Canadian Forestry Journal

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CONTENTS FOR APRIL

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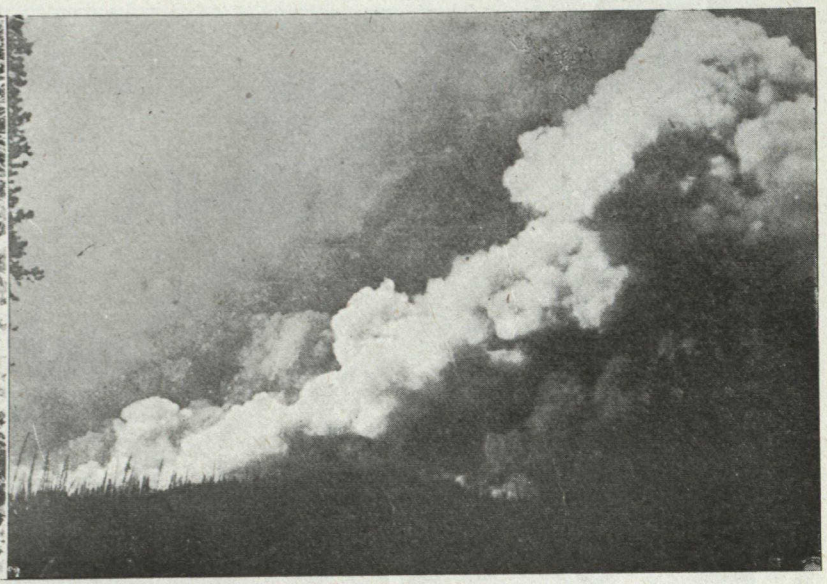


WHICH PICTURE FOR 1918?

Will it be a productive forest in your locality, Mr. Reader, or a forest given over to charred stumps and windfalls?

Will it be employment for skilled workers or will you send these workers to some other district?

Will it be an abundant near-at- hand supply of your wood essentials, without which you cannot exist, or will you pay extra for importing them?

Will it be a Forest Protection year worthy of Canada's other records in war participation or will it pile up a debit of five or six million dollars as a millstone on the overburdened future?

The Seignory of Lotbiniere

By L. Garneau, F.E.

Forest District Inspector Forest Service, Quebec.

A Forest Worked in Foresight, Where Science in Wood Harvesting Gets Elbow Room.

This track of timber land is situated on the south side of the St. Lawrence, 35 miles above Quebec, in the County of Lotbiniere. At the present time, the forest comprises about 44,000 acres, but in twenty years from this date (1914) an additional 40,000 acres will revert to the present administration. These acres are now held by an American Lumber Co., which have the cutting right for that period.

This forest has been in the possession of the present owner's family since 1672, Louis the 14th having granted it in several parcels in the form of seigniories to the Sieur de Lotbiniere.

It was not until 1833 that any definite exploitation was undertaken, except for the King Oak. The first cutting contract was made out by a notary, and the jobbers, for the most part tenants on the estate, undertook to cut and roll into the river 100 to 3500 logs made from the best pine (Pinus strobus) in which the estate was well stocked. No log that was not absolutely free from defect was ever utilized, and even at the present time, valuable pine cut 50 or more years ago and discarded as being unmerchantable, are picked up and made into serviceable material. The jobbers were paid $12.00 per 100 logs and were obliged to roll them into the river when the spring came, at their own expense.

The timbered area is practically level with a slight incline from the St. Lawrence to the southern boundery of the estate.

The tract is well drained by the river du Chene and its tributaries, the Cedre, Ormes, Huron, and Bras d'Edmond rivers.

The soil is a rich loamy sand without croppings of gravel along the rivers banks. The climate is severe at times, so that many of the trees suffer from frost cracks.

The population consists of farmers, who manage their farms in the summer and usually seek employment for the winter in the woods; they are skilled woodsmen, few of them understand the financial side of the exploitation and therefore do not make as large profit as they should. Unfortunately the tendency at present is to emigrate to the cities and towns, and labour, as a result, is getting scarce.

The personnel consists of the following: an administrator, mill manager, assistant, forest-engineer, two assistants, superintendent of fires, two assistants.

The inventory done shows that merchantable material per acre amounts to 17,515 feet, so the total merchantable timber amounts to 766,720,000 feet.

A Trust Fund

The object of management is to insure a periodic sustained yield with adequate financial return on the investment; in other words, to handle the forest as a trust fund in such a way that the present may have the largest yields and benefits from the forest for future generations.

The exploitation and transportation of the material to the mill at Leclercville is and always has been a simple matter. It has been remarked before that the drainage is excellent, the tributaries of the main river gridironing the tract in all directions, the hauling roads to the rollaways are therefore short, as a result the cost per 1000 feet being $4.00. The driving is also inexpensive, the cost per 1000 feet ranging from 0.25 to 55 cents, according to the amount of

snow and ice in the forest during the driving season.

Danger from Fires

The fire danger has always been a menace to the estate but up to the present time, no serious damage has been caused. Surrounded as we are by settlers and having a railway passing through the heart of the forest the danger is, indeed great, specially during the month of May and the first week of June, before the young green vegetation has covered the forest floor, the greatest precautions must be taken to put out any incipient fires.

Half the cost of patrolling the railways right of way is borne by the American Co., our superintendent having authority to call on any of their men in case of a serious conflagration. The right of way is patrolled after the departure of a train from Laurier or Villeroy Stations to either end of the estate. The fire ranger travels on a track velocipede and is equiped with a canvas bucket and a Quebec combination axe, mattock and shovel. As many as 19 incipient fires have been put out in a day. A monthly fire report is kept, which states the number of fires, their location, amount of damage and their origin. Wells have also been dug at every mile along the right of way and telephone lines installed through the forest. A special gasoline motor is used to bring up a fire fighting crew, when occasion demands it. The cost of the fire service is not more than one cent and a fraction per acre.

Tamarac Recuperating

The forest has suffered from the Tamarac saw fly as did all the other timbered regions in the province; as a result nearly all the merchantable Tamarac is dead. There is, however, a vigorous young growth coming up. This tract of timber did not suffer to any noticeable extent from the spruce bud worm; the reason perhaps being that the prevailing winds, from their seat of origin, did not pass over the forest.

It has been decided that the selection system by divisions can best fulfil the object of management on this estate.

In former years, the jobbers choose their own "Chantiers" or cutting areas; as was natural, they were confined to the river banks, and the maturing timber beyond a certain distance from the rivers was rarely, if ever, touched by the lumber jack.

The new regulations distribute the cutting areas over the whole track, a portion, called a division, being cut over a certain period, usually one or two years. The size of the division varies according to the amount of timber it contains. Natural boundaries, such as rivers and swamps, are chosen as much as possible. The division is divided into compartment a mile square, or containing 640 acres. These compartments are required for scientific calculation and orientation. The compartments are divided when necessary into working blocks (chantiers) which are under the control of a jobber.

Roman numerals are used to designate the divisions, the compartments have figures and the working blocks letters.

The trees to be felled are marked by the forester and his crew before the jobbers begin their work. The regulations contained in the contract with the jobber serve as a guide to the marking crew. No hard and fast rule is followed in the marking, as many trees below the diameter limit will have to be felled. These are trees which are liable to be broken or damaged by falling trees which have been cut in the neighborhood; trees which left would be subject to wind throw; infected trees, suppressed trees and damaged trees. On the other hand some trees will have to be left standing which have the required diameter but must remain as wind breaks and seed trees.

The Cutting Plan

A jobber, before undertaking a contract specifies to the administrator

or his agent the number of logs he wishes to make; the forester is then consulted and from his plans and estimates the compartment or working block containing the required number of logs, is marked for him. As soon as the required number of board feet for the year have been secured, the contracts are closed.

Waste Elimination

Our policy is to utilize all merchantable material, in accordance with the cutting plan. Hemlock especially is to be favoured, as its rapid rise in price, especially of the inferior qualities and the large percentage it forms of the standing timber warrants its exploitation in larger quantities than has been the custom. From the following data, it will be seen that our cut of hemlock is not in proportion to the standing timber:

Average amount of Hemlock per acre	10. 000 feet.
Average amount of Spruce and Balsam	6. 000 "
Percentage of Hemlock cut	20 per cent
" of Spruce and Balsam	70 per cent

From the cutting plan, it will be seen that the proportion should be 5 parts Hemlock to 3 parts of Spruce, or 5 million feet Hemlock to 3 million of Spruce and Balsam. It will be some time before these figures can be practically applied, and therefore the best policy would be to increase the cut gradually and when economic conditions are favourable, cut the specified amount.

Every effort must be made to eliminate waste, especially in tops and butts, and the main object to be aimed at while cutting is to leave a clean, healthy growth of young trees, with the age classes properly represented. By these means, the great principal of Forestry will be approached, namely the reproduction of timber in a systematic manner.

L. Garneau, F. E.
Forest district Inspector
Forest Service, Quebec

NEW PUNISHMENT FOR BIRD KILLERS

The old form of punishment by the stocks and the pillory had at least the advantage of advertising both the crime and the penalty. *Youth's Companion* says a similar object seems to have been in the mind of a California judge who recently fined two boys for shooting song birds. The fine was twenty-five dollars apiece, but the court remitted it on condition that the boys carry a banner furnished by the Game Protective Association, with a suitable inscription and the bodies of the dead birds, properly labeled and classified in respect to their usefulness as destroyers of insects; that they distribute one hundred pine cones and six rule cards; and that they bring in fifty signed pledges from other boys.

The Community End

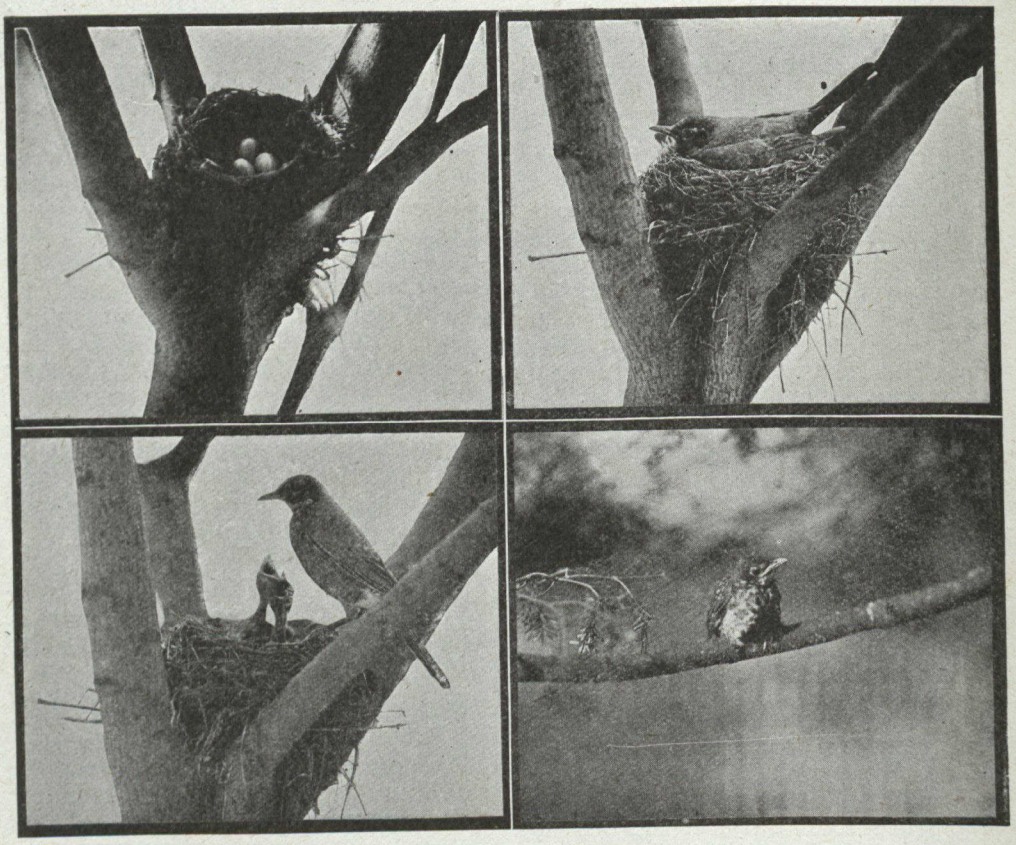
By Lionel Hitchens

"No man can serve two masters; he cannot serve himself and the community; for then the kingdom would be divided against itself; he can only serve himself by serving the community, and this is surely the only sound foundation on which industry can rest. If we are ever to solve the great industrial problem, it can only be by recognizing that industry is primarily a national service, and that the object of those engaged in it is first and foremost for the good of the community as a whole."

The Minnesota state forestry department is placed in charge of scaling and measuring timber cut from state lands, under order of the Minnesota Public Safety commission, adopted in January.

Helping The Robins to Nest

By Winthrop Packard



Courtesy "Our Dumb Animals."

In a *Bird-Lore* census, taken not long ago, it was estimated that the robin was the most numerous American bird, the house sparrow coming next. The robin, in one form or another, nests practically all over the continent of North America and the bird is one of the most friendly that we have. The poet Wordsworth once referred to the English robin as

"Honest Robin, who loves mankind both alive and dead,"

and the words might apply equally to the American robin, for the bird loves to nest not only in our gardens but in our cemeteries and upon our very houses.

Often a robin will select a corner of the porch, a nook under the eaves, or even go inside of the building itself. Recently one is reported to have flown in at the open window of a church during service and to have begun to build his nest on a cornice just over the pulpit. The window was left partly open from that time on and the family of young robins was successfully reared in this admirable sanctuary.

The nesting robins may be assisted by providing nesting sites; a shelf up under the eaves will often tempt them or a sheltered platform set on the limb of a tree. If there

is a trellis in the garden on which a rambler rose-bush or honeysuckle climbs, one of these sheltered shelves set at the top of it forms an admirable site for a robin's nest. One can assist also by putting out nesting material. In the case of the robin the first requisite is mud—good, plain, old-fashioned, black sticky mud, for the robin makes the foundation of his nest invariably of this. In sandy countries and dry weather the birds often have considerable difficulty in getting mud for their foundation. In one of her books Olive Thorne Miller tells of a robin that wet his feathers, then rolled in the dust and went to the nesting site, where he picked the resultant mud from his plumage and used it for the foundation of his nest.

Most of us nowadays have a bird bath in the yard and it is an easy thing to put a dish of clay or loamy soil beside this and moisten it to the right consistency. The robin will come and take it by the mouthful—poor chap, he has no other means of getting it—and begin the nest, perhaps on the porch but more likely on the near-by shade tree. Usually the mud is built up like a shallow cup and then soft grasses—dried grasses of the previous year's growth—are embedded in it and skilfully built around until the completed structure is mud below but softly lined and built up with these grasses. From that time until the eggs are hatched the less human oversight and interference the better, although the brooding mother bird will be very fearless as the process of incubation continues, but after the young are hatched out a gentle friendliness wisely offered will be well received and appreciated.

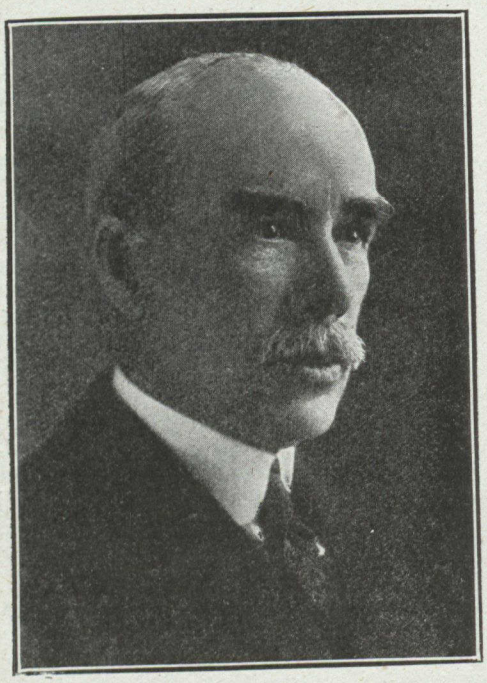
The task of feeding a nestful of young robins is a great one. Everyone of them will eat at least its own weight in insect food daily. Earthworms, rolled in grit, are well liked by the youngsters. Cutworms, inchworms, mealworms—almost any soft-bodied, non-hairy caterpillars may be given freely. Nor need one have any fear that the family will be pauperized by any such charity. This feeding will help the youngsters to grow up with very friendly feelings toward the human family and in no other way can you so readily gain the confidence of the parent birds.

Oftentimes, disaster overtakes a robin family; for some reason the parent birds do not return to the nest and then the human neighbors must take charge of the young. If worms of various sorts are not readily available, bread and milk will nourish the robin children very well. They grow up rapidly and presently will learn to fly, but although they by and by get their own food themselves they still will be very friendly with those who have fed them. They should be allowed complete freedom and will, of course at the migration time, fly away south with their fellows.

If your young robins survive the winter they will surely return to your yard and the delightful process of nest-building may be watched all over again.

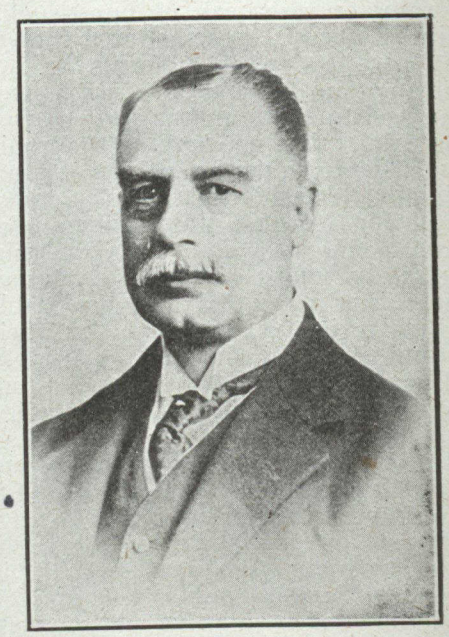
Robins, probably the same family certainly their descendants if not the same birds, have nested year after year in the same site for twenty years.

A U.S. patent granted Edward F. Millard, describse a process for making an all-groundwood newsprint paper in which about 50 per cent. of a short thin fibrous pulp is mixed with 50 per cent. of a long fibered pulp. The short-fibered pulp can be produced by using a machine such as Millard describes in his patent, and the long fibered pulp can be made with the same machine. It is claimed that the long fibres facilitate the running of the pulp while the short fibres give strength and finish to the sheet.



OUR PRESIDENT

Colonel J. S. Dennis, Chief Commissioner of Colonization and Development of the Canadian Pacific Railway; President of the Canadian Forestry Association, 1918.



HON. SMEATON WHITE

President, Gazette Printing Company, Montreal; elected a Director of the Canadian Forestry Association at the last annual meeting.

Norway's Profits from Forests

Twenty-one per cent of the Kingdom of Norway is covered with forest—that is, about 17 million acres. Of that, about 15 million acres is productive forest. The Government owns about two million acres. The commercial forests under Government supervision comprise about one million acres. The rest, or about 12 millionacres of productive forest, is private property. Seventy-five per cent of the timber is spruce (picea excelsa), and pine (pinus silvestris) in about equal quantities, as well as some oak, ash, elm and basswood. Birch is found everywhere. The annual forest growth or increment per acre is about 21 cubic feet. Nearly all the cut timber is hauled on sleighs to the rivers in the winter and floated to the coast in the spring. The felling is now nearly all done by piecework, which has proved to be a great success.

The value of forest products exported is about $30,000,000 annually. Until recently the export consisted chiefly of logs and staves, but pulp, planks, boards, doors and windows, etc. ,have now come into prominence. The pulp represents about 50 per cent of the export value.

The people have awakened to the importance of improved and conservative methods, and planting in the coast districts has also been encouraged. Most of it is done by school children. Douglas fir, imported as seed from the Pacific Coast and raised in nurseries, is being planted quite extensively in some parts of Norway. Forestry is taught in all public schools and instructors give lectures in the country districts.

New Silver From Old Stumps

By James Lawler

How Canadian Investigators in Forest Products Gave a New Lease of Life to Cobalt.

Most people are familiar with the saying of a great English Chemist that he owed his success to his practice of examining the waste materials left after his experiments were over. But this work of supererogation on the part of the old-time chemist has become the regular business of the chemist, the physicist, and the experimenter of today. Everywhere these men are being asked to make bricks without straw—and it is a poor day when they do not return to their taskmasters a better brick than was made under the old conditions. Why does the paper on which this article is printed cost so much more than the common news-print paper? Because half of the material in the tree from which the pulp was made by the chemical process went out into the Ottawa river, or the St. Lawrence river, or the Welland canal in the "waste liquor." Why does not somebody get busy in the work of recovering some of this wood material? Somebody is busy. The Forest Products Laboratories of Canada, under the Forestry Branch of the Department of the Interior have a staff of men at work on this very problem, and as they make an advance toward its solution the results will be made public for the benefit of the people of Canada. This is one of the ways in which the Dominion Government is trying to link up science and industry for the good of the nation.

Pine Oil Flotation

That, however, is another story. What this article endeavors to show is how the waste wood material which is usually left to rot, or which is thrown away or destroyed in the process of manufacture is being used to aid the mining industry. There seems no connection between stumps and mining, but when some unconquerable chemist found that the best means of extracting many of the ores was the "pine oil flotation" process, the stumps and waste wood began to have a new value in the eyes of mining men.

Pine oil is a product secured through the re-distillation of turpentine which, in its turn, is produced commercially chiefly from the "hard" pines of the southern United States. Pine oil forms a very small proportion of the oils produced from the pine tree. It would be costly under any conditions, but when the discovery was made that, in some cases, 20 per cent. more metal could be extracted from the ores by the oil flotation process than by any other method the price of pine oil went up to ten or fifteen times its original price, and, as the United States reduction companies contracted for practically all that was being made in the United States, Canadian miners had either to give up the process or get pine oil somewhere else.

Oils in Pines

Northern pines, generally speaking, are not high in their turpentine content. In the Southern States turpentine is gathered from the living tree much as we gather maple sap. but this method cannot be used on Canadian trees. The only other way is to get the turpentine out of the wood by a process of distillation, and, as this turns the wood to charcoal, it is clear that the chemist must look for his turpentine, not in the log piles of the lumberman, but in the stumps and waste wood left after the body

of the tree has been taken for other and more profitable uses.

Here, then, was the situation: the miners of Canada knew that they could get, say, 20 per cent. more metal out of their ores by the oil flotation process, but they could not get United States pine oil in practicable quantities; how were they going to get that oil?

Some of the mining companies did experiment and got some valuable results, but, after all, as some of them pointed out, the business of a miner is mining and not experimenting, and an appeal was made to the Minister of the Interior to have the Forestry Products Laboratories of the Forestry Branch take up the investigation. This request was granted, and the Forestry Branch secured a Canadian chemist who had some experience in wood distillation and set him to work on the project.

Eight Months Investigation

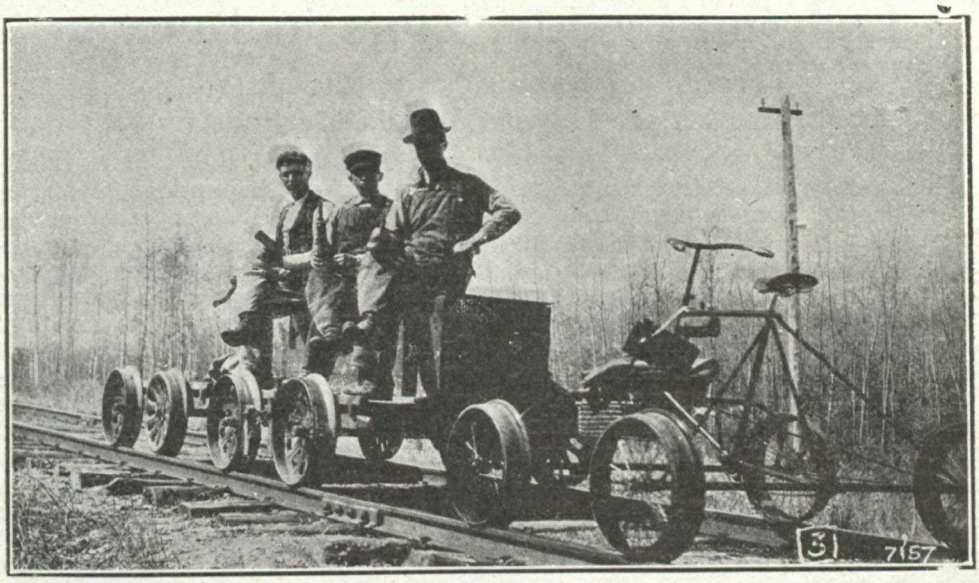
People wonder at the hundreds of experiments an investigator like Mr. Edison makes in investigating a big problem, but that is the way of the modern laboratory, and the hunt for a Canadian pine oil was no exception. In the eight months the special investigator was at work, he searched through the available literature in technical libraries, traveled through the northern Ontario mining region, visited the mines where the oil flotation process was in operation, and conducted "runs" in the experimental plants set up by the mining experimenters. Another line of study was that of the hardwood distillation plants in Canada. These plants do not use pine or other resinous wood and do not attempt to make pine oil, but the processes are analogous and the result of this study was, as will be seen, advantageous both to mining and to the hardwood distillation industry. And in the meantime and in between and all the time scores of tests and experiments were going on to try all kinds of pine and other wood oils to discover those having the right "collecting" and "frothing" properties.

Some of the facts brought out in this investigation were highly illuminative. For instance, it was found that in the United States between fifty and sixty companies had started into the distillation of resinous wood and of these only about half a dozen remain, the rest having made sad failures of the attempt. This is where governments can very effectually help industry by doing the experimenting and allowing private concerns to turn out the product on the lines discovered to be most successful.

But, harking back to pine oil, the investigator found that the old red pine stumps standing thick on "pine plains" in eastern Canada, like those on which Camp Borden is located near Barrie, Ontario, would produce the oil; so would the stumps of the yellow pine trees of British Columbia.

The Testing Stage

He extracted the oil and then the question was whether it would work as well as the oil from the Southern States. Not being a mineralogist, he could not handle that part, but here another department of the Government—the Department of Mines—came into the arena, and as fast as the Forest Products Laboratories made, mixed and combined the oils they were tested in the ore-dressing station at Ottawa on the ores produced in Cobalt mining camps. These combined experiments showed that as good an oil as that from the Southern States could be produced in Canada, but they showed that in any event it would be a very expensive article, because it was present in such small quantities in the trees and because it left in its manufacture a whole train of by-products for which there is no market in Canada. Whether the manufacture of pine oil is a profitable industry for Canada is very doubtful, but the discovery that pine oil will always be expensive was discounted by another one, which is that certain creosote oils, at present



A "track automobile" of the Dominion Forestry Branch in Alberta, showing the motor-driven speeder and the velocipede.

a by-product in the hardwood distillation industry and burned under the boiler as a waste product, can be used in the oil flotation process on equal terms with the expensive pine oil. At present the hard wood distillation industry in Canada uses about five hundred cords of wood per day, and as two and two-fifth gallons of creosote oil are extracted from each cord, it means that Canada has been producing and throwing away as waste about 1,200 gallons per day of the very material required to operate the oil flotation process.

Success in Practice

What the mining men think of the successful termination of this search is shown by a statement made by one who most actively interested himself in this effort to find a new oil, Mr. Arthur A. Cole, Mining Engineer of the Timiskaming and Northern Ontario Railway and President of the Mining Institute. Mr. Cole says of the new reducing agent:—

"A run was made for a whole week, pine oil being entirely cut out and its place taken by hardwood creosote oil. The results obtained in this mill test corresponded with the laboratory results, proving conclusively that hardwood creosote oil can be made an absolute substitute for pine oil in the treatment of Cobalt ores. The only work now remaining to be accomplished before the full benefit of the results of this investigation is realized, is for the hardwood distilling companies to establish a uniform method of handling this hardwood creosote oil so that they can turn out a uniform product. We will then have the highly satisfactory result from this investigation, of a waste product from an already established Canadian industry taking the place of a high-priced American product. At the present time there is sufficient of this hardwood creosote oil being produced not only to look after the present Canadian situation but also to allow for considerable expansion for export."

Canada is at war and needs every available ounce of silver to make silver bullets to help in the winning. She has the resources and the brains, and by such combinations of science and industry as outlined above, there will result the largest possible, most efficient and most economical development of our natural resources.

Logging by Elephants in Burma

Forest Conservator Visits Canada to Investigate Modern Woods Methods.

The high cost of elephants has so influenced the timber trade of Burma that Mr. F. C. Leete, Conservator of Forests, has been visiting Canada in an endeavor to secure mechanical tractors. He visited the Booth limits at Madawaska, the River Ouelle Pulp and Lumber Company's limits at St. Pacome, Quebec, and other localities where log hauling machinery is successfully employed.

Burma contains the finest timber in the Indian Empire. The great commercial species is teak, a wood of remarkable strength and durability, withstanding insect and fungous diseases and retaining its quality even after long years of alternate exposure to extreme heat and immersion in water.

Driving in Torrential Rains

As the annual precipitation in Burma occurs within a few weeks—during which the white officials usually retire to Rangoon—the annual driving of logs must be done in the most immoderate weather. Much as in Canada, dams are constructed and waters stored so as to float the logs down the small streams to the Irriwady, the great trunk river of Burma. Native workers are almost exclusively employed in this task. Rafting on the Irriwady is not dissimilar to the Canadian process, except that the rafts are smaller, and the booming is under the control of British forestry officers.

In the cutting of the forests, the Forest Service officers mark the mature trees to be taken out. They are then girdled so as to facilitate barking. At one time, before British occupation of the country, one timber company controlled the cutting rights over the whole extent of Burma, but this has been much modified and cutting rights can now be secured by any operator. Jobbers supply a large percentage of the annual teak cut, and are obliged to operate under strict regulations. Only the imposition of diameter and other requirements has preserved the valuable woods from complete destruction. Under the unregulated methods of former times, waste of teak was enormous. For example, the native dishes were usually composed of teak, which were made by sawing out a small section of a large teak log and leaving the remainder where it fell. This has been stopped not alone by the British forestry laws but by the success of German commercial agents in inducing the people to use cheap metal plates and cooking utensils. As to German influence in Burma during the war, the native population is content to believe that no power on earth can disturb the "British Rajah"—and let it go at that.

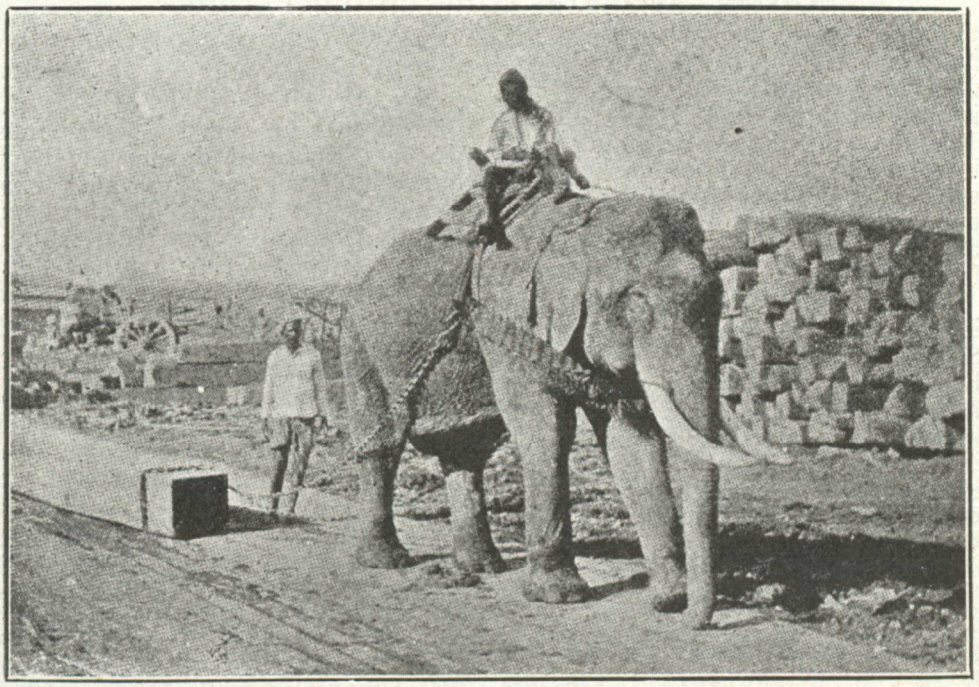
British Justice With Natives

In its dealings with the native population, many instances have occurred wherein the British sense of rigid justice in dealings with native peoples is illustrated. For example, the Forest Service sometimes decides to take into the reserves a piece of land adjacent to a village. Six months in advance, advertisements are conspicuously posted in the village inviting all persons claiming any rights whatsoever in the land to be reserved to appear before the Commissioner at a given date. As often as not, the entire area is blanketed with claims two or three times over. Each claim is carefully examined and, if bona fide, is generously dealt with. In many instances the Commissioner decides cases against the Forest Officer and in favor of the native claimant and may indeed order the whole proposition abandoned if the number and character of the claims promise an abnormal

amount of trouble.

Elephants and native oxen have been the great beasts of burden. The advancing costs of elephants which now range from $2,000 to $3,000, has made the introduction of modern hauling machinery desirable.

This invclves the construction of roads, (which were dispensed with in the use of elephants) and consequently a heavy state investment.



HAULING LOGS IN A BURMESE TEAK YARD.

WOMEN AS RANGERS

"I wonder," asks a correspondent in the Toronto newspapers, "how the Ontario Government will get men to do the work of fire rangers? The government has to patrol miles of railroad besides the forests. Of course, women could not do the forest work, for the men have to carry all their provisions and their canoes over the portages and to cut portages and find new routes and rough it generally. Perhaps women could do the railroad patrol work, and thus leave hundreds of males free for the other and rougher and heavier work. Patrolling the railroads is healthy, and it would be a change. What do the women think about it?"

DECLINE IN PUBLISHING

For twenty years the number of newspapers and periodicals in the United States has been steadily declining, relatively to population. In the last decade or so the number of daily newspapers has notably decreased. A contemporary reports that, though the population of the fourteen largest cities in Michigan had doubled, the number of daily papers has fallen from forty-two to twenty-three.

The Fuel Value of Wood

By W. B. Campbell

Forest Products Laboratories of Canada, March 12, 1918.

An Authoritative Guide for the Wood User, Giving Accurate Data on Fuel Values.

Owing to the scarcity of coal in the winter just passed 1917-18; many people are becoming more interested than heretofore in the use of wood as fuel. It is the purpose of this short article to discuss the value of different woods in this connection.

The primary quality of a fuel is to give off heat when burned. Secondary qualities are ease of handling, ease of kindling, amount of ash, etc. From a chemical point of view, the burning of a substance in air simply means the combining of that substance with the oxygen of the air. This reaction liberates heat in a greater or lesser amount depending on the substance burned. The amount of this heat is measurable and the unit used for practical purposes in this country is what is known as the British Thermal Unit or more familiarly as the B. T.U. One B.T.U. represents the amount of heat necessary to raise the temperature of one pound of water through 1 degree Fahrenheit.

For every combustible substance there is a corresponding "Heat of Combustion" which is invariable for that substance and is expressed as the number of heat units or B. T.U's. given off by the combustion of 1 pound. This quantity is the same no matter how slowly or how rapidly the combustion takes place and it has no direct reference to the temperature of the fire. If combustion is rapid a large number of heat units are produced in a short time and consequently the temperature is high. If combustion is slow the number of heat units per second is small and the heat gets a chance to become dissipated, consequently the temperature is low

When Wood is Wet

If a fuel is wet the water must all be evaporated during the burning of the fuel and this takes away some of the heat. To heat up a pound of water from the ordinary temperature to the boiling point, evaporate it and heat the steam to the temperature of the chimney gases requires about 1220 B.T.U. Consequently for every pound of water in the fuel, this amount of heat goes up the chimney. This loss is present to a greater or lesser extent with all fuels but is particularly important with wood. Coal may contain 2 or 3 per cent. water or 40 to 60 pounds per ton. Green wood may contain 1,500 to 2,000 pounds of water per cord. Air dried hardwood holds about 720 pounds per cord. The reason for demanding well dried wood is therefore quite obvious.

Why Woods Differ

The next statements may not seem quite so evident but they are equally true. The "Heat of Combustion" or "Calorific value" is, within narrow limits, the same for all woods. That is, a pound of one wood will give off almost exactly the same amount of heat as a pound of a different wood. This does not mean that a *cord* of one wood will give the same heat as a cord of any other wood because one cord may be much heavier than the other. Some woods are highly resinous—red pine, for instance—and these have a slightly higher heating value on this account but the difference is not great. The reason for all woods having equal Calorific Values is not far to seek. Fundamentally, all woods

consist of the same substance and one species differs from another chiefly by the way this is arranged in the wood structure. Since all woods *do* consist chiefly of the one substance, the Calorific Values of all of them must be the same. Measurements of the Calorific Value show that 1 pound of *perfectly dry* wood yields 8,220 B.T.U. For comparison it may be stated that 1 pound of good hard coal yields about 12,000 to 13,000 B.T.U. and poor coals go very much lower. Perhaps it would be better to compare these in terms of cords and tons. One cord of air dried maple or birch will contain about 3,250 lbs. of dry wood and about 720 lbs. of moisture. Its heating value will then be

3,250 x 8,220—26,715,000 B.T.U.
less 1,220 x 720— 878,400 B.T.U.
giving a net heating value of 25,836, 600 B.T.U.

A ton of coal gives a net heating value of

2,000 x 13,000—26,000,000 B.T.U.

These two values are very nearly equal so that we can say that *one cord of well dried hardwood (beech, birch or maple) is equal to one ton of good hard coal.* Other woods have heating values in proportion to their weight per cubic foot.

A Guide to Values

The following table shows the number of cords of various common woods required to equal 1 cord of well dried hardwood or 1 ton of coal.

Ash	1. 10 cords.
Basswood	1. 70 "
Beech	1. 00 "
Birch	1. 00 "
Butternut	1. 60 "
Elm	1. 00 "
Maple	1. 00 "
Oak, red	0. 97 "
Oak, white	0. 93 "
Poplar	1. 55 "
Cedar	2. 10 "
Douglas fir	1. 20 "
Balsam fir	1. 80 cords.
Hemlock	1. 60 "
Jack pine	1. 50 "
Spruce	1. 60 "
Tamarack	1. 15 "

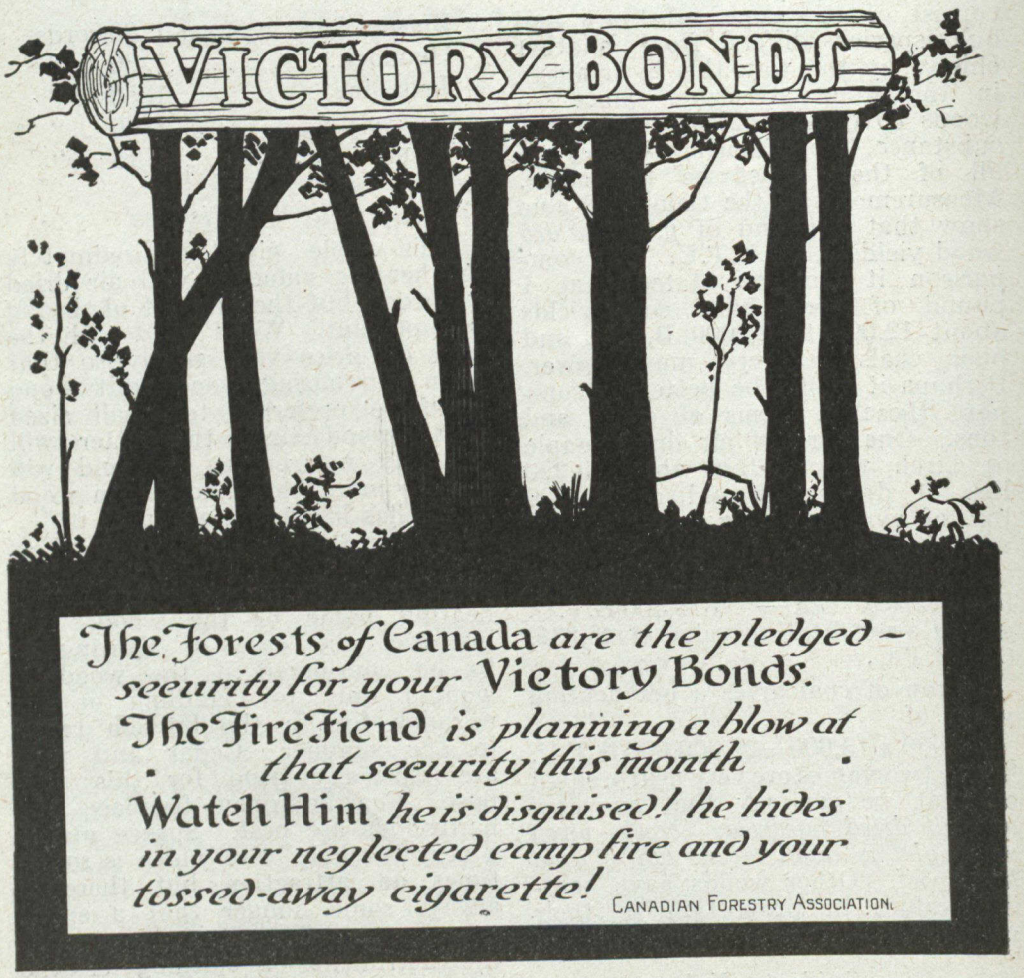
Split Wood is Best

This table gives approximately the heating value of well air dried cordwood but the amount of drying is important. Wood piled with the bark on dries very slowly so that when purchasing wood split wood is to be preferred to small sized round wood since the latter will probably not be so dry and will include more bark and rotten wood which has little heating value.

Some other consideration may at times be as important as the actual heating value of the wood. For instance, the ease of lighting is to be considered if the wood is wanted only for kindling or for a quick fire in the kitchen range in the summer. Cedar and pine are especially good for this purpose. For an open fireplace the hardwoods are best. Spruce makes a very "crackly" fire which is sometimes an attraction but there is always some danger that a spark may be thrown out of the fire to the detriment of clothing or the rug.

A Comparison of Ashes

Another point worth bearing in mind in connection with the burning of wood in place of coal, is the difference in the amount of ash produced. A cord of hardwood will make only about 60 pounds of ashes while a ton of hard coal will makes from 200 to 300 pounds; judging from the grade of hard coal coming to Canada during the past winter 1917-18; the latter amount is more likely and some lots will run even higher than this, especially the small "steam sizes." The calorific value of these latter may frequently be as low as 10,000 B.T.U. in place of the 13,000 B.T.U. used in the above calculations.



1. An example of colored lantern slide cartoons prepared and circulated by the Canadian Forestry Association at its own expense in scores of motion picture theatres in timbered districts. Special designs and wording are being used in French-speaking Sections of Quebec.

Larch Trees Change Their Habits

Most of our coniferous trees retain their leaves during the winter. So well known is this habit that the members of the group are often called evergreens in common parlance. There are, however, a number of trees that prove conspicuous exceptions to this rule, among which are the American larch (*Larix laricina*), the European larch (*Larix Europaea*), and the cypress (*Taxodium distichum*). These cast off their leaves at the end of the growing season. Whether they have always been deciduous, or whether they have gradually adopted the deciduous habit is therefore, an interesting question. Some light is thrown upon the subject, however, by the behaviour of young larch seedlings. It is well known that plants in the immature condition often run through more or less rapidly former conditions of existence. Thus the young cactus plant may produce true leaves and only later take

2. Another example of Canadian Forestry Association cartoons exhibited between reels in picture theatres.

on the usual cactus form. Larch seedlings appear to be no exception to this rule. For some years after the seeds have sprouted, the plants retain their leaves through the winter, but when older, they throw them off. It seems, therefore, that the larches were once like the other evergreen cone-bearers, and have since adopted the deciduous habit. A similar condition exists today among genera, represented in both the tropics and temperate zones. In the tropical rain forest, the species are deciduous. Tropical oaks are evergreen and those of northern regions are deciduous, but even in the latter regions seedling oaks often retain their leaves through the winter. The deciduous habit is very apparently an adaptation to avoid the drying effects of the cold. Only in the dried parts of the tropics do the broad-leaved trees drop their leaves and then it is for the same reason—to avoid injury through drouth.—*The American Botanist.*

An Ounce of Prevention or a Ton of Cure?

One forest fire last year swept 14,000 acres.
Prevention of that fire would have cost: One man's Vigilance.
To replant that area would now cost $140,000.
To replant that area would take 14,000,000 trees.

"Almost everyone who discusses the forest situation in Canada asks: What are you doing in reforestation? Yet the same man will go out in the forest and drop a match or a cigarette stub, and in one fire burn up more young trees than could be planted in twenty years A fire in Southern Manitoda this year (1917) destroyed 600 acres of vigorous young growth. To replant this would cost probably $10 per acre, or $60,000, and would require 600,000 young trees. Solely as a result of the inefficency of a forest ranger one fire in another place ran over 14,000 acres. To replant this would cost $140,000 and take 14,000,000 young trees. Similar cases might be cited all over the country." Excerpt from article by Mr. R. H. Campbell, Dominion Director of Forestry.

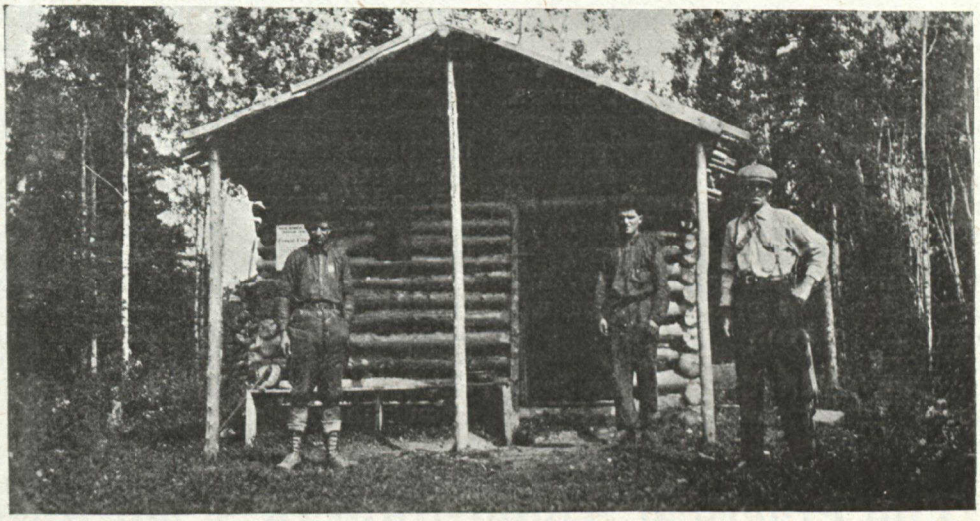
A Forest Dilemma in Australia

Hon. W. G. Ashford,

Minister for Lands and Forests

In many respects the forest wealth of Australia is unique. In bygone years, before the settlers' axes broke the stillness of the mighty bush, the number of our trees and the variety of their species placed this island continent in the front rank of the timber-producing countries of the world, but those who had the ordering of things did not know—certainly did not appreciate—the immense waste that was being caused by the indiscriminate inroads that were made in order that people might clear the land for the grazing of herds and flocks, or for growing crops. Only in recent years has there been recognition of the importance to Australia of a systematic and stable policy of forest conservation, improvement and utilization; but even now few people take any interest in the subject of forestry as a national concern, and fewer still have troubled themselves to think why Governments reserve large areas of land for the sake of the trees that grow and may be grown upon it.

In other words, forestry in Australia is, so far as the public, who own the forests, are concerned, a subject of no interest. The labour expended upon them is not understood; the strict rules made for their protection are often misunderstood, sometimes ridiculed, and not infrequently wilfully ignored. That is not as it should be; but the reason is not difficult to find. The people do not understand their forests; they do not know the great commercial value they are to the country; they have not been taught to look upon trees as much more than a source of supply for fuel and fencing material; and they have been satisfied that the great countries overseas should send us the timber needed for everyday requirements and take in return our good Australian gold.



One of the New Ranger Cabins in Northern Ontario

The Substitute's War on Wood

"Cement, steel, iron, tin, brick, tile, tar compositions, asphalt compositions, paper board, patent plaster, gypsum, patent roofings, floorings, patent framing—dozens of interests, hundreds of companies, and thousands of individuals are all working to the same end—to create a feeling against wood and, correspondingly, to increase the use of their goods. President to office boy, every employee, every stockholder, every co-related commercial and financial interest is working without cessation for the injury of the lumber industry in order to build up its own."

"Meanwhile, what have those who gain their livelihood out of lumber been doing?" asks the Southern Pine Association of the United States.

"Largely nothing."

"They have sat still in sweet, peaceful half-slumber, half-trance—either wholly oblivious of the fight on their property, or in a state of self-hypnosis, convincing themselves that the demand for lumber would through some magic means continue as it had in the days of prosperity, unaffected, untouched; and therefore their incomes would likewise continue without diminution.

Who to Blame?

"The actual result has been that profits have shrunk, withered, and in many cases been transformed into losses. Jobs have grown fewer, and salaries have at least not grown. The lumber manufacturer, lumber dealer, employee, and the stockholder can all blame themselves, for all are responsible in varying degrees.

"It is only very recently that the lumbermen have come together on anything promising a national movement to protect their property. The cold blooded truth of the matter is that the average lumberman, his employees, and his business associates have been satisfied to get their living in part or whole out of lumber, without a thought of their duty toward the protection of their means of livelihood against unjust attacks.

As Prosperity Vanished

"It has required a change in the prosperity of the lumber trade to bring about a change in the attitude

of those interested in lumber. At least s me of the men interested in wood have come to realize the danger confronting their business, and they are now asking you and every man and every woman who has a direct or indirect connection with the sale or manufacture of wood to give help.

"Your individual help is asked—it is needed. If you have any regard for your prosperity you will come to the front.

"How?

"With the truth—with the facts about lumber and its uses, and with the truth and the facts about the misrepresentations that are being scattered over this country in regard to wood.

"Wood Burns" the substitute manufacturers have declared.

"Wood *does* burn!"

"And concrete crumbles, brick walls collapse, steel girders twist into bow knots, composition roofings literally blow up—under certain fire conditions. But little or nothing is ever said of the defects of the wood substitutes; it is only when wood burns that the fact is dwelt upon publicly."

The Practical Application of Scientific Forestry

By R. O. Sweezey, B.Sc.; C.E.,

Consulting Engineer, Montreal

A Call to Wood-Using Companies to Grapple With the Menace of a Deteriorating Forest.

Now that Canadians are really becoming impressed by the glaring facts concerning the rapid depletion of our spruce forests the question properly asked is how can we arrest such destruction?

Must we in Quebec Province, for example, stand by and see the St. Maurice valley reduced to such deplorable conditions of forest waste as we find today in the Trent Valley, the Madawaska or the slopes of Lake Huron?

We do not all realize it but it is none the less true that we are eating into our forest capital at such a rate that the St. Maurice region is but a convenient example of depletion. Like the depleted areas in Ontario its soil is dry, it is a sandy region and totally unsuited to agriculture.

If the forest cover is destroyed we will then have barren waste or at best, a most inferior type of woods that suppress the more valuable conifers.

Decrease in Fire Losses

That some realize the seriousness of the situation is evident and, thanks to the excellent co-operation of timber limit owners, fire risks are yearly becoming less severe. Despite the eminent success attending co-operative fire protection, however, we shall yet no doubt suffer heavy fire losses, which, combined with our present methods of cutting, must result in the complete abandonment of large spruce forests to inferior types like poplar and birch. Indeed even these poor types have failed to provide decent clothing for the bare slopes of large sections of Ontario and parts of the Ottawa valley. Therefore, when we observe this condition now creeping over the St. Maurice valley with accelerating progress there should be no doubt as to the outcome unless the unhealthy condition is interfered with immediately. It is even now so far gone that ere long we shall see pulp and paper mills on the

St. Maurice having to procure pulpwood from the northern forests of the lower St. Lawrence to supplement the wasted resources nearer home. Nor are these conditions alone peculiar to the St. Maurice. New Ontario is making rapid strides towards copying the destructive methods of old Ontario. Even British Columbia will wake up before long to find that statistical experts have their peculiarities.

When we realize that pulp wood and lumber operations annually cut clean an area of two to three million acres leaving little or no chance for reforestation, natural or otherwise, perhaps someone whose business it is to think of these things will "start something." All power to him when he does!

But the question persists,—what is the solution of the difficulty? How are we to prevent the wiping out of our coniferous forests?

A Question of Cost

It is purely a question of cost—not exorbitant either. And it is not necessarily "up to" the Governments, though experience teaches that they may properly be requested to keep their politicians out of the discussion. The solution should be brought about by the manufacturers of forest products and when they convene to this end they must be permitted to co-operate without having unjust accusations of price-manipulation hurled at them. For be it understood that if Canadian forests are to be saved from destruction they must be properly managed —call it scientific or practical management, if you wish, but it will be pure common sense nevertheless. And it will cost something; just how much is difficult to estimate, but the point is that the consumer obviously must pay for it. Hitherto the cost of spruce pulpwood has been so low that the ordinary man could see no advantage in conserving something that had no particular value. Waste therefore started in the lumber camp and has been maintained right through to the press room where it reached its maximum.

Since the forest provides the raw product for the largest industry in Canada, the manufacturer of pulp and paper with whom rests the initiative in this vital matter is about due to act in no uncertain manner for the conservation of the forest by proper management and operation.

He realizes or should realize that it takes one hundred and fifty years to grow a mature spruce forest but by taking advantage of the natural conditions offered in our existing forests the period of maximum volume growth may be perpetuated with the result that a vastly greater forest crop may be relied upon. We know, for instance, that trees grow by accretion of outer rings—adding one each year, therefore the larger the tree the greater will be the volume of accretion. The idea in operation then is to keep the forest at that stage of maximum annual increment cutting only the largest trees and leaving the other immature ones undamaged by too much thinning or insufficient cutting—a process to be guided by local conditions and under experienced men. Proper management further requires the suppression of inferior or damaging species, also seeding or planting where necessary to assist or supplement nature's efforts.

Wider Areas of Operation

All this necessitates operation each year over very large areas compared with the areas now cut clean and left to utter destruction as forest land. It will require intricate road systems, gradual cleaning up of underbrush, permanent camps and steady expansion to eventually embrace the whole of our forests—a process that must necessarily take many years to complete. The capital expenditure involved will be great but no better investment could be undertaken when considered on a permanent basis looking to the future.

Once the system is established, operating costs will become much less but, whatever happens, pulp-

wood prices will have to be maintained at a high level else its very cheapness will render it unworthy of conservation.

To this important end if manufacturers will combine and agree upon proper restrictions to be incorporated into laws of the country they will eliminate the temptation of any one firm to mine its forest area in order to liquidate at high profits.

The Reward of Conservation

No one of course is foolish enough to suppose that anything of this nature can be accomplished at one fell swoop. The change from destruction will probably pass through a stage of obstruction before entering the realm of construction. High hopes, however, may be centred upon the recently organized woodlands Section of the Canadian Pulp and Paper Association which is composed of practical and technical woods men who will gradually come round to conservative forest operation in the strictest sense. And when they accomplish that aim our forests will be shown capable of maintaining in perpetuity a vastly greater output than at present, notwithstanding the alarming situation that threatens to reduce them to such inferior types as poplar and birch.

Consumers of wood, pulp and paper products will be well advised now to adjust themselves to an understanding and realization of conditions as they are and prepare to share the responsibility of proper forest management. And when manufacturers get together for the purposes of such commendable actions as involved in struggling to solve this problem they should be encouraged and not regarded as conspirators merely because the solution of the difficulty perforce involves commercialism. They will be promoters of a national cause as well as the protectors of their own essential industries.

R. O. Sweezey

New Brunswick Launches Its Forest Service

The Government of New Brunswick is rapidly implementing its assurances of a new era in forest fire protection and public forest management by legislation now under discussion at Fredericton. An Act to establish a Provincial Forestry Advisory Commission to consist of the Minister of Lands and Mines, as Chairman, the Deputy Minister, a Provincial Forester, one licensee and a representative of the owners of Crown Granted forest lands is in course of adoption by the Legislature, and will fulfill a most valuable purpose. The function and object of the Forestry Commission will be to advise in regard to all matters relating to the administration of the Act, and to supervise all permanent appointments to the forest service. The latter will administer all statutes, rules and regulations relating to Forestry, hunting and fishing; protection of the forests from fire; construction and maintenance of permanent improvements, such as telephone lines, look-out stations, etc., and reforestation.

Provision is made for the obligatory appointment of an examining board to consist of the Provincial Forester and two other qualified men, all appointments to have the further approval of the Forestry Commision.

A protection fund for the purposes of the Act is made to consist of $30,000 of the revenues from the wild land taxes, ½ cent per acre from license holders, all fees, fines and penalties collected under the Forest Fires Act and Game Act, and to this total shall be added sufficient from the consolidated revenues fund to make a protection fund of $100,000.

The Act for Prevention of Forest Fires is comprehensive enough to safeguard the province under any

reasonably efficient administration. A system of burning "permits" is imposed on those clearing land or roadways. A penalty of $50 is attached to acts of wilful carelessness such as the dropping of lighted matches or tobacco within or near any forest or woodlot. Provision is made for compulsory piling of slash within 300 feet of the railway track. The Act profitably appropriates certain clauses by which the Dominion Railway Act has safeguarded the territory contiguous to roads under its control from fires caused by railway smoke stacks, ash pans, etc. The clauses dealing with the inspection of railway appliances, the enforcement of railway patrol, etc., should quickly do away with the large number of fires which have caused needless losses in the past.

Editorial, Fredericton Gleaner

To what extent does the annual cut in this province exceed the annual growth? It was said some eight years ago that the annual cut was not in excess of the annual growth, but recent information does not appear to support this opinion. If we are cutting in excess we are impairing our capital. The Minister of Lands and Mines appears to be strongly of the view that we are cutting largely in excess, for he argues that at the present rate our forest lands would be almost depleted of spruce and fir in about eighteen years, if the annual growth were not taken into consideration and the annual growth he figures at something less than five per cent. We must, therefore, proceed cautiously and prudently, seeking not only to increase production and to eliminate unnecessary waste but also to get adequate returns from the annual cut.

Planting by Dynamite

By F. Norman Supplee, Landscape Engineer.

At the Cheshire Hunt Club Kennels at Unionville, Pa., owned by Mr. W. Plunkett Stewart, considerable landscape development was undertaken.

A farm, perhaps two hundred years old, had been purchased on which the original mansion stood and the lane leading up to it was lined by 150 year old pines. With here a branch gone, there a top taken out by some severe storm, but stalwart, though gnarled, they still raised their grand heads to face the storms of the four winds. Mr. Stewart, realizing that some day these old fellows must go, decided to plant some young evergreens to take their places and then to continue from where this lane struck the public road right on up into the opposite field with another lane of evergreens to the kennels.

In order to give a pleasanter treatment around the manse, it was decided to plant a screen separating it from the barn, and to make the houndsman's cottage more picturesque, some planning to soften its outlines and to tone down its color was made. The owner also decided upon some foundation planting around the base of the manse, with an immense group of 150 year old box in the circle of the driveway.

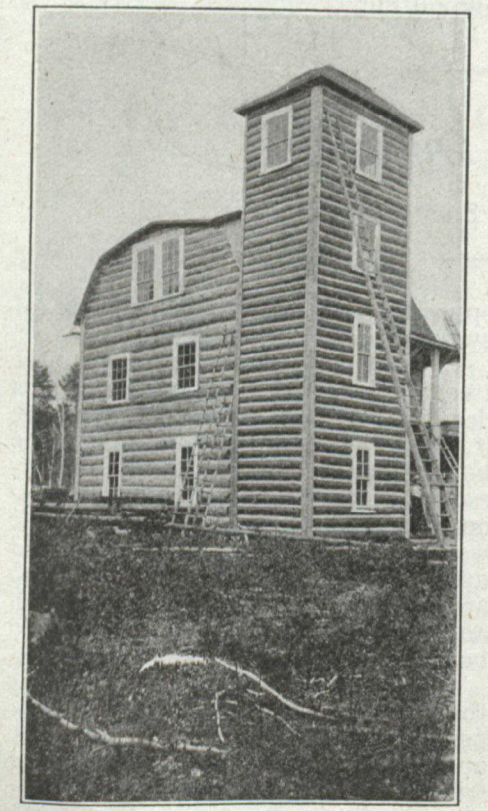
In the planting of the trees along the old lane, it was found to be practically impossible to dig with any expediency among the old pine tree roots. Up the new lane a ledge of rock of mica formation was struck and in the screen between the manse

and the barn a stratum of ground, composed of large stones and clay, hammered into place, it might be said, by the wear and tear of years; therefore, dynamiting, as an easy way out, was decided upon. One-third of a stick was used for each shot with one and a half foot of fuse. Two men made the holes and one man cut and prepared the charges, and two men placed the charges in the bore holes. Two hundred and fifty trees were planted in two days with this force.

The nursery had offered a price of $1.50 each for the planting when they realized the obstacles they were up against. The total cost of planting with dynamite, including the cost of it, was $98.50. Only nineteen trees were lost out of the two hundred and fifty, and that was more due to the fact that that year was the driest summer that we had had in forty years.

The next year the trees made a foot of new wood. Some of the evergreens were ten feet in height. Two years have now gone by since the planting was done and the trees planted with dynamite are a foot taller than trees of larger size which were planted a year previous to this planting but with pick and shovels.

A Log Castle Built by One Man



This is a picture of "Sterling Castle,"—not the original in Scotland, but an improvement, built by Mr. James McQuot, a hermit of White Otter Lake, Western Ontario. Mr. McQuot settled on White Otter Lake, in the wilds some forty miles north of Rainy Lake, about fourteen years ago, and immediately started to build this structure, which has but recently been completed. He cut the timber, dragged the logs to the building site, and put every log in place without any assistance whatever; in fact, he would have no assistance from any one.

The "hermit" is well known among the trappers and loggers in that part of Ontario. He is literally "monarch of all he surveys," since there are no other settlers—not even Indians—in the territory for miles around. Why he erected this pretentious abode for himself it is difficult to say. Directly across the lake from the castle he has constructed a tomb, where he wishes to be buried; and he has announced that there is a reward of fifty dollars awaiting any one who finds him dead and safely consigns him to his tomb, overlooking White Otter Lake.

The Forests of Alberta and the Public Welfare!

The forest has a relation to all the important interest in Alberta. It is a great assistance to agriculture. The farmer needs lumber for buildings, he needs fence posts, fuel and wood for various general uses. The more easily and conveniently such a supply can be provided the better. The small forest reserves throughout the prairie have been set apart for this purpose and are being protected from fire. Those that are denuded of trees will be reforested as rapidly as possible and on those covered with trees steps will be taken to introduce more valuable species where it is considered advisable. The forest reserves will supplement the supply of wood which will be grown on the prairie farms from the trees supplied by the Dominion Forestry Branch which now amounts to over four million annually.

Industrial Growth

The forest has a direct relation to the industries of the country. Sawmills, box factories, and other industries are directly dependent on the forest and can only be continued if the forests are perpetuated. The spruce and poplar of the prairie provinces are the best species for making pulp and that manufacture opens up a field for many varied products and industries. There has been a good deal of discussion of the development of water powers but there has not been enough consideration of the question of the raw material that is to form the source of supply for the upkeep of the industries to be developed by the power. It is not making too strong an assertion to say that the forests and the industries dependent thereon will be the mainstay of the northern parts of the provinces of Manitoba, Saskatchewan and Alberta if the forests are properly managed.

The regulative effects of the forest on stream flow have an important effect on the use of the streams for water power and for irrigation. Water power development is possible in almost all parts of the country and will be necessary for building up industries. Irrigation gives permanency and security to farming in such parts as have not a heavy precipitation and makes intensive farming and closer settlement a possibility.

The investigations of the Geological Survey show that the coal consumption in the prairie provinces is increasing at a much more rapid rate than the population. In considering, therefore, the future needs of the northwest provinces, it is quite evident that in a few years—unless new mines are opened—the present plants will be taxed to their full capacity.

Fuel Needs

The first need of the population is domestic fuel, and much of this is being supplied from the lignite belt. Transportation and manufacture next demand fuel for power production. Thus the per capita coal consumption will increase with added population.

As the mining of one ton of coal will require on the average about two lineal feet of mining timber and it is timber which will hardly stand a long haul it will be seen that the development of the coal mines in a very essential way depend on the protection of the forest areas.

When the lands are not of first class agricultural character the retention of lands in forest or the reproduction of the forest means the possibility of a larger population. The depopulation of the Highlands of Scotland has made a sad theme for poet and historian, but the only suggestion for improvement of conditions in this respect in that the

reforestation of a large portion of the Highlands, combined with a system of small holdings, is the only possible outlook for an increase of population. On such lands on the continent of Europe the forests are preserved and as a consequence the population is large and fairly prosperous. With the forest in existence three or four times as many people can be supported.

The Division in Europe

To show how the matter works out in Europe the following comparison of population and percentage of area in forest will be of interest:—

	Population per square mile	Percent. of land in forest
Belgium	652	18. 3
Germany	310. 4	25. 9
Austria	247	32. 5
Switzerland	234. 8	22. 7
France	189. 5	18. 7
Russia (in Europe)	64. 6	31. 0
Sweden	32. 4	47. 8

The area so far set apart permanently for forest purposes in the prairie provinces works out at the following percentages:—

	Population per square mile	Percent. of land in forest reserves
Manitoba	1. 81	2. 1
Saskatchewan	1. 96	5. 0
Alberta	1. 47	13. 5

It should be noted also that in spite of the considerable percentage in forest in Belgium, Germany, Switzerland and France, the import of timber is heavy even after deducting the quantity exported.

In Belgium the excess of imports over exports is more than the timber produced in the country annually.

Wood Crops

The question to be determined then is the best and most valuable product that can be got from any particular tract of land and devote it to that purpose. If wood is the most valuable crop and the most required it should be grown. If, on the other hand, the best results can be obtained from devoting the land to agriculture or to grazing that should be done. The determination of the best use of the land should not be left to chance. The experience of Europe, of the United States and of eastern Canada is a sufficient guide, for a general decision and the necessary examination to determine the question should be made without delay. In such an examination expert agricultural knowledge should co-operate with expert forestry knowledge so as to assure a determination as near as possible to the final and permanent one.

The Campaign With School Children

From a principal of a Kingston, Ont. school: "The pupils all appeared to enjoy your printed "Talk on Forestry" and when questioned, expressed a desire that they might receive more of a similar kind. These talks supply useful information and material for other "talks" by the teachers. You are to be commended for the work you have undertaken in this connection."

From a New Brunswick school principal: "Your stories for classroom use are exceptionally useful. I should like to be put on the mailing list permanently. These forestry talks are looked for in my school. I also think that a loose leaf book could be made of them and kept in the school library for future use and reference."

Scientific Fire Fighting on St. Maurice

The St. Maurice Forest Protective Association, the pioneer of the Canadian Associations, had an unusually successful year in 1917, the Annual Report of which rebounds to the credit of President Ellwood Wilsun, Manager H. Sorgius and Directors Robert F. Grant, A. Laurence De Carteret, J. M. Dalton, Charles Lebrun and J. H. Dansereau.

Mention is made that the 1917 season, while in the main we had enough dry weather to be dangerous, and more than the average number of fires. I think the reduction in the cost of extinguishing fires by extra labor is a good index of the efficiency of our organization. This cost was $13,004.00 in 1914, $7,329.00 in 1915, $2,759.00 in 1916, and $1,011.00 during the season just passed. That is, the cost has been cut in two each year progressively, and we hope that this cost will not increase in the future. It shows that the rangers, who are the backbone of our organization, have been right on their jobs, and have not had to call for much help.

"The amount of money expended per acre has not increased, in spite of the increase in the cost of labor and equipment, and we have added to our equipment and kept it iu good repair. We are doing the patrolling cheaper than any other protective agency in Canada.

"We have increased our capital account by new speeder sheds and by the purchase of a storehouse and boarding house of our own at La Tuque, which saves us rent and makes accommodation for our men and equipment very much better.

"In this connection I might mention that the appearance of the country is rapidly changing since fires have been reduced and the young growth has had an opportunity to start. I have estimated that the growth average, per acre, over the whole of our territory, is at the very least ten cents per acre per annum, so that the small expenditure of 1-3 of a cent per acre is well worth while.

Over 9 Million Acres

The area patrolled was 8,049,-645 acres, to which must be added 1,000,000 acres of Government lands not under license and lots taken out by settlers, also 229,800 acres which we patrolled for The Laurentian Forest Protective Association.

The net cost of operating amounts to $24,987.12, which is equal to less than one-third of a cent per acre.

It is gratifying to note that the cost of fire fighting during the past season was only 37% of that of season 1916, and 7% of that of season 1914.

According to the reports of our Inspectors and Rangers 217 fires occurred during the season, of which 15 required extra labor to extinguish, burning over an area of 4,341 acres; of these 287 acres were green standing timber, 216¼ acres young growth not yet merchantable, 2,373½ acres cut over land and 1,564¼ acres old burn. The amount spent in fighting fire was $1,011.75, of which the

Causes of Fires

Settlers	4
Drivers	5
Railways	122
Unknown	38
La Loutre Dam Construction	26
Sectionmen	1
Fishermen	8
Construction Crews	8
Jobber	2
Total	217

Educational "Drive" in Gaspe

Splendid educational work is being done this season by the Southern St. Lawrence Forest Protective Association which patrols the territory to the end of the Gaspé Peninsula. Under the stimulating leadership of Mr. W. Gerard Power, Mr. R. L. Montgomery, Mr. Simmons Brown and other directors and officers, the educational part of fire protection is being given its just due. Mr. J. D. Brulé, equipped with a modern stereopticon and a set of lantern slides, etc. furnished through the Canadian Forestry Association has combined his duties of manager of the Eastern Division with propagandist.

In the latter part of March and the first week of April he delivered no fewer than twelve illustrated lectures in the Metapedia Valley and Gaspé District and plans to hold six more meetings on the northern coast of the Peninsula.

Mr. Brulé has been dealing almost wholly with settlers who in all parts of Quebec are still a great fire menace. This is a natural condition in the absence of educational work. Few settlers are wanton timber destroyers. The majority only need to be informed of the relation of the forests and forest industries to their personal welfare, the impoverishing local effects that follow wholesale conflagrations, and other matters in which the timber resources form a partnership with the farmer. An intelligent settler is usually careful about timber burning.

Following are some of the places visited by Mr. Brulé with the excellent record of attendance:

	Attendance
St. Gabriel, Rimouski Co.	225
St. Francois, "	175
St. Marcelin "	125
Ste. Angele "	650
St. Leon Le Grand, Matane Co.,	175
Ste. Florence Bonaventure	250
Causapscall, "	125
St. Luc, Matane	200
St. Leandre "	250
St. Majorique, Gaspe	200
L'Anse au Griffon, "	150
Total	2425

The Future Belongs to the Engineer

By Frazer S. Keith

General Secretary, Canadian Society of Civil Engineers

"The lawyer and the politician have admittedly failed to solve the industrial relations of man to man and the relations between capital and labor. The very qualifications of mind and training that have enabled the engineer so successfully to grasp and solve any problem set before him will be called upon and required to solve and to deal with what will be, after the war, the greatest problem which we have to face.

"We find already many of the executives of large industrial concerns being chosen from our own profession, and more and more will the men who have received a thorough training in technical matters be called to the high positions in industrial affairs. This will mean the opening up of a scope for the profession, giving rise to a future that will place the technical man in control of the industrial life of the nation. Coincident with that is arriving a condition whereby the engineer must, besides drawing plans and specifications, give his advice in connection with financing of any

industrial or engineering undertaking, so that the time is coming, and very soon, when the engineer, instead of receiving the reward that capital is willing to offer, will walk hand in hand with the capitalist on an equal footing, and will share in the rewards that the other has heretofore enjoyed."

An Oak Tree in one of the Compeigne Forests, on the French War Front, is 6 ft. in diameter and 110 ft. high. It has been named "The Oak of the Allies."

Forests and Civilization

By Ellwood Wilson

Forests and civilization are inseparably bound together. Not all forested countries have reached a high degree of civilization, but no unforested country has ever reached a state of culture. Egypt, Babylon, and Assyria may be mentioned as exceptions, but the probability is that they were all forested at the zenith of their progress, and that their decline may be directly attributed to the disappearance of their forest wealth. The whole north coast of Africa, Palestine, and China were at one time well forested, and, with the vanishing of the trees, these civilizations waned and are now at a low ebb. China is probably the best example of deforestation which we have. Originally a country of great wealth, both in timber and agricultural lands the removal of the woods has, over very large areas, destroyed the farms by allowing the rainfall to rush down the hillsides in the form of torrents, carrying large amounts of sand and gravel, which have covered up and destroyed the arable lands. To-day China is a desolate, treeless country, forced to use dung for fuel, and to carry on the most intensive form of agriculture in order to wring a meagre sustenance from an impoverished soil.

Where timber is removed from hills and mountains by lumbering, fire almost always follows and burns not only the timber but also the soil, right down to the rock. If the formation is not rock the situation is far worse, for the soil is washed down year after year into the fertile valleys, destroying them completely. In the Cevennes and Pyrenees districts in France 8,000,000 acres of farm land were destroyed by floods, and a huge sum of money had to be spent by the government in reclaiming them. Where forests are removed in sandy country the wind soon strips the soil of the meagre remaining cover and carries the sand for miles over the surrounding country, converting it into a desert. This happened along the west coast of France, and millions were spent to arrest the devastation. An old friend of mine, Senor Don Ricardo Codorniu, a Spanish forester, has spent his life in this work of stemming torrents, replanting denuded mountain slopes, often carrying earth up on mule-back to start the nucleus of a future protective forest. His work in connection with drifting sands has been most interesting, especially where the sand had commenced to invade a village, burying houses in the suburbs. Wattle fences had first to be built, and between these pines were planted, and when the sand had piled up against the first line of fence this had to be raised to prevent the little trees from being buried before they could fulfil their function. Nor do we have to go so far afield to see the results of axe and fire. Travel west on the C.P.R. through Ontario; take the Canadian Northern to Lake St. John, or the

National Transcontinental to Winnipeg, and see the blackened waste which should be one of our greatest tourist attractions. On the Lievre River there is a large tract of country where the hills are of white quartz. Fire has passed over it and the rain has washed away the burnt soil, and to-day seen in summer, from a distance, they look like snow-capped peaks. There is another hill of this character at Riviere a Pierre Junction, on the Q. and L. St. J. R.R. At Lachute, Que., and along the line of the C.P.R., near Berthier Junction may be seen the drifting sands which have swept over several square miles of once fertile country, turning it into a desert. Fortunately, our progressive Minister of Lands and Forests, the Hon. Jules Allard, through his chief forester, Mr. G. C. Piche, has begun the work of checking this menace, and at Lachute has planted a large area with beech, grass, and young trees to hold back the devouring sand.

AUSTRALIA ISSUES A JOURNAL

The Canadian Forestry Journal greets the first issue of "The Australian Forestry Journal," published by the New South Wales Forestry Commission, Sydney, Australia.

The magazine represents an effort to arouse public sentiment to the importance of forestry and to disseminate information as to Australia's imperative need for conservative policies. It is bound to attain its object if the newsiness of the first issue is maintained.

BOY SCOUT LECTURES

A number of special illustrated lectures to large assemblies of Boy Scouts is being arranged by the various headquarters of the Boy Scout movement in Ontario and Quebec for the Secretary of the Canadian Forestry Association. It is expected, also, that out-of-doors lectures will be given on Conservation topics while the boys are encamped at various outing places during the month of June.

Widening the Field for Aeroplanes

Apropos of recent articles in these columns on the use of airplanes in forest protection, it is interesting to learn that there are at least ten thousand airplanes in constant readiness for use on the Western front, with probably thrice that number of trained pilots. When the war broke out the principal European powers had 2,786 military planes, and slightly over three thousand trained military pilcts. Before peace comes, provided the United States completes its aviation construction programme, there will be not less than twenty thousand air-planes in commission, and probably sixty thousand trained pilots. Is this vast capital investment to be of no value to civilization after the war? Are the pilots to go back to their former occupation—wingless eaglets compelled to crawl on earth when they would fly in the upper blue?

Edgar C. Middleton, a pioneer aviator, whose book "Airfare," has recently been published by Constable & Company, and deals in a very thorough way with the airplane, the seaplane, and the airship in peace and war, is convinced that great aerial fleets will be built up after the war not only for the transportation of passengers and mails, but of certain classes of freight, including silks, spices, tea, furs, ivory, and similar valuable commodities. He even outlines the principal aerial trade routes from London to the East and South, the Western route across the Atlantic having still to be tried out. The Atlantic stretches are too wide to permit of airplanes as at present operated carrying either passengers or mails, the entire lifting capacity being required for the petrol necessary for the journey.

An illustration of the route to Cape Town from London by the West African aerial service is thus presented by Lieut. Middleton: Allowing a minimum average of 110 miles an hour, with light wind, and half an hour for each landing, an airplane leaving London at 8 on a Monday morning would keep the following time-table:

London, 8 a.m., Monday.
Paris, 10 a.m., Monday.
Bordeaux, 1 p.m., Monday
Gibraltar, 8 p.m., Monday.
Fez, 9 p.m., Monday.
Lagos, 5.30 p.m., Tuesday.
Loango, 2 a.m., Wednesday.
Johannesburg, 8 p.m., Wednesday.
Cape Town, 4 a.m., Thursday.

Total time London-Cape Town 2 days, 20 hours. By steamer, via Funchal, the time taken is three weeks, which gives an advantage of two and a half weeks. Another route to Cape Town would be London-Paris-Lyons-Rome- Alexandria-Ankobar- Mombasa- Zanzibar-Bulawayo-Johannesburg-Cape Town.

STONE CROPS VS. TREES

(*Kingston Standard*)

In the days long past these districts were gone over for pine; later on for other timber; farmers settled on the partially cleared ground in order to grow supplies for the lumber camps. But theirs was terrible work; the land was unfit for proper cultivation; the "stone walls" which are to be seen there are sufficient proof of this. "Stoning" was a regular part of the farmer's and his family's work and we have been told by a man who went through this from his boyhood that he often used to stone till his fingers bled. It is little wonder that one leading agriculturist has said that every crop raised there represented blood and tears.

The Toronto Globe says that the fact has been familiar for a quarter of a century to private observers that the "ranching" of cattle is perfectly feasible on the so-called "waste" lands of Ontario, meaning those northern areas that have been stripped of their crop of valuable timber, especially the white pine.

These areas are to be found scattered over the part of the Province north of a line located approximately from the mouth of the Severn River to Sharbot Lake, and thence along the height of land northwestward and westward to the Manitoba boundary line. It goes on to say that "Of such lands, fit for the ranching of beef cattle and in some places also of sheep, there are many millions of acres that ought to be seeded for a new crop of pine, and should, during the next half century, be devoted to the production of beef, mutton, venison and the flesh of the moose, with the very finest of freshwater fish in thousands of lakes and streams which abound perennially with water."

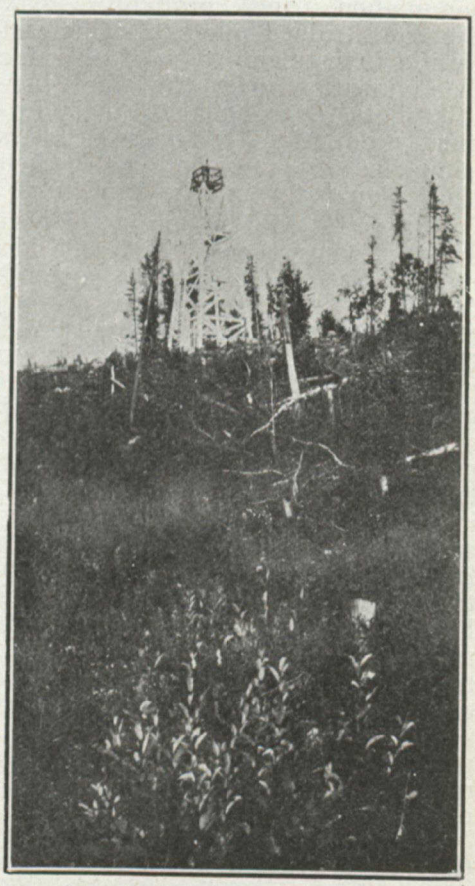
Settlers Still a Great Fire Factor

A striking fact in the Annual Report of the Ottawa River Forest Protective Association for 1917 is that out of 108 fires, no fewer than 40 were caused by settlers. As the result of special measures to be taken this year, however, there promises to be a reduction in this class of fires. The Ottawa River Association, Eastern Section, experienced 74 fires in May and 17 in September. Fires burned over 5,270 acres in the limits and 3,599 acres on private lands the most of it on old burns and cuttings. In addition there occurred on the western section of the Association, damage to standing timber estimated to be less than 30,000 board feet partly scorched. Only 28 fires were encountered on the western section seven of which required extra labour to extinguish. The western section shows a total of 305 acres burned over on limits and private lands.

The total area patrolled by the Ottawa River Association is now 20,967,529 acres. The total net cost of patrol was $22,264.

BOOKS FOR THE CHILDREN

The circulation of "Twenty Canadian Trees," a book for school children or their seniors, issued about two years ago by the Canadian Forestry Association for free distribution, has reached its seventeenth thousand and will soon be over the twenty-thousand mark. Recently, Boards of Education have been purchasing extensive editions of this little book for presentation to the senior children. The School Board of Sault Ste. Marie, Ont., ordered 1200 copies.



A modern lookout tower on the Abitibi Pulp Limit in Northern Ontario. This tower is typical of the excellent work being done this year and last by the Ontario Department of Lands, Forests and Mines in extending forest fire protection.

Fire Rangers Want Your Aid This Year!

The danger season for forest fires is at hand. Rapidly drying soil has left the old grass, brush, leaves, etc. in most perilous condition for starting fires.

An effort is being made by the fire rangers in this province to keep down the forest losses this year to a minimum. They will succeed only if every camper carefully extinguishes his camp-fire before leaving it, if every smoker refrains from tossing away burnt matches or tobacco in or near a wood, and if settlers in the newly-opened districts guard their land-clearing fires with the utmost care. Settlers' fires continue to be the very worst source of forest conflagration, although campers and careless smokers are close competitors.

"The fire rangers," says the Canadian Forestry Association, "want every good citizen to regard himself as a deputy ranger from now until November first.

"A Canadian forest was never worth so much as to-day, never gave so many jobs as to-day, never put money into circulation as it does this year."

Sample of Bulletin used by hundreds of English and French newspapers in Canada during April.

"Passing the Buck" on a Wood Supply

Instigated, no doubt, by the U.S. Fuel Controller, the order has gone forth through Canadian Fuel Controller Magrath that those ordering their next winter's anthracite coal are to receive seventy per cent. of actual requirements, the stock on hand being taken into consideration. In other words, consumers are to have in their cellars, when stocked up, only seventy per cent. of next winter's probable consumption. It is also intimated that this order may be abrogated later on, but it will hold until further notice. Which may be taken to mean says Toronto "Saturday Night," that it will terminate only when the situation clears up, if it does. This policy is, no doubt, adopted in order that there shall be a more equal distribution throughout the continent; and it may be stated in this connection that the United States Fuel Controller is treating our various Provinces in respect to coal exactly as if we were just so many States in the American Union. There is absolutely no discrimination against us, as with other foreign countries and as applied by the United States not only on coal but various other necessary commodities.

The very fact that a cut of thirty per cent. in our probable coal requirements for next winter is deemed necessary by the American Government, should awake us to the necessity of doing what we can to aid ourselves through our own resources. As it stands, however, we appear to have done little or nothing, preferring to pass the buck on to Uncle Sam, letting him become responsible for keeping us from freezing to death next winter. As the Provincial and the Ottawa Governments appear to have passed up the entire question, it seems necessary that our various municipalities in Ontario and Quebec take up the question of providing a certain proportion of firewood for emergencies. These organizations should be getting together now, and a couple of months hence the wood should begin to arrive, else it will be too late."

Lumberjacks on Liberty Tour

The picture shows four employees of the Brown Corporation, Berlin, N.H. and La Tuque, Quebec, who recently penetrated the snow-bound fastnesses of the lumber camps and sold war savings stamps worth $4,185 in five days.

Equipped with a melodeon, which made up in volume of music for what it lacked in size, a violin, and hundreds of leaflets on which were printed the words of patriotic songs, these four men chartered a stout pung, painted a vivid blue, and started off on the oddest concert tour New England has ever seen. Besides all the regular patriotic songs their repertoire included "Over There," "Good-by Broadway, Hello France," "Keep the Home Fires Burning," "The Long, Long Trail," etc. The lumberjacks now have choral clubs. The party met temperatures of 52 below, and sometimes had to resort to snowshoes.

In all, the concert tour covered 136 miles of snow-bound country. They returned with stamps worth $4,185 accredited to the "lumberjacks" of the North Country, and the firm conviction that the "up river" folk have as warm hearts, as lusty voices, as wideopen pocketbooks, and as strong a patriotism as any to be found in the country.

LOOKING OUT FOR 1950!

A letter to Toronto Saturday Night

London, Ont., March, 1918.

Dear Sir,—Following up your timely article on the advisability of laying up a supply of wood for the coming winter, thereby avoiding another fuel shortage, would it not be well for our Ontario Government to take up the matter, if it has not already been done, of making the province a producer and not a consumer alone of this kind of fuel? Many sections of Western Ontario in particular, which were once heavily wooded are now practically bare and in a few years time good timber will be as little seen as the Buffalo on our western prairies. A timber raising campaign might be started to put in a dozen or more trees of good varieties for every one moved and thus in some way meet the future requirements for timber and fuel and should as well be profitable.

Yours truly,

TRAVELLER.

AN IMPLEMENT FIRM'S WOOD REQUIREMENTS.

In a letter to the Forestry Journal, the Massey Harris Company, Toronto, state that the average annual consumption of timber in their Toronto and Brantford factories in the making of farm implements amounts to 20,000,000 board feet.

The Pine Tree Overseas

A pamphlet called "The Pine Tree" was issued by the Canadian Forestry Association some weeks ago, containing items of information regarding Canada's needs and progress in forest conservation. This was designed for the overseas members of the Forestry Battalions and a first edition of 1000 copies was sent to Y.M.C.A. camps, foresters, etc. in England and France. The aim of the pamphlet which will be followed up by others; was to give the rank and file a better idea of the forestry situation in their own Dominion so that what they witnessed in the forests of Europe might be properly related to home conditions.

An officer writes as follows from the 76th Co. C.F.C. in France: "I can assure you that such literature is thoroughly appreciated by the personnel of this company and I trust we may be favored further by your kindness and thoughtfulness.

"The first leaflet of "The pine Tree" is an introduction and there can be no doubt of the great value to this and other forestry companies of further supplies of information."

Another officer in France writes: "The Pine Tree is very interesting and I have circulated copies where I thought they would do most good."

From Captain Douglas Weir, (for Director of Timber Operations) London : "Copies have been forwarded to the various officers in charge of districts for distribution among the reading huts of the camps.'

FIRE EXTINGUISHERS ! !

Head Off the Fire Season This Year by Employing These Lantern-Slide Sermonettes In Your Local Motion-Picture Theatre.

The Canadian Forestry Association is sending out to a large number of motion picture theatres in or near timbered districts educational films (dealing with forest fire prevention) and educational lantern slides.

We cannot cover the whole country. You know your district best. Suppose you order a dozen of the slides for your local use! They can be had at the slide-maker's price, 20 cents each. Or we will gladly prepare new reading matter applicable to your own territory, without any charge to you.

Any motion picture theatre will gladly utilize these slides between the reels of film, thus bringing sharply to the attention of the audience the needfor care with fire.

Your local theatre will show a new slide every night if you keep it supplied.

ENGLISH WALNUTS FAIL

The Persian or so-called English walnut is of commercial importance in this country only in the far Western States. In the South, it has thus far failed altogether. In the North and East it has held out gleams of hope, first bright then dull, for more than a century. There is no way of telling the number of three of this species which have been planted in the northeastern section of this country but let us imagine it to have been 60,000. Of these, fully 50 per cent. have succumbed to climatic conditions; 25 per cent. have been but semi-hardy, and possibly 25 per cent. have attained the bearing age. A part of each of the last two classes have borne crops of commercial size for a number of years.

produced nuts of good size and quality. A great many of all those surviving are now proving susceptible to a walnut blight.

A liberal estimate of the present number of Persian walnuts in this part of the country would be 10 per cent. of the original supposed 60,000 or 6,000 trees. Of these, the writer has positive knowledge of none which are now bearing crops of nuts in such quantity, and of such size and quality and with such regularity and which have so borne for such length of time as to encourage commercial planting. Few of the Eastern grown nuts are so free from tannin as to be really pleasing to the taste or favorably comparable with the best nuts of the market.

He Would Conscript Beaver as Fire Rangers

(*An Article by a Detroit Ranger in the North Woods.*)

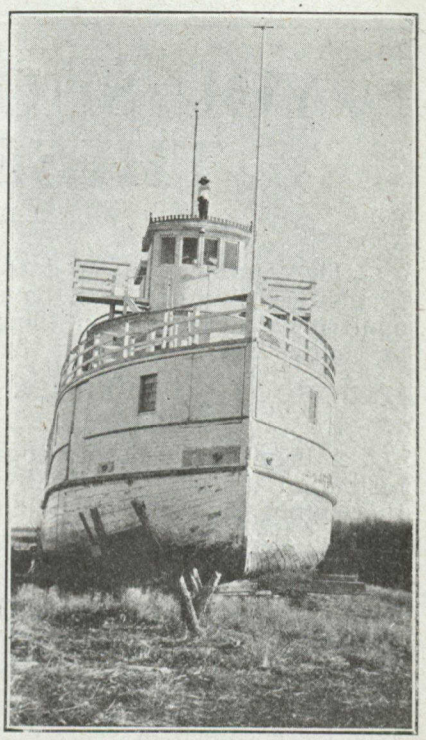
While beaver have generally been considered somewhat hostile to the inroads of civilization and averse to having near neighbors, it has occurred to the writer from observations made this summer that they might be prevailed upon, albeit unconsciously, to relinquish this theory, and turn their well known industry to good advantage in the development of this district.

It has been my privilege, while covering my district during the past year, to see considerable of a beaver colony and their work. This particular colony has chosen as a home, Judicial Ditch No. 13, the main drainage ditch in the lower Rapid river district one-half mile south of Baudette and Spooner, on one of the three main highways leading to the two towns.

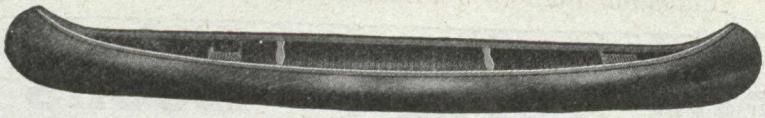
The dam is about thirty feet long and holds about a nine-foot head of water. Not having access to green popple, which is their preference for food and construction work, they have adapted themselves to their surroundings, and have cut the scrub alder and willow from the ditch bank and skidded dry tamarack and spruce from adjoining lands. Combining this with a good supply of weeds and mud, they have constructed a dam that is almost as impervious as concrete. Settlers have in a number of instances been compelled to destroy part of the dam, as it hinders drainage for a distance of about two miles, but invariably the following morning the dam is complete and full of water. One evening last week while going in an auto, it was necessary to stop the machine in order to make way for a big husky who was trying to drag a large tamarack across the road. We ran the machine up to within twenty feet of him, but he tenaciously hung on until the log was landed in the pond, and then quickly disappeared.

The point I wish to bring out is that it might be an excellent idea to press a few of these fellows into service, and have them conserve the water at strategic points for use on these peat-grade fires which are causing us no end of trouble just at present.

On the North fork of the North Saskatchewan River. The common consequences of a forest fire: a "mine" of maturing timber wrecked in a few hours.



This type is not commonly recommended for inland situations. Some years ago, the steamer ran on the Lesser Slave Lake but was 'scrapped' when the railway arrived. The fire rangers have found it quite a convenient look-out tower and have appropriated it as a piece of equipment unmatched on any other fire district.



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