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# CANADIAN FORESTRY MAGAZINE



AN ENTICING PICTURE OF LAKE LOUISE, ALBERTA.









THE  
ILLUSTRATED  
**CANADIAN  
FORESTRY  
MAGAZINE**



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No. 6

## Tree Planting as a Replenisher of Our Timber Supply

A Planted Area of 250 Square Miles Would Yield 100,000  
Cords of Pulpwood Each Year in Perpetuity.

By *Ellwood Wilson,*

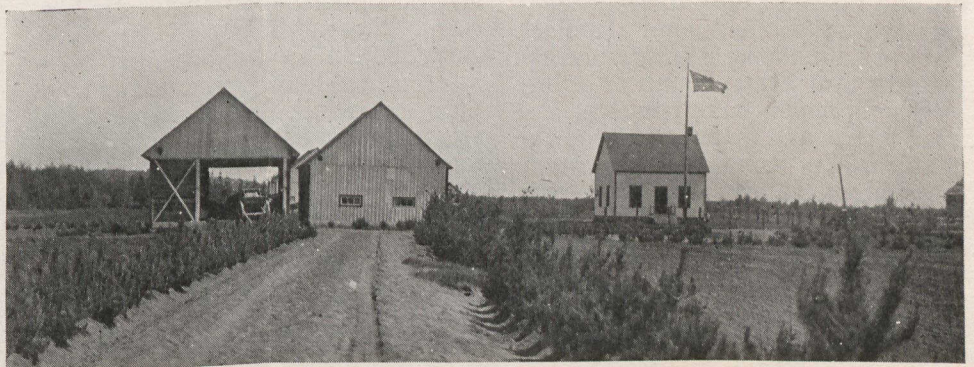
Chief Forester, The Laurentide Company, Grand Mere, P. Q.



The Editor has asked me to discuss the relative merits of artificial vs. natural replacement of our forests, or, in other words, whether it is better to let our forests alone after we have cut them, trusting to nature to reproduce them, or whether it is better to make plantations and to fill out those places in the forest where nature has not finished the job. It would be just as unreasonable to ask me to discuss, in general, the relative merits of dry farming and ordinary farming in a region blessed with normal rainfall. No farmer in such a region would dream of dry farming, and no farmer in an arid region would attempt to farm in the ordinary way. He would be a fool if he did. A forester who should attempt to plant trees on an area which nature had already stocked with 1,500 good trees to the acre would be equally foolish if he left nature to seed in a tract of bare land with no seed trees within miles of it. The two methods are complementary and must be employed together. Each has its proper place and part in a general forestry policy, and which shall be adopted depends entirely on the location and the end desired.

### How Nature Works.

Let us see now what the conditions are when nature has had a free hand, taking as our example a section of the St. Maurice Valley of Quebec where we have accurate information. The description will be much condensed, as it would take too much space to go into much detail. We find, in general, a rough country, broken by ridges, with many



Growing trees and good citizens. The Laurentide Company maintains a public school on its Tree Nursery at Proulx, Quebec, where free education is provided to the children not only of the nursery employees, but of farmers in the surrounding district.



A new seed bed at the Laurentide Company's nursery station. The men are engaged in planting white spruce seed gathered in the St. Maurice Valley.

lakes, some swamps, and a poor soil underlaid with granite. In the very coarse grass, where the swamps are not so wet we have stunted black spruce, often well over 100 years old





Girls are here engaged "threading" seedling trees into the planting boards, which are then carried to the trenches in the open field.

and only five or six inches on the stump. In the valleys we have stands of red and white spruce and fir, and on the ridges, birch, yellow and white, maple, some hemlock and spruce and fir. Where fire has passed over the country, white birch and aspen have come in, and later spruce and fir have entered the mixture. In some sections where the soil is sandy we have pure stands of Jack Pine which have seeded in after a fire. Other sections have small stands of red pine and through all the forest we find individual white pine, the remnant of earlier stands.

### Concentrating the Wood Crop.

As today, owing to lack of transportation and sufficient demand, there is very little use for the so-called hardwoods, that is trees which lose their leaves in the winter, we shall leave out of this discussion everything but the softwoods, and of these confine ourselves to the spruce and fir. Under natural conditions the average number of such trees, four inches and over at breast height, is 160 per acre. A fully stocked stand of mature trees, 12 inches in diameter at breast height might possibly run to 400 trees per acre. The average stand of softwood in the St. Maurice Valley, 4 inches and up at breast height, is 11 cords per acre. Our fully stocked stand would give 75 cords per acre. The best natural stand of which I have any record in this section gave 40 cords per acre four inches and up, and was pure black spruce. Now there is a good deal of difference between 40 cords per acre and 75, and our planted stand would be almost 100 per cent better than we

get under the very best natural conditions.

The great need in Canada is for accurate information about our forests. The public would be much surprised if they could see how little information lumber companies and pulp companies have about their timber lands, how few of them even have maps which are in any way complete or accurate. Information as to areas burned over and species and stands per acre is almost wholly lacking. This is realized and many of the larger pulp and paper companies have engaged foresters and are getting this information as rapidly as possible. The Commission of Conservation has done splendid work along these lines and the Dominion Forestry Branch has made a good beginning. So many men who at-



The militant woman once more! Girls become very adept in plantation work. Here we see a healthy, happy group taking up spruce trees to be transplanted to permanent sites.

tempt to discuss these subjects have very little acquaintance with the woods, except as they see them from a canoe or logging road. They are likely, in travelling through the woods and seeing here and there good samples of natural reproduction, jump to the conclusion that nature can take care of the future, if we keep the fire out, not realizing perhaps how much time has been wasted by nature in getting reproduction started, or how scattered such reproduction is.

In handling a forest property, it is absolutely necessary to look to the future and to plan operations for at least three generations ahead and it is necessary to decide what end you wish to arrive at. The right policy is one of perpetual wood production, the management of the



Here the planting-board has been opened. Note the little trees properly spaced and firmly set in the trench. The board is now withdrawn and earth firmly tamped about the roots.



forest for a sustained yield, and whichever method of regeneration, whether natural or artificial, that fulfills this end is meeting the requirements. Timberland owners must take stock of their areas, determine where planting is required, and so locate their plantations as to give a maximum yield with a minimum cost, which conditions will be most fully met by proximity to the mills and using species of rapid growth. Let us take a concrete case. Let us imagine a pulp company with a plant which has cost some ten to fifteen million dollars and which has built up around it a community of five to ten thousand souls. Let us take it for granted that the directors wish to continue to manufacture pulp for the next hundred years. They might of course decide to scrap their mill at the end of twenty-five years and let the community fall to pieces and return

must help nature. Many mills have already adopted the first plan and have bought lands, often several hundred miles away from their plants, which they propose to hold for the future. The transportation charges on wood from these lands will be very heavy and they are not of the very best quality, being further to the northeast where the conditions for growing timber are not so favourable. On such lands held for the future, interest on the investment must be charged, fire protection is difficult and expensive, logging costs and transportation will be very high and the ultimate yield will bring only six to seven cords per acre cutting to Government demand limits.

#### Changed Ways—Changed Ideas.

Logging as carried on in Canada in the past has taken no thought for the future, and the results are beginning to show in the increasing

time. Logs had to be got out cheaply in order to earn dividends. Now we know the situation and that our supplies will not last for ever and we must devise ways and means to keep our industries going.

#### Make Each Acre Carry Timber

The statement has been made that all we need to do is to keep the fire out and let nature alone. This is manifestly wrong and I do not think that any forester who knows the conditions will subscribe to it. Something more must be done. In casting around for better methods we have gone to Europe where they have passed through the same crisis and have found a remedy. They have been forced to log entirely differently. Instead of taking out the best tress they gradually remove the poorest trees, trying always to favor the young growth and increase the STAND PER ACRE. They want timber and they want as much as they can force each acre to raise. This means that their logging costs when they first begin to manage a natural forest are proportionately high, but that, as the stand per acre increases, the logging costs decrease. We must change our logging methods so as to attain the same end, but we also must go through a period of greatly increased costs in order to improve the condition of our forests. Those of us who have studied European conditions on the ground know that we cannot adopt their methods here without modification. Foresters are agreed as to what must be done to improve logging conditions, but very few concerns are yet willing to spend the money or to reduce the cut per acre to accomplish these necessary ends.

#### The Case of Sweden.

Now let us glance for a moment at the attitude of European and Indian foresters who have sometimes centuries of experience to go on, toward natural reproduction unaided. At the Imperial Forestry Conference last summer only one forester would consider such a thing feasible and he was in charge of pine forests which reproduced very rapidly. All were in favor of aiding nature by planting. What is the practise in Sweden where conditions are admitted to be similar to our own? They have found that they cannot depend on nature alone and always fill out by planting the spaces left vacant by natural reproduction. They have a condition there which is very different from ours. The coniferous forests contain little hardwood while those of Eastern Canada abound with hardwoods, and cutting the softwoods encourages the hard-



A plantation of Scotch Pine set out in 1915. Laurentide Company's nurseries, Grand Mere, P.Q.

to the wilderness, as has been done in many a community built up around a large saw-mill in the United States, but have they a moral right to let the community dependent on their enterprise go to pieces? Are they not obliged to try and keep the community alive? In order to keep the mill going they must have wood. Let us further say, for the sake of argument, that our mill has timber enough standing to keep them going for twenty-five years—what shall they do after that is gone? In the first place, will the lands which they will cut over in that time restock themselves naturally? The investigations carried on by the Commission of Conservation on such lands, show that it will take fifty to sixty years to get a crop of merchantable timber and that it will average about one and a half cords per acre. Not enough to make logging possible. There are then two other possibilities, either they must buy virgin lands or they

inaccessibility of the timber and the large increase in logging and transportation costs. The practice was to go into the territory as near the mill as possible, to take the timber along the shores of the lakes and rivers, and to get the trees which only needed to be hauled short distances. In other words, removing the accessible timber, with no thought of a second cut.

High stumps were left, also tops—a large part of which could have been utilized. Logs which were good for pulp were used to make camps and roads. Trees a little difficult to reach were left. Much young growth was destroyed. Much logging debris was left and too often areas logged one season were burnt the next. This was not done deliberately, and no great blame can attach to the men who did the work. They and the directors of such companies were laboring under the same delusion as the general public, that we had timber for all



woods which gradually take up all the ground. In Sweden planting is just as much a part of their woods operations as is logging, they consider the two as part of their management of the forests.

There are thousands of acres in Canada which are unfit for agriculture and nearly always such areas can be found in reasonable proximity to our mills. Why not plant up such areas with valuable timber trees, aiding nature wherever she has made a start? Fire protection and management being over smaller areas would be cheaper and more intensive. Long drives, often taking two years, would be avoided, transport of men and provisions long distances would be done away with, local populations of men trained in woods work would be built up, as in Europe, logging costs would be much reduced as with the larger stands per acre, the use of logging machinery would be possible, and owing to the nearness

and accessibility of the forest such large reserves of logs would not have to be carried with the large outlay for insurance and fire protection and interest on money tied up.

#### Will Planted Forests Pay?

A planted area of 250 square miles on a rotation of 50 years, that is five square miles cut clean and replanted each year, would yield 100,000 cords per annum in perpetuity, while it would take 1,302 square miles of natural forest to yield the same amount on the same rotation if the amount removed at the first cutting could be removed at the end of fifty years from the same area and this does not, in the light of our present knowledge seem possible. If the cost of carrying virgin timber lands to supply a cut at the end of forty years is figured it will be found that the cost per cord

at the end of that time will be more than with planted trees and that the virgin stand will be steadily deteriorating through over maturity and insect damage while the planted stands will increase steadily in value year by year as they grow.

The great bulk of the timber in Canada belongs to the people at large and the cutting rights are leased to individuals and corporations. When this timber is cut should not the Governments make proper regulations for cutting and replanting so as to perpetuate and increase our timber supply? Canada's future economic welfare depends on the perpetuation of her forest resources. This can best be effected by proper utilization and by hastening nature's slow and wasteful methods of forest renewal by artificial regenera-

## THE IMPORTANCE TO THE PULP AND PAPER INDUSTRY OF CONSERVATIVE FOREST MANAGEMENT

By Percy B. Wilson; President, Canadian Pulp & Paper Association. Vice President, Spanish River Pulp & Paper Mills Ltd.

The forest is the foundation upon which the pulp and paper industry is built. Without available raw material, the established plants, so important to the welfare of the Dominion, must cease to function. It is essential that the mills already existing shall be supplied with wood, sufficient to meet their annual requirements. It is inconceivable that responsible executives should exploit a National inheritance of this matter without taking thought for the future prosperity of the country, or the industry.

When the pulp and paper industries of the country were established, it was felt the supply of raw materials was inexhaustible. Development of the natural resources, employment of labor, liquidation of the National assets of wood and water-power were the important factors to be considered. The capacity of the mills established was predicated upon the power that might be developed, and the capital available for investment, rather than upon the volume of wood that a definite area would yield annually forever.

The demand for Canadian pulp and paper products increased when the supply of available pulpwood in the United States began to show signs of depletion and the expansion

of the Canadian Pulp and Paper industry followed. The larger mills demanded more extensive woods operations; with expanding woods operations, the cost of pulpwood constantly increased. Attention was then centered upon wood supply. It was realized that the quantity of **available wood**, rather than the total amount of wood in the Dominion, was the index of continuity of supply.

The quantity of wood available for any established plant is limited to the wood on the area from which the mill may draw its supply within certain limits of cost. Without devising means for the perpetuation of this supply, it is evident that the quantity will be exhausted in a given period, depending upon the extent of the area cut over annually.

Since the pulp and paper industry represents an enormous investment in mills and the necessary accommodation for labour, the latter involving in many cases the building up of new towns in the wilderness which, once established, cannot be moved, it is essential that the forests which supply the mills shall be perpetuated. This can be accomplished by no means except conservative forest management. Conservative forest management includes protection of

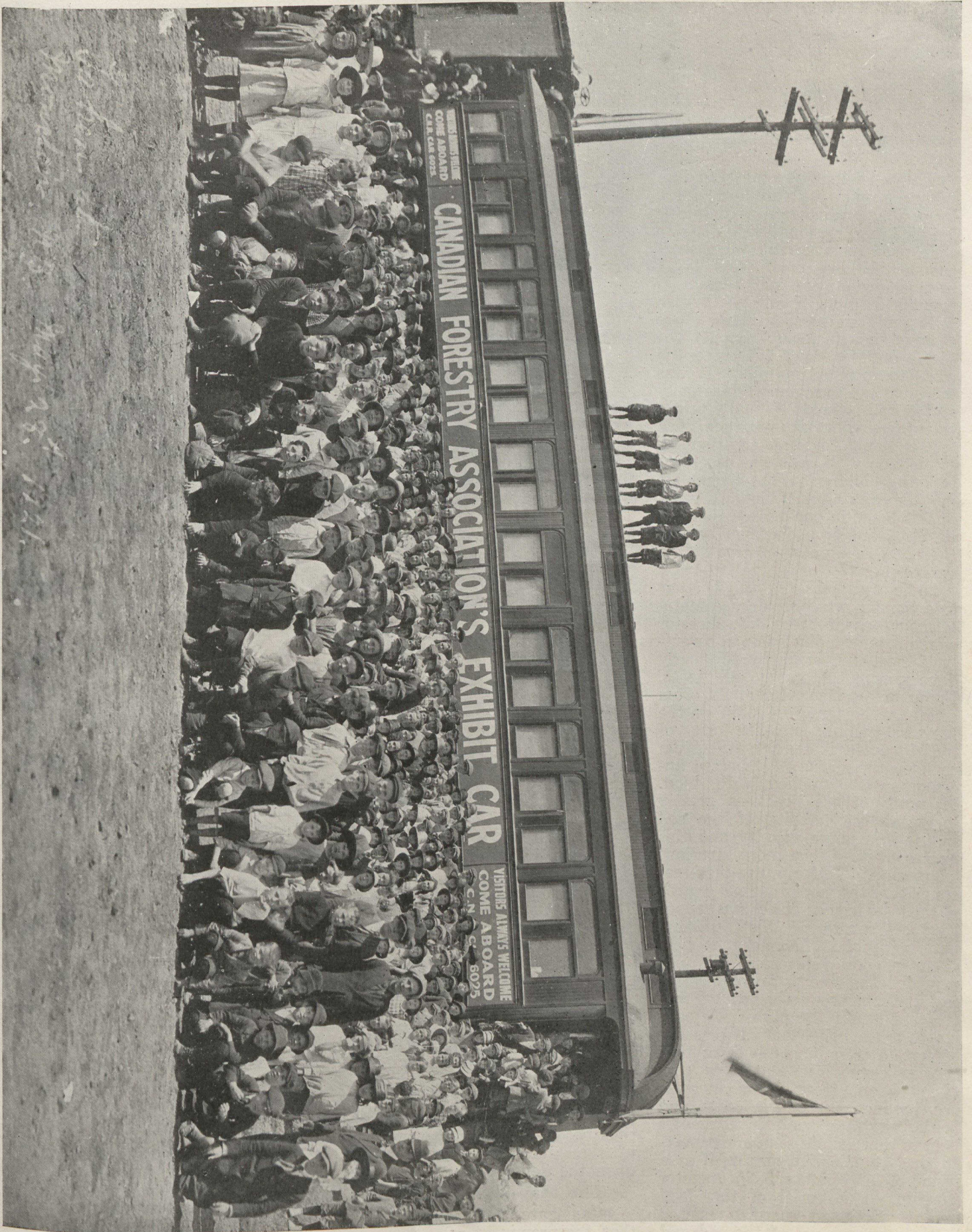
the forest against fire, utilization of all wood in the stand that it is economically possible to use, and the introduction of systems of cutting that will insure regeneration of the stand.

As present investment is necessary to insure future income, the pulp and paper industry must invest in conservative forest management at once, if it is to continue in prosperity. The strength of a plant must eventually be measured—not by the quantity of power developed, nor by the number and size of its producing machines, but by the proper relationship of the annual requirements of wood, and the annual yield of the forest, that it controls.

Forest exploitation promises closed plants, impoverished communities and the destruction of an important National asset.

Forest perpetuation through conservative forest management insures the continuity of the mills resulting in prosperous communities and permanent enjoyment of a rich inheritance by the Nation.





Aug 28, 1921



## THE WORSHIP OF TREES

(Article No. 2)

By Dr. C. D. Howe, Dean, Faculty of Forestry, University of Toronto.

The belief that tree spirits had an influence upon cultivated crops was by analogy transferred to domestic animals, and various kinds of trees were used to insure the increase of the herds. Relicts of this belief in a changed form still remain in country districts in both the British Isles and on the Continent where a green bough placed against the stable on May Day will cause the cows to increase in milk. It was believed by our remote ancestors and is still believed by many primitive races that the presence of a tree or bough, or some ceremony in connection with trees was necessary to bring children to the home. It may be, we reflect, a modified relict of this belief in our desire to have a rubber plant or a dwarf fir tree in the home or a boxwood tree on the verandah.

Some antiquarians believe that tree worship was only an accidental offshoot, as it were, of ancestor worship, a form of worship apparently almost universal in the early development of nearly all races. Frequent sacrifices of animals, often of human beings, were made on the barrows, cumuli, or other forms of burial places. It was also the custom to keep the spirits of departed ancestors well supplied with food. Naturally, those practices greatly increased the fertility of the soil in the immediate vicinity and this expressed itself in a more luxuriant vegetation. The primitive man reasoned that the more vigorous growth of the trees in such places was caused by the spirits of his ancestors entering them. Therefore he held them in great veneration, and also regarded the tree as an emblem of fertility and productiveness. From this conception he passed by easy stages to the belief that the presence of certain trees in his fields or that certain ceremonies and rites centering about trees would increase the productivity of his crops and herds. In fact, some investigators believe that primitive man discovered the art of agriculture itself as a result of his ceremonies in ancestor worship. The burial of the dead and the victims of sacrifice resulted in the turning over of the sod and the stirring up of the soil. The native grains and fruits which he

### THE MORNING COMETH.

Henry Van Dyke.

Many a tree is found in the wood  
And every tree for its use is good;  
Some for the strength of the gnarled  
root,  
Some for the sweetness of flower or  
fruit;  
Some for the shelter against the storm,  
And some to keep the hearth-stone  
warm;  
Some for the roof and some for the  
beam,  
And some for a boat to breast the  
stream;—  
In the wealth of wood since the world  
began  
The trees have offered their gifts to  
man.  
But the glory of trees is more than their  
gifts;  
'Tis a beautiful wonder of life that  
lifts,  
From a wrinkled seed in an earth-bound  
clod,  
A column, an arch, in the temple of  
God,  
A pillar of power, a dome of delight,  
A shrine of song, and a joy of sight!  
Their roots are the nurses of rivers in  
birth;  
Their leaves are alive with the breath  
of the earth;  
They shelter the dwellings of man, and  
they bend  
O'er his grave with the look of a loving  
friend.  
I have camped in the whispering forest  
of pines,  
I have slept in the shadow of olives and  
vines;  
In the knee of an oak, at the foot of a  
palm  
I have found good rest and slumber's  
balm,  
And now, when the morning gilds the  
boughs  
Of the vaulted elm at the door of my  
house,  
I open the window and make salute;  
"God bless thy branches and feed thy  
root!  
Thou hast lived before, live after me,  
Thou ancient, friendly, faithful tree."

placed upon the burial ground as food for the spirits, germinated on the spot, grew vigorously and yielded an improved and more abundant harvest. Observing this, it occurred to some practical minded worshipper, keener than his fellows, to stir up the soil and plant seeds in other places than the burial mound, and thus began the cultivation of crops with all its far-reaching influence upon the development of the race.

### The May-Pole Tradition.

At any rate, it seems quite certain that the prominent role of trees in the popular festivals of the European peasantry is an outcome of the

belief in the blessings which the tree spirits had in their power to bestow. We have an illustration of this in the May Day festival or the mid-summer festival. Originally in these, and it still holds in many parts, it was the custom to go into the woods, cut down a tree and bring it into the village amid general rejoicings. Later, these May-trees became simply May-poles. We have a quaint description of a May-pole celebration in the time of the good Queen Bess, from a Puritan writer who regarded such ceremonies as idolatrous. He says: "They have twentie or fourtie yoke of oxen, everyone having a sweet nosegaie of flowers tyed on the tippe of his hornes, and these oxen draw home this Mai-pole (this tinckyng idoll rather), which is covered all over with flowers and hearbes, bounde rounde aboute with strynges from the top to the bottome, and sometime painted with variable colours, with two or three hundred men, women and children following it with great devotion. And being reared up with handkerchiefs and flagges streamyng on the toppe, they strawe the grounde about, binde greene boughes aboute it, set up sommer hauls, bowers and arbours hard bye it. Then fall they to banquet and feast, to leap and daunce about it as the heathen people did at the dedication of their idolles whereof this is a perfect patterne, or rather the Thyngge itself."

As we have seen, the object of this ceremony was to bring in from the forest the renewing and fructifying spirit of vegetation newly awakened in the spring, so the pole was renewed each year. In course of time, however, the original meaning and significance of the custom was forgotten and the May-pole was regarded simply as a center for holiday merry-making. The people saw no necessity of felling a fresh tree every year, so they let the pole stand, only decking it with green boughs and fresh flowers on May Day. Later, the pole was taken down at the end of the ceremony and stored away until the next May Day, and finally the pole was not used at all, and is used today in the May festivals only in the more





A photograph showing one section of the Forest Exhibits Car of the Canadian Forestry Association, now travelling through New Brunswick and Nova Scotia with very large audiences at the daily exhibitions and the evening lectures. The Car is designed to impress in popular manner the value of the forest resources, and their relation to employment and provision of raw materials for all other of Canada's business activities. This enterprise has been called "a forest protection school on wheels." As many as three thousand people have visited it in one day, and the average attendance is from three to five hundred, according to the size of the community.

remote country districts. May-poles were forbidden by the Parliament of 1644, but came once more into favor at the Restoration, then to be set up in London in 1661, on or about the site of the present St. Mary's-in-the-Strand. It is thought by some that our word "maple" is a contraction of the word May-pole. Although

### An Oak's Water-Raising Power

The average oak tree in its five active months evaporates about 28,000 gallons of water, an average of 187 gallons a day.

The world's forests are being so depleted that from Brazil comes the statement that reforestation of the eucalyptus tree is proposed. Five years suffice for the growth of the tree to a commercial size, and the expense is calculated at 3s. sterling per cubic metre of wood.

The cultivation of camphor is an important industry in Hiogo, Japan. Some of the larger and older trees have a diameter of 15 feet, and a reputed age of 300 years. About 50,000,000 lb. of camphor is sent out of Japan every year. One-fourth of this goes to the United States.

the tree may have been used as a May-pole on the continent, it probably was not used in England, for the only native maple there is a shrub. It is thought the birch was most commonly used in England for this purpose.

### The Tree, A Spirit Home.

The next step in the evolution of the tree spirit is the giving it the human form. The spirit became a god among the ancient Greeks. Dionysius was at first simply the spirit of the vines and later of the mulberry tree. In time he became a god of these trees and by gradual transitions the god of the cereal crops, and finally of vegetation as a whole. His festivals were held on the 20th of March and on the 21st of December. On the spring equinox, with the resumption of vegetative activity, he was thanked for carrying the people through the winter and supplicated for good crops during the coming growing season. At the winter solstice he was thanked for good harvests and supplicated for as moderate a winter as possible.

Our remote ancestors, living at this time in a more northern and a more heavily forested region, and so not being particularly successful

agriculturists, probably did not carry the tree spirit through so many transformations as did the Greeks, yet there is evidence that it did take human form, as is found in many folk-lore tales. In fact, we find in the Old Country a relict of this idea in the May Queen, May King, Leaf Man, Jack in the Green, where human beings are substituted for the May-tree and the May-pole. When the Queen o' the May makes the rounds of the village with her garlands of flowers, she is bestowing upon the households the blessings of the spirit, not of a tree, as in earlier customs, but the spirit of vegetation as a whole, although the Queen herself at the present time probably does not understand the historical significance of her act. At present in our own country, also, the personification of the tree spirit or of the spirit of vegetation is being lost, if not already lost. The ceremony exists with us apparently only in the desire to go a-maying, and that desire although felt by all of us is now seldom realized. One of the pleasantest recollections of my childhood is the going a-maying, and on return from the woods distributing our flowers among the aged and infirm of the village.

Various superstitions in regard to trees are offshoots of tree worship. They have been handed down to us through folk-lore and legend, but often with their origin forgotten and their significance modified or completely changed. Their persistence down through the distractions of

*Continued on page 365*

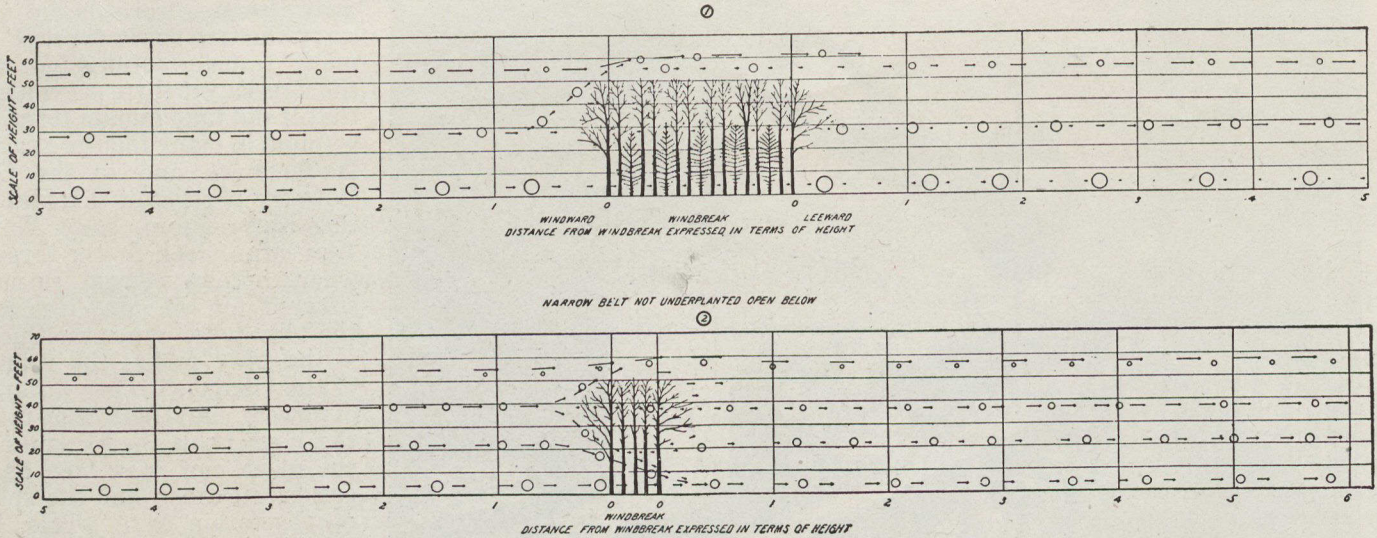
### What a Forest Asset really means

What national forest estates mean to a country can be seen in the case of Germany, which has a net revenue from its State forests of £16,000,000. This, at 4 per cent., represents a capital of £400,000,000. To this national asset, bringing in a gross revenue of some £21,000,000,000, and a net revenue of £16,000,000, is partly due to the fact that Germany had before the war a national debt of only £270,000,000 against France's £1,300,000,000, and England's £600,000,000. France has lost a large part of its best State forests, and now has a forest revenue of only £500,000.

No countries have greater need of some substantial set-off against their national debts than the Australian States. I have quoted Germany here because the statistics are the best known.—A Discussion on Australian Forestry. (Hutchins).



Mature shelter belt underplanted densely



Showing the effect of two kinds of windbreak on air currents...Velocity indicated by length of arrows...Humidity by diameters of circles.

## Breaking the Power of Prairie Winds

By Carlos G. Bates, U.S. Forest Service

The windbreak directly reduces the mechanical force of winds and through this reduction has several other influences. The measurement of velocity of surface air currents has been carried on chiefly in connection with studies of evaporation and is accomplished by the use of the standard anemometer, which expresses the wind velocity in miles per hour. As in the case of all other atmospheric measurements, the anemometer is set up at a height of 4 feet from the ground. One instrument, in a fully-exposed situation gives the normal wind velocity for a stated period, while at the same time other instruments exposed at certain points within the area influenced by the windbreak show comparable velocities. The distances from the windbreak are always even multiples of the height of the windbreak.

### Evaporation

The ability of the windbreak to check evaporation must be its source of greatest benefit, since, in the region where windbreaks find their greatest usefulness moisture is almost always insufficient for the best interests of agriculture. To thoroughly understand the influence of a windbreak upon evaporation it should be stated that the evaporation of water from any wet surface and also the transpiration of moisture from the leaves of plants is accelerated by three conditions — heat, dryness of the air, and rapid air circulation. Hence, anything which reduces the movement of the air reduces the rate of evaporation and may effect an appreciable saving of the moisture supply.

Evaporation has been measured in a way which shows about the same effects of windbreak protection as are felt by the plants of a field crop. In other words, the evaporating surface of the instrument responds to the same influences as do the leaves of

plants. The evaporimeter consists of a circular sheet of filter paper resting on a thin glass plate and continually moistened by a supply of water which is fed onto the center of the paper. The moist paper is exposed to sunlight, and the circulation of the air above it is perfectly free, so that it responds readily to changes of temperature and to changes in wind velocity.

In this case, as in measuring wind, the normal evaporation for the period in question has always been obtained by exposing an evaporimeter at a point where it could not be affected by the windbreak. Other evaporimeters were similarly exposed on both sides of the windbreak at distances from the windbreak which were one, two, and five times its height, and, in addition, on the leeward side at ten and twenty

times the tree height. These distances practically cover the entire range of the windbreak's influence upon evaporation. The instruments show the quantity of water evaporated, and the amount evaporated in the open is taken as the normal, or 100 per cent. Amounts evaporated at other points are reduced to percentages of the normal.

### Humidity

It has been assumed that the greatest effect of a windbreak upon the humidity of the air over grain fields arises not so much from the possibility of the trees adding to or detracting from the moisture content of the air as from their disturbing influence upon the movement and direction of air currents. To determine how great this effect might be the amount of moisture in the air at several points on both sides of the windbreak and at a height of 4 feet from the ground was determined in a single case by numerous and successive readings of the ordinary cog-psychrometer.



PRAIRIE COTTONWOOD TREES, 45 FEET HIGH.

Photograph taken near Raymond, Alberta. The trees are 18 years old, irrigated, and were planted by Herbert Cook in 1902 to shelter his home. The seedlings were obtained from the Dominion Forestry Branch, at Indian Head, Sask.



## Flying Operations this Summer

The following operations are being undertaken by the Director of Flying Operations Branch of the Dominion Air Board

### Vancouver, B. C.

Operations being undertaken for the Department of the Interior, Forestry Branch, consisting of forest fire protection, forest reconnaissance and photographic reconnaissance; forest reconnaissance to consist of the identification of species, location of timber, estimating the amount of timber in various localities; photographic reconnaissance to consist of the taking of photographs of certain areas, showing burnt and green areas, waterways, etc.

Forestry work is also being undertaken from this base on behalf of the B. C. Government, Department of Lands and Forests. It will consist of the same nature of work to be carried out for the Department of the Interior.

### High River, Alberta

Work at this base is being undertaken for the Department of the Interior, Forestry Branch, patrolling the various reserves along the foothills of the Rockies, forest fire protection being the chief factor.

Experiments are to be carried out during the present summer with the wireless telephone, in this area. Wireless communication from machines to ground and vice versa will be established. Only a limited amount of photographic work will be undertaken.

### Victoria Beach, Man.

A Station is being established at Victoria Beach, Manitoba, to undertake work for the Department of the Interior, Forestry Branch. The work will be divided equally between forest fire protection and photographic reconnaissance. It is proposed to construct a mosaic map of a portion of the forest east of Lake Winnipeg, 36 miles in width and 40 miles in breath.



COUNTING OUR TIMBER WEALTH BY CAMERAS.

An aerial photograph taken recently by the Air Board showing a mixed coniferous and hardwood stand.

### Northern Ontario

Work will be undertaken on behalf of the Ontario Government over the forest areas situated north and south of the Canadian National Transcontinental Railroad. Work will be commenced at Sioux Lookout. Representative strips of photographs will be taken on both sides of the transcontinental line at a distance of approximately 180 miles.

The unit will be mobile and on completion of the work at one spot, will be moved east about 150 miles to another suitable location. The country will be covered in this way from Sioux Lookout to Cochrane.

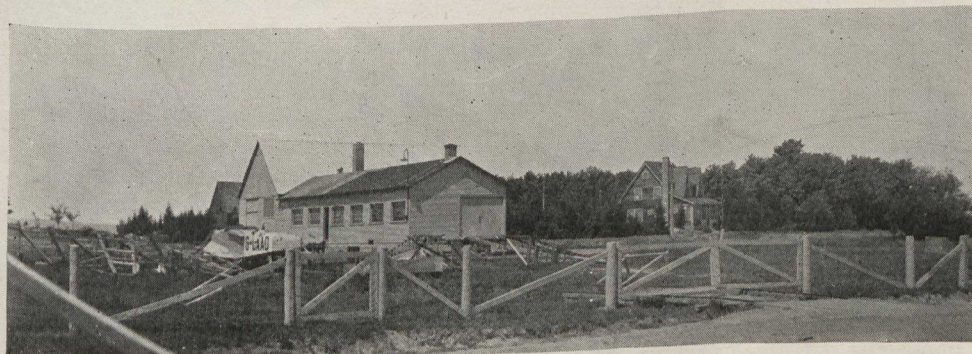


A developing forest fire as seen from an aeroplane. Photo by Laurentide Co. Air Service.

Forestry observers are to be carried and will sketch in the disposition of forests on each side of the representative photographic strips.

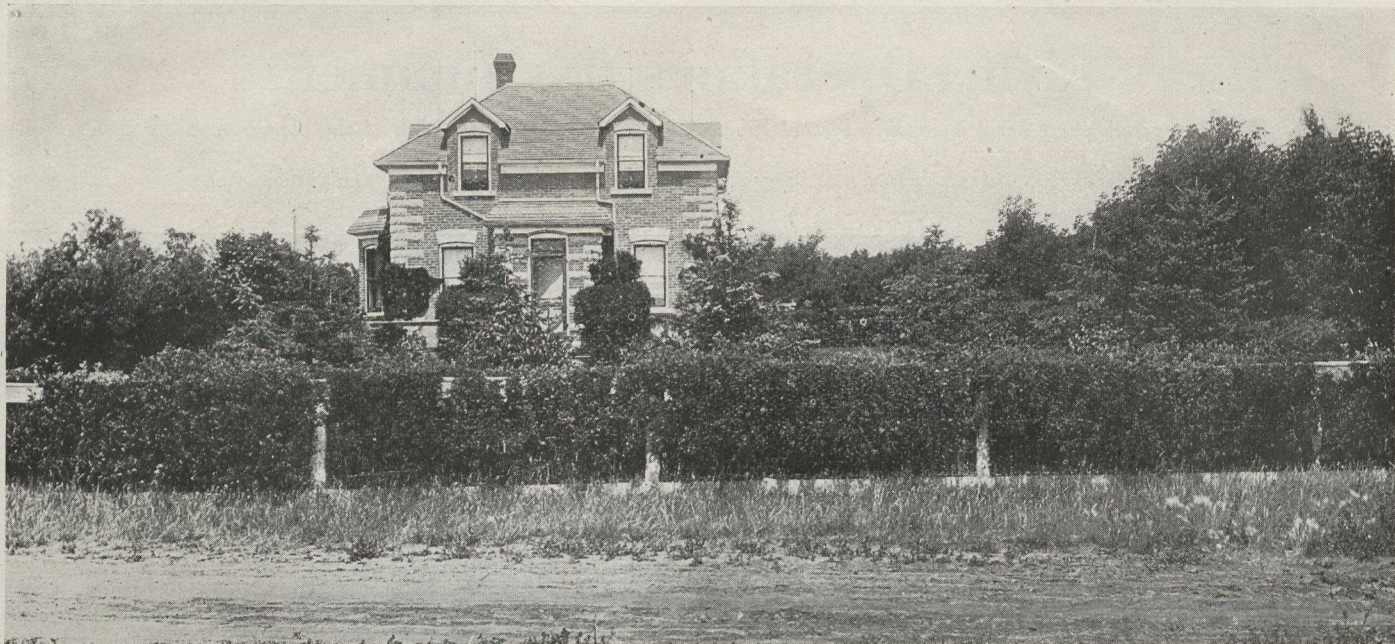
### Roberval, P. Q., (Lake St. John)

Forest reconnaissance and photographic survey will be undertaken on behalf of the Quebec Provincial Government. A certain amount of work will also be done for the Department of the Interior, Forestry Branch, mostly of an experimental nature.



Part of the Air Station, constructed by the Laurentide Company, at Lac a la Tortue, Quebec, showing the machine shop, and the residence of the senior pilot.





HE WANTED TREES ON THE "BARE PRAIRIE" AND GOT THEM.

A progressive resident of Oxbow, Saskatchewan, who came to a treeless plain and changed it into "Home Sweet Home."

### Transforming the Prairie

Oxbow, Sask., May 10, 1921.

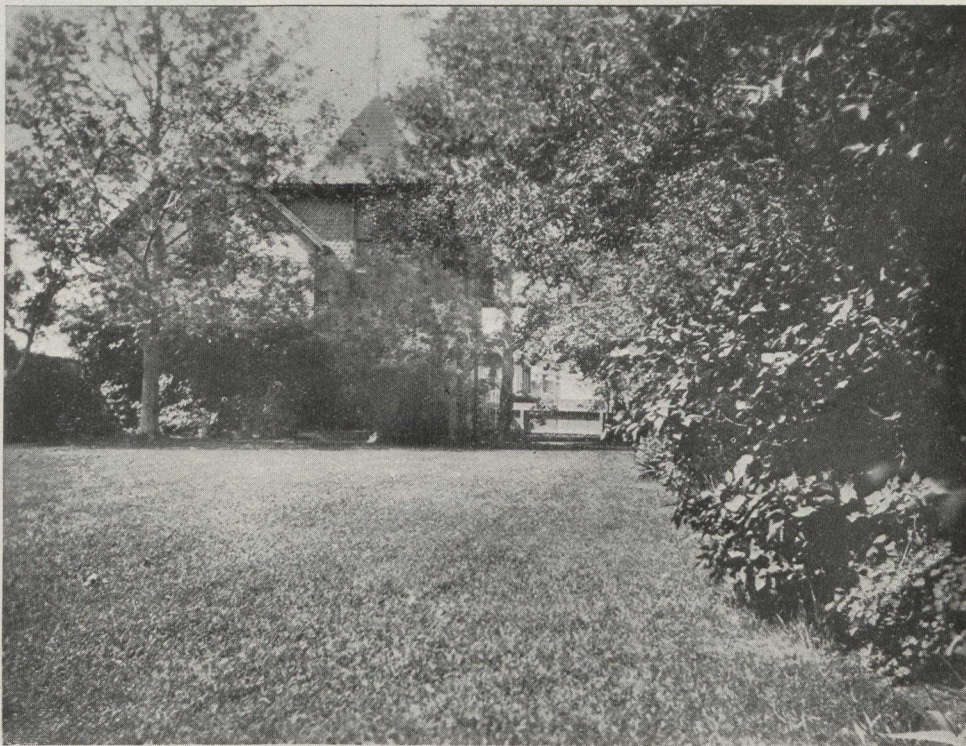
Illustrated Can. Forestry Magazine,

Just a word of encouragement in your work, and I would say that I think you have a long hard row to hoe before you will get people interested to the extent of abandoning money grabbing in order to plant trees in a big way. But don't give up the ship, I think the salvation of this whole western country depends upon tree planting to a larger extent than anything the writer can think of. As a proof that tree planting can be carried on successfully, I am sending you by concurrent mail a photo of a private residence in Oxbow, and I can remember when this plot was as bare as your hand as far as shrubs and trees are concerned, and that is not so very long ago. I can remember when we came here in 1882, there wasn't a shrub of any kind from the Moose Mountain to the International Boundary. Prairie fires no doubt were responsible for this condition, and as soon as we got the system of fireguards, especially the native poplar, began to appear in the low places around the sloughs, and today, this entire country is like a park, that is, the greater sections of it, and I can see no earthly reason why our main roads should not be lined on each side of the road with trees, even if they were one hundred feet apart.

Any tree with life in it will grow if properly planted and taken care of as I myself have seen it proven in thousands of cases. All we need is push, and it will take a lot of it to get the people interested. The magazine is fine provided it reaches enough of the people.

Yours very truly,

T. W. BAIRD.



WHY KEEP THE PRAIRIE FOREVER BARE?

Mr. R. G. Mathews, of Macleod, Alberta, is the owner of this handsome place. The trees are not more than seventeen years old and were planted without irrigation.

"I CAN'T SPARE THE TIME."

By Archibald Mitchell.

An acre of 1,800 trees 4'x6' planted by two men and a team in a day does not look such a terrible job, and three days switched out of the middle of seeding time on a prairie farm and tacked on to the end of it doesn't look so disastrous. "John Smith"

and "Tom Brown" with similar fields, starting to seed on the same day and coming out at the end of the season with similar wheat yields apiece, but with "Smith" having a fine plantation in addition, and "Brown" with nothing else but the wheat, gives them a different slant on the proposition. "It looks different when you put it that way."



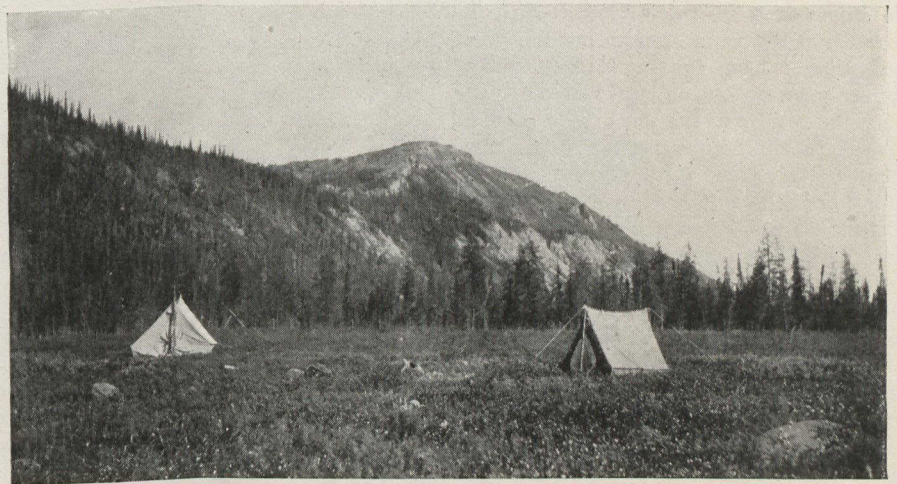


DRIFTWOOD ON THE MACKENZIE RIVER NEAR OLD FORT GOOD HOPE.

On Canada's Northern Boundary the derelict logs of Siberia, Norway and the St. Lawrence River find a common meeting place.

## Mackenzie River Driftwood

By Dr. E. M. KINDLE,  
*Geological Survey of Canada*



AREA KEPT FREE OF FOREST BY ICE ACTION. NORTHERN BANK OF THE GREAT BEAR RIVER ABOVE MT. CHARLES.

All explorers who have an acquaintance with the Arctic coasts of America are familiar with the driftwood which in many places encumbers the shore line. Along many parts of the Arctic coast of Alaska and Canada vast quantities of forest debris consisting largely of good-sized logs and trees are piled up on the beach where the adjacent land affords nothing in the shape of timber larger than the Arctic willow, which seldom grows higher than a man's head.

The "Fram" expedition collected 40 samples of the drift logs from the coasts of the Arctic Archipelago, and these have been determined by Dr. Ingvarson who recognizes three main sources for the wood. The first is the Yenisei and Lena Rivers of Siberia, the second is the St. Lawrence, and the third is the coast of Norway. The Mackenzie River is not mentioned. In the writer's opinion it is second only to the Siberian rivers as a source of Arctic coast driftwood, and he here records his own observations concerning it.

### Driftwood on the Mackenzie

One might easily spend a single season on the Mackenzie, as the writer did in 1917, without learning that it furnished a very large amount of driftwood to the Arctic coast. During that season the driftwood seen consisted of occasional

floating trees or widely deployed trains of forest debris. The "voyageur" sometimes utilizes one of the larger trees which still retains the branches, to make progress against an upriver wind. The deeply submerged branches cause the strong subsurface current to bear such a tree and any canoe which may be attached to it into the teeth of an upriver breeze as effectively as the underwater sail expedient, which is often resorted to when a floating tree is not available. Even in fair weather the floating tree is often made use of to save time for the "voyageur" on the Mackenzie. By lashing to a suitable tree he can cook his meals while proceeding on his way. If for any reason night travel seems desirable, the canoe may be secured to an Arctic-bound tree at bedtime and an undisturbed sleep obtained.

The relatively small amount of driftwood seen on the Mackenzie in 1917 is due to the fact that flood conditions did not occur on any of its tributaries that year, and though a great carrier of driftwood the Mackenzie is not itself a great producer. The writer has elsewhere remarked that the vast quantity of driftwood carried by the Slave and its tributaries ends its northward journey in Great Slave Lake. In the same place he has pointed out some of the contrasting features between the Mackenzie and such streams as the Peace and Athabasca Ri-

vers which materially affect the relative amounts of driftwood produced by them. Because of the comparatively straight course and the frequency of boulder-paving the Mackenzie — except in the delta — takes from its own banks a relatively small toll of trees. By far the greater part of the driftwood which it bears to the Arctic Ocean comes from its western tributaries. Great Bear River, the only large eastern tributary, receives its crystal clear and very cold water from Great Bear Lake, which retains the driftwood as well as the silt which enters its basin.

### Driftwood on the Great Bear

Like other subarctic streams the Great Bear River contributes from its own banks a small amount of driftwood during the spring break-up, as a result of the destructive grinding and uprooting power of the great volume of moving ice which is brought to bear locally on the river bank forests by ice jams. Immediately above Mt. Charles on the northern bank of the Great Bear is an area large enough for the maneuvering of an army which ice action keeps permanently free of forest growth. It is the result of rather special conditions. The channel is here relatively narrow and the water swift. Ice forms to a great depth on and near the banks because the river repeatedly breaks



through and overflows the ice-covered surface. The end of winter finds a great ice dam more than 30 feet thick built across the river just above Mt. Charles, a circumstance which makes the formation of an ice jam at this point an annual event. In 1919 as late as July 30 ice ramparts 20 to 30 feet thick were found bordering Great Bear River above Mt. Charles for more than a mile. These consisted not of the cemented blocks of jam ice but of ice which had formed in place — the ends of a great winter ice dam.

#### Source of Mackenzie Driftwood

The Gravel, the Peele, and other large western tributaries of the Mackenzie doubtless carry notable quantities of driftwood into the main stream, but the great bulk comes from the Liard River. The timber growing on the banks of the Liard and its southern branches is about as large as that found on the Peace and Slave Rivers, and its driftwood includes many trees from one to two feet in diameter. The unusually high stage which the Liard reached in 1919 set afloat a vast quantity of stranded logs, many of which had started their northern journey in previous years. At the time the mouth of the Liard was passed on July 1, it was discharging very little driftwood. The vanguard of the main volume of the Liard driftwood reached Old Fort Good Hope on the lower Mackenzie about July 13. At that time the writer was using a canoe a short distance above the old fort and had an opportunity to get a clear conception of the great volume of the floating mass of trees, logs, limbs, and bark. The immense volume of this floating mass of travel-scarred tree trunks and forest debris greatly exceeded anything previously seen or imagined. In general it formed a nearly continuous mass a quarter of a mile or more in width. When, as frequently happened, the mass of drift spread out under the influence of a breeze or current which carried it toward the middle of the river the width often exceeded a mile. Walking over this driftwood was often more feasible than canoeing through it. The closely packed phase of this particular exodus occupied about four days in passing a given point. Detached masses of small size and single, widely scattered logs followed it for several days. Spruce and poplar comprise the great bulk of the Mackenzie driftwood. Here indeed is a mammoth supply of pulpwood delivered at tide-water, cutting and transportation free, that merits the consideration of any enterprising paper company that can solve the commercial problem of transportation around the Alaskan coast!

This vast contribution of driftwood eventually comes to rest chiefly on the coast of Arctic America and the islands west of Greenland. Frank Russell, traveling down the Mackenzie delta and



VIEW OF ICE RAMPARTS ON THE GREAT BEAR RIVER ABOVE MT. CHARLES, LOOKING UP-STREAM. THE RAMPART ON THE FAR SHORE HAS AN AVERAGE THICKNESS OF ABOUT 20 FEET.

along the coast to Herschel Island, remarked the immense quantities of driftwood brought down by the Mackenzie "strewn for hundreds of miles along the coast. . . . The sand beaches of the coast are literally covered with the white trunks from which the bark and branches have been worn".

Other travelers have noted the large quantities of driftwood seen along the Arctic coast east of the Mackenzie, which is evidently its principal source. Dr. R. M. Anderson has informed the writer that he found it much more abundant on the western than on the eastern sides of projecting points along the shore east of the Mackenzie. On the coasts of Victoria Island and Banks Land seen by Dr. Anderson, driftwood was scarce as compared with the mainland. That it is distributed far and wide throughout the Arctic Archipelago, though less abundantly than on the mainland, there can be little doubt.

(Published by courtesy American Geographical Society.)

### Lumber Resources of Canada

A census of the lumber industry, in Canada has been completed by the Dominion Bureau of Statistics, embracing 2,879 operating concerns, of which 52 were in Alberta, 251 in British Columbia, 29 in Manitoba, 255 in New Brunswick, 462 in Nova Scotia, 60 in Ontario, 60 in Prince Edward Island, 1,151 in Quebec in Quebec and 16 in Saskatchewan.

The total capital invested in the industry, including land, buildings and plant, machinery and tools, stocks in process and supplies and working capital is given as \$149,266,019.

The number of employees on salaries was given as 2,874 males and 285 females, who received a total of \$3,554,097. The average number of employees on wages was 25,516, engaged in logging operations and 28,820 in the mills, their combined wages amounting to \$34,412,411.

The aggregate value of production in 1917 amounted to 115,884,905. The census covered 29 kinds of lumber, 11 of shin-

gles, 10 of lath, 6 of pulpwood and 10 of miscellaneous products.

Ontario is estimated to have between 70 and 90 million acres covered with commercial saw lumber.

Quebec is estimated to have forest resources of 230 billion board feet, of different kinds of commercial saw timber and an additional 100 billion feet of pulpwood.

New Brunswick is estimated to have 17 million acres of commercial saw timber, estimated at 25 billion board feet.

Nova Scotia is estimated to have 15 million board feet.

In British Columbia, the area of merchantable timber land is estimated at 33 million acres. Saw timber is estimated at 350 billion feet and pulpwood at 366 billion feet.

The Prairie Provinces are estimated to have an area of 10,920,000 areas of forest and the merchantable saw timber is estimated at 41,850,000,000 board feet.

#### How Fast Do Trees Grow

One of the things most necessary to know in regard to Canadian forests is how rapidly they grow again, when cut down or burned over. Most of the European countries have this knowledge in fairly complete form and are managing their forests accordingly, but European figures cannot be applied to Canadian forests. Each country must make up its own growth-tables. Information on this subject is being gathered in different parts of Canada. One of these scientific studies of the rate of tree-growth is being made by the Forestry Branch of the Department of the Interior at Petawawa, Ontario, in the heart of the Ottawa valley. Plots of different kinds of trees are set apart, and the rate of growth in these measured and recorded. The effect of thinning, trimming, and draining upon the growth is also studied, so that in a comparatively few years data will be available which will be of the greatest value in the management of Canadian forests and woodlands.



# Trees for the Prairie Home—A Practical Plan



Winds, the One Disagreeable Feature of Prairie Life, are Easily Counteracted and Home Life Transformed — A Helpful Story by a Practical Expert.



By Archibald Mitchell,

Western Lecturer of the Canadian Forestry Association.

Of the necessity for trees about the home, it should not be necessary to write.

One has only to live even a few months on the Prairies to know how welcome a shelter is when the wind is blowing.

We are glad to see the Chinooks in the winter. We look upon them as a special blessing after a spell of 30 below, but they are all the better when you can enjoy the balmy weather they bring, behind the shelter of a well-arranged belt of trees.

And even in the summer; who does not know how disagreeable it can be sometimes to go out, anywhere away from the shelter of the house, and be swept almost off one's feet by the sheer force of the wind.

Then there is the dust. In this country, as in all other dry countries, the dust like the poor, seems to be always with us; and yet, these trees stop a tremendous lot of dust. At least the smother from the neighbouring summer fallow never reaches the houses when there is a substantial shelter belt between it and the west wind.

And Temper and Nerves! There is no telling the difference a few trees make. No wonder some poor women get discouraged and, indeed, almost distracted, sometimes, when the wind comes sweeping down, the washing blows away, and everything goes wrong at once. Two or three days of steady high wind have an uncanny power to rattle ones nerves; there's no mistake about it.

And yet, one can get about quite comfortably in the lee of a good belt of trees whether it blows high or blows low.

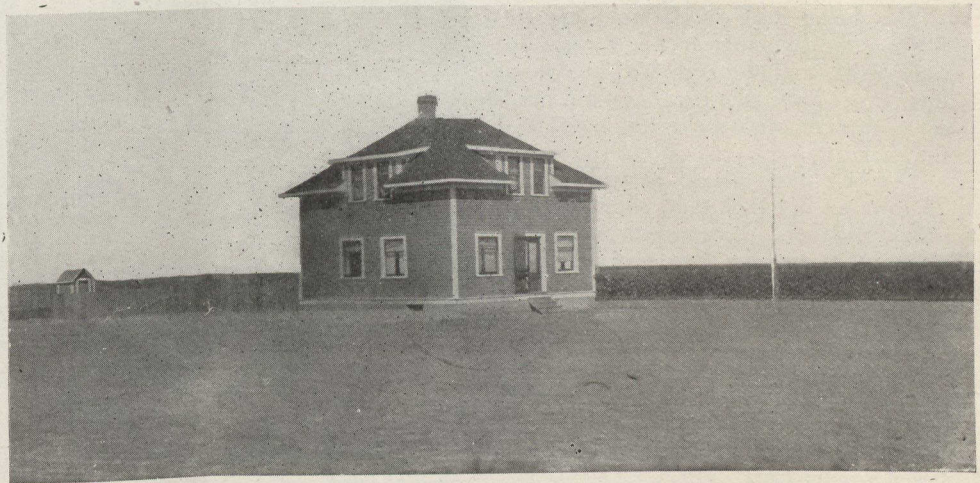
How often these days do we see mention of the optimism of the western farmer.

How, no matter how badly he is hit, he just launches out again and carries on, seemingly as full of optimism as ever.

"This is going to be the banner year, the best yet" he says, and off he goes to prepare for another crop.

It is an optimist's country, and there is no doubt about it, we owe it in great measure to the fact of the sunshine.

It is a country of sunshine, and the bright, clear, sunshiny days one after another make it an ideal country to live in. Even in the winter this is so, for most of the bright, sunshiny days we get then would be highly enjoyable but for the one drawback, the wind. There is no getting away from it, the wind is a source of great discomfort, both in winter and summer, and surely it is only reasonable that the first thing one should think



HE PRACTISES WHAT HE PREACHES.

Two photographs showing what trees can accomplish about a prairie home. The owner of this place is Mr. Archibald Mitchell, Western lecturer of the Canadian Forestry Association. Mr. Mitchell occupied the property at Coaldale, Alberta, in 1912, at which time the photograph of the unplanted homestead was taken.



After five years, the house and grounds are beautifully bordered with trees and shrubs.

of when starting out on the Prairie is to do what one can to stop it by planting a few trees.

Not that we will ever be able to stop the wind from blowing. We can never do that. But there is no reason why we should not have all the little local shelter we need for the house and farm buildings, if we want to.

Curious isn't it, when one stops to think, the one all-the-year-round, disagreeable, feature of our climate is the one we can most easily overcome. And we

can overcome it effectually too if we just want to.

And fortunately for the Prairie, this is true on dry land as well as irrigated land. There is no trouble about the trees growing if they get a fair chance. Use the right methods and the right kinds of trees and there is no doubt of the result. They will grow.

When starting to plant, the first consideration is the main shelter belt around the whole group of farm buildings.

## When Starting to Plant.



This usually runs along the West, South and North sides, making three sides of a square. This enclosed space should be of good size to allow room for expansion in the future, for new buildings, hog and calf pastures, root ground, seed ground, garden and orchard, and so on, about 200 to 250 yards square is about right. Never mind if there is more land enclosed than you think you will use, the crop inside of the belt will be all the better for the shelter.

The shelter itself should be about 100 ft from the buildings to allow room for snow drift, and there should be two or three cross belts wherever they are needed to give complete shelter to any part of the enclosure.

The belt itself should be wide, 16 to 24 rows on dry land, and about 6 to 10 under irrigation. Tree growth is a matter of moisture and the greater width is required on dry farming to enable the plantation to keep its moisture from being dried out by the wind passing through it. Under irrigation we can supply water whenever it is needed and the only consideration is to provide enough trees for a shelter. Hence we can get along with fewer rows of trees.

The trees planted 4 feet apart in the rows, and the rows four feet apart will assure a good shelter in a very short time. If even only cuttings and plants twelve to eighteen inches high be used, the plantation will be 8 ft high in three years, and will be close and compact, already affording a good amount of shelter. In



Everybody happy when a fertile prairie farm is enhanced by tree planting. This is John Glambeck's place at Milo, Alberta. The trees are planted only seven years ago. They are maples with a mixture of Caraganas.

ten years there is no reason why the general level of the plantation should not be 25 to 35 feet high.

#### Consider Your Home!

The house grounds should of course be inside the main belt but they should be apart from the rest of the enclosed space and different from it in its arrangement. The house itself should be fairly close to the shelterbelt, about 100 feet or so to allow for snow drift. If there is a snow trap (consisting of a double row of caragana 100 feet) outside the main belt, as there sometimes is, it may be nearer, for we must not forget the first consideration is shelter, and the closer the belt is in reason, the quicker its benefits will be realized.

The house, with its surroundings, is the most important spot on it. It is where the hope of the nation is to be brought up and it has a right to be different.

The lawn and its shrubbery will constitute the little Park of the place, the playground of the children, and, in its arrangement it should be as natural as we can make it.

Modern town planning demands lots of Parks, places different from the same old grind of street after street, and of such a nature that people entering find themselves in a different kind of world altogether. Instead of long lines of straight sidewalks and houses, they see groups of trees and shrubs with pleasant walks winding through and among them, and, dominating everything, beautiful expanses of well-kept green grass.

The Park is a complete change, and that is precisely the effect we want in the house grounds of our farm.

We want it to be our little Park, the place that differs from every other place,

something in which to forget everything else, something to rest in, and something that is so attractive it makes us do so whether we want to or not. That is what we want in the home grounds of the farm.

#### Approaching the House

The house should have an entrance separate from the Farm yard entrance, and the drive should curve nicely up to it. There should be a turn round so that when our friends and neighbours come to see us they do not have to go into the farm yard or the cattle corral to turn their rigs or cars when they want to go home. The drive too should be convenient so that a wagon can get to the coal chute at the back door as well as the front one. Then the lawn should not be too large or the grass will never be cut. About 100 to 150 feet square, roughly, is about right. This means from half to one hour's work with the mover every week. No time at all when compared with the pleasure the lawn gives. Shrubby should bound the lawn, and the borders of the shrubberies should be sweeping curves, irregular and bold, enticing us to go round the shrub masses to see what is beyond. The shrubs arranged in groups of three or four of a kind, giving a mass effect, the tall ones at the back, the lower towards the front, with clumps of perennial flowers, the blues, the reds, the yellows, and the whites here and there, makes an artistic effect, which, once seen will never be forgotten, and one realized, will never be done without.

The middle of the lawn should be kept open, not cluttered up with flower plots and specimen trees. A wide open lawn is far the best.

Shrubs and flowers should be planted close to the base of the house to link up



MR. ARCHIBALD MITCHELL, WESTERN LECTURER AND DEMONSTRATOR OF THE CANADIAN FORESTRY ASSOCIATION. MR. MITCHELL IS A PRACTICAL TREE PLANTER OF 30 YEARS EXPERIENCE, MOST OF WHICH HAS BEEN LIVED IN WESTERN CANADA.





**TREE PLANTING ON THE PRAIRIES.**

John Glambock, of Milo, Alberta, has attained splendid results in tree planting in five years time, as shown by the photograph. He is raising excellent fruits and vegetables, within the protecting zone of his tree belts.

the building with the ground and make it more natural and as if it really belonged there.

**The View From Your Window**

The turn round is usually planted, either wholly, or at least at the ends with clumps of bushes, and similar groups of shrubs should be placed in the hollows of the curves of the drive, the effect being to afford a reason for the drive taking the curve, an obstruction for it to go round, as it were.

The view from the windows too is important. From the windows, women get their outlook on the surrounding country and even if the houses face the west and the prevailing wind, there should be no solid shelter belt there to shut us out from looking around us. In such a case, a hedge of Caragana should be planted in front of the lawn and just inside that, a row of big trees about twelve feet or so apart. The hedge can be trimmed to about 4 or 5 feet and the trees to seven or eight of clean stem with big bushy tops. In this way, with the hedge below and the heavy tree tops above we can have a good deal of shelter on the lawn and at the same time our view is not unduly obstructed. The effect to the passing traveller is to enhance the beauty of the place by reason of the semi-screen afforded by the trees, the house just seeming to peep through the trees as one passes by.

So much for the ornamental part.

Then the chicken house should be convenient to the house, and so also must the clothes lines. It is a good arrangement to have part of the main shelter belt included in the poultry run. It makes a

good scratching place for the hens and is cool and shady in hot weather. This can usually be arranged.

The other farm buildings will be arranged to suit, of course, and convenient to the house as possible and yet apart from it.

**The Children Deserve It**

These, then, are some of the features to be considered in laying out a farm home.

Usually there are some little attempts to plant a few trees and flowers round the farm home but there is seldom any real plan to work to and the result is often a good deal of expense and work with about half or less of the results possible for the same outlay when correct principles are followed. It is all a matter of information. Most people want nice places, and everybody admires them when they see them. The trouble is so few are ever show nthe right way to set about getting them. If there is one thing the different rural organizations, the Community clubs, the Schools and so on should take up with vigor, it is this same matter of building worth while homes.

The children demand it; they have a right to nice, cosy, home surroundings; and the women deserve it.

"Time"! Of course it takes time, and the men have little enough for their work usually, but a few days spent in fixing up the house and lawn will be well worth whil and the time will never be missed from the year's work if they will only make up their minds to it.

It is all largely a matter of making up your mind.

**Fire Extinguishers**

Many attempts have been made in the past to devise a fire extinguisher which could be used quickly to control small forest fires. Such attempts have failed mainly because no effective apparatus light enough to be easily carried by a warden was ever devised.

There is now however on the market an extinguisher in powder form which experience may prove to have a place in fighting forest fires. The material is known as "Firex" and numerous people interested in forest fire protection have seen it demonstrated as an extinguisher of fire. The powder thrown on a hot fire forms a gas which extinguishes fire with which it comes in contact.

Without doubt the powder could in many cases be used to deaden fires around snags or in slashings until more thorough suppression measures could be applied. It can be secured in small paper or tin-containers weighing filled about 1½ pounds, or if desired, in bulk. The material is not expensive, and it is believed worthy of trial.

"Forest Patrolman",  
Portland, Ore.

A recent compilation of the Federal Forest Service shows that in the States of Montana, Idaho, Washington, Oregon and California total number of fires reported the years 1916-20 was 34,811 burning over an area of 6,635,697 acres and resulting in a loss of \$13,641,020.00.



Built in April, 1921, by the New Brunswick Forest Service. This tower gives a thorough survey of 2,000 square miles in Victoria County.



# "Fox Farming," A New Western Industry

By H. H. C. Anderson

In the development of the great Canadian West the quick money making schemes have been numerous and very varied. Coming under the legitimate class, none perhaps have proved more unique, in many ways, than the rapidly developing culture of furs to meet the tremendous demand of the fashionable world. The Western Provinces of the Dominion, following the start made in the industry in Prince Edward Island, were not slow to recognize the fact that Western Canada presented ideal conditions for the fostering of fur bearing animals; and at the present time, while not very extensive, the industry ranks as one of the best paying in Alberta, Saskatchewan or Manitoba.

## Start with Wild Stock

When from the East came the tales of the wonderful prices paid for both furs and stock in the new ranching business, the Western farmer and capitalist were not slow to realize its importance or opportunities. They were soon in business for themselves. The scarcity of foxes prevents this new line introduced in many places, and the result was that the majority of the farms in the West were started by companies, with sufficient capital to buy good stock. The great tracts of country to the North of the three prairie provinces provides the sources from which the majority of the prized animals are bought, and many of them are now being kept in the West instead of being shipped East, as before. The alluring profits which continually loom up before the producers induce them to hold back from many present sales and the present time "holding" seems to be the policy of the business.

The never ceasing demand for the pelts of the silver, red and blue foxes keeps the prices so high that at the present time it takes a lay out of a small fortune to establish in the new business. The prices paid for single animals never drop below four figures, and a good pair will bring a very large amount. As high as \$15,000 has been paid for a pair of silver foxes, which were judged to be as near perfect as possible. An Edmonton, Alberta, man living in the centre of the city captured a silver fox in his chicken coop, and at first believed it to be a dog. The next day he received an offer of \$6,000.00 for the animal which turned out to be a perfect female specimen of the silver fox. Some idea of the value of the animals can be obtained by the figures which place the total worth of the foxes owned in Prince Edward Island at \$10,000,000.

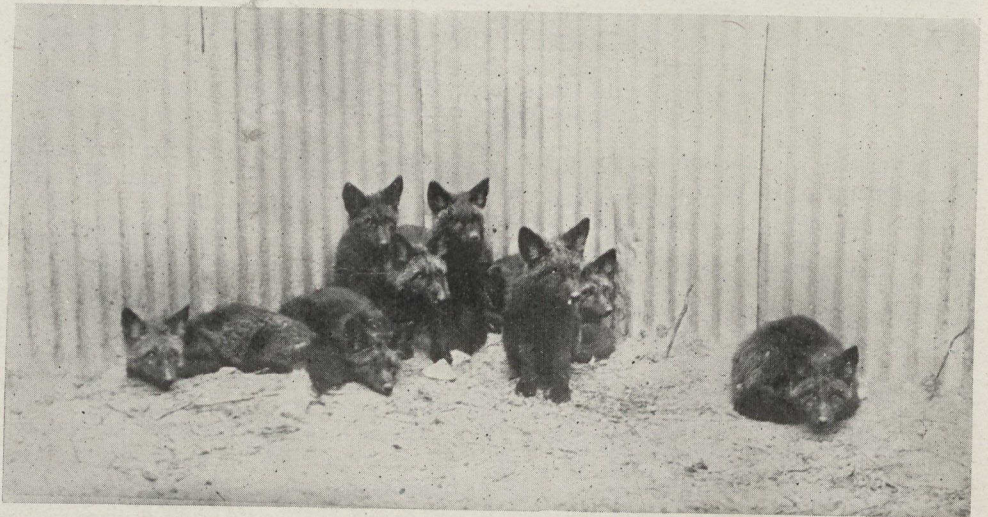
## The Start of the Industry

Canada is now just winning back by artificial means a source of wealth which was lost by primitive extravagance. The great fur wealth, in what used to be the wilds, went unprotected at the mercy of the operations of the early fur traders.

As a consequence, the work of reclamation will prove a long, slow process. The culture of furs on business-like lines was started by Hon. Charles Dalton on Prince Edward Island in 1887. It has developed to such an extent that the island now practically controls the fox pelt supply of the world.

Islands. These islands, with their numerous caves and natural shelters, made an ideal breeding ground; and the large quantity of seals killed every year made food plentiful. Since the regulations prohibiting the killing of seals went into effect it is made necessary to salt down meat to feed the foxes during the year. The blue foxes were sold to farmers for \$800 per pair.

While in western Canada, the companies and individuals operating for farms have not been in the business for a sufficient length of time to warrant dividends of a sensational order, some of the East-



IT WOULD TAKE A FORTUNE TO BUY THEM.

Young silver foxes on a Western fox farm. A wild silver fox, caught in a trap, recently sold to a breeder for over six thousand dollars.

This pioneer experiment was first tried with a pair of foxes in a rough, old shed. The industry has developed along modern lines until the farm to-day represents a miniature hunting ground, where every care is taken to keep the captives in as natural surroundings as possible.

Many of the latest fox farms are located on small islands. These locations are greatly favored by breeders. The enclosure is thus doubly isolated from the outside world, and the chances of trespassing become remote. The presence of water in a large body too, does much to make the conditions healthy for the animals, which at times prove extremely delicate.

A large number of blue foxes have been brought from Alaska breeding grounds to Canada. The majority of these animals went to the Maritime Provinces. The fact that the killing of seals is no longer permitted necessitated the owners to move them to the Pribilof

ern companies are declaring dividends anywhere from 20 to 340 per cent. In capitalization the companies range from \$20,000 to \$200,000 owning from 2 to 20 pair of foxes. These profits are exceptional considering the short time that the companies have been in business; and the Western owners are looking forward to the same results.

## A Fox Ranch near Calgary

One of the most successful farms in the West is situated at Midnapore, about ten miles from Calgary, Alberta, and was started by a group of Calgary businessmen. The farm has not been in operation very long, but already a good number of breeders have been collected. The enclosure, which consists of some forty acres, is situated on a creek and the land is well wooded. The owners are more than pleased with the success of the venture up to date and are contemplating additions to their present stock.



# Spruce Budworm Injuries in Eastern Canada

By J. M. Swaine, Chief, Division of Forest Insects, Entomological Branch, Department of Agriculture

The Spruce Budworm outbreaks of recent years have caused an appalling havoc in the pulpwood forests of Quebec and New Brunswick and a recently discovered infestation is now spreading westward from Quebec into Northern Ontario. Balsam, spruce and hemlock have been injured by the budworm but the balsam has suffered much the most severely. Throughout the greater part of Quebec, south of the height of land, and in a large part of New Brunswick the balsam has

caterpillars develop in myriads and cause extensive and destructive outbreaks, lasting from three to four years in each section affected. The caterpillars feed chiefly upon the opening buds and young needles on the upper part of the crown, giving the affected trees a reddish or scorched appearance, by which they may be distinguished from a considerable distance. The adult state of the insect is a small yellowish-brown moth, which appears in mid-summer and, flying readily,

The weakened balsam is attacked by the Balsam Bark-beetle, *Pityokteines sparsus* Lec., and the Balsam Weevil, *Pissodes dubius* Rand.; the spruce by the Four-eyed Spruce Bark-beetle, *Polygraphus rufipennis* Ky., and the Destructive Eastern Spruce Bark-beetle, *Dendroctonus piceaperda* Hopk. The last is the most serious enemy of our eastern spruce and although a serious outbreak by it has not occurred during the last twenty years it may develop rapidly in the spruce weakened by the budworm. The Four-eyed Spruce Bark-beetle is already abundant in many locations in both Quebec and New Brunswick, but outbreaks caused by it are usually of minor importance and are less likely to spread rapidly in green timber. It is probable that this bark-beetle injury is spreading now in both Quebec and New Brunswick. The spruce and balsam dying in Quebec at the present time, excepting the Temiskaming district, is due chiefly to this cause and not to present attack by budworm.



Dead and dying balsam trees following defoliation by the Spruce Budworm.  
Photo by M. B. Dunn.

actually been killed in amounts varying between fifteen and more than seventy-five per cent. Our surveys have not been complete enough to enable us to estimate the loss at all closely; but it is evident that, in Quebec Province, south of the height of land, we have lost at least one-quarter of the balsam above pole size during the last ten years, and that the loss has been quite as severe as this throughout large areas in New Brunswick. The spruce has suffered much less severely and probably very little of it was actually killed in Quebec Province by the budworm outbreak. Although the defoliation during the primary outbreak checked the growth of the spruce more or less completely, the trees usually survived the attack, and have largely recovered their normal appearance.

## The Primary Budworm Injury

The spruce budworm is a small brownish caterpillar, affecting the foliage of balsam, spruce and hemlock in the extreme eastern part of Canada and the United States. At wide intervals the

distributes the injury, often with great rapidity.

## Secondary Injuries

The primary spruce budworm injury weakens the trees by destroying the foliage year after year; but it is probable that the spruce, at least, would usually recover if the budworm injury were not supplemented by the attack of other insects. Balsam appears to be killed more easily than spruce by the primary defoliation. After one or two year's injury by the budworm both spruce and balsam are sufficiently weakened to be susceptible to attack by bark-boring beetles. These destructive insects lay their eggs in the bark of the weakened trees and the developing broods of grubs destroy the inner bark completely, killing the tree usually in one season. Probably most of balsam and all the spruce which has died in the budworm outbreaks in Quebec has actually been killed by this secondary bark-beetle attack, whether or not it would eventually have survived the attack by the budworm.

## Present Condition in Quebec

The recent Budworm outbreak in Quebec Province commenced in the region about Grand Lake Victoria about eleven years ago and spread rapidly throughout the rest of the Province south of the height of land, excepting the section north of the Saguenay River, and the extreme western border between lakes Abitibi and Temiskaming. The Budworm attack lasted about three years in each locality affected and then died away, leaving in its wake an immense quantity of dying and weakened balsam and of weakened but more hardy spruce.

An enormous amount of balsam died within two or three years after the attack, either as a direct result of the defoliation or from immediate attack by the Balsam Bark-beetle or the Balsam Bark Weevil. These two species of beetles bred abundantly in this weakened timber and a large part of the balsam which has died during the last few years in Quebec has been killed by them. The condition of the timber in Quebec last season indicated that, probably, throughout most of the Province, the greatest injury to balsam was past.

There will still be a heavy loss each year, through injury by bark-beetles and fungi, and our mature stands of balsam should be utilized before their greatest value has been destroyed. There is little danger of another budworm outbreak in the immediate future on the areas recently affected; the timber dying now will be mostly killed by bark-beetles. It should



be safe now to leave balsam in Quebec Province as long as it remains in a healthy condition; but when many dying trees are found, indicating a rapid increase of bark-beetle injury, the whole balsam stand should be utilized as rapidly as possible.

It has already been stated that very little spruce died in Quebec as a result of the spruce budworm attack, and although bark-beetles have killed a considerable quantity of the budworm weakened spruce their injury has not yet become very serious. Nevertheless this injury should not be overlooked, and during the next few years any considerable amount of dying spruce in the East should be reported to us without delay so that control measures may be arranged for as soon as they are needed.

In the Temiskaming District of Quebec we have an active primary Spruce Budworm Outbreak spreading, as already mentioned, across the Interprovincial line into Ontario. It was discovered in the Long Lake section on the Quebec side of the line only last summer, and the injury has already been very severe. Many of the trees are already dead, killed by the bark-beetles, which are exceedingly abundant, and give the trees defoliated by the budworm little chance for recovery. Our ground and air surveys conducted last summer determined that the heaviest injury was still on the Quebec side of the line, but that the infestation extended as far west as Lake Temagami, with western margin of the outbreak reaching a line extending from the southern end of Lake Temiskaming through Lake Temagami and then north and east, recrossing the interprovincial line just south of the height of land. While the infestation is still light on the Ontario side of the line it may be expected to develop in severity this summer and to extend rapidly westward through the balsam and spruce stands, becoming most destructive where the percentage of balsam is highest. It has not yet gone far north of the height of land but will probably extend northward in stands carrying a high percentage of balsam. We hope to follow the course of the injury closely through ground and air surveys this season and to record the centres of heavy infestation and the changing boundaries of the outbreak.

White pine foliage was attacked by the caterpillars to a limited degree last season, but no serious injury to pine from this cause need be anticipated.

#### Present Conditions in New Brunswick

The Balsam has been very seriously depleted throughout the central part of New Brunswick by the effects of the Spruce Budworm defoliation and the Balsam Bark-beetle attack which followed it. A forest insect survey of this infested area now in progress under the direction of Mr. J. D. Tothill will be completed this

season and it should then be possible to make a fairly close estimate of the loss that has been incurred.

The spruce was injured much less severely than the balsam and although on large areas the spruce was badly checked last year it is now probable that 90 per cent of this will recover unless, in its weakened condition, it is attacked by extensive bark-beetle outbreaks.

#### Possibilities of Control

We have not yet discovered any means of checking a primary budworm outbreak. With the balsam and spruce attacked by myriads of caterpillars, extending over thousands of square miles of territory, the outbreak spreads like a forest fire and no methods of control, feasible at the present time, will have any effect upon it. The Temiskaming outbreak covers a section more than 100 miles long and more than 30 miles wide. The young caterpillars have over-wintered in myriads, chiefly on the twigs of the balsam, over most of this area. When the buds open towards the end of May, the caterpillars will commence their destructive work, feeding upon the young foliage as fast as it develops. The injury could be checked only by destroying the greater part of these caterpillars. That could be done only by poisoning the caterpillars with arsenical sprays or dusts or by killing the infested trees and so starving the caterpillars before they could complete their development. Either of these methods could be employed effectively on a small isolated area; but when thousands of square miles are infested we can as yet only keep in touch with the progress of the infestation and record the rate and direction of its spread, so that the threatened timber may be salvaged in advance of the injury.

The injury to balsam and spruce caused by the budworm and insects which accompany and follow it has been studied closely by officers of this Branch in Quebec and New Brunswick during the last five years. An endeavour has been made to discover all factors affecting the development and subsidence of the outbreaks and the relations of succeeding secondary injuries. A detailed report on this investigation is being prepared.

It is evident that, throughout the course of these outbreaks, the heaviest injury has been to stands containing a high percentage of balsam, and, further, that the secondary injury by bark-beetles became increasingly abundant as the outbreaks developed and that it continued the destruction after the budworm disappeared.

It, therefore, follows that, considering the possibilities of a future budworm outbreak, the faster the balsam is removed from our mixed stands the safer it will be for our forest in the future; and, further, that the destruction of bark-beetle breeding grounds by burning the slash from balsam and spruce cuttings will have

a decidedly beneficial effect upon the neighbouring forest.

#### Summary

It should be explained here again that the only active budworm outbreak now existent in Quebec Province is that in the Temiskaming district. Throughout all the rest of Quebec, with the possible exception of the north shore below the Saguenay, the spruce budworm has practically disappeared and we have now to deal only with the aftermath of its injury, chiefly bark-beetle attack in the weakened balsam and spruce. There is reason to believe that the most of this latter injury is past so far as the balsam is concerned, and the destruction of balsam slash will aid greatly in reducing future losses. There have been several rather severe local outbreaks of the Four-eyed Spruce Bark-beetle in spruce in Quebec during the last two years but none have yet proved of more than local importance. Bark-beetle outbreaks can be controlled effectively by modified lumbering operations, and if extensive loss should be threatened from this cause, we can recommend practical and effective means of control.

#### Fire Prevention Hints for Smokers.

Don't drop FIRE when you smoke in the woods, nor throw it out along the road. Keep the forests!

Matches, pipe coals, cigar stubs, and cigarette ends start many forest fires.

BE CAREFUL! Don't start a fire in the woods when you begin or end your smoke! Be sure your match, cigarette or pipe is out.

YOUR CO-OPERATION in order to keep down forest fires is asked. Break your match in two. Knock out your pipe ashes into your hand. Don't drop a burning cigarette.

FOREST FIRES cost millions a year. Don't start one.

#### Causes of Failure in Prairie Tree-Planting

It is safe to say that at least ninety per cent of the failures in tree-planting on the prairies are due to the fact that the importance of one or of all of three points has been overlooked. The three points are these:—

1. The soil must be most thoroughly prepared before planting;

2. Only such species of trees should be used as are known to be hardy in the district and suited to grow in the particular kind of soil and in the situation where it is desired to plant them;

3. A certain amount of cultivation of the soil after planting is absolutely necessary. This cultivation must be carried on until the trees are well established and able to grow without further care.—Norman M. Ross, Dominion Forestry Branch Nursery Station, Indian Head, Sask.



# Handy Things to Know About Camp Fires

by W. N. Millar, Faculty of Forestry, Toronto.

Lengthy chapters, whole books indeed, have been written on the subject of camp fires. The camp fire has its place in song and story. It has been viewed from every conceivable angle and like other things that hark back to the days when man was newly on this earth, the normal reaction to the idea of the camp fire springs from memories deep-seated in human consciousness. But as a practical, everyday problem, the camp fire appears to the forester in two quite dissimilar guises. There is the camp fire he builds himself to boil his tea or fry his bacon or give him a welcome respite from the black flies or drive back the biting cold of the northern winter, and there is on the other hand, the camp fire the other fellow builds for just as necessary a purpose but which he only too often neglects to safe-guard and so gives rise to the forester's greatest enemy, the forest fire.

Thus we see that, as is so often the case, the camp fire can be both friend and foe. It is all a matter of the intelligence displayed in its use. No camp fire properly built, properly used and above all properly extinguished when no longer required for use, need give the slightest concern to anyone. But every camp fire in the forest during the summer contains potentialities of the most dangerous sort and as such should be handled with due care and regard for the possibilities involved. To the experienced woodsmen those facts are trite. But all builders of camp fires are not experienced woodsmen. Therefore many things need to be mentioned in discussing the building of camp fires that to the woodsman seem obvious.

## A Home-Made Match Box.

For instance, camp fire building requires an adequate supply of matches well insured against moisture if the trip is to be a lengthy one and many fires are to be lighted. If the whole supply cannot be carried on the person a suitable receptacle for the extra supply should be provided and matches placed in it at the start. For this purpose an ordinary friction top can is excellent.

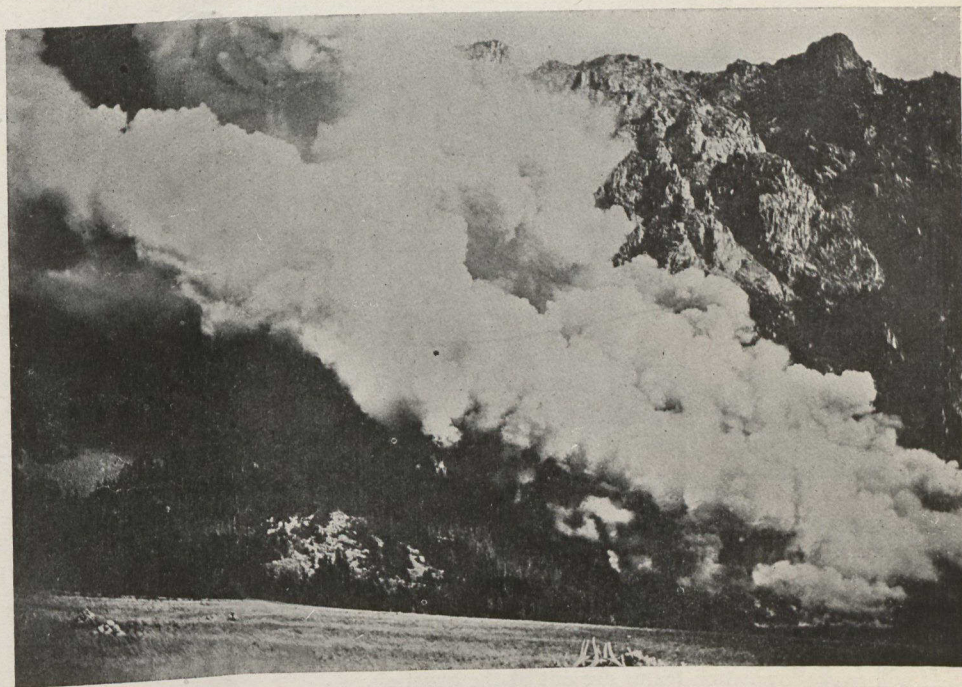
To carry matches on the person, many forms of match boxes are available but very few have the properties of strength, simplicity and water-tightness that the woodsman's matchbox must possess. A ten gauge brass shotgun shell will neatly

chamber a similar twelve gauge shell and furnish a matchbox that for strength and simplicity cannot be excelled and which is as perfectly watertight as a pocket matchbox needs to be for any service.

## Where to Build Your Fire.

Another preliminary to proper camp fire building is a knowledge of what is and what is not a suitable camp fire site. Often, indeed, one has small choice. The necessities of camp location involved in the finding in reasonably close proximity of wood, water and forage in the mountains or of wood and a level dry surface of sufficient extent in the canoe countries only too often

make necessary the placing of the fire in none too handy a spot. But the real woodsman will always show his appreciation of true forest etiquette by sacrificing convenience to safety and will never build his camp fire in a dangerous place. For instance, it is often convenient to start the fire against a rotten windfall. Don't do it! Fire can hold over in rotten logs, giving no sign of its presence for weeks, only to burst out in a dry windy day and cause trouble. Often a bit of the forest floor is invitingly smooth because it is thickly blanketed with a layer of "duff." Don't build a fire on this either! It will be found extremely difficult to put out. Sometimes



HUNDREDS OF DEVASTATING FOREST FIRES BEGIN AS NEGLECTED COOKING FIRES

## A DAY AT CAMPFIRE

A Song of the Campfire Club of America

A Godsend to the lover of good fellowship and the joys of sweet communion with Dame Nature.

Where the full moon shines by night over the glistening silver path across the lake, broken only by the silent, drifting, shadowy canoe.

Where the bright sun warms the crispness of the mountain air.

Where the ear can be attuned to Nature's harmonies and you can sit in the forest with only the wild folk for your companions.

Cares of the mind and a troubled spirit fade away as you enter the cleft in the rocks, which forms a gateway to this earthly paradise.

An emotion of joy rises in the breast and a flood of happy memories rushes through your mind at the sight of the curling smoke from the campfire, and as the lurking scent of good things for the inner man are wafted to you on the breeze.

Renewed in spirit, clear vision, refreshed in mind and body, you return to take up your work in the world while your thoughts are full of anticipation of another Campfire day and your heart is full of gratitude for a heavenly blessing.



a standing, green tree affords a tempting spot at its base for a fire place. Don't use it! Even at a distance of several feet the inner bark may be scorched and weeks afterward a bad fire scar is seen to have formed. Very often rocky points invite the canoeist because they are sunny, windswept, free from flies and brush. Use them cautiously. Generally they are carpeted with a thin layer of moss,

highly inflammable. A sudden puff of wind, a spark ignites the nearby moss, and, unless there is an immediate extinguishment of the fire, trouble ensues.

#### Keep Safety Foremost.

In selecting the place for your fire take first the old fire place if there is one. Quite often this is the case in any but the most remote or infrequently travelled regions. If the

camp has been pitched on an entirely virgin site, pick a spot for the fire in proximity to the water rather than the tent. Select a level spot free of brush, rocks or windfalls so that one can move freely around the fire. Remember if you use a reflector that it is a fiendish device unless set on a clear level surface and approachable from behind and not directly in line of the smoke from the fire. On the other hand, when the flies are bad, the camp fire smoke is quite welcome about the tent. Don't forget that.

For special purposes, special devices and locations are desirable. It is not possible to describe them here. In general, however, the fire should be built only on rock or mineral soil and all inflammable materials cleared away from around it for five feet or more. Usually, this can be done safely after the fire is built by pushing the adjacent litter into the fire. The main point is not to neglect this precaution. So much for safety in fire location.

#### What Woods to Choose

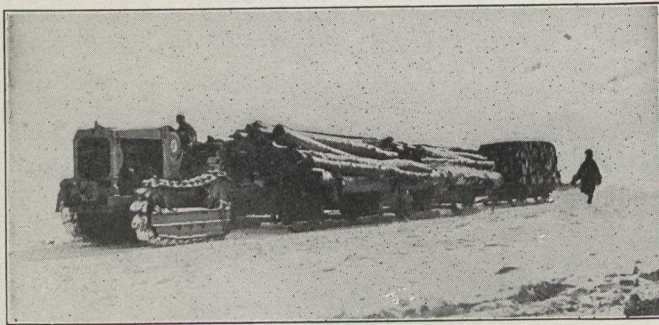
The first operation, after the site is selected, is the securing of wood and kindling. No kindling equals the bark of the paper birch. Wherever it is found, the problem of starting a fire in any weather is solved. Next to the birch bark, the fat resinous woods that may be chopped out of blazes or big scars at the base of jack or lodgepole or bull pines is the most efficient kindling. Throughout the western mountain forests, small groves of trees specially barked by the Indians to produce such kindling usually mark excellent camp grounds and are readily available. Where none of these are to be had, the dry lower branches of pine, cedar or in fact almost any evergreen tree will suffice. All such kindling should be used the same way. With the knife, cut shavings in three or four pieces of dry branch or split wood but the shavings remain attached to the wood. Place these close together with the bunches of shavings in contact to serve as the starting point for the fire.

#### Stacking the Fuel.

The choice of fuel and subsequent arrangement on the fire after the kindling is placed is governed by a few simple but often neglected principles—These are briefly:—

1. Use as dry wood as possible.
2. Grade the pieces up in size, using the smaller branches near the kindling and gradually increasing the size.
3. Place all fuel compactly so that there is intimate contact between the pieces.

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**JT** TRACTOR HAULING LOAD OF 24 TONS AT 20° BELOW ZERO.

The **JT** is dimensioned for its ability to go ahead where there is no road—under trees and between them—its traction is sure in the underbrush, on solid, swampy or sandy ground—its control is sensitive and positive—it can be handled to the fraction of an inch in narrow passages.

It will snake logs when teams are out of the question.

The **JT** will turn in a radius of 6 ft., its width over all is 60 inches, and it has a caterpillar traction of 1,628 sq. inches.

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The inexperienced camp fire builder can accomplish this work readily by arranging the wood in courses at right angles to each other. The experienced woodsman, however, seldom uses this expedient but merely grades his fuel properly and makes sure his wood is dry and compactly placed before touching off the fire.

**Dry Wood in Rainy Districts.**

A word may be said here about the selection of dry wood. Except during or immediately after a rain or in a locality where frequent camping has depleted the supply of dead wood, no difficulty need be encountered in securing dry wood if instead of picking up wood that is in contact with the ground, the precaution is taken of breaking off dead branches from standing trees or selecting from fallen trees wood that has been held above the ground. Such wood may be broken off with the bare hands or cut with a small hatchet. Where a full sized axe is available, material of any suitable size may be cut. It then becomes desirable to select trees according to their value as fuel, with due regard to soundness and dryness. Dry, standing dead trees are much more satisfactory than fallen timber. After heavy or long continued rains it often becomes very difficult to find fuel dry enough to burn. Recourse must then be had to the underside of dry leaning stubs or if only fallen timber is available, the underside of the largest trees must be selected. The author once travelled for seven weeks in a region where rain occurred daily. Long before the end of that period it became necessary to locate camps primarily on account of the availability of extra large deadfalls, on the underside of which it was alone possible to secure dry fuel. Such a condition is encountered very rarely.

**Green Aspen for Winter.**

During the winter, however, it is more difficult to distinguish dry from wet wood than in summer. In periods of extreme cold more than ordinary care must be taken to select sheltered parts of standing trees. After the fire is well started, either winter or summer, green or wet fuel may be used in considerable quantity and it is generally advantageous to cut all large fuel, for large fires, twice as long as required and burn the pieces in two "chunking up" the fire from time to time. Where it is desired to maintain a fire for a long time, as over night, for instance, green fuel is generally preferable to dry. Green aspen is excellent for this purpose and although the process of burning it is often referred to as

"stewing green poplar" the results are quite satisfactory.

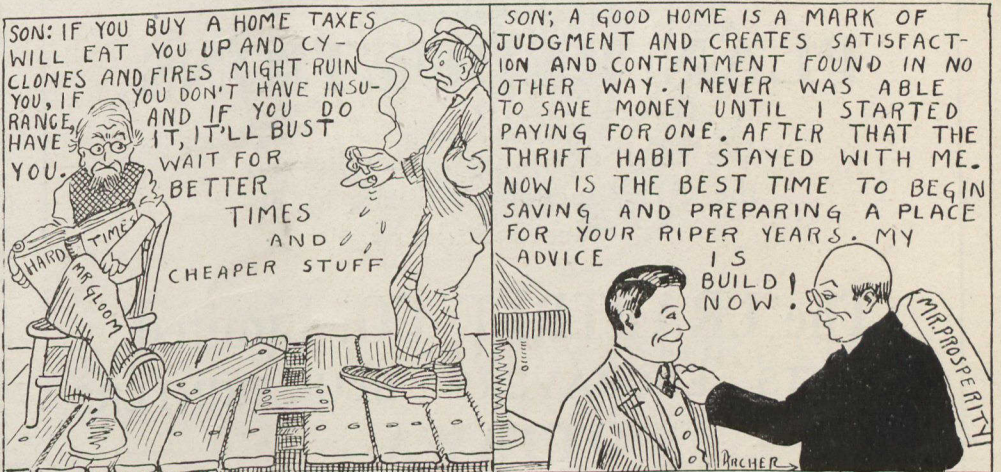
**Using the "Squaw Stick".**

The most common sort of camp fire employed is one used primarily for cooking purposes. These vary all the way from a small blaze made with a mere handful of dry sticks to boil a kettle of water for noon tea, to cooking fires at permanent camps where various additional cooking operations such as baking, frying, broiling, etc., are conducted. Such fires are provided with suitable accessories for holding utensils which it is not possible to describe here. Also they are usually fairly well safeguarded. The dangerous fires are the small ones built for only temporary use, noon lunch fires especially. The only accessory equipment of such fires is generally

the support for a single kettle, commonly a "squaw stick" driven on a slant into the earth and inclined over the fire with a weight, if needed to hold down the end and a block under it to keep it at a suitable height above the fire.

**Method of Making Camp.**

Nothing has yet been said about when to light the fire. The natural tendency in making camp seems to be to first build a big fire and then go about the rest of the work. To those campers to whom the cheerful ruddy glow of the fire is an essential to a feeling of comfort and to whom this cheer seems to justify the work involved in cutting wood and keeping up a fire that is not being used, the "start-the-fire-first" method of making camp is, of course, the proper one. But this is not the necessary



Which of the Two Fathers is Giving the Better Advice?

**"A little good stock"**

The cookery books tell people to use it; and you know what a difference it makes to the tastiness of a soup, a stew, a hash, or a meat pie. But in summer stock is such a trouble to make. It is far better to use Bovril. Bovril gives the dish a delicious flavour.

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procedure. Where economy of effort is desired, the proper procedure on making camp is first to secure and stack ready for use sufficient wood to provide for the supper fire and kindling for breakfast as well. Then put up the tents, make the beds, build the fire place, fill the kettles, peel the potatoes, slice the bacon and do any other preparatory operations. When all the preliminaries are complete and the kettles hung over the properly arranged fuel and kindling, then and not till then should the match be applied. Thus no fuel is used that does not contribute heat directly to the process of meal preparation and the camper

who is accustomed to starting the fire as the first operation in making camp will be astonished to find how little fuel is really needed for cooking purposes alone.

When it is desired to keep up the fire after cooking is completed no difficulty as a rule will be found in securing an adequate fuel supply even after nightfall. Such a fire is generally only for purposes of warmth or to serve as a centre around which the crowd gathers to continue the never-failing game of trying to outlie one another and the most readily procurable fuel may be used—size, shape, kind or even dryness is unimportant. Pick up what-

ever is handy. That's a good way to clear away trash from around your camp fire and improve both the safety and convenience of the site.

#### And Then—A Precaution!

Finally, the all important question of extinguishment must be mentioned. It is right here that most troubles arise and the noon camp fire is the worst offender. At permanent camps there is generally someone around to prevent the fire escaping and in a very short time a space sufficiently large to ensure complete safety is burned clear around a well guarded camp fire. But noon camps, lunch camps on portage trails, small fires built for smudges, little trail side fires of all kinds built only for temporary use, these are the ones most often left unextinguished by the careless, thoughtless traveller and from these the forest stands in greatest danger. There is really no excuse for such negligence. Few people build fires in the woods except to boil water over them. "Dry Camps" are not unknown but the author never found them attaining any degree of popularity. Water is a requisite at every camp, even the short pause at lunch time and water will thoroughly extinguish any campfire if applied as it should be. It makes no difference where the fire has been built. Every forester who has fought forest fires can tell stories of camp fires safe-guarded by the most painstaking precautions which, when left unextinguished and unwatched, gave rise to forest fires. The one un-failing method is to thoroughly drown out the fire with water. Don't be content with throwing on a cupful or two and damping down the blaze. Put out every last spark. If near open water, the simplest way is to throw all unburnt brands into the stream or lake. The ashes can be spread out thin and well soaked down till all fumes cease to rise. If in doubt, test with the hand. Whenever the coals feel at all warm, apply more water. This is not as formidable as it sounds. Two or three minutes work well directed will suffice, and the satisfaction of making a thorough job of one of the forest's worst enemies should repay every real woodsman for such effort.

It does, if he IS real.

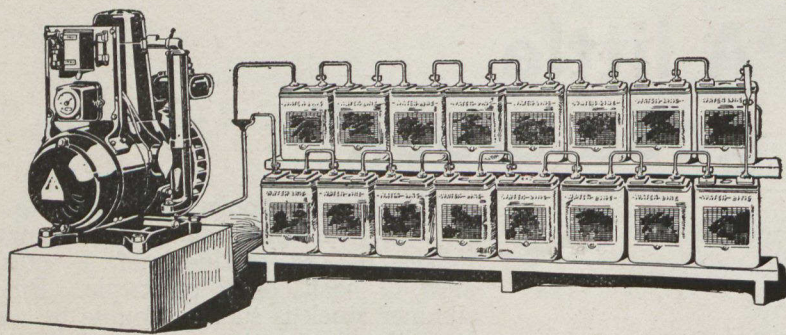
W. N. M.

The city of Moosejaw has planted this spring 28,000 trees and shrubs. In Central Park the holes for the trees were dynamited to make certain of a moisture supply.

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## Treeless Barrens That Come to Life

Mr. Freeman Tupper, Forester of the McLeod Pulp and Paper Company, who has written interestingly for this magazine on the rapid recovery of many of the barrens of Nova Scotia, has been asked by some of his readers why the new forests have only recently commenced to grow. "Why didn't they grow before? Why is Nature re-seeding portions of our barrens now after so many years of waste?"

In artificial reforestation, it is considered a good time to seed or plant immediately after a burn. The soil is free of surface vegetation, and the light ash aids in seed germination. Care is then taken to plant at the proper time, and guard against adverse conditions, such as soil erosion and frost. Nature, however, does not work as quickly. Conditions soon arise which hinder seed germination, and thus many years pass before she again restocks the forests.

The prime factors of natural reforestation are source of seed, and preparation of the soil.

The seed of all our coniferous trees comes from the cone, or fruit of the tree. In the autumn, after the cone becomes thoroughly dry, it opens and allows the wind to blow the seed hither and thither. Some species are so formed with wings that they are carried a considerable distance. These seeds germinate and become trees, providing the soil in which they fall is right. The next question is: If our forests were swept away years ago by fire, where are we going to look for seed bearing trees.

Go where you will in Nova Scotia, especially on the Atlantic slope, and one will find thousands of bogs and swamps. Many of the swamps, and sometimes on the edges of the bogs, contain a stand of timber, which did not burn owing to the extreme dampness. We find seed bearing trees among them, and these bogs and swamps are situated in and about the burned areas. Again, on many barren lands, noticeably on the Liverpool River watershed, there are numbers of large white pines of high canopy. The bark being thick and corky, resisted the heat and escaped destruc-

tion. Near the butt they were charred, it is true, but they have recovered, and after fifty years of growth it is hard to see the marks. They are now excellent seed bearing trees. Younger trees are also found here and there over the barrens,

whose age dates back to a year or two after the burn. They obviously spring from seed trees in the neighboring swamps. Being the exception rather than the rule, they withstood the adverse conditions, and are large enough now to be seed bearing.



### BUREAU OF CANADIAN INFORMATION

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

#### WESTERN CANADA FARM LANDS

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

#### IRRIGATED FARM LANDS

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

#### EASTERN CANADA FARM LANDS

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

#### INDUSTRIAL INVESTIGATION AND RESEARCH

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

#### INDUSTRIAL OPENINGS

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

#### CANADIAN INTELLIGENCE SERVICE

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

### DEPARTMENT OF COLONIZATION AND DEVELOPMENT CANADIAN PACIFIC RAILWAY

MONTREAL: C.P.R. Bureau of Canadian Information, 335 Windsor St. Station.

WINNIPEG: J. F. Sweeting, Industrial Agent, C.P.R. Depot.

CALGARY: M. E. Thornton, Supt. U.S. Agencies, Dept. of Natural Resources Building.

NEW YORK: C.P.R. Bureau of Canadian Information, Wilson Building, 1270 Broadway.

CHICAGO: C.P.R. Bureau of Canadian Information, 163 East Ontario Street.

LONDON: A. E. Moore, Manager, 62-65 Charing Cross.

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

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



So that today the young forest which is springing up can be directly traced to these three sources of seed bearing, or parent, trees.

Of course a great deal depends upon the condition of the soil in which the seed must germinate. The soil under a stand of timber is chemically different than that of the barrens. The fire destroys the humus content, and if not planted immediately it is exposed to the wind and sun so that the surface layer loses water content or mois-

ture; it cracks open and becomes hard. Water from the rains does not gradually sink in, but runs freely over it, causing floods, soil erosion, and then excess drought. This affects the flow of our rivers, and sometimes on steep hill-sides the soil is washed away so that it will never produce another stand of trees.

The next thing that happens is the springing up of a dense growth of scrubby bushes, alders, wire birches, and other hardwoods. These seeds,

many of which have been on the ground in a latent state, germinate under most any condition, and grow very rapidly. These, then, are the adverse conditions to our coniferous species. To repeat, the seeds are either washed away, killed by drought, or frost, or choked by the thick surface vegetation. These conditions continue for a number of years, then comes the turning point. Conditions begin to improve; the broad-leaf species, or hardwoods, grow to be trees, which form a protection of the soil surface. The water content is again retained, and the rank growth of shrubs begins to die out. This, of course, requires a set of years to perform the work, but nature works in her own time and ultimately the soil is again made fertile to receive the seed of a new forest. The over-wood of hardwoods form a protection for the young seedlings, and they grow to be vigorous trees. Many of the hardwood will eventually die out as the new trees overshadow them, and as the years go by our heritage will again return to us.

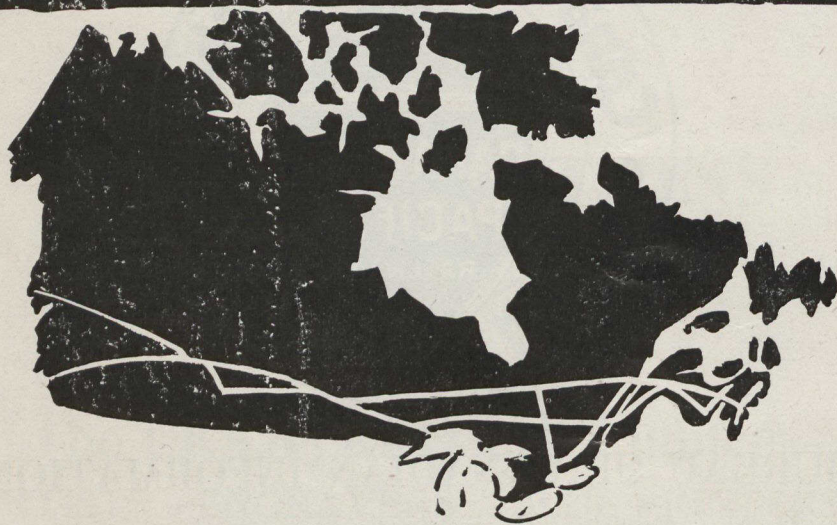
Just one careless match, camp-fire, or tobacco ash, and nature's work of years has all been in vain. It is a shame of course, but we will not pity nature. We are the ones who suffer. It affects the social and industrial conditions of our whole nation. Our forest is our supreme industry. France realized this fact, and now the loss by fire in the forests of that country is only .0002 of its area.

#### TEN RULES.

#### For the Preservation of Our Forests.

1. Never start a large fire in or near timber any time during the fire season of spring or fall.
2. Never leave any fire entirely unwatched, no matter how safe it seems or for how short a time.
3. Never light a match without putting it out.
4. Never throw cigar or cigarette butts, or pipe ashes in dry leaves.
5. Never make an open fire without cleaning off all the inflammable material in a space at least 10 feet in diameter.
6. Never build a fire against a tree—live or dead—or against a log.

## Canadian National Railways



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**Forest Products.** The forest resources of Canada are served, in the main, by the Canadian National Railways. The pulp and paper mills, with few exceptions, are situated on its lines.

**Minerals.** Practical information on the mineral resources of Canada, and opportunities for development.

**Intelligence Service.** The Industrial and Resources Department of the Canadian National Railways has the widest range of information on Canada, and which is available to the public.

Correspondence is invited from manufacturers, mining men, trade representatives, chemical engineers and others desiring information on Canadian conditions, resources, and industrial opportunities.

R. C. W. LETT, General Agent,  
EDMONTON, ALTA.

J. WARDROP, General Agent,  
WINNIPEG, MAN.

C. PRICE GREEN,  
Commissioner,  
Industrial and Resources Dept.  
TORONTO





7. Know the name of every Forest Ranger in your section and how to reach him quickly.
8. Feel a responsibility for every forest fire you see, no matter whether you started it or not.
9. Try to get it out yourself, but if beyond your control,
10. Get word to the Forest Ranger at once.

At Woodstock, N.B., June 1st, five citizens of Perth appeared before a local Justice and pleaded guilty to a charge of having failed to extinguish their camp fire when on a fishing trip on May 13th, in a finely wooded section of the province.

A fine of \$50 was imposed on each man, in addition to the cost of extinguishing the fire. Only the prompt action of Forest Service men stopped a disastrous fire which might have had serious consequences for many industries and for the Province as owner of most of the timberlands.

This is the first case of a fisherman in New Brunswick being punished for failing to extinguish his camp fire.

## PRAIRIE TREES AND DRY YEARS.

By Archibald Mitchell

The familiar "Trees won't grow in dry years" was emphatically discounted by a visit to Doctor McCallum's farm at New Dayton, Alberta, where we found the Doctor just in from the seeder and glorying in his "bush." Planted in 1916 and '17, his trees are a splendid contradiction to the usual camouflage, and when you tell people you saw trees there, eleven to twelve feet high, planted in 1917, and some of which had made growths of four and a half feet last year, without irrigation, the objectors have no more to say. The concrete fact is something they can't get over.

## How to save white pine from blister rust.

By S. B. Detweiler, U. S. Forest Service  
White pine blister rust can be controlled by uprooting currant and gooseberry bushes. A diseased pine cannot directly infect another pine. The spores formed on a diseased pine produce infection only on currant and gooseberry bushes. Here the disease passes through two stages on the leaves. In the first stage it spreads from bush to bush. In the second stage it produces spores that cause blister rust infection in white (five-leaved) pines. The blister rust is absolutely and entirely dependent upon currants and gooseberries for its spread. Since these bushes are the only "carriers", their destruction is the primary basis of controlling this disease. This prevents further infection of the adjacent pines. Wild currant and gooseberry bushes are commonly present in white pine areas, in addition to cultivated bushes.

The spores which infect the pines have a very short life. They are so delicate that most of them perish within a short distance from the currant or gooseberry bush on which they are formed. A distance of 200 to 300 yards between white pines and the nearest currant or gooseberry bushes is sufficient to protect the trees under ordinary



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conditions. Cultivated black currants are an exception to this rule because of their extreme susceptibility to the rust and their heavy spore production. They should not be permitted to grow within a mile of white pines. It is advisable to destroy black and flowering currants throughout pine-growing regions. Other cultivated currants and gooseberries should be as widely separated from the pines as possible, because bushes usually are numerous, of large size, and grow on open sites exposed to the wind. They should not be planted in sections where white pine is an important tree. The practice of designating pine growing and currant growing districts, followed in some States, should be more widely adopted. Conditions in different localities vary, therefore it is desirable that someone qualified to judge conditions be called upon to determine the necessary width of the protective zone before control work is begun.

The amount and extent of pine infection largely depends upon the kind of currant and gooseberry bushes, their number, size, and exposure to the wind. Thus, three cultivated black currants, in a single year, infected 68 per cent of the pines in an adjacent 8-year-old plantation, but the damage was restricted to trees within 125 feet of the bushes. At another point, five cultivated black currants in a period of 15 years, have killed or commercially destroyed 47 per cent of the pines within 300 feet; but at a distance of 800 feet, less than 10 per cent of the trees are diseased. A single wild gooseberry bush 3½ feet high, and fairly well screened by surrounding forest growth, infected every white pine (25 trees) within 20 feet radius. No evidence of infection from this bush could be found at a distance greater than 50 feet. In contrast to this, an isolated wild gooseberry bush seven feet high, growing in the center of a young pine plantation and fully exposed to the wind, caused infection up to a distance of 500 feet. Infections occurred over a period of four years in both cases. The last illustration shows the importance of destroying large bushes in exposed situations.

Experiments in progress since 1916 prove that the destruction of currant and gooseberry bushes effectively protects white pine from blister rust.

#### GOOD THINGS FOR NEXT ISSUE.

Dr. E. M. Kindle, who wrote "Mackenzie River Driftwood" in this issue, contributes a striking article on "A Tree Three Million Years Old." Dr. Kindle's reputation as a palaeontologist is international and his studies of fossil trees are uncommonly interesting and informing.

Mr. B. M. Morton, author of "Native Trees of Canada," the best work of its kind yet published, writes in the coming number on "The Repair of Damaged Trees."

"The Tragedy of the Buffalo," attractively illustrated from photographs and sketches is the type of fact-story with which every Canadian delights to get acquainted. If you have a boy relative in your family, hand over the next issue to his hungry hands.

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**PRESERVATION OF CANADIAN PULP AND PAPER INDUSTRY**

By Frank J. D. Barnjum, Annapolis Royal, Nova Scotia

Some idea of the enormous consumption of wood and timber in the United States can be gained from the fact that if their entire supply were drawn from Canada alone, the total available Canadian supply would last the United States only about six years.

I have recently read remarks by an American paper manufacturer, who is, quite naturally, selfishly interested, regarding the proposed Canadian embargo against the export from Canada of pulp-wood for the United States Mills. I note that the advocacy of such an embargo by Canada is described as "propaganda of men striving to serve personal ends," and from "selfish interests." But it seems to me that the selfishness is entirely on the other side, when the American mills want to deprive the Canadian pulp and paper manufacturer of his raw material.

If wood were being shipped from the United States to supply the Canadian Mills how long do you think it would be before some action would be taken along these same lines?

Canada is in a much worse plight so far as her available supply of standing timber is concerned than is the United States. So far as my own personal ends or selfish interests are concerned, my mills in Canada have the largest supply of standing wood, based on their capacity, of any pulp mills in the world, all of which land is owned in fee, with the wood now exportable to the United States. Consequently, I cannot be accused of selfish interests in supporting an embargo or export tax on pulpwood.

I am perfectly willing to acknowledge that the situation with regard to a supply of raw material for the mills on both sides of the line is critical, and, as a matter of fact, sulphite pulp, at least, should even now be manufactured out of some annual crop instead of trees, even though the quality would be inferior, and the cost much greater. We need what standing wood supply now remains for the building of homes and uses for which there is no substitute for wood.

I note it is stated that Alaska can furnish perpetually one-third of the print paper consumption in the United States, but when we consider that paper uses only about three per cent. of the total amount of wood consumed annually in the United States, one-third of this would be merely one per cent. of our total consumption, so we might as well forget Alaska. Furthermore, as a matter of fact, when Alaskan wood is used to any extent it will not be reserved for paper alone but will be used for all other purposes for which wood is required. And, when you consider that the entire supply in the Alaska National Forests would last



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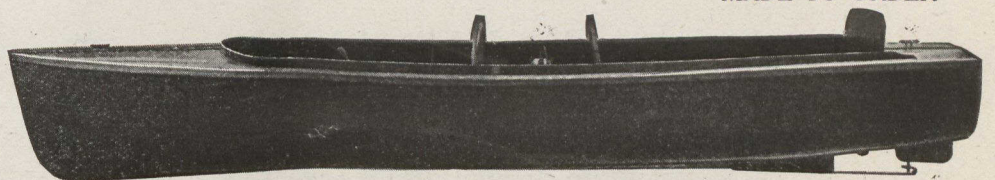
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MILLS AT IROQUOIS FALLS, ONT.



the United States for all purposes only a matter of about one year, it will be readily seen that we are only raising a false hope in counting upon Alaska for a future paper supply.

Some idea of the enormous consumption of wood and timber in the United States can be gained from the fact that if their entire supply were drawn from Canada alone, the total available Canadian supply would last the United States only about six years.

The present temporary surplus of pulpwood and lumber was simply brought about by the high prices of 1920, which enabled the lumbermen to operate in the remote sections that contain our present remaining supply. As soon as business returns to normal, this apparent surplus will very soon vanish and will not be replaced until prices become sufficiently high so that the lumberman can again pay for the long hauls. In proof of this assertion, lumber is being sold at the pre-

sent time at an actual loss of \$15 to \$20 per thousand feet, and pulpwood in about the same proportion.

This shortage of standing timber is world-wide, so we cannot look to other countries for supplies. As soon as business resumes anything like normal proportions there will be a sad awakening for our pulp and paper mills in so far as their supply of raw material is concerned; and that is why I say these mills should begin even now to use some annual crop as a substitute, at least for their sulphite pulp.

When such authorities as Senator W. C. Edwards of Ottawa, one of the best posted lumbermen of Canada, state that the standing supply in Eastern Canada will be exhausted in about twelve years, and R. W. Hibberson of the well-known timber cruising firm of Hibberson Brothers of Victoria, British Columbia, advises us that even British Columbia will be facing a timber famine within fifteen years, surely the time has arrived for some immediate action towards the retaining of our remaining supply for our home industries.

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### TREES

In the Garden of Eden, planted by God,  
There were goodly trees in the springtime  
sod—

Trees of beauty and height and grace  
To stand in splendor before His face.

Apple and hickory, ash and pear,  
Oak and beech and the tulip rare.

The trembling aspen, the noble pine,  
The sweeping elm by the river line;

Trees for the birds to build in and sing,  
And the lilac tree for a joy in spring.

Trees to turn at the frosty call  
And carpet the ground for their Lord's  
footfall;

Wood for the bow, the spear and the flail,  
The keel and the mast and the daring sail;

He made them of every grain and girth  
For use of man in the Garden of Earth.

Then, lest the soul should not lift her  
eyes  
From the gift to the Giver of Paradise,

On the crown of a hill, for all to see,  
God planted a scarlet maple tree.

Bliss Carman.



**Our Car in New Brunswick.**

Regarding the New Brunswick tour of the Canadian Forestry Association Exhibit Car, Mr. W. B. Snowball, of Chatham, N.B., a well-known lumberman writes: "I am satisfied that the car is a great educator and will do a great deal towards eliminating the unnecessary destruction of our forests."

Mr. G. H. Prince, Provincial Forester of New Brunswick, writes: "I do not hesitate to say it is a splendid success and has met with great audiences in all parts of the Province. Our meetings here in Fredericton this morning were splendid; 1,900 children and school teachers attended the three meetings, beside a considerable number of citizens. Expressions of approval were heard on all sides. I have to thank you for what you have done to allow the Exhibition Car such a long run in New Brunswick this year."

At Fredericton, N.B., the Provincial authorities arranged for three meetings on Monday morning, May 23rd. The first, 9.30 a.m., was addressed by Col. Loggie, Deputy Minister of Lands and Mines; the second, 10.30 a.m., by Dr. B. C. Foster, Principal of the High School; the third, 11.30 a.m. (for Normal School Students and the Public) by Bishop Richardson.

The Canadian Forestry Association has enjoyed the heartiest cooperation from the New Brunswick Forest Service, the Minister of Lands and Forests, Hon. C. W. Robinson, having acted as chief speaker at two of the large public meetings. Through Mr. G. H. Prince, Provincial Forester, and his staff, the arrangements of the tour were everywhere facilitated, advance advertising was furnished, and excellent audiences assured. The value of educational propaganda is nowhere more intelligently appreciated than by the New Brunswick Forest Service.

**The Printers' Strike.**

Owing to the tie-up of Ottawa printing offices, through a strike of printers, it was found impossible to issue in June or July the Canadian Forestry Magazine. Many other Canadian publications suffered a similar dislocation. It is probable that such interferences will not be encountered again this year. For the omission of these issues, under such unavoidable circumstances, the Editor asks the indulgence of readers and advertisers. The present issue is many pages under normal size.



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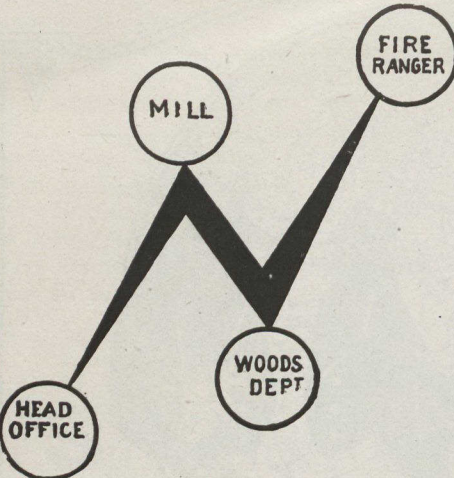
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### The Doom of the Modern City

To the students of the New York State College of Forestry at Syracuse, N. Y., Laurie D. Cox, professor of Landscape Engineering declared that the American city, the modern city of today, was only an experiment and that the question as to whether it would endure in its present form as a place of human domicile was problematical. Prof. Cox intimated it was quite possible that a new system of city planning would have to be adopted within the next fifty years.

He said that it had not been settled by any means that we could go on living in the city under the present system, because the tendencies of the urban community were discouraging to human efficiency, due principally to nervous tension and the poverty of out-of-door recreation places. This is not so much a physical need, as is commonly believed, science having largely overcome many of the physical disadvantages of city life. It is a mental need. Only about three generations can survive the shock and confinement of the modern city without mental impairment.

One of the first considerations of the landscape engineer is to counteract the destructive effects of large numbers of persons crowding their business places and their inhabitants together, living in narrow, noisy quarters and being deprived of the fresh air, quietude and perspective of the country. The city of the future may be designed to obtain primarily mental recreation rather than physical recreation.

Prof. Cox also told the students that while striving to overcome the effects of the concentration of population in the city it was also incumbent on the landscape engineer to leave the mark of adornment and beauty on his work.

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# The Plea of the Pines

By James Lawler, Dominion Forestry Branch

We are the tall white pines. We are Canadians and love our country. Some call us lordly, but we do not want to lord it over any one. Men! We are your brothers and desire to serve you, and serve with you, to make our land the best in the whole world. Some praise us and call us stately and magnificent, and then treat us as enemies; we desire less praise and more friendship.

We are not unmoved by the joys and sorrows of our human brothers. We do not resent it when we are cut down and made into useful things. When a tree is made into a hobby horse, it rejoices with the child who bestrides it. When we become a cradle, we protect the infant we hold with somewhat of the joy and solicitude of a mother. When we are rafters and sidings of shingles, we keep away cold and storm from the little family with the care of a father. When made into a canoe, we rejoice in the joy of the lovers we bear slowly and safely through quiet pools and shady narrows. We rejoice with them that do rejoice and weep with them that weep. Yea, human brothers! We do more. We go down into the grave with you; and you and we together return to the dust from which we both sprang.

You call us lordly, write sonnets about our evergreen topmost branches which comb the fleeces of the clouds, you extol our soft, straight-grained, cream-colored wood, and yet you treat us as if we were possessed by devils. You have driven us off the fat, fertile lands and put them under the plow. We do not complain of that: it was inevitable, but we do complain that after we have gracefully yielded up the rich lands you have pursued us into the hills and barren lands, and harried us with fire and axe, as if our family were vermin to be exterminated. We do not complain that you cut us down when we are grown. That, also, is inevitable. But we do complain that when you have cut down the tall trees you smash down the seedlings, the babies of our race; that you kill the birds which protect us from the insects; and that, above all, you let flames devour young and old, mother-tree and sapling, yea even the very earth in which we stand, so that we can establish a family again, no more for ever.

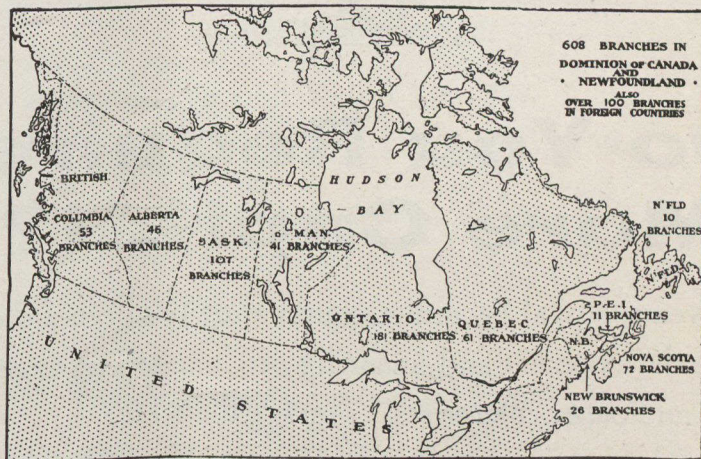
### Give us the Waste Lands

We will, human brothers! make you, on behalf of our family—of our brothers, the spruces and firs, and our cousins the hardwoods — a solemn offer, a fair bar-

nor the rich lands around the lakes, nor the prairies; let the farmer take them — he feeds you. We do not ask the good pastures; let them go to the shepherd —

he clothes you. But give us only the waste lands, the sandy barrens, the boulder-strewn table-lands, the rocky hillsides and we will bless you. We will shelter

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## Oregon and Fires

By F. A. Elliott, State Forester.

Over \$640,000,000 in merchantable timber is annually endangered by fire in Oregon. Timber, next to land itself, is the state's greatest resource. The lumber industry today employs ten times as many men as any other manufacturing industry. The importance that forest protection plays in the prosperity of the state is therefore readily understood.

From May until October each year the fire danger is ever-present. Thirteen per cent. of the fires are caused by lightning while 87% are caused by human inorance, carelessness or malice.

The State Forester is principally concerned in the suppression of such fires as do occur and in the elimination of those 87% man-caused fires on the 9,000,000 acres of privately owned timberland. Probably in no other state will be found better co-operation in forest protection than exists in Oregon between the Federal and state forest services and the timbermen themselves. Their combined efforts through organized systematic patrol, and fire fighting work backed by effectual laws, have eliminated over 90% of the annual forest fire losses.

Oregon's forest fire law is second to none. Its most unique provision is the compulsory forest patrol section, founded on the principle that all timber owners should bear their proportionate share of the protective cost. Assessments made on an acreage basis thus provide for patrol, improvement and fire suppression work in the timbered districts. This law has met with the universal approval of the timber owners and has materially aided in solving the state's fire problem.

The War Department has cooperated in forest protection during the past two seasons. The 1920 aerial forest patrol consisted of eleven planes and operating per-



sonnel. A distance of 90,800 miles were flown, and 719 fires reported, with 89% efficiency in their location.

The keeping of our forests green until they can be properly utilized must be attendant not upon forest officers alone, but upon the co-operation of all users of the forests either for pleasure or profit.

The present pressing need is added Federal aid and greater state participation in the cost of fire elimination, in order that the existing organization may be amplified and made more efficient.

**FORESTRY IN SWEDEN.**

*By Edward Beck.*

STOCKHOLM, Sweden, June 5. —Co-operation between the State and the owners of the private forests accounts in a large measure for Sweden's pre-eminence in forest development. The State's liberality in providing the means, its wisdom in enacting reasonable laws for the preservation of the forests and to provide for their continuity, combined with the private owners' willing compliance therewith, constitute the second most important factor.

There is apparently no conflict between the State and the private owners in these matters. Swedish forests have been under legal control for more than seven centuries. There are a few general laws applicable to the entire country. Different laws apply to different provinces or districts. Their enforcement and supervision are invested in local forest commissions, one for each province, which in turn, is answerable to the State Forest Service, which has general supervision both of the forest laws and of the State-owned forests. The commissions usually comprise in their membership a representative of the State, one of the private owners, and one of the immediate district concerned. Besides enforcing the law and arbitrating disputes, they maintain forest nurseries and distribute plants and seeds for purposes of reforestation. They encourage the planting of idle lands and promote local interest in tree culture. Their expenses are met by means of a small tax imposed on the stumpage values of the timber cut in their respective districts. They are also subsidized by the national and the provincial Governments and derive additional revenue from the sale of seeds and plants. They serve to obviate some of the objections which the owners of the private forests might otherwise offer to interference with their rights of private property in their forests.

In 1918 it was found necessary to pass a stringent general law forbidding the cutting of young growing forests unless and until it was shown that such cutting was essential to their improvement. Exception was made in the case of land destined for agricultural purposes, pastures, building sites, etc. In enforcing this law the commissions are empowered to fine disobedient owners, to confiscate wood illegally cut and to prohibit

absolutely for stipulated periods any further cutting on the areas involved. In such cases the owners have the right of appeal to the courts. This law is the result of excessive cutting during the recent war period when the demand for lumber and its price were both abnormal.

Laws fixing a minimum diameter limit for cutting, such as prevail in Canada, have been applied from time to time in several of the pro-

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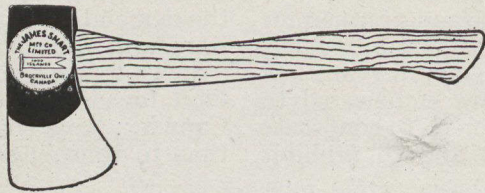
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vinces. They have usually proven unsatisfactory and are not regarded as having contributed to the general improvement of the forests.

Speaking generally, it may be said that the state's efforts are directed principally to securing a greater volume of reproduction. The private owners, while not neglecting this important feature, are said to excel in improved logging operations and in forest upkeep. No new laws are enacted for the control of the forests until there has been full and free deliberation between the governmental authorities and the private owners. New laws and regulations are usually the result of mutual agreement.

The Swedish public forests are managed by the Swedish Forest Service, operated as part of the national Department of Agriculture. The Service is governed by a director general and six assistant directors, with district foresters, assistant foresters, forest engineers, etc., for each of the several districts into which the public forests are divided. The Service is organized on semi-military lines. It has a distinctive uniform and a very pronounced esprit-de-corps. Its personnel includes young men of high social standing to whom the remuneration paid, which is less than unskilled laborers receive in Canada, is probably a secondary consideration.

The Forest Service has complete control over the state forests and either supervises or manages the other publicly owned forests, such as those owned by various counties, villages, parishes and communities, many of which, by the way, derive considerable income from the proceeds of their forest possessions. It has charge of the execution of the laws governing the management of all forests and of cutting and all other regulations. Its officers pay visits of inspection to private as well as public forests to see that the laws are being observed.

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

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



cutting might deter private capital from being employed in reforestation.

The State Forest Service derives its revenues from the sale of standing timber and in other ways. It shows an annual surplus. It expends about 50 per cent. of its income on forest improvements and upkeep. This is in marked contrast to what the Canadian provinces are doing for their Crown lands. Quebec, for example, which is more liberal in its forest appropriations than most, has 45 millions of acres under license against Sweden's less than half that extent. Quebec derives an annual income of about \$4,500,000 from its Crown lands and appropriates for their upkeep, administration and improvement about \$400,000. Sweden on the other hand, out of an annual revenue of about \$5,000,000 puts approximately \$2,500,000 back into her forests.

Education plays an important part in Swedish forestry. The government spares no expense in educating and training picked men for forest work in both its higher and its less important branches. A college of forestry has been in existence here since 1828. It is now located on beautiful grounds on the outskirts of Stockholm in buildings especially erected and well adapted to its purpose. It gives instruction in both theoretic and practical forestry, its course covering three years. The entrance requirements include nine months of practical training in the field as well as a certificate of graduation from a high school or college. It is said to be without an equal in Europe. Its courses are in such demand that would-be entrants have to go through a preliminary elimination trial, which only two-thirds of those entering survive. Its graduates are in great demand for both government and private service.

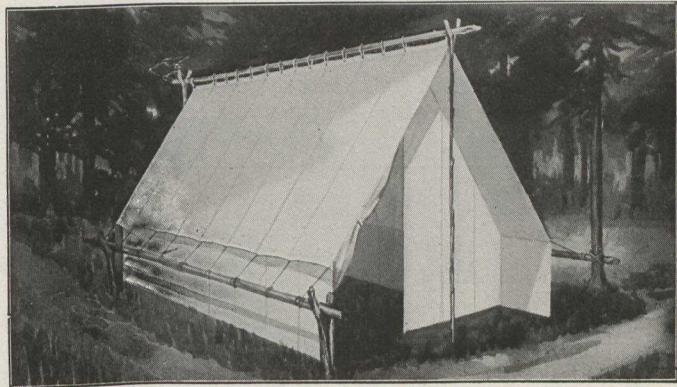
In connection with the college the government maintains a forest laboratory which devotes all of its efforts to research on questions bearing on forestry. It has two sections, one devoted to forest management and to investigation in regard to the growth of stands, and the other mainly to geological and botanical subjects. It is exceptionally well-equipped and ably staffed. A visit disclosed a number of important and interesting experiments in progress. The laboratory maintains experimental areas in all parts of the country and is doing a work that no private agency is competent to undertake.

The State also maintains a number of schools of a lesser grade, sit-

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uated throughout the country, chiefly for the training of forest rangers. There are eleven of such schools in all. At each school there is an experimental forest area for the practical instruction of the students, who are also required to spend part of their school year in the forests, themselves doing actual forest work. The course usually comprises a full year of study and the object sought is practical insight into forest management and the supervision of forest operations. Charcoal burning,

which is an important part of the industry is also taught.

A visit of inspection was made to one of the best of these rangers' schools located near Bispgarden in middle Sweden, where it has been established since 1898. The school has a director and assistant director who live on the premises. It employs two rangers and other necessary staff. It graduates eighteen students every year. A primary education is sufficient for admission. The average age of the students is

twenty-two years. There are many more applicants than can be accommodated. The students are lodged and boarded at the school free of charge, their only expenses being for books, etc. Each student is allowed 25 kronor a month (\$6.25). The studies are mostly of a practical character and include forest accounting, ditching, loggers' camp construction and other co-related subjects. The school maintains a nursery as well as an experimental plot. It also operates an extensive plant for the extraction of seeds from tree cones. It buys the cones in large quantities from the private forests and other sources and markets the seeds all over the world, deriving a large revenue therefrom.

The work that this school and its fellows are doing in training men for practical work in the forests cannot be overestimated. In the opinion of the visitors it supplies one of the most important elements in Sweden's progressive forest policy.

Reforestation as practised in Sweden and forest fire protection will be treated in future articles.

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### Industries Peter Out

The New York State College of Forestry at Syracuse, announces that its wood using survey of New York State, made in co-operation with the United States Forest Service, shows a 30 per cent decrease of the number of wood using concerns in the state since 1912, as a result of the disappearance of the forests which furnished their raw material. This survey is indicative of what would be disclosed by survey of other states.

### Sir George Foster's Opinion

Department of Trade  
and Commerce

Ottawa, May 10th, 1921.

Robson Black, Esq.,  
Secretary,  
Canadian Forestry Association,  
Ottawa.

I have yours of the 9th with enclosed copy of letter from your Western Organizer and Illustrated educational sheet.

I am very much pleased indeed to receive the information you were kind enough to send me and to know that there is so general and enthusiastic a response to the campaign that you have put into operation, which, if carried on with the impetus of its commencement, as I have no doubt it will be, will really almost revolutionise the North-West in this respect. Great credit is due to your Association for its patriotic and enterprising work.

Yours very truly,

(Sgd) Geo. E. FOSTER.



**Good Fire Publicity**

The Dominion Parks Branch, Department of the Interior, is responsible for another ingenious means of appealing to the public to prevent fires in the National Parks. A "Luck Piece" has been designed, which is stamped out of aluminum and bears the terse, yet significant warning on one side, — "Prevent Fires — Save the Forest" together with the words, — "Buffalo Medicine" (Luck Charm). The connection between the idea of a luck charm and the preservation of the forests, which everywhere clothe the valleys and the slopes of our National Parks, is best explained in the little pamphlet which accompanies the luck piece, tucked away in a neat little miniature "medicine bag" of an attractive Indian design. These little tokens will be handed out to hundreds of visitors to the National Parks this season and there is little doubt but that they will effectively carry the message they are intended to convey.

Riga, Russia.—Forest fires are sweeping the great timber belts of Central Russia with such frequency and in such magnitude that a catastrophe for the forest area is threatened, says the Moscow Isvetia, which places the responsibility for these conditions upon the drouth, the carelessness of the peasants and the disorganization of the forest service.

These statistics are incomplete, but in 24 provinces 11,364 fires have been reported, destroying or damaging 5,400,000 acres of timber, the newspaper states.

According to information reaching Moscow, adds the Isvetia, in 22 provinces 29 per cent. of the fully grown trees, forty per cent. of the middle growth and 31 per cent. of the young growth already has been damaged.

**THE WORSHIP OF TREES**

*Concluded from page 335*

many generations and the actual belief in them in many cases are startling evidences of the natural conservatism of the human mind.

**Why a Chestnut is "Lucky."**

Primitive people personify the soul, or rather the spirit or ghost as they call it. The indwelling spirit is usually the miniature of the human form or it may be a bird or if a wicked spirit, it may take some grotesque animal form. When the spirit leaves the body it may take up its abode in a tree or other kind of plant, in an animal, in a stone, mountain or body of water. All nature is filled with spirit forms. All diseases and misfortunes are caused by the dominance of some evil spirit in the body. Having

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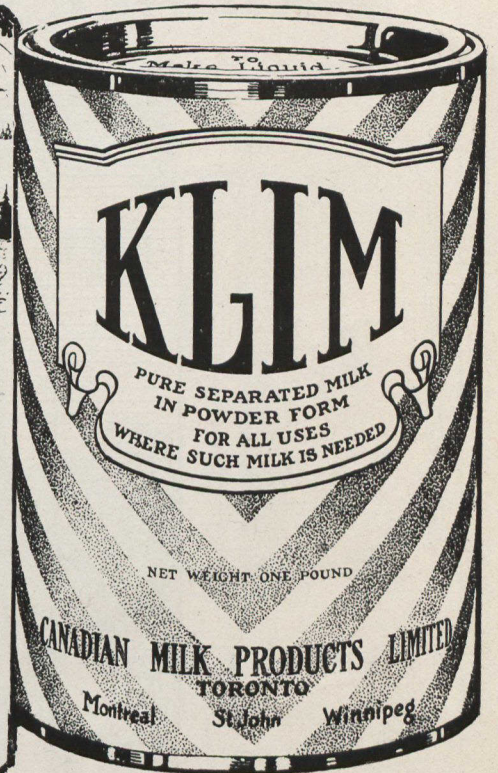
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such beliefs, it is only natural that rites and ceremonies should have been evolved to prevent an evil spirit from entering the body or to expel it when it has once entered, or in other words, the use of magic. The next step is the belief in the efficacy of charms and we find many of these associated with trees. Most of us as children have carried horse-chestnuts, acorns, walnuts or hickory nuts in our pockets for good luck or to ward off some ailment. Those of us who went often to the swimming

hole carried some charm to keep away the cramps. We can remember when our grandmothers stirred the home-made soft soap with an ash stick or hazel stick, or put an ash stick or some other charm into the churn to hasten the coming of the butter.

**Strange Cures for Disease.**

The ash tree, and by confusion of names, the mountain ash, plays an important part for some reason in tree magic. In my native State

within a few years, a man cured himself of fever and ague by tying himself (and it) to an ash tree and then crawling out of his bounds, leaving the disease tied to the tree. In England children are sometimes passed through a cleft ash tree to cure rupture. A young ash sapling is split longitudinally for a few feet and the child is passed three times from east to west through the fissure at sunrise. There are many variations in the ceremony in different localities, but in all of them as soon as

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the ceremony is performed, the tree is bound up and the fissure plastered with mud or clay. The belief is that if the tree heals, the child's body will heal, but if the cleft does not heal, the operation will not be successful. If the disease is cured and some one cuts down the tree, even a long time afterward, the disease will reappear. Thus not long ago a man who had recently taken possession of an estate in England and in making improvements planned to cut down some ash trees, was asked by a neighbor not to cut a certain tree for he as a child had been passed through it.

A similar cure for various diseases, but especially for rupture, has been commonly practised in nearly every country of Europe, but on the Continent the tree employed is usually an oak instead of an ash. Ten or a dozen years ago the ceremony was performed in Newfoundland, only the tree used was a mountain ash instead of the real ash.

**In Aid of the Milk Supply.**

One finds in folk-lore literature many references to the mountain ash or rowan tree as an effective agency against evil spirits. In Westphalia, for example, the herdsman cuts at dawn on May Day just as the first rays of the sun are touching it, a rowan tree and switches his cows on the flanks with its branches to drive away witches which are particularly likely to rob the cows of their milk on the morning of May Day. In Scotland the branches of the rowan tree are placed over the doors of cow stables for the same purpose. A still better way of attaining the same object is to tie a cross of rowan tree wood with a scarlet thread to the tail of each cow. A modified relict of this belief is found in New England, where it is said that cattle will drive better, if the farmer carries a white ash or a mountain ash stick.

**Fortune Follows the Rowan Tree.**

The practice of driving away evil spirits by beating with switches is common in the remote districts all over Europe and South America. Among people who no longer believe in evil spirits the custom still persists on certain festival days, such as Easter, Christmas and New Year's, only now the ceremony is said to bring good luck. It is a general belief in the rural districts of New England and also in Eastern Canada, that a mountain ash tree on the lawn or in the garden brings good luck to the household. That may be the

reason so many of them are to be found in our cities. The same idea is found in the custom of planting a tree at marriage or at the birth of a child.

Thus I have tried to outline the role which trees have played in the

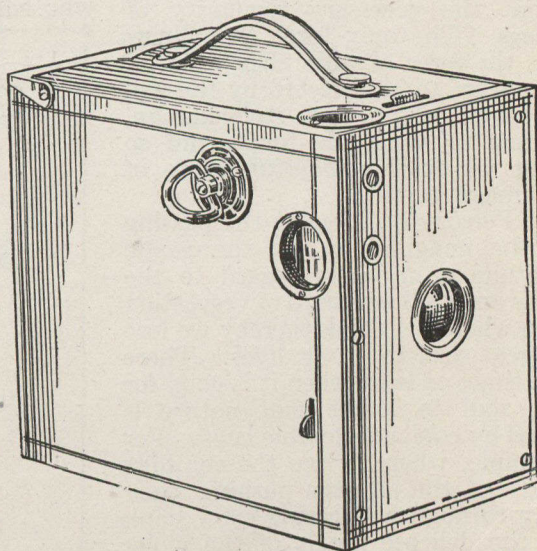
imagination of primitive people to show you that trees were regarded as the abode of spirits and as such, worshipped; they being the largest and dominant forms of vegetable life, their spirits influenced the fertility and productiveness of

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the weaker and more lowly cultivated plants; that this influence was transferred to domestic animals and the lives of men, and finally how some of these beliefs, long outgrown, have been handed down to us as mere superstitions. The prosaic and coldly rational temper with which modern men regard the manifestations of nature was unknown in the childhood of the race. Our primitive ancestors knew nothing about the laws of nature, nothing about physical forces, nothing about the relations of cause and effect, nothing about the necessary regularity of things. The only force they knew was the force of will; they believed all nature to be directed by the will of spirits whom they gave human, animal or vegetable forms and so built up their wonderful fabric of un-imagination.

Personally, I regret the passing of the imaginative and the poetic attitude of mind in regard to the trees and to the courses of vegetation as a whole. I think thereby we lose a great deal from our lives. There are times at least when it is good for the soul to forget that nature is ruled by cold, unalterable laws. For example, when we see the coralline buds of the arbutus pushing their way through a lingering snow bank or the delicate petals of the violet unfolding in their bed of fallen leaves; when we study the graceful branching system of the white birch or of the spired crown of a fig tree outlined in the winter's twilight; when we behold the passing glory of the autumn or in the spring feel the cosmic surge of re-awakening life feelings come to us which never could be inspired by the dogmatic rules of the laboratory or by the exact methods of scientific research. At such times we sympathize with those primitive people who tinged the manifestations of nature with the warm hues of the imagination and clothed them in the graceful drapery of mystic fancy.

#### Wind Damage on Prairies

Winnipeg, Man., May.—Saskatchewan has suffered considerably as a result of severe windstorms which swept over various portions of that province recently and, as a result, a great deal of seed was blown out of the ground, but the sections most affected are those which did not have the entire crop destroyed, said J. B. Musselman, secretary of the Saskatchewan Grain Growers in an interview here. "We had eight days of wind", said Mr. Musselman, "which did a vast amount of damage in central Saskatchewan, reaching from the Manitoba boundary to north

of Saskatoon. In the aggregate, a large acreage will have to be resown, but the greatest damage will arise from drifting of the soil itself and evaporation of an immense amount of moisture."

#### INCREASE RAILWAY PATROL.

Ten hand-speeders were purchased recently by the New Brunswick Forest Service and put to work patrolling the railroad from Nicol to Moffat's, on the St. Leonard's subdivision, seven miles of railroad being assigned to each patrolman, who will follow every train, and ex-

tinguish any fires that may occur. These ten hand speeders replace two power speeders which have proved unsatisfactory.

The order forbidding the burning of brush after the 10th of May has been well observed by the settlers especially in the northern part of the province. This order has received the approval of the licensees of the Crown Lands, Insurance Companies, and of many others interested in the prevention of fires, and it has been fully justified by the results obtained.

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# AIRCRAFT FOR FORESTRY SERVICE

## *Use of Aircraft in Forestry and Logging*

Ellwood Wilson

Chief Forester, Laurentide Co., Ltd.



*An interesting account of effective work done this year by seaplanes in Central Quebec.*



The writer has been in charge of the Laurentide Company's aerial work for two seasons and gives herewith the results of the work. The first season showed absolutely the practicability of the planes for reconnaissance of unmapped or mapped areas, for transportation of passengers and of fire-fighting equipment, for looking over the work of

log drives, for spotting forest fires and for aerial photography.

The winter was spent in overhauling planes and engines and in the study of the pictures, taken from the air, on the ground. This spring a photographic laboratory was equipped so that photographs could be handled well and expeditiously.

Showing the practicability of the use of aircraft in forestry service, we reproduce the above from an article in the October, 1920, issue of this magazine.

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