quality and flavor to the California variety as attested by the California Walnut Grow-

ers' Association, to whom samples were submitted for examination. The trees were grown on the ranch from seed, and the alderman is an enthusiastic advocate of the permanent establishment of a walnut growing industry in the Pacific coast province.

A valuable feature in walnut production is that the trees thrive admirably and produce abundantly on rough land. Trees are usually planted about fifty feet apart, so that a substantial orchard can be established on a small acreage. The Franquette and Mayette varieties have been found the most suitable for British Columbia growth, and that it is more satisfactory to grow the American black walnut and graft the chosen variety upon it. Hard-shelled walnuts have disappeared from commerce and what is known as the soft-shelled English walnut dominates the market to-day. It has been proved that these grow admirably on the Canadian Pacific coast.



A group of Directors and members of the Canadian Forestry Association who attended the Annual Convention at Toronto, January 10th.

Solving our Troubles by Experiment Stations

By Earle H. Clapp, Assistant Forester, U.S. Forest Service, Washington.

The traveler in central Nebraska, scanning from his Pullman window the dreary monotony of the sandhill landscape, is amazed to see it broken near the town of Halsey by the refreshing green of a growing forest. The Nebraska sandhills cover, all told, some 1,250,000 acres. They are not unlike the waves of a choppy sea, and are in slow movement before the prevailing winds. The Nebraska sandhills' cover, native vegetation of bunch grass, shrubs, and other plants adapted to semiarid conditions retards but does not wholly check this movement. Here and there in the bottoms that wind among the hills the soil permits some field crops to be grown, but the hills themselves are almost pure silicious sand and scarcely more fertile than a sea beach. Live-stock grazing is the only form of use to which these great barrens in their natural condition could as a rule be put.

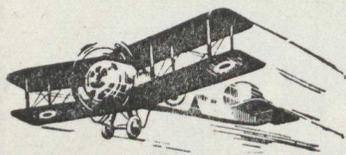
Something over 20 years ago a few thousand jack-pine seedlings were pulled up in the Minnesota forests and planted in these sandhills. To the surprise of everyone except the man who suggested the plantation, the trees survived and grew. It was at once assumed that afforestation here would be an easy task. An area was set aside as a National Forest. A nursery was established and planting operations were begun, but from 1903 through 1908 the results of plantation

after plantation were so poor that foresters almost despaired of success. The plan of action was changed from trial and loss to systematic experiment and investigation. A trained scientist from the forest experiment station which had been established in the central Rocky Mountains a short time before was assigned to the task of finding out how to make forest plantations grow in the face of the difficult conditions presented. In two or three years the key, or rather keys (for the problem was complex), had been found. Nursery methods were developed that would produce more sturdy stock. The most favorable time for field planting was found to be a brief period, varying with

the season, when the spring was far enough advanced to minimize the frost danger, yet not too late for adequate moisture. The unexpectedly wide variation of natural conditions between the sand ridges, south slopes, north slopes, and bottom lands within small distances was revealed, and the knowledge applied in the selection of the species best adapted to each site. For example, western yellow pine was found to be best suited for the pure ridge sands with their severe exposure to hard, drying winter winds, and jack pine for south slopes, where it was found that a tree must be able to start immediately after transplanting, while the soil moisture is still sufficient.



An Evening Scene at Victoria, Lake Winnipeg.



AVIATION

IN FOREST CONSERVATION



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



"Birds of a feather." A flock of Bristol aeroplanes, seven thousand feet above terra firma.

Seaplanes Displace Fire Rangers

For the first time, probably, in the history of forest protection, seaplanes will be utilized this year in Manitoba to displace a substantial part of the staff of patrolmen.

By arrangement with the Air Board five F. 3 type machines, each capable of carrying seven men and pilot will be employed under Col. Stevenson, District Inspector of Forest Reserves for the Dominion Forestry Branch.

Last season's experiments produced such remarkable efficiency as compared with the system of ground rangers that the

'planes were adopted without hesitation.

Instances such as covering in 42 minutes routes that required three days by canoe were of such frequent occurrence in last season's trials as to leave little room for doubt regarding the superiority of the seaplane. Fires were spotted with great accuracy and promptness and men transported with surprising dispatch and complete safety.

A special article from the pen of Colonel Stevenson will appear in the next issue of the Forestry Magazine.

FLYING CONDITIONS IN CHINA.

Air Service officers returning from leave in North China report conditions ideal for the development of aviation. North China has great areas of level open country. Fortunately for aviation, the Chinese live in communities, so there houses are not scattered over the country side, but collected in small groups behind a stone wall. Graves of the millions of Chinese dead are scattered promiscuously over the countryside and obstruct many otherwise perfect sites. They also reported weather conditions ideal in Peking and Shanghai during the months of October and November.

FARMAN TO TRY FOR WORLD RECORD.

W. Wallace Kellett, the Farman representative in America, has received a cablegram from the factory in France, stating that a Farman Goliath will attempt to beat the world's endurance record early in spring. The machine will carry approximately three tons of fuel, food for two days, and is expected to remain in the air at least 40 hours. There will be two pilots, as yet not chosen.

A Farman Goliath held the world's record from June, 1920, till December 29, 1921, when Eddie Stinson and Lloyd Bertraud kept a J. L. 6 All-Metal Monoplane in the air over Roosevelt Field, Long Island, more than 26 hours and 19 minutes, beating the Goliath's record by 2 hours 33 seconds.

BIG AIR FORCE FOR JAPAN.

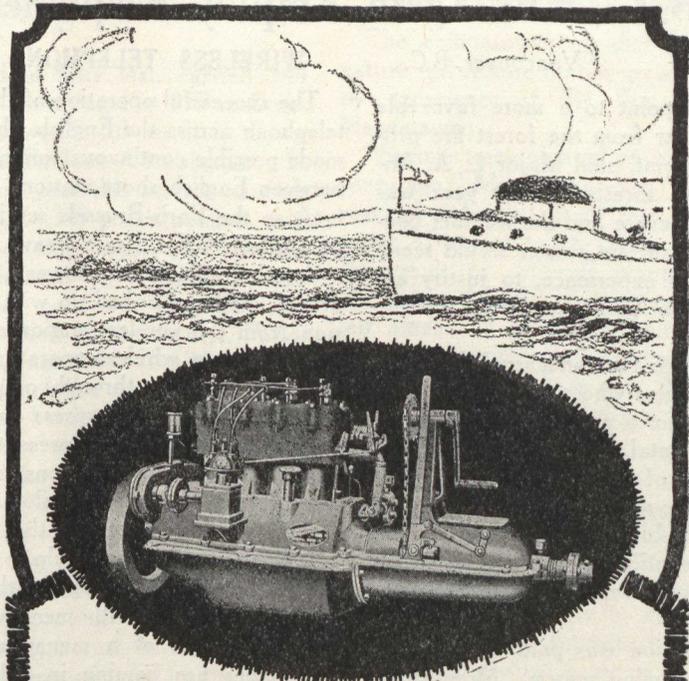
Heads of the Japanese navy, faced by the decision of the arms conference at Washington to cut Japan's naval strength in accordance with the 5-5-3 ratio, plan to give the Mikado a great air force of 156 planes, six balloons and four airships. In the words of Captain Kikutaro Takahashi, Director of the Aerial Bureau of the Naval Office, Japan "will insist on at least the same aerial strength as England or America."

Japan has at present only one airplane carrier, the Wakamiya, with a displacement of 5,875 tons, but when her new vessel of this type, the Hocho, is launched, she will rank next to England in number of carriers, America being third with one. It is pointed out here, however, that the United States has two carriers under construction, larger than any owned or projected by England or Japan.

"When plans now in hand are completed, Japan will occupy fifth place among the powers. However, we are contemplating construction of three or four more airplane carriers. Our geographical position necessitates an increase in our aerial strength, which we will insist on keeping at least equal to that of England or America."

GERMAN MACHINES DESTROYED.

From Berlin the figures given for aircraft destroyed, etc., up to October 1st last are 12,471 aeroplanes and 20,364 aero engines destroyed and 629 aeroplanes and 3,632 engines surrendered.



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B. C. Will Again Employ Seaplanes

Vancouver, B.C.

Indications point to a more favorable season this year from the forest fire protection standpoint, said Major L. A. Andrews, district forester. Last year was exceptionally severe and the weather conditions of the current winter would seem, in the light of experience, to justify expectation of a great reduction in the losses.

Such also was the consensus of opinion of the 30 rangers who were called to the district office for a conference. Together with departmental officers from the Capital, the staff of the district office went thoroughly into all phases of the situation. Papers on publicity, organization, fire-fighting, prevention, protection and other kindred subjects were read and thoroughly discussed.

Much attention was paid to organization for the coming season. More vigorous advanced precautions will be taken this year than ever before, said Major Andrews, by the putting into effective practice of methods which have been in process of development for some time. The usual propaganda against carelessness will be begun at once, while the various rangers will begin, before the fire season is on, to organize their gangs and appoint local leaders responsible for putting them to work without waiting for instructions from headquarters in an emergency.

Similarly efforts will be made to have in each logging camp one man responsible to the company and the department for organizing and training fire-fighters among the employees.

Major Andrews said that between now and May he would be in consultation with his chiefs at Victoria and the superintendent of the seaplane station at Jericho for the purpose of laying out a programme in experimentation in the use of flying boats for every kind of forestry work. Patrolling, conveying senior departmental officials to big fires, conveying expert fire-fighters to the scene of activities in rapid time, transferring fire-fighters from one fire to another, and various other suggested uses for seaplanes will be tried.

EGYPTIAN DISTURBANCES AND PLANES.

A very effective measure to cope with the disorders in Egypt was, under martial law, announced in Suez, as follows: "If aeroplanes perceive an assembly they will drop smoke bombs; if the assembly does not disperse they will drop shells and open fire with their machine-guns."

WIRELESS TELEPHONE AIDS

The successful operation of the wireless telephone across the English Channel has made possible continuous communications between English shore stations and flying craft in the Paris-Brussels service, and is particularly helpful in a heavy fog.

An air traffic control tower at the aerodrome has been linked up with an extension from the wireless station and so arranged that a wireless operator can plug the air controller through on a wireless telephone to any air express on the wing, with the result that any present orders or explanations of conditions at landing fields can be conveyed to pilots.

The wireless tower at the aerodrome also has proved a great help to pilots who are landing in rain or fog, for the operator can communicate with mechanics in the field by means of a megaphone as the aeroplanes are coming in. The system has served further to eliminate danger from the Channel air service.

CASUALTIES IN ITALY.

During the period from February 1, 1921, to the end of August, 1921 (7 months) there were 16 airplane accidents in the Italian Army Air Service, resulting in the death of eleven pilots or observers. The report on these casualties states that most of them occurred to student pilots, or when they were being carried, and may therefore be attributed to them, for, according to the testimony of eye witnesses, the accidents were due to errors of judgment.

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Fast Air Services Pay on Long Routes

Some very interesting figures relating to the progress made by the French aerial routes have been issued by the French Under-Secretary of State for Posts and Telegraphs. These figures disclose that, taking the twelve months from October, 1920, to October, 1921, the mail traffic on the London-Paris route has steadily diminished in volume. In October of 1920 3,005 postal packets were carried, while in the corresponding month of 1921 this number had fallen to 1,923. It may be remarked that it is quite possible that a good deal of this decrease is due to the fact that regular British lines are running and are obtaining their share of the mail traffic. Nevertheless, the figures are somewhat curious, the more so as we find the same conditions affecting other French lines, which are not subject to outside competition. The Paris-Brussels service shows an astonishing falling-off, only 71 letters being carried last October, as against 621 in the corresponding month of 1920. Paris-Amsterdam shows a decrease from 176 in May last to 35 in October, while the figures of Paris-Strasbourg fell from 115 letters in October, 1920, to 64 in October last.

On the other side of the picture, we find that Paris-Prague rose from 138 packets of mail in 1920 to 863 in October of this year. The Jarris-Warsaw

route, opened in May last, carried 344 letters in that month against 877 in October. A really wonderful result is shown by the route Toulouse-Casablanca. In October of last year this service carried, out and home, 24,349 postal packets, and in the corresponding month of 1921 this total had increased to 40,607. During the whole year no fewer than 306,181 letters were carried by this service, Paris-London coming next with 28,534.

The deduction to be drawn from these figures seems to be that the business community does not attach a great deal of importance to the saving of a few hours on the shorter aerial routes, but that where the saving of time amounts to days, as it does in the case of the Toulouse-Casablanca route (by which five days are saved in comparison with train and steamer), there is a rush to take advantage of the facilities afforded by the aerial mail. The figures are more than a little interesting, and can, we think, be studied with advantage by our own postal authorities, who seem dubious as to the advantage or otherwise of using aerial mail on long runs. The way they appeal to us is that they prove that the longer the distance over which aerial conveyance is used the more rapid the growth of the traffic and the more successful the enterprise must be.—“Aerial Age.”

HOW TREES MAKE GROWTH.

The comparative rapidity with which nature will restore timber growth is shown by experience of Mr. Wm. Keppy, of Magnetawan.

“Spruce trees planted on my place 30 years ago,” Mr. Keppy said, “have since reached a height of 40 feet and a diameter of a foot to 16 inches. This was the result of artificial planting. It is surprising, though, what nature will do if left alone. A portion of our farm, unsuited to agricultural purposes, burned over 28 years ago, is now thickly covered with spruce, balsam and pine, many of the trees 25 feet high.”

ONLY POOR LAND REQUIRED.

There are, according to Dr. Howe, close to half a million acres of waste land in old Ontario, very close to markets, that could be profitably reforested. There are another half million acres in central Ontario, that in the past have borne ten to twenty thousand feet of pine per acre, that have been burned and reburned until all the young growth has been destroyed.

ONTARIO PLANTS HIGHWAY TREES.

W. A. Maclean, Deputy Minister of Highways of Ontario, stated that 20,000 trees had been planted in the last two years to beautify Ontario's roads.

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ROBSON BLACK, *Editor and Manager*

FROM President R. P. Kernan's report relating to the Laurentian Forest Protective Association's experience in 1921, we take these lines:

"We prosecuted seventy-nine people for infringing the regulations governing the burning of brush, but owing to strong local influences it was very difficult to carry through these actions to a successful conclusion."

On every hand the forest resources are imperilled by "strong local influences." Often these influences are localized in an individual, but where enough such people are found in an organized community, Forest Protection gets short shrift.

Why do we sit by with folded hands or with hole-in-the-corner indignation meetings while "strong influences" have it all their own way.

The Laurentian Forest Protective Association is one of the greatest believers in educational propaganda and no one supports that cause better than the President, Mr. Kernan, but from one end of Canada to the other ninety-eight per cent of remedies for forest fires take the form of buckets and pumps, towers and canoes, while "strong local influences" baffle the finest mechanical and personal equipment that money can buy.

Forest fires are set by people.

People set forest fires not from malevolence, usually, but because they do not value forests.

When the Canadian people VALUE forests, they will protect them.

Over in Sweden and Norway, the people have been taught the convincing facts of forest protection. They have been given an intelligent attitude towards forest protection. Through educating popular opinion, Sweden and Norway have rid themselves of forest fires.

You can't do that job with sub-poenas.

You cannot do more than fifty per cent of it with rangers and lookout towers.

Public opinion is the great cause of forest fires and until Public Opinion is instructed and persuaded we will continue to sow our crop of fireweed and charcoal year after year ad infinitum.

EDITORIAL

BOATING ON TWO STREAMS.

In the experience of the Canadian Forestry Association, public "knowledge" of this country's forest resources and public opinion on forest conservation follows two channels. The first reflects the informative educational process of the Forestry Association and other agencies resulting in certain well-digested and tenacious convictions:

That the destruction of Canada's forests by fire is a crime against future generations.

That the operations on all forest areas should, as early as practicable, be placed upon a basis as permanent and continuous as fruit farms.

That the interests of the State and of the wood-using industries are substantially identical and that the welfare of both is synonymous with "sustained yield" in the commercial forests.

That the nation as a whole has reached the end of its tether in "ruthless exploitation" and the annual pillage of timber by fire and that measures of forest restoration are considerably overdue.

But along a neighboring valley runs another branch of that river of Public Opinion, wider, and with considerably more horse-power. It represents the outdated prejudice of the Canadian farmer of 1825 against the barricading timber line. It shimmers with "suspicions" founded upon what has been carelessly printed for the last quarter century on "lumber barons" and "timber scandals." It asserts with all the finality of ignorance that there is more Canadian timber than will be needed in three centuries.

This mass of circulating prejudice and misinformation is the real source of our annual forest devastation. The thing that started probably a thousand of Ontario's fires last year was not Men but Attitudes. We may arrest a man (once in a blue moon) for causing a forest fire. We fine him. We pay lawyers to help us get that fine imposed. We bring witnesses and we pay them too. Of course something is accomplished by punishing that man, but the effect is local and effervescent.

The progress of Forest Protection is in the hands not of magistrates or rangers but of the Canadian public. And while an ignorant public will burn down a forest, a well-informed public will just as determinedly protect a forest.

To argue otherwise is to brand the Canadian camper, sportsman and settler, as a scaliwag. And that's going pretty strong.

TO BELIEVERS ONLY.

If you believe in the national purposes of the Canadian Forestry Association; if you find interest and help in the pages of the Canadian Forestry Magazine,

Reciprocate.

Turn in your membership subscription for 1922. Without it, the Association cannot function effectively.

Sit down to-day and get "that Canadian Forestry matter" out of the basket of "delayed action."

ORGANIZED SHELTER PLANTING.

Winnipeg.—Approval of the scheme of organized planting of shelter belts and wind breaks throughout the prairie provinces to protect farms from winter elements was given by the Manitoba Horticultural and Forestry Association, in convention.

Bonusing of farmers who fall in with the plan either by provincial or municipal governments was considered favorably, and it was thought probable the idea would be acted upon this year.

Strong endorsement of the scheme was given by Norman L. Ross, of Indian Head, Sask., and Prof. M. H. Alderman, Minnesota University, St. Paul, who addressed the delegates during the morning session.

Whitby, Ont.—A permanent standing committee on reforestation, with Owen Davies, Reeve of Uxbridge township, apostle of the scheme in this county, as chairman, was appointed by the Ontario County Council today, as the first definite step toward reforestation in this county.

With Mr. Davies on the committee are Deputy Reeve Nesbitt of East Whitby; Deputy Reeve John Forgie, Pickering; Reeve F. W. Weir, Reach; Reeve Johnson, Rama; Reeve Gerrow, Uxbridge, and Reeve Jewett, of Cannington. A proposal is before the Council to accept 100 acres of waste low land offered free by private owners in the township of Uxbridge, which will be fenced off and planted with trees supplied by the Government.

In the 7th Concession of this township, there are six or seven hundred acres of useless land which could be utilized for reforestation purposes. Some definite action will be taken in the matter this session, as the Council is solidly behind the scheme.

Research Work of the Dominion Forest Service

By W. G. Wright

The early efforts of foresters in Canada were directed mainly to administration, and it is only during the last few years that forest research in this country has assumed any importance. A considerable amount of investigative work was in progress before the war, but it was only when the impetus to research generally, due to the war, affected forest research, that any permanent development took place. In 1917 the Commission of Conservation commenced a series of investigations and in the following year the Dominion Forest Service was able to make a start with a postponed scheme for a permanent organization for research. The Dominion Forest Service has now taken over the work of the Commission of Conservation.

The ultimate problem in forest research work in Canada is—"How shall we keep our forest on a basis of a continuous yield of desirable forest species?" When we have good stands of pine, spruce or other merchantable timber, how shall we replace these when cut over? Where the main species are at present undesirable or not merchantable, can we increase the value of the growth by working up markets or by developing methods of utilization to make these species valuable or can we increase the value of this kind of forest by increasing the proportion of more valuable species? If we are to rely on natural growth of young trees to obtain these results, we must find methods of logging that will give us the desired new growth; these methods must be so simple that they can be used as the basis of timber sale regulations. If we are to make use of planting, or other artificial methods of regeneration, we must examine the economic possibilities of these methods. This involves a knowledge of cost of planting or seeding, of costs of upkeep and a knowledge of what yield of timber we may expect of the different species within a given time.

Detailed Study Required.

Any investigations of the yield of timber that we may expect will depend upon numerous measurements of standing timber throughout Canada, and require in addition experiments in various methods of improving the condition of the forest by thinning. These studies will be greatly facilitated by some method of measuring standing timber that is simple and accurate, and that does not involve felling trees. Such a method could be adapted to commercial cruising.

The old time timber cruiser depends on his experience in the woods to tell him how many board feet or ties are available



BATHURST EXPERIMENTAL CUTTING, BATHURST, N.B. COMMERCIAL OPERATION.

Clear cutting in strips in 90 year old black spruce to secure new growth from the side. Note seed trees on the right, entire removal of softwood on cut over strips and successful slash disposal. This was a commercial operation.

in a given area. More modern cruising methods entail some system of selection of sample areas; volumes of these sample areas are determined and the timber on the whole area may then be calculated. The basis of this method is the volume table. These tables are based on examination of a large number of trees and may be in terms of board feet, cords, ties or in terms of any other product. It is found that tables for any given species

are not necessarily applicable over the whole range of that species and that generally for each locality a new table has to be prepared or the general table modified. The result of this is that an immense number of local volume tables have been and are still being made, the majority of the tables having local application only and being of no further value once the timber to which they apply is cut over. It is clear that there will be



PETAWAWA FOREST EXPERIMENT STATION, NEAR PEMBROKE, ONT.

Study of yield of red and white pine and experiment in thinning to improve growing conditions of remaining trees. Note trees numbered for periodic measurement. Material removed for fuel.

immense advantages in a volume table method that involves the preparation of one volume table only, which will apply to all species in all parts of Canada and that will hold good for all time. Such a volume table method has been developed in Sweden and it seems probable that a similar method can be put to general use in Canada.

The Dominion Forest Service has undertaken to study these problems. Permanent forest experiment stations have been established at Petawawa in the white pine region of Ontario, and at Lake Edward in the pulplands of Quebec; the latter in co-operation with the Laurentide

Company. Studies of cutting methods to secure new growth of softwoods are being carried on, and experiments are being made to determine the economic possibility of increasing the proportion of softwoods in the mixed hardwood softwood forest. Studies of the yield we may expect from white and red pine, jack pine and spruce, in the natural and in the thinned forest, are under way. Extensive studies are being made of methods of estimating timber for commercial and scientific purposes.

Research Work East and West.

Research work in connection with the

two experiment stations is being extended to various localities in the east. Systematic experimental cuttings on a commercial basis have been made in New Brunswick, in co-operation with the Provincial Forest Service and the Bathurst Lumber Company.

Similar work is being carried on in the Dominion Forest Reserves in the West. The enforcement of cutting regulations on timber sales, is a well established principle on the reserves and this feature is very favourable to research or experiments, in connection with logging operations.

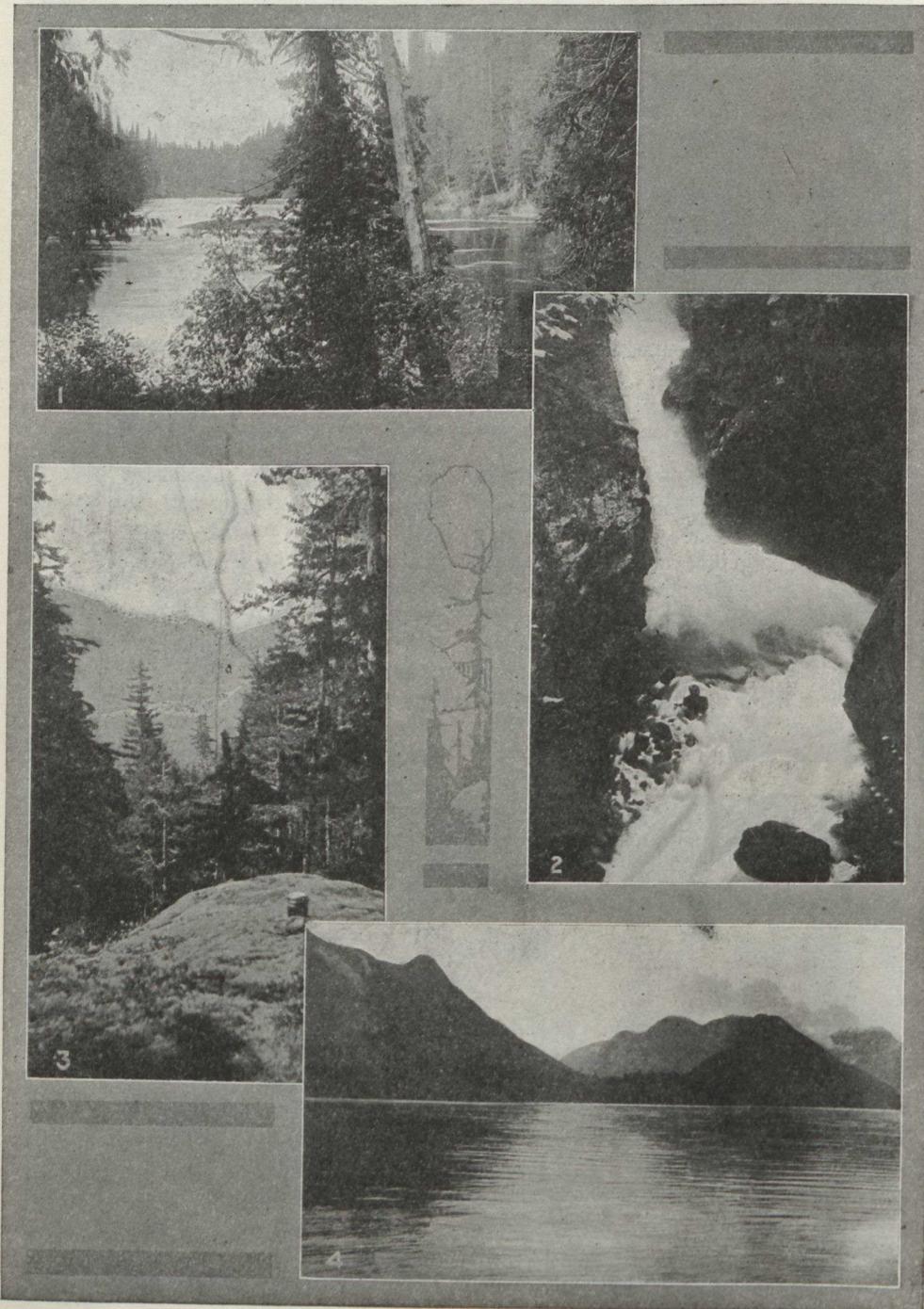
We have been fortunate in having the enthusiastic co-operation of many of the leading lumbermen and pulp and paper makers of the East, and we are encouraged to hope that this co-operation will be continued and very much extended. While our record so far is one of beginnings rather than results, the results we have obtained and the importance of the problems we are attacking justify the vigorous prosecution of the work.

A NEW FOREST INDUSTRY.

In these days of lowered prices for farm products anything which gives a farmer another crop is of importance. At the request of the British Forestry Commission, which bears the expense, the Forestry Branch of the Department of the Interior is collecting the seeds of Douglas fir, Sitka spruce, and some other trees of the Pacific coast to be shipped to Great Britain to be used in reforesting denuded areas there. The Forestry Branch has erected a seed-extracting plant in New Westminster, British Columbia, and the collection of the seed is done largely by farmers, in the newer settled districts near the city, who bring in the cones in sacks to New Westminster market. It seemed rather odd to some to see farmers coming to market with sacks of cones instead of apples and potatoes, but as the farmers receive \$2 per sack for the cones, and as the Forestry Branch thus secures the seed required at a reasonable rate the innovation is considered most satisfactory.

ARTICLE BY MR. C. A. EDWARDS.

The leading article in the January issue of the Canadian Forestry Magazine entitled "Remarkable Advancement of Tree Planting on the Prairies" was written by Mr. C. A. Edwards, of the Tree Planting Division of the Dominion Forestry Branch, Indian Head, Sask., the name of the author being inadvertently omitted. The Forestry Magazine hopes to publish several other articles from Mr. Edwards' accomplished pen in the near future.



BRITISH COLUMBIA THROUGH THE CAMERA'S EYE:

1. Irene Pool, Campbell River. 2. Elk Falls, Campbell River. 3. Chehalis Lake looking south. 4. Lillooet Lake (lower) looking north.

The Woods and Markets of British Columbia

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

In spite of the increased use of steel and other substitutes for wood, the per capita consumption of timber is increasing, and is likely to continue to do so. Wood, therefore, is still a very important commercial and industrial commodity. To the Province of British Columbia, it is vitally important. The stands of coniferous woods along the coast and in the interior of British Columbia constitute our greatest provincial asset. The Government obtains a revenue of over three million dollars annually from its timber. To a population of only 700,000 people, a fair-sized city population here, this amount is very important, particularly when one bears in mind that an amount equally large is required to meet our annual education bill alone. You can readily understand, therefore, that we are intensely interested in our timber. It forms a large part of our life's blood, and the circulation of the life's blood of any portion of the Empire should cause at least a slight sympathetic throb here, in the heart of the Empire.

British Columbia's Great Asset.

According to the Whitford-Craig report, the only record we have to guide us, British Columbia has a stand of commercial timber of 366 billion feet, or, roughly, 200 million Petrograd standards, or one-third of Canada's total stand. Of this total, 350 billion feet is of saw-log size, which, in British Columbia, is of 10in. top. Roughly, two-thirds of this stand of timber is still in possession of the and the balance in the interior.

The total area of forest land in British Columbia is estimated at 149,000 square miles, of which 115,000 square miles are still in possession of the Crown, the balance being nearly equally divided between lands Crown granted and lands held under timber licence, lease or sales.

About one-quarter of the estimated stand of timber is still in possession of the Crown. Crown timber is now disposed of only by tender, an upset price being set by the Forest Branch.

Our chief commercial timbers are Douglas fir, Sitka spruce, Western hemlock, red cedar, Western yellow pine, and Western larch. Of these, you are chiefly interested in the first two, though our hemlock ought to be better known in this country.

The Value of Douglas Fir.

The most important of our woods is undoubtedly Douglas fir, known throughout the world under various names, the chief here being Oregon pine and British Columbia pine.

As a matter of fact, Douglas fir is strictly speaking neither a fir nor a pine. The name Oregon pine—which, by the way, the Oregon people are seeking to

revive in place of Douglas fir—was first given to this wood by accident. Doctor McCollough, a Scotsman, and the first Hudson Bay factor at Fort Vancouver,

McDonald's Tested Seeds

Grow Good Crops

Here's your Order!

Check varieties—put a ring around price of quantity wanted—cut out and mail with total amount.

Raise Your Own

Vegetables & Flowers

To save you time—here's a list of tested seeds you can depend upon. We know they are absolutely reliable. You don't even have to write us a letter—cut out the ad—check varieties wanted—pencil a ring around the price of quantity wanted—mail to us with total amount, also with your name and address.

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FLOWER SEEDS

Asters—McDonald's Giant Comet Mixed, 10c per pkt., 75c per 1-4 oz., \$2.50 per oz.

Nasturtium — McDonald's Fine Dwarf Mixed, 10c per pkt., 20c per oz.

Sweet Peas — McDonald's Superb Spencer Mixed, 10c per pkt., 35c per oz., \$1.00 per 1-4 lb.

Zinnia—Giant Dahlia Flowered (Mixed), 20c per pkt.

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NAME AND VARIETY	POSTPAID PRICES		
	Pkt.	Oz.	1-4 lb. Lb.
Beans (Bush)—Round Pod Kidney Wax	.10	—	.60
Beans (Bush)—Stringless Green Pod	.10	—	.70
Beans (Pole)—Kentucky Wonder Wax	.10	—	.50
Beet—Extra Early Egyptian	.10	.20	.50 1.60
Beet—Detroit Dark Red	.10	.20	.50 1.75
Cabbage—Copenhagen Market	.10	.75	2.25 —
Cabbage—Select Jersey Wakefield	.10	.50	1.60 —
Cabbage—Danish Round Head	.10	.50	1.60 —
Carrot—Nantes Half Long	.10	.20	.50 1.75
Carrot—Chantenay Improved	.10	.20	.50 1.75
Cauliflower—Extra Early Erfurt	.25	4.00	—
Celery—Paris Golden Yellow (French)	.20	1.25	—
Corn—Early Mayflower	.10	—	.45
Corn—Select Golden Bantam	.10	—	.45
Cucumber—Davis' Perfect	.10	.20	.60 2.00
Cucumber—Arlington White Spine	.10	.20	.60 2.00
Cucumber—Green Prolific Pickling	.10	.20	.60 2.00
Lettuce—Big Boston	.10	.30	.90 —
Lettuce—Grand Rapids	.10	.30	.90 —
Musk Melon—Montreal Green Nutmeg	.10	.30	.90 —
Water Melon—Cole's Early	.10	.20	.60 —
Parasnip—Improved Hollow Crown	.10	.20	.50 1.40
Onion—Large Red Wethersfield	.10	.25	.70 2.50
Onion—Prizetaker Red Globe	.10	.30	.90 3.25
Onion—Yellow Globe Danvers	.10	.25	.75 2.50
Onion Sets—White, Yellow or Red	—	—	.45
Peas—American Wonder	.10	—	.50
Peas—Nott's Excelsior	.10	—	.50
Peas—Gradus or Prosperity	.10	—	.55
Pumpkin—Winter Luxury	.10	.30	.90 —
Radish—Vick's Scarlet Globe	.10	.20	.60 2.00
Radish—Scarlet Turnip White Tipped	.10	.20	.50 1.75
Spinach—Victoria	.10	—	.35 1.00
Swiss Chard—Lucullus	.10	.25	.75 —
Squash—Hubbard Improved	.10	.30	.90 —
Squash—Long White Bush Marrow	.10	.30	.90 —
Tomato—Bonny Best	.10	.50	1.60 —
Tomato—Chalk's Early Jewel	.10	.50	1.60 —
Tomato—Livingston's Globe	.10	.50	1.60 —
FIELD ROOT SEEDS			
Carrot (Feeding)—Imp. Short White	.90	—	3.75
Turnip (Swede)—Select. Prize Elephant	.90	—	3.75
Turnip (Swede)—Danish Queen	.90	—	3.75
Mangel—Select. Mammoth Long Red	.70	—	2.75
Mangel—Giant Half Sugar	.70	—	2.75
Mangel—McDonald's Red Tankard	.70	—	2.75
Mangel—Giant Yellow Intermediate	.70	—	2.75

McDonald's Dollar Vegetable Collection

\$1.50 Catalog Value for \$1.00

1 Package Each of Best, McDonald's Improved Blood Turnip—Cabbage, McDonald's First and Best—Carrot, Nantes Half Long—Corn, De Lue's Golden Giant—Cucumber, Devon White Spine—Lettuce, Wonderful—Musk Melon, Miller's Cream—Parasnip, Improved Hollow Crown—Onion, Prizetaker Red Globe—Pumpkin, Winter Luxury—Radish, Rosy Gem—Squash, Hubbard—Tomato, Bonny Best. POSTPAID, \$1.00.

McDonald's Gem Flower Collection

85c Catalog Value for 50c

1 Package Each of Sweet Alyssum, White—Aster, Double Mixed—Calendula, Choice Mixed—Morning Glory, Tall Mixed—Nasturtium, Dwarf Mixed—Poppy, McDonald's Superb Shirley—Sweet Peas, McDonald's Rainbow Mixture—Zinnia, Giant Double Mixed.

POSTPAID, 50c

Kenneth McDonald & Sons Limited.

66 Market Square, Ottawa, Can. Seeds



Thluicho Lake, looking north from the portage at the south end.

in the territory of Oregon, named it Oregon pine in this way: The company had a schooner arrive from the Hawaiian Islands with sugar and a request for a return cargo of timber. Natives were set to cut down the huge trees, saw them up, and load the schooner. McCullough's chief clerk asked how he would describe the timber in the manifest. The doctor,

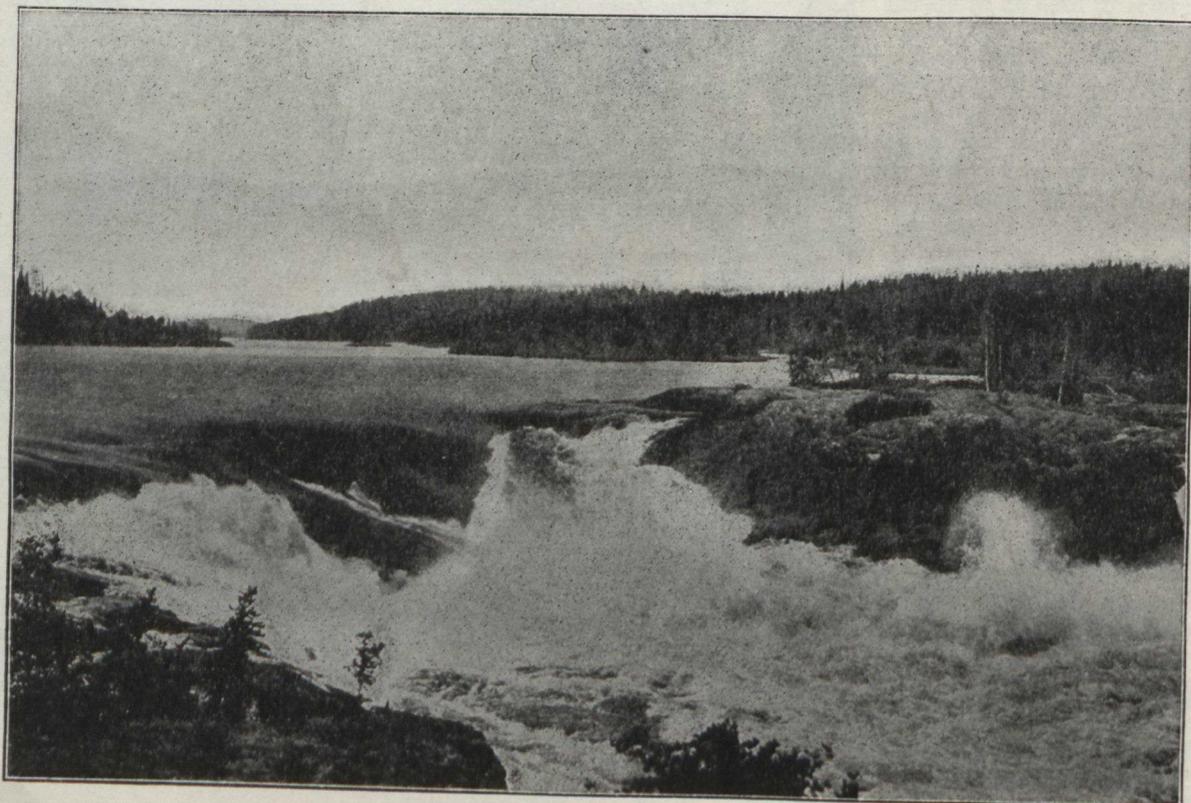
who was something of a botanist, said, "It's neither pine nor fir, but it's nearer a pine. Call it pine." "What sort of pine sir?" asked the clerk. The doctor thought for a moment, then said, "This is Oregon; call it Oregon pine." The name was picked up by sailing-ship captains who had to ship masts and renew spars on the Pacific Coast, and the sail-

ors carried it to every port in the world. The sailor was a great advertising agent, and his work still shows big results after all these years.

Early in the 19th century, David Douglas, a Scotch botanist, was sent out to the Pacific coast by the Horticultural Society of England. Douglas found this magnificent tree; decided it was nearer fir than pine, and called it Douglas fir, which is now its recognized trade name all along the coast. You seem in this country to prefer the term pine, largely, I suppose, because of your high regard for the yellow pitch of the Southern States. There may not be much in a name, but we sometimes find a good deal of trouble in the two names, and it is not surprising to find people who believe that Oregon pine and Douglas fir are two distinct species. I need

not assure this audience that they are one and the same tree.

Douglas fir comprises 21.7 per cent, or 76 billion feet, of our total stand, and is the most important tree on the North American continent. We naturally use a great many adjectives in connection with it, but one cannot over-emphasise the qualities of his best friend, and I would describe it as British Columbia's



Oracha Chutes on Taltson River, B.C.

best friend. Its enormous size I leave to judge from the films.

It varies in colour from a straw-yellow to a reddish-brown, is moderately hard, yet easy to work, straight-grained, tough, resilient, and durable. It takes stains well, holds nails firmly, and does not worry about water.

The great value of Douglas fir is in the variety of uses to which its lumber may be put. Its great strength, coupled with comparatively light weight, makes it ideal for heavy structural work, such as supports in large buildings, bridge and ship timbers, framing for houses, plank-ing for scows, dredges, &c. It is also equally suited for all dimension material, such as joints, scantling, &c., in any kind of building to be exposed to any kind of weather. We have in British Columbia houses built of Douglas fir 60 years ago still occupied and in good condition—and the climate of British Columbia is not particularly dry in fall and winter. We find Douglas fir remarkably durable. Your Great Western Railway Company here has furnished us with evidence of its durability when creosoted and used for sleepers. Out of 616 sleepers tested, only 23 have been removed on account of decay in 17½ years.

Douglas Fir a Strong Wood

You might be interested to learn that city engineers in Canada and the United States are to-day giving exactly the same working stresses for Douglas fir and pitch pine, after years of experience of both woods. Hundreds of tests carried out by the U. S. Forest Products Laboratories show Douglas fir to be equal in strength to Southern pine; in fact, in elastic limit to be 10 per cent. stronger. Douglas fir is the strongest wood in the world for its weight. Railroad companies in Eastern Canada use much of it in car construction for sills, &c. However, I am probably wasting your time in dwelling on these points, as you are all familiar with the qualities of this wood. As time goes on and pitch pine disappears, as it is rapidly doing, you will become still more familiar with Douglas fir. Ten years hence most of your large structural timbers will come from the Pacific Coast. Long-leaf pine, on which pitch pine built up its great reputation, is now but a name for dense yellow pine of any of the three varieties. The Southern pine people are grading their timbers with fine discretion on a density basis, calling the three grades Long-leaf, Short-leaf, and Loblolly, though all three are to-day quite frequently of the Short-leaf variety.

Besides being invaluable as a structural timber, Douglas fir, sawn edge-grain, makes a very fine flooring, wearing evenly and taking a splendid polish. In Canada, we use much more wood-panelling in our houses than you do here, and for this purpose and other interior finish,

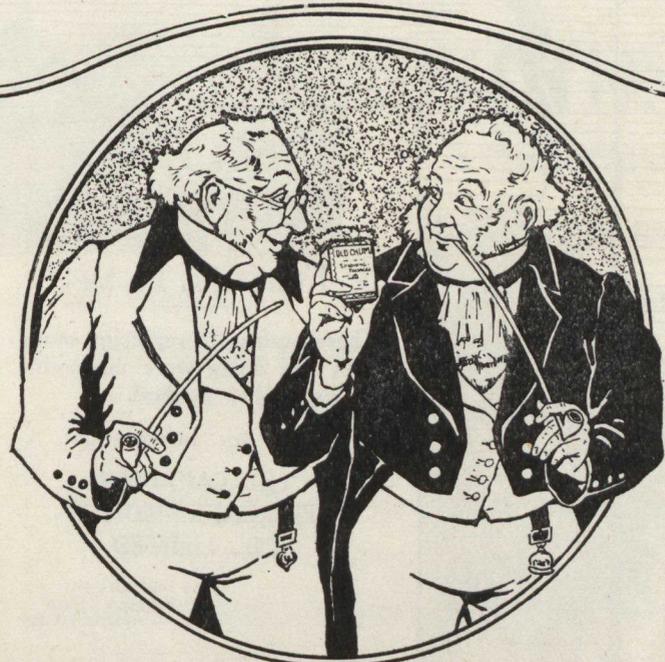
Douglas fir is the most popular wood. The figuring is distinctive, and when the grain is fine and "curly" a remarkably beautiful effect is obtained. It finishes and polishes splendidly. The best effects are, of course, obtained from veneer-cut panelling, as panels may be matched very closely.

(Continued on page 696)

CORRESPONDENCE COURSE IN FORESTRY.

The Canadian Forestry Magazine is in receipt of information from the University of Toronto which will be of considerable interest to many of our readers.

Through the Department of University Extension, arrangements have been made to give a correspondence course in forestry along elementary lines. Necessarily this will take the form chiefly of directed reading on which periodical examinations will be held. It will not be possible to grant a diploma of course on the work covered but a certificate will be granted indicating sufficiently the student's progress. Enquiries should be addressed to W. J. Dunlap, B.A., Director, Department of University Extension, University of Toronto, Toronto, Ont. The Canadian Forestry Association heartily recommends the new course to all seriously interested in forestry who are not able through various causes to attend a forest school.



Everybody Smokes

OLD CHUM

CANADA'S FAVORITE
PIPE TOBACCO



The British Empire Will Pool Forestry Knowledge

(From an Address by Lord Novar, at the Inaugural Meeting in London, of the Empire Forestry Association)

It is not necessary, perhaps, to dilate in the City of London on what can be achieved by the initiative and effort of private individuals and voluntary bodies, more especially in these days when we have learnt by experience that Government-run business suffers from the lack of personal initiative and from inability to take quick decisions or to secure econ-

ominal administration. At the same time we must freely admit that in no industry can Governments more hopefully participate than in forestry; in fact, forestry is in a peculiar degree an industry in which Government, voluntary organization, and the individual can most usefully co-operate. The Empire Forestry Association should prove a useful interme-

diary between all these agencies, and should be instrumental in levelling up the knowledge and methods of conservation and afforestation in all the different centres of the Empire. Government departments cannot interfere with one another. None would brook being told by another, however tactfully, that its methods were unscientific or out of date. But within one great voluntary organization such as the Empire Forestry Association every society and department can pool its knowledge, make known its methods, and make use of the information and experiences of its fellow-members, without even acknowledging any obligation. There are knotty points to be solved, and I say with conviction that a quickening of interest in forestry and a general advance in knowledge will be best secured through the co-operation of those who have an intimate experience of local policy and conditions in all British lands, and it is such persons who will form the membership of the E.F.A.

The Cinderella of Industries.

Sylviculture with all its subsidiary manufacturing processes is the most perennial wealth-producing and employment-giving industry. It can be carried on in all parts of the world, and involves no destruction of capital as does mineral exploitation. Yet it is the "Cinderella" amongst industries. Although arboriculture began in the Garden of Eden and timber was in demand at the building of the Ark, less is known about it, less science and less money have been applied to its development than to any of the more modern processes of manufacture such as the growing of cotton and sugarcane, or the production of rubber and wool.

The forest record of the British race is a poor one. Backward at home, we have destroyed the timber of every continent into which we have penetrated, and the virgin forests in the possession of our race are going as rapidly to decay as the stately parks of England. In this country pioneers in forestry have had, from lack of all sources of information, to learn by costly experiment and failure, and the planting career of most of us can be traced from many an ill-assorted mixed plantation to the gradually evolved plots on the hill-sides of pure or of suitably mated trees. The English and Scotch arboricultural societies have through their work and publications spread much enlightenment, and the planting owners of to-day need make none of the egregious errors of the pioneer. But these societies



are local. They cannot extend their influence to other countries; and though elsewhere there are excellent institutions doing similar scientific work—such as the Technological Museum of Sydney, New South Wales, which has made most interesting researches into the properties and uses of the oils and timber of the Eucalyptus—yet that work is scarcely known throughout Australia, and is probably unheard of in South Africa or in any other part of the Empire.

Rebuild Damage of War.

In the same way, the accumulated experience of the Forest Service of India and the fine work it has done, is shut up in their own sphere of operation, and not one of these societies has been hitherto a lamp to the feet of the pioneer silviculturist.

The losses already incurred are incalculable. The war has accelerated the destruction of our reserves and those of Europe, while the neglect of natural regeneration and unscientific planting has aggravated the situation. Now that the whole world is awakening to the importance of making good the sins of the past and of developing timber resources; now that there is a prospect of much public and other money being expended here and everywhere on forestry, it is imperative that all available knowledge and the result of all scientific research and experiment should be made accessible to the world (applause). It is in order to pool experience, to gather up knowledge and render it easily accessible to stimulate enquiry, research and experiment, that the Empire Forestry Association has been created.

MAINE FORESTRY ASSOCIATION.

The Maine Forestry Association met in annual convention January 6-7, and a full and valuable program was presented. The sessions were well attended by enthusiastic people and much was accomplished. The Association in its closing session expressed in resolutions its strong opposition to the proposed transfer of any part of the United States Forest Service from the Department of Agriculture to any other department. It also urged that the Legislature of the State of Maine develop the State School of Forestry to full technical and practical efficiency in order to make possible the training of young men in forestry within the State and to provide the public instruction in forestry. The final session was marked with interest and enthusiasm in the topics presented for discussion, and a very profitable and instructive program was carried out. It was the most successful and valuable convention yet held in the interests of forestry in the State.

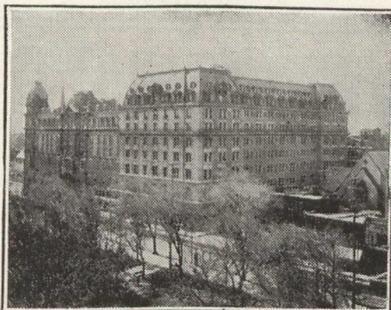
AS OTHERS SEE IT.

Forest Preservation.

(*Montreal Star.*)

It is a lamentable state of affairs when over seventy-five per cent of the fire waste of this country is due to carelessness. Our forests are of immense value and their preservation is a matter of national concern. More severe enactments are called for if the forests are to be better safe-

guarded against the careless. There are countries where gross want of forethought comes under the criminal enactments. One cannot wonder at this when the danger of forest conflagrations to human life is considered, and when the immense value of forests is taken into account. The efficient patrolling of our forest areas by airmen undoubtedly would do much to lessen the tremendous yearly loss by fire, and those in authority are pursuing a proper course in taking steps to ensure such patrol.



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Prospectus will be furnished on application.

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"A CANADIAN SPORTSMEN'S AND NATURALISTS' ASSOCIATION"

The Editor,
Canadian Forestry Magazine,
Ottawa, Ont.

Sir,—The letter which you printed in your December number from Mr. J. Moffatt Ross has doubtless been read and cordially approved by a majority of your readers. Since you invite comments, I am writing to say that I for one should like to see such an association as Mr. Ross proposes, in active existence; but it might be advantageous that its scope and also its name be enlarged by the addition to its membership of those who are not only sportsmen but also naturalists.

I would therefore suggest that the name be "The Canadian Sportsmen's and Naturalists' Association."

That, as far as possible, this Association should be organized on non-political lines, following the commendable example of the Canadian Forestry Association; and that; if it could be arranged, two or three members of each of the scientific societies, (such as the Ottawa Field Naturalists' Club, the Alberta Natural History Society, and also those in Vancouver, Victoria and other centres), should automatically become members, their dues being paid by their respective associations.

The suggestion that the Canadian Forestry Magazine be used by the Sportsmen's and Naturalists' Association appears to be one which would further the interests of both; for while enlarging its field, the inevitable monotony of its present atmosphere will be avoided, its interest for many readers thereby increased, and the object of both associations would be advanced.

For adequate protection of game and wild life—fish, flesh and fowl,—propaganda is as useful as it has proved to be for the protection of forests; it has always seemed strange to the writer that governments have failed to use placards and posters to bring before the people the advantages of game protection, as they have in the past few years, as the results of the activities of the Forestry Association, advocated the protection of the forests. Had they done so, the fact that his own interests and those of his children were being served by fair treatment of the game, etc., would by this time have been a belief of the average citizen, just as he now believes in the protection of the forests from fire; and it is plain that, until such propaganda is used the objects that we have at heart are not likely to be gained.

Only a strong association of this nature will bring about these desirable results.

A step in this direction, as regards birds, is now being taken in Vancouver; but there appears to be no reason why this should not be part of a nation-wide movement. There is no doubt that many people in all walks of life are willing to protect wild creatures, and would support any endeavour of this nature, were it once brought to their notice.

At the time of writing, the affairs of game-protection in this western province are deplorable; and it may be that a strong association, could it but be organized, would yet save the marvellous heritage of wild life which it is the duty of every right thinking Canadian citizen to assist in preserving for future generations.

I have the honour to remain, Sir,

Yours faithfully,

T. L. THACKER.

Monarch M Tractors

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All the Year Round

Day in and day out service makes Monarch Tractors economical for hauling in the lumber woods.

Monarchs give all-year-round service—on snow or ice, in deep sand or mud—for they lay their own tracks as they go—broad steel chain treads that get sure footing on any surface, and which do not sink even in the lightest soil.

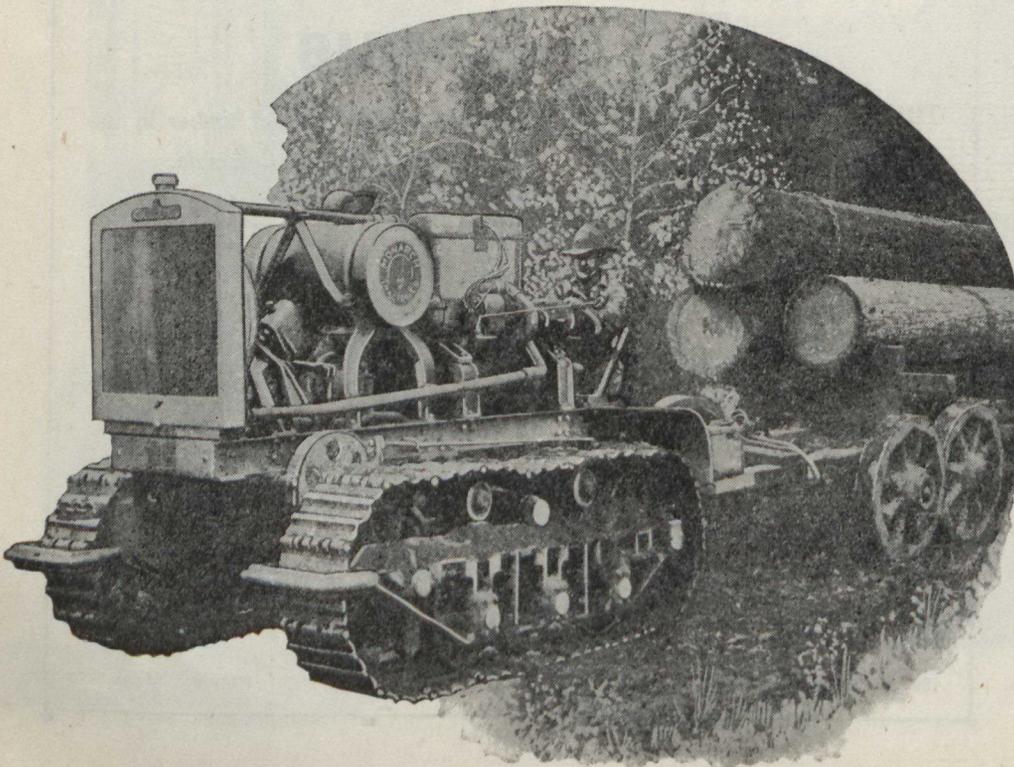
Out in the woods, where mechanics are scarce and spare parts hard to get, you will especially appreciate the sturdy, simple construction which enables them to give continuous, uninterrupted service.

Their cost of operation is low for their fuel is coal oil.

They are easy to operate and will turn in their own length.

In addition **Monarch Tractors** furnish power for snaking or for any purpose for which a stationary engine is required.

Monarch Tractors Limited, Brantford, Ont.



During his "round-the-world" journeying Lord Northcliffe made a stay at Bangkok, and on December 23 he visited the aerodrome at Don Muatung, where Sir Ross Smith alighted during his Australian flight in 1919. "The Times" correspondent states that Lord Northcliffe was surprised to find the air station equal to most of those in Europe.

Siam, he states, has 25 landing-places and five aerodromes. At Don Muang there are 115 planes, including school machines, and a staff of 650 men.

It looks as if there should be a good opening for British development in this land of promise.

Wireless Telephones Save B.C. Forests

By P. Z. Caverhill, Chief Forester of B.C.

It has been truly said that where there is no progress, there is a backward tendency. This applies to modern methods of fighting fires in cities, which have shown such a huge improvement in equipment and methods used, and this is no less true of forest fire fighting.

In cities, however, communication with the fire suppression force is rapid and accurate, and it is this factor which bears such a large part in keeping down fire loss; by quick knowledge of an outbreak and quicker action. But forests are far from towns and cities, as well as the usual commercial methods of communication, that of the telephone and telegraph or even roads. This feature is still further accentuated where the forests adjoin a coast line of approximately 12,000 miles, such as that of British Columbia with its sparsely settled inlets from 20 to 70 miles in length; isolated logging camps scattered along the shores, and out of touch with the world except for the irregular visits of the camp tug boat, or occasionally of some coasting steamer.

Patrolling Remote Areas.

With inlets of such length to cover, when a Forest Ranger starts to inspect the camps situated along these inlets on his launch (a vessel capable of travelling at about eight miles per hour), it means that he would be out of touch with his headquarters for a week, or possibly two. It also means that he could not be reached in time to direct him to make certain inspections or give him other information until he returned to his headquarters or could not be informed of the fact that he was needed because of a forest fire.

Conversely, he could not communicate with his headquarters, requesting help in the way of men and tools; so that the initial action, which is all important in the case of fire, could not be taken or become really effective.

To overcome this handicap of communication, advantage was taken of advancing science in the form of the Wireless Telephone and three Land Stations and five launches were equipped with wireless telephone sets, which allowed communication with the District Supervisor's headquarters, being effective within a radius of 40-50 miles, and the whole in touch with the District Office in Vancouver, and it is no uncommon occurrence for a Ranger to receive a message within the space of a couple of hours that would, with the existing methods of communication, have taken a week or more.

Thousands of Messages by Wireless.
From May to September 1st, 1921, a

total of 3,704 messages were received at and from the different wireless sets, and 3,115 messages were transmitted, containing a total of 212,606 words. These figures convey some idea of the use to which these instruments are utilized, and approximately 90 per cent of these messages were in reference to matters of Forest Protection.

The days of the foot patrolmen and the

horse are nearly gone; new methods and ways were necessary as the problem of protecting the forests from fire became more complex each year; and each year sees the adopting of modern scientific methods to combat forest fires, of which the wireless telephone is but one, though a most important and necessary link in the chain.

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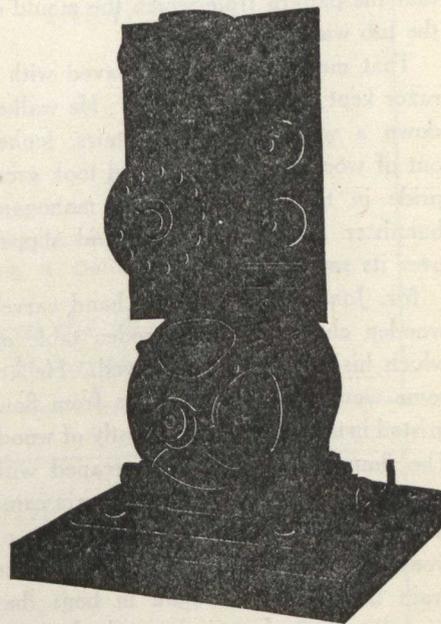
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The belt connected unit illustrated can be driven from any power shaft. Twenty-four hour service is obtained by the use of 16 cells of TITAN storage battery.

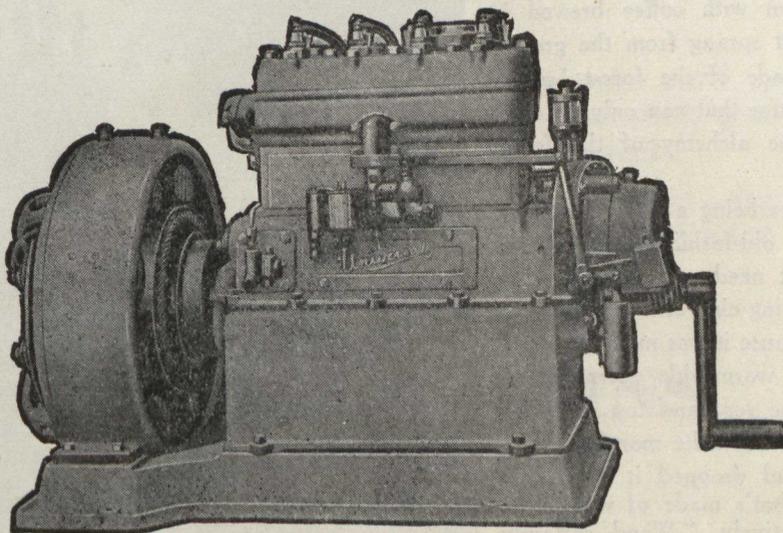
The Plant is 32 volt and has a capacity of 32 lights direct from the generator or 67 lights for five hours when combined with TITAN 216 ampere hour battery.

Complete stocks of 32 volt belt driven or direct connected plants and standard wiring material always on hand at our Houses.



Belt connected Plant—operated from any good engine.

110 Volt D.C.
Universal Plant.



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The Man who Needed no Wood

"I don't need wood," said Holingbrook Jones, as he got out of his wooden bed. He stepped on a rug that had been woven in wooden looms. He pressed an electric button held in the wall by a wooden support, the wire to which had been wound on a wooden spool. The wall of the house, the paper on it, were made of wood. His valet came holding his master's coat on a wooden hanger. "Draw my bath," said Jones. As he slid over the smooth porcelain of the bathtub he repeated, "I don't need wood," but he forgot for the moment that the pattern from which the mould of the tub was made was wood.

That morning his valet shaved with a razor kept in a wooden case. He walked down a wooden flight of stairs, looked out of wooden casements, and took great pride in the highly polished mahogany bannister as his caressing hand slipped over its smooth surface.

Mr. Jones sat in a richly hand carved wooden chair and at a wooden table on which his breakfast was served. He ate some wonderful griddle cakes from flour gristed in mills constructed mostly of wood. The flour came from grain reaped with machinery mostly of wood, the grain came from seed sown by a device mostly of wood, by a farmer who had drawn the grain in a wooden wagon in bags that were wood products. Jones had maple syrup on his griddle cakes and washed the cakes down with coffee brewed in pure water that sprang from the ground in the cool shade of the forest—sweet, crystal-clear water that can only be compounded by the alchemy of the forest floor.

But Mr. Jones being a self willed man and strong in old-fashioned ideas said again, "I don't need any wood," as he lighted his morning cigarette with a match that burned because it was made of wood. He had a nice warm ride downtown in his limousine the seat and top of which were wood. He read the morning paper half through and dropped it remarking disgustedly, "That's made of wood to," and then reflectively, "Wood certainly does play a large part in my affairs."

That day the omnipresent wood problem confronted him again and again. The pen in his hand was principally wood and the check he signed was also made of wood. He observed he was completely hemmed in by wood, the floor, the desk,

the picture frames, the ceiling. He boarded a train at eleven o'clock for New York and sighed, "I am free from the wood spectre at last," but when he handed the conductor his ticket there it was again. As he looked out of the car window he noticed that the very foundation of the railroad was made of wood ties. He had to admit that wood was used in about everything that contributed to his business and comfort and as he glanced at the forested hills he sighed, "My health too!" For the first time the sense of his utter dependence on the

forest was aroused. Before starting back home he wired his butler to have a good rousing fire in the fireplace. Again the importance of wood struck him forcibly. As he sat before the hearth that evening listening to the music of his player piano the most vital parts of which were made of paper and wood he began to wonder how the supply of wood was holding out, and when he discovered that three-fifths of the forests had been destroyed already he was alarmed and said, "This wood problem is serious; I'm going to get behind the forestry movement strong; certainly, everyone needs wood."

From N. Y. College of Forestry Syracuse.



1. Little Qualicum Falls, Vancouver Island.
2. Stamp River Falls, Vancouver Island.
3. Granite Creek, Tributary to Skeena River.

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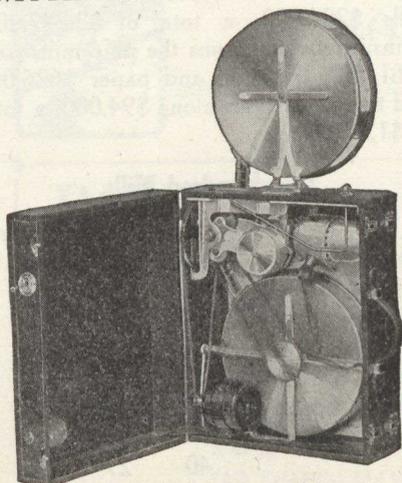
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360 Millions Invested in Canada's Pulp and Paper Industry

A preliminary report on the pulp and paper industry of Canada, just issued by the Dominion Bureau of Statistics covering the year 1920, shows a total of 100 pulp and paper mills in this country. Of these Quebec leads with 46, while Ontario is second with 37. Pulp mills are the most numerous.

The production of wood pulp amounted to 1,960,102 tons with groundwood over half of this, or 1,090,114 tons, and unbleached sulphite 515,649 tons.

While newsprint showed a value of \$80,865,000, book and writing paper ran up well with a value of \$21,868,000, and wrapping paper \$12,161,000, and boards (cardboard) \$12,904,000. Quebec and Ontario were very close in the production of newsprint, Ontario's total being \$32,677,000, while Quebec's was \$35,889,000. Book and writing paper made in Ontario was worth \$12,586,000, while Quebec's production was a little less at \$9,282,000. In wrapping paper Ontario's production was \$3,012,000, while Quebec's was more than double at \$7,740,000. The newsprint production in Ontario includes that of the Abitibi, Spanish River, and Ontario Paper Companies mills, while those in Quebec include Laurentide, Price Bros., Brompton, St. Maurice, Donnacona and Belgo-Canadian. In British Columbia the production of newsprint was \$12,298,000.

Quebec easily leads the other provinces in capital invested in these mills. The amount invested in pulp mills in Quebec is \$51,740,000 as compared with \$17,664,000 in Ontario, and \$19,306,000 in New Brunswick, \$8,999,000 in British Columbia, and \$5,948,000 in Nova Scotia. In pulp and paper mills combined Quebec has over \$112,000,000 invested and Ontario \$81,000,000. In paper mills Quebec leads with \$12,000,000 to Ontario's \$10,000,000. The total investments exceeds \$347,000,000, adding those of 1921 the total will run close to \$360,000,000.

It is interesting to note that the pulp mills paid in taxes, municipal, provincial and federal, \$731,000; the pulp and paper mills \$1,912,000 and the paper mills \$204,000, a total of \$2,847,000. In insurance premiums the pulp mills paid \$561,000, the pulp and paper \$626,000 and the paper mills alone \$94,000, a total of \$1,281,000.

One Hundred Mills.

Provinces—	Pulp Mills.	Pulp & Paper Mills	Paper Mills
British Columbia	4	2	--
Ontario	7	13	17
Quebec	18	12	16
New Brunswick	5	--	--
Nova Scotia	6	--	--
	40	27	33
Total	100		

CAPITAL INVESTED.

Pulp Mills.

British Columbia	\$ 8,999,875
Ontario	17,664,687
Quebec	51,740,520
New Brunswick	19,306,351
Nova Scotia	5,948,012
Total	\$103,659,445

Pulp and Paper.

British Columbia	\$ 27,782,155
Ontario	81,292,372
Quebec	112,398,011
Total	\$221,472,538

Paper Mills.

Ontario	\$ 10,212,532
Quebec	12,208,818
Total	\$ 22,421,350
Grand total	\$347,553,333

The experiments show that, for a tall hedge, the suitable species to use are Siberian Pea Tree, Honey Locust, Josika Lilac and Common Buckthorn. For a tall evergreen hedge, Douglas fir and Norway spruce will probably prove the best, although at Ottawa there is a pleasing white pine hedge that has stood for thirty years. Among many tests that have been made for medium to tall hedges, two of the most favorable growths have proved to be Alder Buckthorn and Wayfaring Tree. The shrubby or Woody Caragana also makes an attractive hedge, but is rather soft. The Tamarack and European Larch have also done well.

For evergreen hedges of medium height, the various forms of American Arbor-vitae serve well, the ordinary one found in Eastern Canada being satisfactory. The Japanese pine is promising, and the Swiss stone pine is good at Ottawa after twenty-six years' growth. Low-growing hardy hedges are furnished by Japanese Barberry, the Dwarf Caragana and the Alpine Currant. The only privet hedge found worthy at Ottawa is the Amur Privet, but it is not hardy for the colder parts of Canada.

AMERICAN ELM

FINEST STREET and SHADE TREE



How to Choose Your Hedge

What is the best hedge for a garden, walk or drive?

For some years, the Central Experimental Farms at Ottawa have been carrying out experiments to test the hardiness and suitability of various kinds of shrubs. At present there are there eighty-four hedges, each fifty feet in length, in which some one hundred and twenty species of

trees and shrubs are under test. The plants have been set eighteen inches apart in the row and, for better comparison, the hedges are being grown, as far as possible, side by side. Pruning is done each year, generally after most of the growth has been made. Plants from one and a half to three feet in height have been found best to start with.

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HOW TO PREPARE GROUND FOR TREE PLANTING.

In prairie tree planting a thorough preparation of the soil is of the utmost importance; as a matter of fact, the success of the plantation depends on it. Our average prairie soil requires deep cultivation to secure a suitable root room and also to furnish a reservoir for water storage, hence it is apparent that the land should be ploughed at the proper season.

Summerfallow may be considered as the best preparation for tree planting. In some seasons it is the only preparation than can be absolutely relied on. There are cases, perhaps not infrequent, where success has followed planting on root ground, back setting, or even stubble, but as the trees will remain where planted for years and years, it will be impossible to remedy any defects due to improper preparation in later years. Old ground, deeply summerfallowed in May, and then conscientiously surface cultivated throughout the summer, will be comparatively free from weeds and contain a maximum of moisture which will insure the success of the planting in the following spring. New land should be broken early, backset as soon as the sod is rotted, and then immediately disced and thoroughly surface cultivated till freeze up. Next season treat as summerfallow. Don't imagine that it is a loss of time to put two seasons' work on new land. The extra labour and time spent will be more than compensated for by the results obtained.

On comparatively light soils, if breaking is done very early and backsetting fin-

ished in late June, a third ploughing seven or eight inches deep may be given towards the end of July or early August. This thoroughly cultivated subsequently, will give a good preparation for tree plant-

ing provided the work has been very thoroughly done.

Stubble land.—Planting on stubble land should be absolutely avoided, failure is an almost invariable result.



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NORTHERN GROWN FOREST TREES.
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Reports

Maps

Old Town, Maine.

J. W. SEWALL
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Munsey Building.
Washington, D.C.

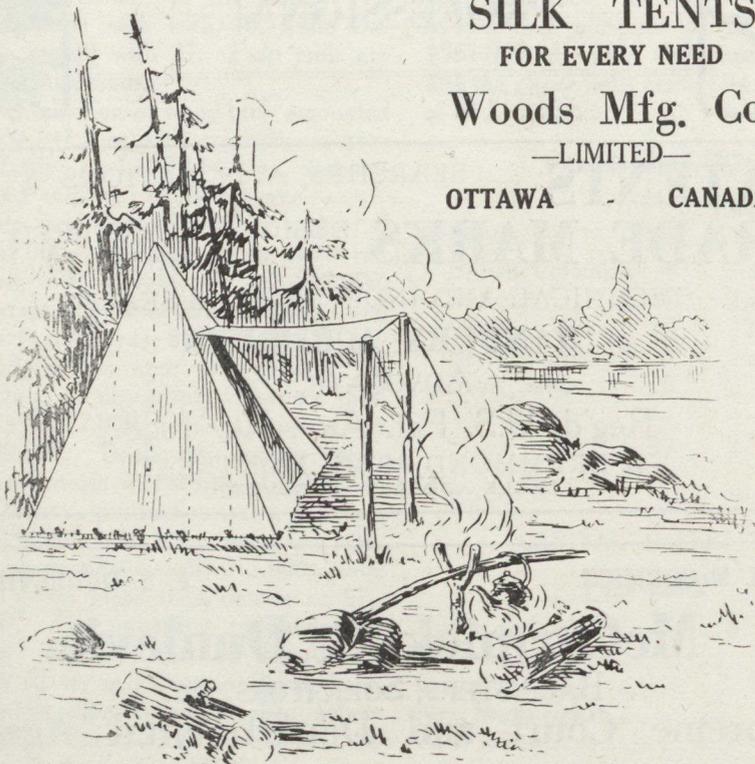
LARGEST CRUISING HOUSE IN AMERICA.

GOLDEN EAGLE KILLS DEER.

It does not seem possible that an eagle could kill a full-grown Virginia deer. However, a letter from Mr. E. Grandjean, forest supervisor of the Boise National Forest, Idaho, says

"The golden eagle is very destructive, attacking especially the young mountain sheep, collecting a heavy toll of our mountain goats, and also destroying a large number of fawns. They kill also full-grown deer. This is an undisputable fact, since we have records of instances

where these birds have been seen killing mature deer. The attack in these instances is very similar each time. The eagle strikes the deer on the back of the head and neck, and thereby, by its first assault, frightens the animal and then continues to strike it until the deer is dead.



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HAD FORESIGHT BEEN OUR VIRTUE

In a letter from Mr. W. F. Godsall, a Life Member of the Canadian Forestry Association at Victoria B. C., formerly at Cowley, Alta., the following most interesting remark is made.

"Professor Macoun used to be one of my guests at the ranch in early days. Oh, how much suffering and loss would have been spared since if attention had been given to his statement to me that the small sage growing among the bunch grass on our prairies indicated that we were in the arid belt. It will only grow in an arid climate, said Professor Macoun.

TREES AND RAINFALL IN TURKESTAN.

(From Lord Ronaldshay's Book "On the Outskirts of Empire in Asia.")

"I was somewhat surprised to learn that since the Russian occupation (of Turkestan) where trees, poplars and Turkestan elms, were largely planted, the rainfall has increased by 250 per cent."

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BOIS FRANC

::

::

LAZARD,

Montreal.

Montreal.

HOW A NATION'S RESOURCES ARE TURNED TO CHARCOAL.

HERE were 14,463 forest fires in the pulpwood regions of the United States during 1920, burning 2,059,408 acres, according to a report compiled by the Woodlands Section of the American Paper and Pulp Association, in co-operation with the United States Forest Service.

The tremendous losses by fire tremendously handicap the paper manufacturers in their efforts to determine a future forest policy for this industry, for the problem of artificially planting new forests would be enormously minimized if the loss by fire in growing forests could be eliminated.

In the New England States alone there were 2,419 fires, of which 1,619 were in Massachusetts, 164 in Maine, 542 in New Hampshire, 54 in Vermont, and 40 in Rhode Island. The area burned over in Maine was the largest of this group, being 39,803 acres. Fires in 1921 did even more damage, and the same is true of New York. Here there were 479 fires in 1920, burning 35,176 acres.

In the group of States including Pennsylvania, Maryland, Ohio, Virginia, West Virginia, North Carolina and New Jersey there were 4,928 fires, of which 1,597 were in Pennsylvania and 1,644 in North Carolina. The total area burned over was 716,863 acres.

In the lake States of Michigan, Wisconsin, Minnesota, there were 776 fires, burning 597,910 acres, and in the great forest States of Washington, Oregon and California, there were 4,861 fires, burning 645,648 acres.

The total damage by these fires throughout the country was \$6,319,641.

Col. W. B. Greeley, Chief Forester of the United States Forest Service, has said that if the forest fire menace could be eliminated, the problem of future forests for the country would be greatly simplified.

MR. BARNJUM MAKES AN OFFER.

In order to encourage reforestation in Nova Scotia, Mr. Frank J. D. Barnjum, of Annapolis Royal, N.S., is offering 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 farmers 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 the Government Forester of Nova Scotia, if one is appointed, otherwise by Mr. Barnjum's forester, to insure satisfactory results.

WHICH CURRENCY?

This may be a dull year in some lines, but dullness makes poor currency.

Reader, you are a member of the Canadian Forestry Association. If your account for membership and subscription has reached you, please

make a point of paying it. Don't take for granted that the Association has plenty of funds without yours, and can afford to wait. The Association has no reserve fund whatever and no endowment. Current receipts are all we have to keep the work moving.

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IROQUOIS FALLS, ONT.

Winter Courses in Prairie Forestry

Archibald Mitchell, special instructor in prairie tree planting of the Canadian Forestry Association, has been added to the list of those giving short courses for the Extension Department of the University of Saskatchewan, and will be on tour for two months. Mr. Mitchell is now preaching the gospel of tree planting on

the southern circuit. The following are some of the places being visited:

Special Circuit—Kelliher, Feb. 2; Punnichy, 3; Elstow, 6; Viscount, 7; Evesham, 10; Macklin, 11; Primate, 13; Luseland, 14 and 15.

Northern Circuit—Landis, Feb. 21; Traynor, 22; Naseby, 23; Plenty, 24 and

25; Kerrobert, 27 and 28 and March 1; Kelfield, March 2, 3 and 4; Loverna, 8 and 9; Dewar Lake, 10 and 11; Zelma, 14 and 15.

Southern Circuit—Dunkirk, March 3; Qu'Appelle, 6 and 7; Moosomin, 8 and 9; Halbrite, 13 and 14; Midvale, 15 and 16; Macoun, 17 and 18; Elbow, 20 and 21; Hawarden, 22; Glenside, 23; Broderick, 24.

THE SASKATOON OF 1931

"In another decade, what will the appearance of Saskatoon be? The Star ventures to predict that anyone leaving the city this year, and returning in 1931, will find difficulty in recognising it as the same place. The little saplings that now bear a few sparse leaves on their tiny branches will be full-fledged shade trees, and the difference it will make in our streets will be wonderful. The gardens, lawns, boulevards, parks, really to be considered in embryo today, will aid in making the city beautiful.

It is not possible to alter the appearance of the city greatly in a single year, but working steadily and consistently, much can be accomplished. The trees set out this year will be doing their bit toward improving the city long after the present generation of Saskatoon citizens has passed to its reward, and those who come after will honor all those who had foresight enough and thoughtfulness enough to put the trees in the ground and cultivate them for the first years after transplanting."

Saskatoon Star.

A NEW MOVIE ON PLANTING.

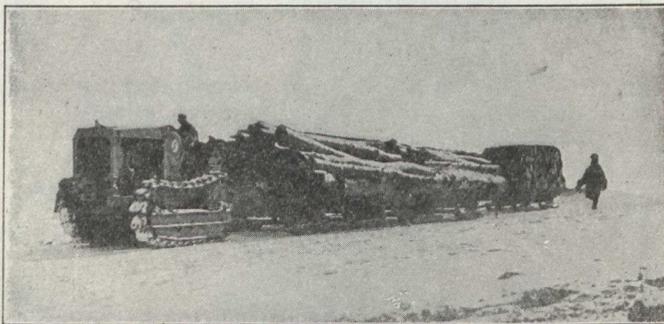
By initiative of the Government of Saskatchewan a new motion picture film describing the entire process of tree planting in Prairie conditions has been produced. Mr. Archibald Mitchell, of the Canadian Forestry Association's staff, assisting in the work.

Unusual care has been taken to make the film both interesting and fully explanatory. It will be seen by hundreds of audiences throughout the West next year, and the Canadian Forestry Association will undertake to give several copies of the film maximum distribution by means of its lecturers.

Q. Is it not a fact that Ontario, Quebec and New Brunswick, have given away most of their timber resources?

A. The "fact" needs modifying. For example of seventy million acres of accessible forests in Ontario, only ten millions are leased to limit holders. These leases are renewable every year and the leaseholder in all provinces with few exceptions is subject to such regulations and increased taxes as the Government may choose to apply.

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The Wood Wealth of Czecho Slovakia

Article Compiled by F. W. H. Jacombe, Dominion Forestry Branch

The wooded districts in Czecho Slovakia comprise 29.5 per cent of the total area of the Republic. It is one of the most heavily forested countries in Europe. Switzerland has only 23.5 per cent.

In the Czech Provinces (Bohemia, Moravia and Silesia) the forests have an area of 2,340,900 hectares (5,782,245 ac.); in Slovakia and "Sub-Carpathian Russia," of about 2,000,000 hectares (4,940,000 ac.). It is in Silesia, Slovakia and sub-Carpathian Russia that the proportion of forest area is highest (34.5 per cent); Bohemia comes next with 29.6 per cent, and Moravia has 28.0 per cent.

The Republic of Czecho Slovakia, whose forest production exceeds its consumption, is thus an exporting country in forest products. Hence it is natural that, in the interest of the State, the government should have some control (conceivably a complete one) of the export trade in wood. The geographical position of the country and its navigable rivers cannot be favorable to exportation unless several of the States adjacent to Czecho Slovakia (e.g. France, Belgium and Italy) suffer from a deficit in forest production.

Shortly after the conclusion of the armistice, the country was overrun by foreign buyers who caused a veritable fever for exportation and brought about an enormous rise in the price of wood.

With regard to the question of the annual production of material in the Czecho Slovak forests a forest engineer, Mr. A. Prokes, has given information in the "Gaette de Prague." The basis of his statistics is the production in 1910, which is accurately known for the three Czech provinces (Bohemia, Moravia and Silesia).

Figures are given separately for (1) wood suitable for construction and (2) for fuelwood.

(1) Construction Wood.—Of wood suitable for construction purposes, Bohemia has 3,563,750 cubic feet (100,913 cubic metres) of hardwood, and 110,952,800 cubic feet (3,141,804 cubic metres) of coniferous wood, a total of 114,516,550 cubic feet (3,242,717 cubic metres). Moravia has 5,051,460 cubic feet (143,040 cubic metres) of hardwood and 44,050,600 cubic feet (1,247,364 cubic metres) of coniferous wood, a total of 49,102,120 cubic feet (1,390,404 cubic metres). Silesia has 1,242,523 cubic feet (35,184 cubic metres) of hardwood and 25,380,043 cubic feet (718,676 cubic metres) of coniferous wood, a total of 26,622,566 cubic feet (753,860 cubic metres). The entire republic has thus a grand total of 9,857,723 cubic feet (279,137 cubic metres) of hardwood construction timber and 180,383,510 cubic feet (5,107,844 cubic metres) of coniferous building timber, a total of 190,241,233

cubic feet (5,386,981 cubic metres) of construction timber of all kinds.

(2) Fuelwood.—For fuelwood the figures are as follows: Bohemia, 8,983,677 cubic feet (254,387 steres,* i.e. cubic metres, of hardwood fuelwood, and 70,063,830 cubic feet (1,983,968 steres) of coniferous wood, a total of 79,047,507 cubic feet (2,238,355 steres) of fuelwood of all kinds; Moravia, 23,378,036 cubic feet (661,986 steres) of hardwood fuelwood and 37,967,192 cubic feet (1,075,101 steres) of coniferous fuelwood, a total of 61,345,228 cubic feet (1,737,087 steres) of fuelwood of both kinds. Silesia, 3,801,307 cubic feet (107,640 steres) of hardwood fuelwood and 7,718,870 cubic feet (218,572 steres) of coniferous fuelwood, making a total of 11,520,177 cubic feet (326,212 steres) of fuelwood.

The grand totals for the three provinces are, thus, 190,241,234 cubic feet (5,386,981 cubic metres) of construction timber, and 151,912,911 cubic feet (4,301,654 steres) of fuelwood.

Allowing one stere as the equivalent of 0.65 cubic metre, the total volume of fuelwood exploited in 1910 amounts to 98,740,740 cubic feet (2,796,000 cubic metres, or, say, 1,097,120 cords). The total amount of the exploitations in the three Czech provinces in 1910 was 288,982,645 cubic feet (8,183,000 cubic

metres) or, on the average, about fifty cubic feet per acre (3.5 cubic metres per hectare). Mr. Prokes allows for the forests of Czecho Slovakia an average production of forty-three cubic feet per acre (three cubic metres per hectare), or about 211,890,000 cubic feet (6,000,000 cubic metres).

Allowing pre-war prices, Mr. Prokes estimates the value of this annual production at 250,000,000 crowns, or at the pre-war value (20.26 cents) of the crown, \$50,650,000. He estimates, on the other hand, that when the forests are better managed this production of material can be increased to 175 cubic feet per acre (five cubic metres per hectare) in the Czech provinces, giving a total of 423,780,000 cubic feet (12,000,000 cubic metres), and 140 cubic feet per acre (four cubic metres per hectare) in the rest of the country, which will thus yield 282,520,000 cubic feet (8,000,000 cubic metres).

This will give a total of 706,300,000 cubic feet (twenty million cubic metres), of which the value may be put at 29 cents per cubic foot (fifty crowns per cubic metre), or a total of \$202,600,000 (1,000,000,000 crowns).

*A stere is a cubic metre in the same sense that a cord is 128 cubic feet. But just as the actual volume of solid wood in the cord will occupy, say, seventy per cent of the stacked contents (128 cubic feet), giving some ninety cubic feet of solid wood, so the actual volume of solid wood in the stere is taken as 0.65 of a cubic metre.



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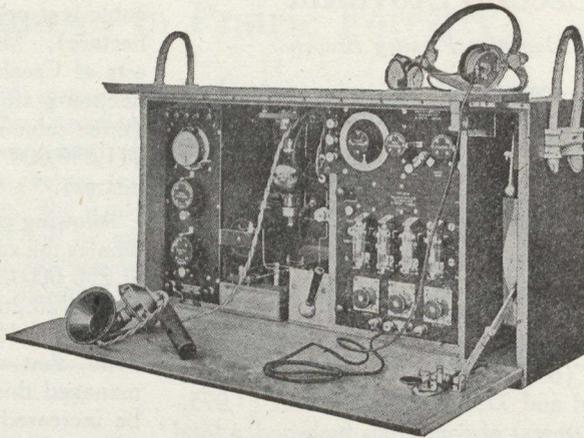
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The Prince and Aviation.

(*"Flight" of England.*)

The Prince of Wales has the happy knack of saying precisely the right thing at the right time. As we know only too well, civil aviation in this country is not developing as we had every right to expect it would after the War, and it requires every assistance of word and deed to guide it along the right road. In these circumstances the thanks of all associated with the movement are due to our versatile young Prince for the heartening and prophetic words spoken by him at the recent dinner given to the Dominion Premiers by the Royal Colonial Institute. After dealing at large with the subjects of Empire importance, the Prince came on to the subject of aviation. "There is no doubt," he said, "that the future of rapid Imperial inter-communication lies in the air, and I trust that the day is not far distant when civil aviation will have built up a great air organization on the same lines as our mercantile marine, and that the delegates at the next Imperial Conference will travel by the Imperial air routes which are now being worked out. "It is a subject that has boundless possibilities, and it is impossible for me here to develop them, but just as the roads of the Roman Empire failed to keep pace with the requirements of the times, so modern communications are insufficient for a Commonwealth of Nations which extends over all parts of the globe. The British Empire has more to gain from efficient air communication than any other State in the world, and I feel that no time will be lost in solving the very important problems which are connected therewith."

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What is Forestry?

What is Forestry? Ask anybody. You probably won't find out, because until recently few have paid serious attention to forestry. This is not to be wondered at. Forestry has been one of those—way worry—problems of the future. But that often-referred-to future is beginning to reach into the pockets of the people and is rapidly losing its futuristic disguises to the man on the street, says the New York State College of Forestry.

Forestry is the raising of repeated forest crops from non-agricultural soils and the proper utilization of these crops. Forestry involves the production of wood and the use of it. The primary purpose of forestry is to make the forest yield supplies to meet the needs of man. The farmer grows corn, the forester grows trees, one is as much a human necessity as the other. One is a crop of months, the other a crop of decades. That's why everybody can give a pretty good definition for agriculture and a pretty poor one for forestry.

Forestry is a science. It is also an art. It involves the problem of water supply where regulation and fresh replenishment is dependent on the forest. It involves the vital problem of recreation. The forester of to-day has undergone a marvelous transition from the old lumberjack

who used to embody the popular conception of a forester.

The forester has become a scientific specialist. He is required to study a complexity of subjects. Some branches of forestry require knowledge of cutting and hauling timber, the sawing and seasoning of lumber, some relate to the adaptability of innumerable kinds of wood to products of manufacture, the chemistry of wood, the production of pulp and paper, the structure of wood; other branches concern the protection of wood and trees from disease, the protection of trees from destructive insects and fire and the investi-

gation of new uses of wood; the science of growing trees, studying soils, topographical and climatical condition, the reproduction of continuous tree crops; the diversity of the ornamental and recreational problems in city forestry; lumber salesmanship also has become part of the curriculum of forestry instruction.

Forestry has been practiced in most foreign countries for more than 100 years but rarely in America. The people, however, are beginning to realize the need because it is being expressed in increased cost of living. Necessity is bringing out forestry and is teaching the cost that follows the neglect of forestry.

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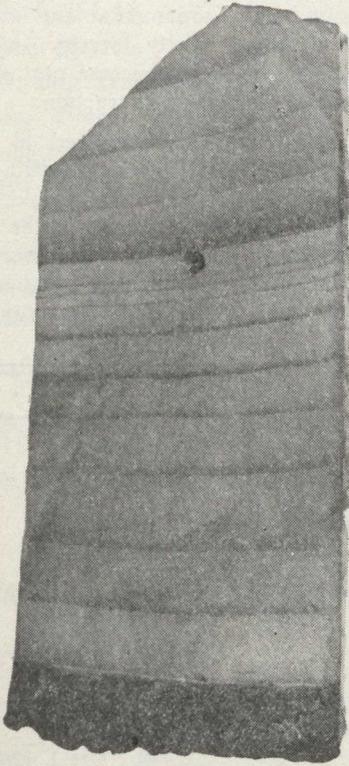
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How Has the Budworm Spread Over Quebec?

(A Communication from the Entomological Branch, Dept. of Agriculture, Ottawa)



Budworm suppression in a living balsam from the Shipshaw River, Quebec. The 1912 ring (compressed, with dot) shows marked retardation, which followed the first year of budworm feeding in 1911.

In connection with our investigation of the recent budworm outbreak in Quebec, we are endeavouring to trace the rate of spread and progression of this epidemic through the Province. In order to make recommendations to prevent or control future outbreaks it is very essential to know if this epidemic originated in sev-

eral places simultaneously or spread from one point.

The time the budworm appeared in any region can be determined from the retardation in the annual rings of the trees. The accompanying photograph and explanation describe this feature. Small blocks of wood taken from living balsam showing the last 12-15 years growth is all that is necessary for this determination. The samples should be taken from healthy trees, preferably in stands containing much balsam. They need not be more than 1 inch wide, 1 inches long and the depth of 12-15 annual rings. At least six trees should be sampled.

For instance we know the outbreak appeared about Grand Lake Victoria in 1910 or 1911, and about the same time north of Lake St. John, south of Lake Abitibi the first appearance was in 1920. It spread down the south shore of the St. Lawrence from near Quebec in 1913 to Matane in 1915. What happened on the north shore and many other points in Quebec we do not know.

We are anxious to get data from any regions in Quebec and will greatly appreciate any assistance in securing these blocks of wood. They should be mailed without postage to the Entomological Branch (Division of Forest Insects), Department of Agriculture, Ottawa. Any accurate observations as to the time the forests started to turn brown from the feeding of the caterpillars and the length of time the outbreak lasted will be helpful; also estimates of the amount of timber killed in any locality.

over a long period at comparatively short distances only from the parent trees. Reproduction sometimes but not always followed single fires. Abundant seedlings were found on some soils, and none on others. Reproduction was found after fires in virgin forests, but second fires and fires in young second-growth stands left a barren waste.

The solution of the problem was found by the staff of the forest experiment station in a fact for the first time recognized in the annals of forestry in this or any other country—a peculiar and striking adaptation of nature which has perpetuated the magnificent fir forests of the Northwest notwithstanding the periodic occurrence of disastrous fires. In the duff of the heavy virgin stands enormous quantities of seed are stored, some of which retains its vitality over a number of years. When fire or cutting makes it possible for the sunlight to reach the ground the stored seed germinates, and seedlings by the thousands and millions begin their aggressive career, to hold the soil for their kind. If fire occurs after germination, the young seedlings are destroyed and nature's reserves are exhausted. It then becomes necessary to depend upon seed trees alone, and these seed up the surrounding areas very slowly and to comparatively short distances. If slash fires are very severe, the duff is largely or altogether consumed, and with it the seed necessary for a young stand. On cut-over areas, if a slash fire is delayed until after the stored seed germinates, the opportunity for prompt natural reproduction is lost.

In the discovery of seed storage lies the possibility of prompt natural replacement of the Douglas fir forests of the Pacific coast. There is still much to be worked out, but the direction which investigations must take has already been indicated, and, if they can be continued, it is only a question of time until the entire problem will be solved. The solution of this problem will determine whether we leave a heavy investment in seed trees, and how we dispose of slash. A new light is being thrown upon the entire question of fire protection. The forester realizes that he can no longer devote his efforts primarily to keeping fire out of virgin stands. Fires in stands too young to have deposited a reserve of seed on the forest floor mean artificial planting at high cost, and in the analysis a monetary loss almost as great as that caused by fire in virgin stands.

Practical Results From Research

By Earle H. Clapp, U. S. Forest Service

Soon after the Forest Service took over the administration of the National Forests in 1905 it became necessary in selling timber to determine silvicultural methods for cutting the Douglas fir stands of the Pacific Northwest. It was then thought that the needed information might be gleaned through general observations on private cut-over lands and old burns; but for a number of years the evidence there secured seemed to lead into a maze of conflicting indications. A forest experiment station was established in 1913 and this problem was one of the first assigned to its staff. It was found through the in-

tensive investigations then instituted that sometimes splendid natural, even-aged stands of seedlings literally clothed the ground over thousands of acres after a fire in virgin timber. In the splendid reproduction following fires the distribution of the seedlings seemed to bear no relation to the location of the seed trees. The densest reproduction might be found, under circumstances which seemed to eliminate wind-carried seed, at distances of a mile from the seed trees, or much higher on mountain slopes, or within high intervening ridges. If seed trees were present a few seedlings might come in each year

Trees in Millions for Our Prairies

Three and a half millions Manitoba maples, 900,000 Russian poplars, 1,500,000 caraganas—it is necessary to talk in big figures to tell of the work the Forestry Field Nursery at Sutherland is carrying on. But it still not enough. Six million trees set out by Saskatchewan farmers next spring will represent a good year's work for the future welfare of Saskatchewan; but even then the work will be only begun. After it had been carried on on as large a scale or larger, for the next ten years, a fair start will have been made. In twenty years the condition may be regarded as approaching the point of satisfaction. In thirty years the appearance of Saskatchewan will be wholly altered, and the change will all be to advantage.

When the first settlers came to Saskatchewan they were greatly pleased by the fact that there were no trees to cut down to clear the land for growing grain—nothing to do but to plow through the prairie sod. But gradually the people are nature of the handicap that the lack of trees means. They are learning that the trees, destroyed long centuries ago, must be replaced if agriculture is to be as profitable as it should. They are learning that every tree on the prairies has a definite value not easily to be measured, but nonetheless real. And because the people are learning these things is exactly why there are six millions or more of trees at Sutherland to be set out in the spring

The wind is one of the enemies the prairie farmer must fight, and the trees are his only weapons. Soil-drifting is one of the difficulties this enemy creates for the farmer. Several remedies are useful, but first and foremost comes the wind-break of trees and shrubbery. But great as is the damage from drifting, it is not the worst. The wind is an insidious thief of moisture. The average precipitation over a large part of the province—the part where trees are scarcest—is barely sufficient to grow big crops. What does fall is all needed, but the lack of trees is enabling the wind to filch it away. No one needs to be told the effect that a hot, steady wind has in this regard. Trees and more trees is the answer. Trees will break up the wind, lessen its force, conserve the moisture, and also attract precipitation.

The advice of the superintendent of the Forestry Farm is to plant trees—seedlings preferred. The seedlings cost almost nothing for transportation and little for labor in planting them. They

will grow faster than older trees transplanted, and a much larger proportion will survive transplanting.

Once there was an idea, almost a tradition, that trees would not grow on the prairie. It doesn't exist now. Not all trees will grow in prairie soil and with the climatic conditions of the level plains, but a dozen different varieties will, and most of them do wonderfully well if given the little care that is necessary.

Not only the farmers should be interested in tree-planting, of course. There are hundreds of little towns in the province, drab, bare and unpleasant in appearance, that could be completely transformed by tree-planting. It has already been done in many cases, so it is not the theory, but fact. And the more trees, the better the appearance is likely to be, and the greater the pleasure of living in the towns.
(From Saskatoon Star)

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Lumber of All Kinds

Trees and Our Money Chest

When John Muir, the famous Naturalist, was strolling one day through a California park, he saw a group of axemen chopping down a mammoth Cedar tree. To learn the age of the monster Mr. Muir counted the rings. It was a painstaking task but when he arrived at the edge he had established the tree's age as four thousand years. In the same grove stood many members of the Sequoia family that had weathered from two to three thousand years of history.

It taxes our imagination to think that in our own day we could gaze upon a living thing that has breathed the same air as David and Goliath. Yet that very fact is a happy illustration how this old world never outgrows its need for trees and forests. We have thousands of Canadian trees that are mere children to-day and will probably witness the unimaginable events of two centuries hence. Similarly, we have many a Western tree that could unfold strange tales of Indian warfare

even when Champlain was planning new defences for Quebec.

In the office of any great Trust Company, you may see tiers of steel boxes. Each contains the story of an estate, placed in the hands of the company for careful management. The heirs of each estate are looking to the company to safeguard and improve each piece of property—whether a farm or a row of houses or the cattle on a ranch, or a mine—with such close attention that the estate will return a profit year after year and if possible, the profit must never grow smaller.

We Canadians, children or grownups, are a good deal like that trust company. We have been given by our forefathers a splendid country, not as spending money but as a sacred trust, a savings account. That is the way the people in France and Switzerland and Sweden look at it. France has forests probably four times as large and many times as rich as they were a

hundred years ago. They do not burn down their forests in Europe as we do, but prefer to keep them green and thriving in order to provide employment and keep everybody prosperous. There are towns in France and Switzerland that pay all their taxes out of the profits of pieces of forest no bigger than those we burn up year by year in nearly every province of Canada.

In 1918 Nova Scotia ranked fifth among the provinces in lumber production with a cut of 166,332,000 bd. ft., valued at \$4,089,039. Spruce is the chief cut. In 1915, 63 per cent of the saw timber figured as spruce, 18 per cent hemlock and 9 per cent white pine.

In 1909 Dr. B. E. Fernow, of the University of Toronto, was engaged by the Provincial Government to make a reconnaissance survey of the forests of the province. Careful estimates in his report entitled "Forest Conditions of Nova Scotia" show that, in spite of the fact that an area of two million acres has at one time or another been so severely burned that it is now semi-barren of commercial trees, there were still, in 1912, 5,774,000 acres of coniferous saw timber on the mainland. This area, with the addition of that to be found on Cape Breton island, should yield ten billion feet of merchantable saw timber for Nova Scotia as a whole, according to the clause of the provincial government.

The reserve of pulpwood figured out at 24 million cords, viz.: 12,000,000 cords in the pulpwood and mine-prop forest of Victoria and Inverness counties, 2,000,000 in the other parts of Cape Breton island, and 10,000,000 cords on the mainland. The pure hardwood area of Nova Scotia amounted to 526,824 acres.

Timber conditions in Nova Scotia are related to the geological formation. The granite area, while seldom affording good farming land and showing a proportion of swamp and of natural or burned over barrens, has good forest soils, the thinner soil of the ridges for fir, that of the steeper slopes for mixed growth, that on the gentler slopes and on the bases for spruce and hemlock. The quartzite areas composed of rock less easily disintegrated than that of the granite they enclose, show more frequent barrens. It is the slate formations that occur in these areas and the better of the glacial deposits in the valleys that provide good farm lands and show a finer forest growth. The timber of the northern slope, which drains into the basin of Minas and the Northumberland strait, though of the same character as the timber of the Atlantic slope, is more luxuriant, owing to the wide spread diversity of limestone, slate, sandstone and conglomerate.

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Canada's Storehouse of Paper-making Woods

It has been estimated that there are 500,000,000 acres of forest land in Canada, about half of which is covered with merchantable timber. On this there should remain, deducting the amount declared, according to estimate at 3,000 board feet per acre, a total of 3,279 billion feet. Owing to destructive fires this has been lessened considerably. Just exactly how much pulpwood is available it is impossible to state. A statement put out under governmental authority in 1915, estimated Canada's supply of pulpwood at 1,033,370,000 cords. A more recent estimate made by the Commission of Conservation gives the total pulpwood resources of Canada at the present time as 901,000,000 cords of coniferous pulpwood species, and adds that there are also large amounts of poplar and jackpine in all the provinces which are, to an extent, used in the manufacture of some papers.

Situation in Eastern Canada.

A study of the pulpwood situation in Eastern Canada by the Commission of Conservation gives a total estimate of actually available spruce and balsam in Quebec, Ontario, New Brunswick and Nova Scotia, roughly speaking, 306,000,000 cords, with a possible addition of 38,000,000 cords in Ontario with the extension of the Temiskaming and Northern Ontario Railway. Accessible and inaccessible, the Commission places the supply of spruce and balsam in the Eastern Provinces at 501,000,000 cords.

The Commission's estimate includes roughly 100,000,000 cords in Ontario, 18 per cent of which are privately held; 155,000,000 cords in Quebec, 14 per cent private; 26,000,000 cords in New Brunswick, 46 per cent private; and 25,000,000 cords in Nova Scotia, practically all private. The annual consumption and pulpwood exports of spruce and balsam from these four provinces is between five and six million cords.

British Columbia is estimated to contain 92,000,000 acres of absolute forest land, of which 33,000,000 acres contain merchantable timber, about half of which has been damaged by fire. There are estimated to be 225,000,000 cords of pulpwood in the Pacific Coast province. Exploitation in this province has only begun, but already British Columbia ranks as third producer in the nation's pulp and paper industry, and very extensive developments in the near future are quite assured.

The total unexploited pulpwood resources of the Prairie Provinces are estimated to account for 85,000,000 cords. Great areas of young forest growth exists on lands previously burned, and these should in time considerably supplement the present pulpwood supplies.



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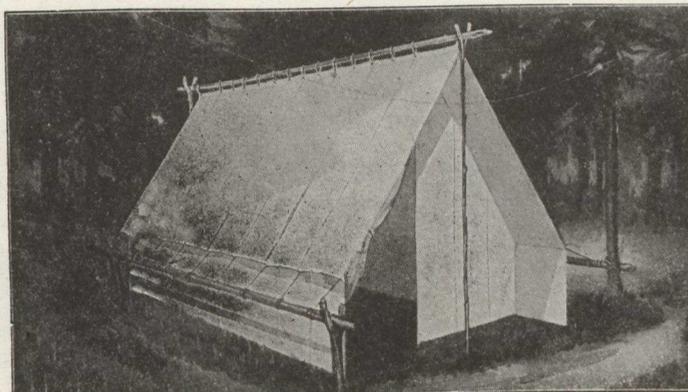
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THE WOODS AND MARKETS OF BRITISH COLUMBIA.

(Continued from page 677)

Sitka Spruce.

We now come to Sitka spruce, the best known of our spruces. It is found throughout the Douglas fir region, but is at its best on the north Vancouver Island and north of the fir belt on the Queen Charlotte Islands, particularly on Graham and Moresby Islands of that group. From Graham and Moresby Islands, British Columbia shipped during the war enough Sitka spruce to construct 20,000 aeroplanes. Your timber research men here found that Sitka spruce met their requirements of lightness with strength, toughness, even grain and freedom from splitting. When active fighting ceased the Imperial Munitions Board

immediately dropped operations and lost all interest in spruce. Many millions of feet of the cream of our spruce lay in the woods and the water, the latter subject to teredo attack. This large stock of splendid material was ultimately sold at salvage prices to be sawn into lumber and chewed up into pulp to make paper. Possibly this was the best plan of disposal at the moment, but it seems a pity that such quantities of valuable aeroplane stock should be devoted to giving racing results to the public. I venture to think that the Germans or the Japanese would have valued it more highly. The Japanese have been, and are, casting longing eyes on our Sitka spruce.

To-day, much Sitka spruce is going into pulp, but it is also being made into boxes of all sizes. Its freedom from taste or smell makes it invaluable for

containing foodstuffs. It is also being used for framing, sheathing and sub-flooring, while it is more than useful as core stock for veneered articles. It is also one of the most resonant of woods, because the fibres are long and regularly arranged, and is now being used in making piano sounding-boards, cabinet gramophone horns, and I find in Britain that it is in high favour with violin makers. Like most British Columbia woods, it is obtained in large sizes, much of it clear.

Western Hemlock.

Western hemlock is not so well known over here as it is in Canada. It constitutes 18.3 per cent. of our commercial timber, and, like the others, grows to large sizes. Even in Canada, its good qualities and value are not so well known as they will be. To-day, much of our hemlock goes into pulp, for which it is admirably suited, but for ordinary building purposes it is equally as useful as Douglas fir. It has 88 per cent. of the strength of its bigger brother, and is therefore not suitable for the heaviest type of construction, but it makes excellent siding, flooring, ceiling, scantling, inside joists, &c. For sash and door fixtures, turned stock, panelling, etc., it has exceptional merit.

Western hemlock is usually light in colour, and contains no pitch or resin. It dresses to a smooth, satin-like surface, capable of taking a very high polish, and is not easily scratched. I notice that you are fond of enamelled woodwork in this country. Western hemlock takes enamel finish to perfection. Sawn slash-grain, it shows a very handsome figuring. Edge-grain hemlock flooring has proved invaluable. It hardens with age, and we have an instance on the Pacific Coast where it has been down for 50 years and is now so hard that it is difficult to drive a tack in.

Hemlock weighs dry only 2,240 lb. per 1,000 ft., as against 2,749 lb. for Douglas fir; an important factor where we have such long railway hauls. Railway companies are using it for car flooring, siding, &c., and find it highly satisfactory.

The Japanese, who use large quantities of our fir and cedar, have become aware of its good qualities, and are now asking for it. Toronto Harbour Commissioners have put seven million feet of our hemlock into Toronto Harbour work in the past few years, and the Dominion Government are using it in construction of part of their big dry docks at Esquimalt, near Victoria, British Columbia. It is also very popular as a box and packing case material. One firm on the Coast is shipping 50,000 hemlock oil cases to Singapore every month. Incidentally, the hemlock bark is very rich in tannic acid, but this industry has not been developed on the Coast.

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Red Cedar.

Western red cedar, another of our giants, is not much used in this country, but is a very important wood. In some ways it is more important than any of the others. It is the overcoat for our houses, in the form of roof and siding shingles, and, while I may be prejudiced, I believe they are much more artistic as a house covering than slates or tiles, while they keep out the heat in summer and the cold in winter. Rain or snow on a shingle roof is like water on a duck's back. These shingles, of which you will see something in the "movies" later, can be rendered fireproof by various means. Red cedar may, with the Southern cypress, be described as the "wood eternal." Trees which fell in the damp woods of British Columbia centuries ago are found to-day perfectly sound and fit for singles and lumber. It was from the red cedar that the Indian hollowed out his war canoes, split planks for his lodges, and carved his historic totem poles, and his the term "family tree."

The wood is exceptionally light, soft, and of close, stright grain, making it easy to handle and work. It is remarkably free from warping, shrinking or swelling. The narrow sapwood is white, and the heatwood runs from a light yellow to brownish-red. It is invaluable for all outdoor work, as all weathers are alike to red cedar. It is our great fence and pole materials, requiring no treatment or preservative. The butt will stay sound for years and years under any conditions. For siding, lattices, pergolas, arbors, sum-houses, greenhouses, etc., it is unequalled.

It is also very effective in interior work, though its softness renders it liable to denting in low panelling. For beam ceiling work it is exceedingly handsome. Finished naturally, it acquires with age a silvery, silky sheen which is very beautiful. It was used for ceiling in the music room of the two-million-dollar Hart House of Toronto University with splendid effect.

We have another cedar—the yellow cedar or cypress—which is not, at the moment, of commercial interest. It is found only scattered stands, above the 2,000ft. level on the lower coast, but at tide water farther north. It is similar in outward appearance to the red cedar; the wood is sulphur-yellow in colour and is the heaviest and most durable coniferous wood in the Province. It is easily worked, and takes a beautiful satin-finish, which renders it especially useful for finish and cabinet work. It is practically unaffected by changes in moisture, and is very valuable for boat-building, greenhouse, battery separators, &c., and is said to be immune against teredo. The latter statement I cannot vouch for. There is a considerable quantity of it on the Queen Charlotte Islands, but it is hard

to get. Clear yellow cedar commands a very high price.

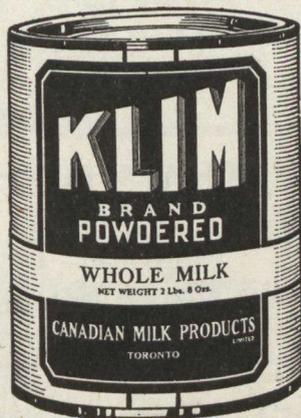
Another interesting wood is our black cottonwood. It is found in river bottoms on Vancouver Island, along the Fraser River Valley to Prince George, and in the Skeena and Naas River districts north and east of Prince Rupert, the terminal of the Grand Trunk Pacific Railway. It is the only deciduous tree in British Columbia which is of commercial value.

The wood is greyish-white, soft, odourless, tasteless, straight and even grained, very light, long fibred, and easily nailed, glued, and veneered. It is an ideal box material, and its great strenght, compared with its light weight, renders it especially valuable in making laminated wood product. It is now in demand for carriage and automobile bodies, and in the near future will be much more highly valued than at present.

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These, with the exception of the small firs, which we do not consider as individually of great importance, comprise our chief woods adjacent to tide water.

Our interior woods, though of great value to British Columbia, are too far from the ocean to be brought over here successfully. The most important of these are the Western soft pine, Western larch. They are the important woods of southern interior of the Province.

Western Soft Pine.

Western soft, or white pine, as it is sometimes called, is a tree of slow, even growth, producing wood of fine grain and quality. It is soft, light, strong in proportion to its weight, works very easily and smoothly without splintering or splitting, and readily takes and holds paints, stains, and varnishes. It seasons unusually well, benign free from warping or checking, and once seasoned, holds its shape without shrinking or swelling. It is of a soft, satiny texture, and is so similar to the famous Eastern white pine in appearance that it is difficult to tell them apart. The tree grows to large size, and its lumber can be obtained in wide, clear stock. It is very popular in Eastern Canada, on the prairies, and in the United States, where it is largely used in buildings of every kind for joists, rafters, sheathing, studding, shiplap, &c. In interior finish it gives splendid service. It comes from the planers without knife marks or fuzz and with a smooth surface which can be given a high finish with less labour than most woods.

Western larch is the largest and most massive of North American larches, growing to a height of 100 ft. to 180 ft., with a diameter of 3ft to 4ft.

THIS IS CANADA'S CASE TOO

The most immediate thing is the protection of the forests from fire. There are some 245,000,000 acres of forest lands in the United States which contain cull or second-growth timber, or which are more or less completely stocked with young trees. This is nearly double the acreage of our remaining virgin forest.

These 245,000,000 acres of second growth and young timber may well represent a forest asset of the United States of greater value than our remaining virgin forests.

Upon their protection rests very largely our ability to bridge over the gap when virgin timber ceases to be an important factor in the yearly cut of forest products. Their protection from fire, in my judgment, the most important single forestry problem before the United States today.

Q. Can trees be successfully grown on the bare prairies? What made the prairies treeless?

A. Certain species of trees as Russian Poplar and Manitoba Maple can be easily and rapidly grown on nearly all portions of the prairies. It is generally believed that fires are in the main responsible for the denuding of the southern prairies. With the coming of settlement and the subduing of prairie fires, so common in the Indian days, tree growth has rapidly encroached on what was formerly bare prairie. Several U. S. States, once a dreary windswept plain, has been "made

over," commercially and aesthetically by the planting of shelter belts.

Q. Are many of the lumber or paper companies planting trees to replace the timber they cut?

A. Only a very few, because one year's forest fires destroy more grown-up timber than any conceivable amount of planting could replace. In one timber fire last year, enough wood was destroyed to have required for its replacement 14 million little trees at an expense of \$200,000 and a wait of sixty years. The great problem for Canada is not tree planting but forest fire prevention.

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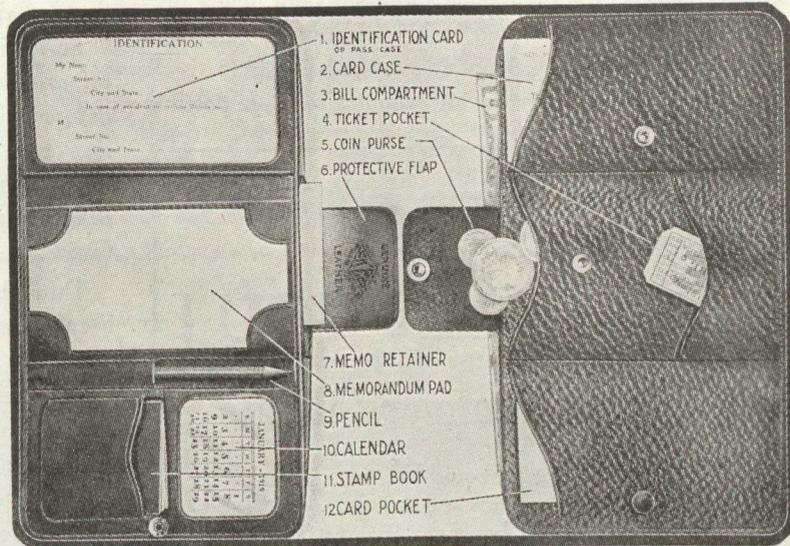
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valueless, and the damage on the lower watersheds from excessive floods finally forced national action. The forests of the French Alps are now both highly productive and highly effective in regulating stream flow and preventing erosion.

Forest investigations also made possible

the fixation of sand dunes along the French coast. After deforestation these dunes gradually moved inland, sometimes 10 miles or more, burying in their progress agricultural lands, orchards, houses, and even villages. The movement of the sand has been stopped and the dunes now produce a valuable forest crop.

Forest investigations made possible the reforestation of the Austrian Karst. Fire, deforestation, excessive grazing, and erosion had converted this originally productive region into a rocky desert. It now supports a luxuriant and valuable pine forest.

Through forest investigations the French Landes in a little more than half a century has been changed from one of the poorest to one of the most prosperous sections of France. Formerly swampy and malarial, it is now a health resort. It is the center of the world's second largest naval-stores industry. It supplies a large part of the mining timber needed by the Welsh coal industry. A prosperous agriculture has been made possible on the scattered farm lands from the largely increased returns through forests on the poorer soils.

It is only through forest investigations and the work of forest experiment stations that the pre-war timber production in Saxony of 60 cubic feet per acre was possible, a production which netted \$5.10 per acre to the State. Although practically every one of its forest regions is much more favorably situated than the forests of Saxony, the United States is producing less than 15 cubic feet per acre. The results of the European stations can be duplicated in the United States.



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