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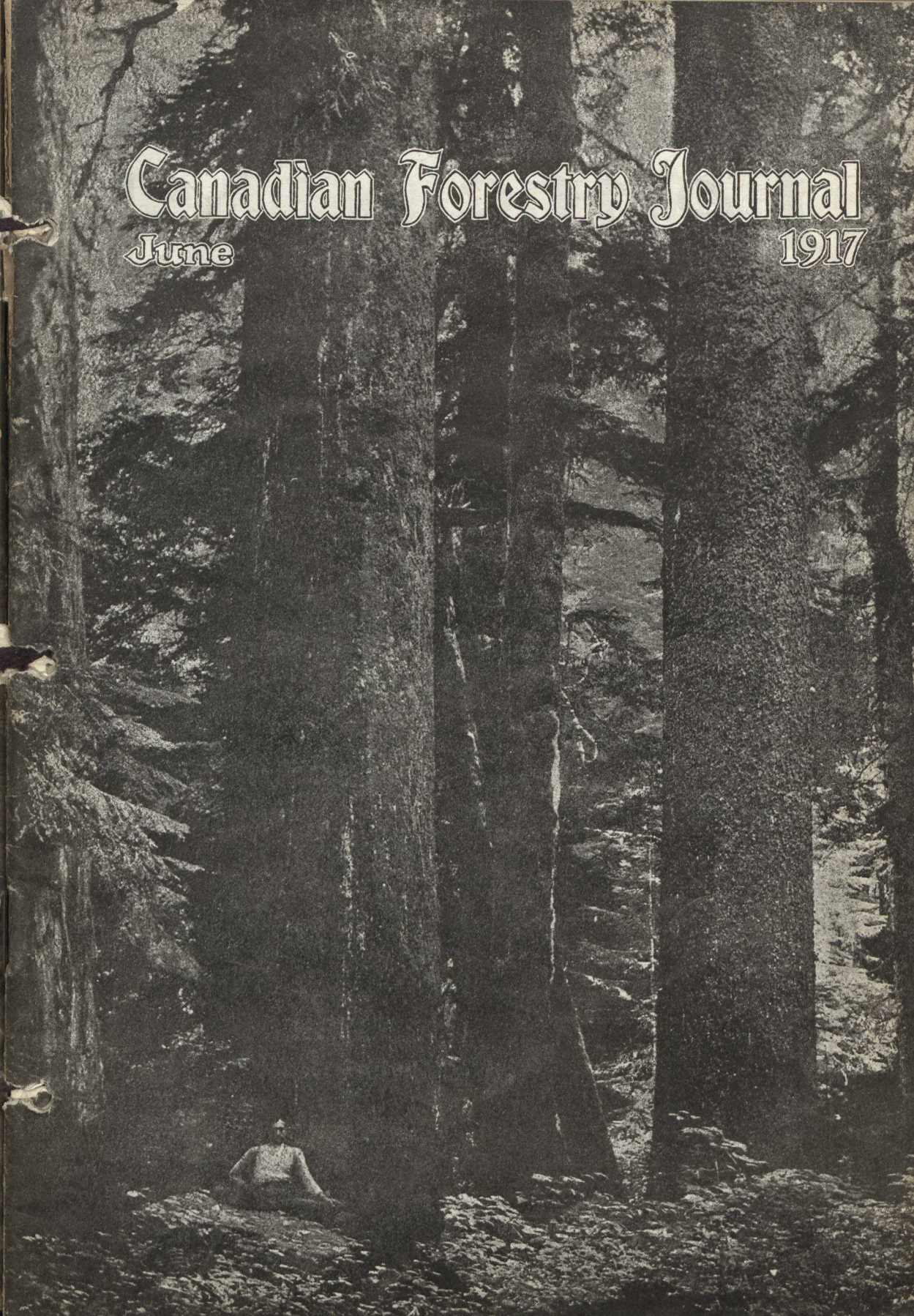
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CONTENTS FOR JUNE

No. 6

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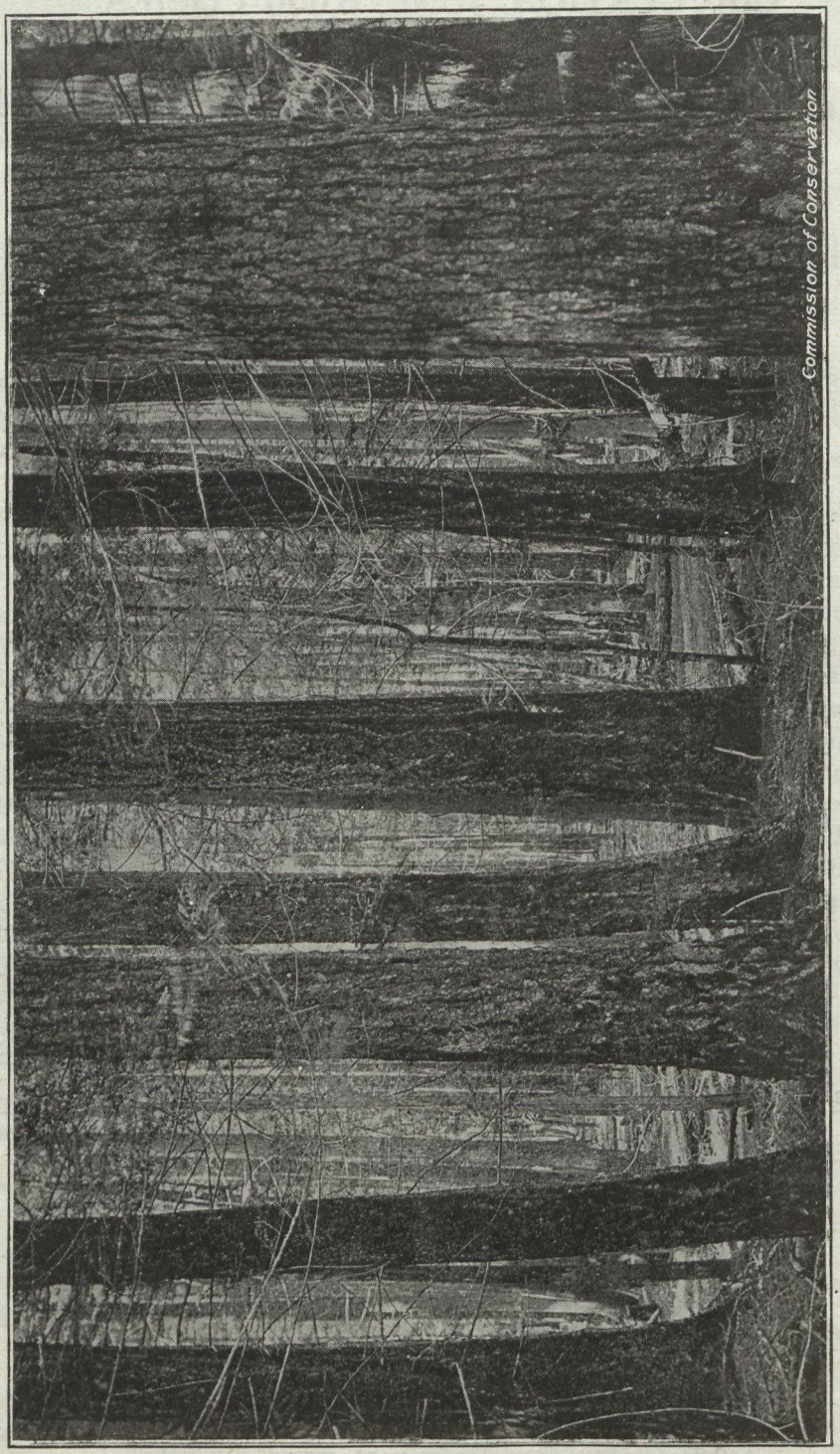


Courtesy Comm. of Conservation.

HEAVY STAND OF DOUGLAS FIR, HEMLOCK AND CEDAR IN SOUTHWESTERN BRITISH COLUMBIA.

dollars, and the single state of Massachusetts some hundreds of thousands.

"In the problem presented by Sable Island not only do property considerations enter, but considerations involving the saving of human life. At the least the subject is worthy of continued and persistent experiment, and it is to be hoped that the authorities will not rest satisfied, or torpid, in consequence of the failure of this one attempt."

Forestry Work for Women

BY MARY SUTHERLAND.

(*In charge of Forestry Seed-Beds at Aber, North Wales.*)

To make provision for planting operations after the War, the British Board of Agriculture have sown large quantities of forest-tree seeds. The following is an account of the work at one of the nurseries, and indicates one type of forest work which may be carried out successfully by women's labour:

A centre was established in the spring of last year, under the control of the Department of Agriculture of the University College of North Wales, Bangor, on the College farm at Aber, and for the greater part of the work female labour alone was employed.

The site chosen for the seed-beds was a field of about 2 acres, close to the shore of the Menai Straits, and quite unsheltered from sun and the prevailing west wind. The field, of which the soil was a moderately light loam, was ploughed, and harrowed in early spring, but if more time had been available would have benefited by still further cultivation.

The area was then measured out into seed-beds, these being 4 ft. 6 in. wide, with 1 ft. 6 in. paths betweeen each bed. The beds were of a length varying with the shape of the field, the longest averaging 60 yds.

The beds were brought to the necessary fine tilth by repeated raking over, and basic slag was raked in at the rate of about 10 cwt. per acre. This was followed, in the second week of May, by the sowing of the seed, this operation having been delayed by the bad weather.

Drills across the beds were marked out by means of a heavy wooden roller, of the same width as the bed, and having laths 2 in. wide affixed to the surface at intervals of 6 in. When drawn lengthways down the bed the roller left furrows 2 in. wide for the reception of the seed. The seed was sown evenly in the furrows, either from a seed-horn, or equally satisfactorily from an improvised horn made from a large glass bottle, having a wedge cut out of the cork, just large enough to allow for the passage of a few seeds at once. The seed was first coated with red lead to prevent it being eaten by mice and birds, and sowing was only carried out in fine weather when the soil was in a dry, friable condition suitable to receive and hold the seed. After distribution, a Spitzenberg drill roller was taken over each drill to cover the seed, and the whole operation was completed by drawing a light, wooden roller over the bed lengthwise to consolidate the surface.

Seedlings of Norway Spruce, which was the first species sown, were through the surface about a month later, a month being the average time of germination of all the species, except Douglas Fir, which took considerably longer, delay being due to the spell of dry weather after sowing, and during July. Once the Douglas Fir seedlings had started, however, growth was very rapid, and by autumn the beds showed a crop of good, strong seedlings, though these were fewer in number than the quantity of seed should have produced.

The beds were first weeded when the seedlings were just showing, and the weeding was carried on continually all through the summer. As a rule, hand-picking was the only satisfactory method of cleaning the beds, the

ENGLISH WOMEN CUTTING MINE BOOMS.
These war workers not only use the saw but carry and pile the logs.

seedlings being so very small. The Dutch hoe was used between the rows later on, to prevent a further crop of weeds making headway. Towards autumn, the beds were hoed as often as possible, in order to cultivate the soil between the growing seedlings, and, by preventing caking of the soil-surface, leave it open to weathering. The large area of paths considerably increased the difficulty of keeping the ground clean; rough hand-picking was periodically necessary until a weed-killer was used, which effectively cleaned the paths.

During the three summer months, on an average 7 girls, and for a shorter time a number of school-children, were employed in tending the seed-beds. The employment of women in this work, was eminently suitable as it required, speed and careful manipulation to carry it out with minimum amount of damage.

War Aviators for Forest Guarding

The St. Maurice Forest Protective Association is trying to arrange for a test of an aeroplane for locating forest fires, and if this proves successful it hopes to introduce the aeroplane as a part of its mechanical equipment. There seems no reason to doubt that such a patrol would be much cheaper and more effective than the present ranger system, and if it should prove possible to land near a fire and extinguish it without calling for additional labor, the cost of fire protection would be very materially decreased.

A meeting was held recently in Montreal for the formation of a Montreal section of the Imperial Aero League and the question of the employment of these machines in commercial work of all kinds was discussed. Many aviators will be free after the war and they could be employed in carrying fast mail, forest fire protection, and many other services.

Can Canada Sell John Bull His Wood Supply

Some Reforms In Present Methods are Discussed by Overseas Officer.

THE following article was prepared by Captain Douglas Weir, B.S.A.; M.Sc.; officer in charge, Forestry Branch, Canadian Forestry Corps, with the assistance of Staff Sergeant A. V. Gilbert, a graduate of Toronto Forest School, and was read by Col. Gerald White at one of the meetings of the Imperial Institute held in London, England.

Germany's Timber

"The Timber imports from Germany consisted mostly of Fir (Pine) and Spruce, but a great deal larger proportion came from Russia. The Fir is a variety of Pinus sylvestris, well known in this country as Scotch Fir and the spruce is Picea excelsa. To the trade in this country the Fir is usually known as redwood and the spruce as whitewood. These timbers have for years had Canadian competitors such as Douglas Fir, White Pine, Norway Pine and Spruces. The Douglas Fir, however, has been imported chiefly as large structural timbers, along with American Southern Pine. This latter is known here as Pitch Pine while the Douglas Fir is called Oregon Pine or British Columbia Pine. For general construction and manufactured articles white pine, red pine and spruces have been in demand, but of recent years the price of white pine has been prohibitive. The rapidly decreasing supply of this timber in Canada must also be noted. The Norway or Red Pine is considered superior to the European Red Wood but the Canadian Spruces have not been received so favourably, as it is held that they did not work up so nicely. These were, of course, the Eastern Canadian Spruces but the large imports from British Columbia of Sitka Spruce during the War, for the manufacture of aeroplanes have shown this to be a lighter, stronger and more durable timber than the eastern species.

Where Canada Failed

It is important to note here the chief difficulties encountered in the past, in the entry of Canadian Species into competition with the European ones. The most important, of course, is transportation. This difficulty is off-set by the fact that Canadian timbers have, in the past, competed successfully here and more especially since the British Columbia Government sent their Chief Forester to this country to advance the interests of their timbers.

The question of finance also enters largely into the discussion. The Baltic exporters have worked harmoniously with British merchants in shipping timber on six months' notes, etc., whereas Canadian timber men have insisted on their timber being paid for before it left Canadian ports. In addition the former have paid more attention to having their own representatives here who studied the British markets closely, and their exporting firms would send timber here in varied forms to conform very closely to the uses to which they were put. Of recent years Canadian firms have shown more enterprise in having agents here, and the further application of this principle, in the future, should advance the use of Canadian timbers greatly and aid in solving the question of finance.

Loss by Shrinkage

Another difficulty has been that timber from Canada did not arrive here in as good condition. Before the completion of the Panama Canal

timber often arrived here in very poor condition but even recently timber received here does not conform to the specifications that it is shipped under. This is, of course, due to shrinkage and dealers in this country consider that the timber was not seasoned before shipment, as well as the Baltic timber. The British Columbia timbers showed this defect to a much greater extent than eastern timbers. This difficulty can be easily overcome by the Canadian exporters.

Coming to the question of actual replacement of the Baltic timbers, we find that Canada is pre-eminently a valuable source of supply since Canada, especially British Columbia, has large timber resources and about 95% of the annual Canadian lumber cut is coniferous material. The question of Canadian species to be used must not depend alone on the suitability of different species for certain uses, but to a great extent on the available sources of supply both as to species and regions of Canada. The very valuable white Pine is being rapidly depleted in Canada. All eastern timbers are being exploited rapidly with the exception of the Spruces, hemlock and balsam fir which extend as far west as Alberta, and are present in large quantities in northern Ontario and Quebec, as yet almost untouched. British Columbia with its vast timber resources is the most logical source of supply for years to come as its very valuable and multiform species are still present in quantity.

The Range of Woods

Important Canadian woods in descending scale of available resources are Douglas Fir, Spruces, Eastern White Pine, Western Hemlock, Eastern Hemlock, Western Yellow Pine, Western Larch, Red Pine, Western Red Cedar, Western White Pine, Tamarack. Structural timbers in descending order of merit, and resources are Douglas Fir, Western Hemlock, Eastern Hemlock, Western Yellow Pine, Western Larch, Red Pine and Eastern Larch.

The importation of large structural timbers has been much greater during the war than in peace times. For mining timbers many Canadian species are available.

Recommendations

The outstanding features of this article are that Douglas Fir and Western Hemlock, available in very large quantities from British Columbia, should be imported to this country, principally for structural timbers but also for many other purposes, if transportation question can be solved. In addition the spruces and pines of Eastern Canada can replace Baltic timber for general construction, inside and outside finish, various manufactured articles and purposes too numerous to mention. Sitka Spruce (Silver Spruce) and other Spruces and Pines are also available from British Columbia. Since, as I understand, pulp is not manufactured to a great extent in Britain, pulp may be imported from Eastern Canada, as large quantities of spruce and balsam fir in Canada makes it possible to supply a great deal of this very necessary commodity, imported in the past, so largely from Scandinavian countries.

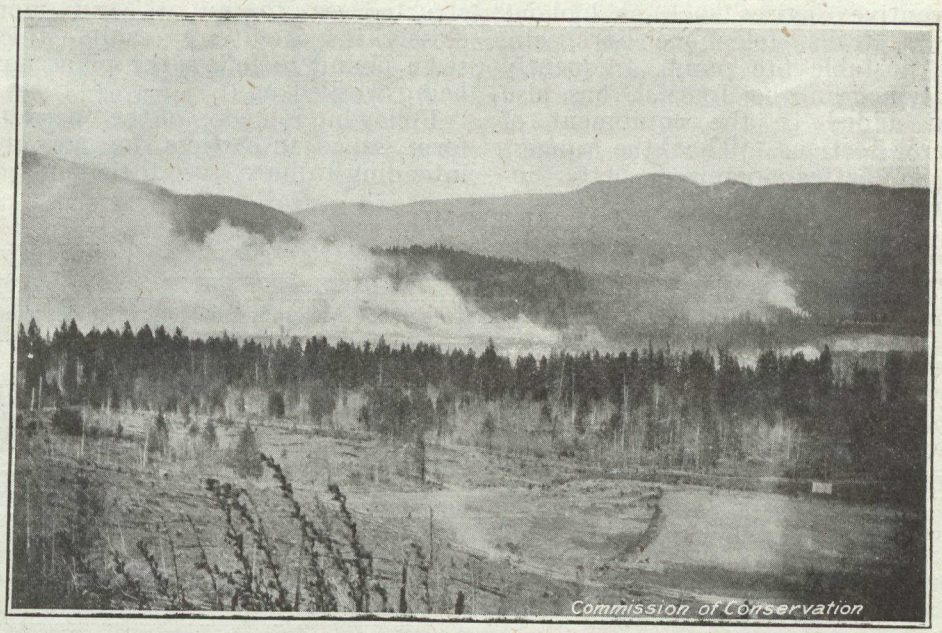
It should be noted that timber imports from Germany were not appreciable as compared with those from Russia, Finland, Norway and Sweden

A comparison of timber freights before the war shows approximately these rates:—

	per standard.
From White Sea Ports ..	32/6 to 37/6
From Baltic Sea Ports....	20/ to 25/
From St. Lawrence Ports	35/ to 40/
Gulf of Mexico Ports (Steamers)	70/ to 80/
B.C. Ports (Sailors)	£7

From Mayor Costello of Calgary:—"I am very much in sympathy with the work of the Association and am enclosing application form for membership."

"We realize our country suffers a lot through the loss of timber caused by fire each year, and you certainly have our strong support in the work you are endeavoring to do." The Farm and Ranch Review, Calgary.



SETTLERS IN KAMLOOPS, B.C. DISTRICT BURNING THE DEBRIS RESULTING FROM LAND CLEARING.

The fires were set out immediately following a rain and by the permission of a Government Forest Ranger.

Ontario's Forest Protection Work

Ontario has entered the fire season of 1917 with a forest protection organization greatly superior to that of preceding years. By new legislation at the last session the Minister of Lands, Forests, and Mines, received authority to radically recast the entire scheme of forest fire prevention. No time was lost in appointment of proper officials who have been given ample leeway in securing for Ontario the benefits of modern forest guarding methods. The money appropriation for the work indicated the Minister's appreciation of the size of the job on hand, and his choice of officers has been generally hailed as well judged.

The chief executives of the new system are as follows:

Provinc al Forester: E. J. Zavitz; Assistant, J. H. White.

District chiefs: L. E. Bliss, stationed at Port Arthur. Ernest G. Poole, stationed at Cochrane; and A. J. McDonald stationed at North Bay.

As Mr. Bliss has already organized his district, he is given general supervision of the work in other districts. The task of selecting rangers, approving their appointment preparing fire report forms, fire warnings, etc. has involved the head office staff in a prodigious amount of work, nor is it to be expected that the organization proper will get its stride until next season.

The new department has applied its authority over settler's clearing fires, which are such a problem in Northern Ontario, and rangers are now requiring settlers to get permission before burning their slash. A number of motor cars have been purchased for the use of inspectors and rangers, and arrangements are being made for the construction of

preventive devices such as lookout towers, trails, telephone lines, etc. The portable fire pump, frequently mentioned in the Journal, has also been added to the equipment of several sections. That the rangers will be better organized, better instructed as to duties, and more closely inspected are results which seem bound to follow the plans now being worked out.

Following is a copy of the "permit" form issued to settlers, loggers, etc. intending to burn over their lands:

FIRE PERMIT.

The Forest Fire Prevention Act, 1917.

No.....

Ontario.

Date.....191.....

Authority is hereby granted to .....to set out fire upon the following described

Address.....

lands.....

.....

for the purpose of .....

(State whether for clearing land, destroying logging slash, or other purpose) between the

.....day of....., and the.....day of.....

191.....; on compliance with the following conditions.....

.....

.....

The acreage to be burned over is.....

I have.....personally inspected the area.....

(not)

By.....

(Signature.)

FORESTRY BRANCH. .....

(Title.)

Note.—This permit is subject to revocation.

Forest Fires in Northern Ontario

Newspaper reports claim that considerable areas of Ontario forest land have been swept by fires during the last weeks of May. No official report has been obtainable as this issue of the Journal goes to press. A despatch to the Toronto Globe from Fort William, May 29th, stated:—"Forest fires raging all through the organized and unorganized districts around Fort William and Port Arthur are destroying large areas of timber and uncut pulpwood. Bush fires have been raging in fully a hundred sections west of Fort William since last week, and great strips of forest in the unorganized sections of Conmee and beyond have been left blackened wastes.

"Rains to-day have done much to smother the fires, but the danger is not yet past. So far, no losses have been reported from outlying settlers.

From Sault Ste. Marie, Ont. came the following:—May 15.—"Dense smoke caused by heavy forest fires on the north shore are adding to the troubles of lake navigation. Very few boats were moving to-day, and so dense was the smoke in Whitefish Bay that the tugs were not able to work in the ice, and practically the entire upbound fleet has been compelled to come to anchor."

Fire conditions have been serious in the United States as well, as witness the following from Green Bay, Wisconsin:—May 21.—"Rhinelander Paper Company employees have been active in fighting forest fires in Oneida county during the last several days. The corporation equipped a special train for the men to go from Rhinelander to the burning districts. Dynamite and other supplies for stopping the progress of the fire were contained in the train.

Logs of paper mills in the central part of Wisconsin were destroyed while the fires burned in forests. Loss of several thousand dollars may result. Rain which fell Saturday stop-

ped most fires in the territory in northern and western Wisconsin."

The Peace River Country has had its fire experience this season. A newspaper despatch states:—May 10. —"Several large forest fires are sweeping through the timbered country back of the settlements here. South of town and east of the Smoky a fire is blazing fiercely over a country covered with dry poplar and brush. Down the Peace several blazes can be seen, but as none of the fires are in valuable timber no harm will result unless they spread too far.

The Pennsylvania Department of Forestry reports:—"A rough summary of the forest fire situation in Pennsylvania, issued May 21st, states that about 1,000 fires occurred before May 1st, over 750 reports and bills having been received to that date. It is evident that the number of fires will exceed last year's, but the area burned over to date is much smaller. The 760 fires reported averaged only eighty-six acres each, as compared with an average acreage per fire of 154 in 1916, and 306 in 1915. About 375 of the 750 fires were extinguished before they covered ten acres.

"The past week has been the worst fire week this year, and doubtless many small fires and several large ones will be reported. So far only a dozen fires of over a thousand acres have been reported."

PASTOR AND FLOCK FIGHT FIRES

The Fort William Times-Journal has the following story:—"Had it not been for the presence of many villagers and settlers from the surrounding country who were gathered for public worship in the little church at Hymers Sunday morning, the village of Hymers would have been wiped out by fire, according to a statement made by George E. Hymers, of Hymers, who is in Port Arthur to-day. "Service was going on," Mr. Hymers said, "and the minister, Reverend J. Waldron, announced that the congregation was dismissed and everybody was to help fight the fire. The minister himself was one of the hardest workers in the bucket brigade which helped save the village from destruction." Thus, from soul saving the minister turned to property saving, and was instrumental in contributing largely to the success of the fire fighters and the salvation of the village.

Mr. Hymers said that the bush fires started some time early on Sunday, which raged fiercely on Sunday, visiting Hymer's village in a most menacing manner. There was not much damage to timber, because there is none in that immediate vicinity to be burnt, but some of the settlers in the outlying districts suffered heavy losses. Colin Campbell, of Harstone, is the heaviest loser, his saw mill, house and everything being consumed and 135,000 feet of lumber. William Winslow, of O'Connor, one of the best known agriculturalists in the district, lost his house, buildings, and everything he had. William Mountstephen, of Kakabeka Falls, lost his barns, which were on his farm in Conmee township, and others sustained lesser damage to outbuildings and lands by the fierce onrush of the flames.

Mr. Hymers estimates the total damage caused by the fires, which are still raging in that district, as over $10,000. Yesterday afternoon a long distance message reached Mr. Hymers from Hymers that the fires were coming down the ravine near the cheese factory, but that buildings were being watched and protected.

So far as has yet been ascertained, no actual cases of destitution have been reported, but all the settlers who have been visited by the fire king have sustained considerable loss in buildings and effects.

MR. CAVERHILL RESIGNS

Mr. P. Z. Caverhill, Director of the New Brunswick Forest Survey, has resigned his position and will return to the British Columbia Forest Service.

Nut Tree Growing in Island of Corsica

In an informative article advocating the growing of more nut trees in the United States and Canada, a writer in "American Forestry" gives many convincing illustrations of the customs of other lands where the produce from nut trees as well as the timber itself is considered a chief source of income. Of the chestnut tree cultivation in the Island of Corsica, the article says:—

"We have the very stimulating example of Corsica where mountain slopes as steep as a house roof and even steeper are clothed for miles in a continuous expanse of trees which look strangely like a forest, yet every tree is a grafted chestnut. Every acre is as valuable as good corn land in Indiana, and scattered along the magnificent macadam roads are the substantial stone villages of the numerous population that supports itself in comfortable prosperity from the combined income of chestnuts, chestnut wood, and the by-product of pasture and a small garden patch. The chestnut industry has continued in Corsica for centuries. Certainly the earth offers few examples of agriculture so permanent, so automatic, and so easy. When a Corsican gets pushed for money he goes out and cuts down an old giant worth often from $10 to $25 in American gold.

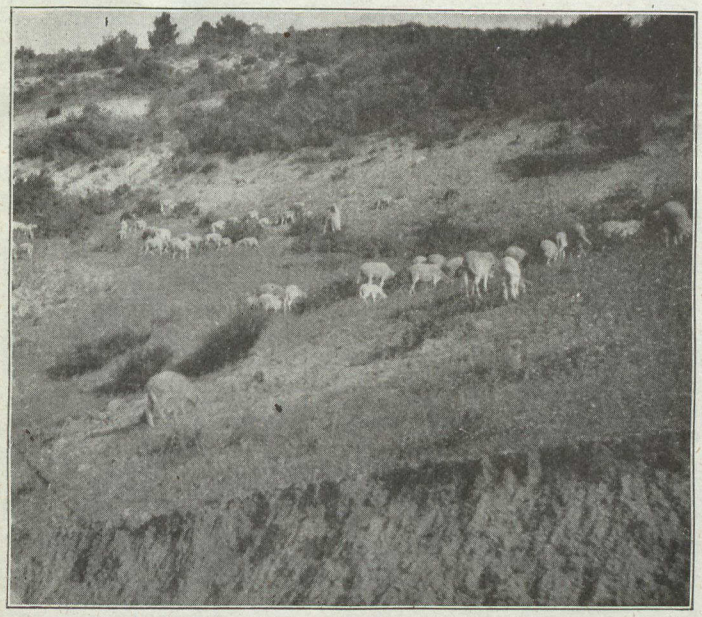
The practice of the Corsican mountaineers in their tree crop agriculture or fruitful forestry, whichever you choose to call it, is very suggestive of a proper method of handling the technical question of getting a stand of trees and keeping it, and at the same time utilizing the by produce of pasture. The Corsican goat, whose milk makes much good cheese, browses in the chestnut forests and keeps down most of the undergrowth. When a Corsican sees a chestnut tree which in five, ten, or twenty years is likely to be ready to go to the pulp mill, he goes off to his little nursery, digs out a ten-foot chestnut, and plants it near to one which it is to succeed. He puts two stakes beside it to keep it from being ridden down by the goats. When it is established in two or three years, he grafts it, and there it stands leading a submerged kind of life for five or twenty or thirty years. But when the old monarch by which it stands finally comes down, it is ready to spring promptly into rapid growth.

Lands with first-class climate are too valuable to grow mere wood. Some part of our country to the South as indicated by climatic studies, as well as by history and present development, seems not to have a first-class climate for the development of numerous, vigorous, energetic and healthy men. Here timber should be grown. Certain parts of America are too cold and have winters too long for the easy support of large numbers of people.

SAWDUST STOPS FIRE

Recent experiments went to prove that sawdust is useful as a fire extinguisher. It was found to be very successful in quenching fires in oil, and much superior to sand for fires in tanks of inflammable liquids. Experiments were conducted with tanks of burning lacquer, though the same principles appear to apply largely to tanks of burning oil. The floating sawdust forms a blanket that shuts off the air from the flames; and sawdust itself catches fire only slowly, and then does not burn with a flame. The sawdust blanket was completely successful in putting out the fires in these tests. It made no difference whether the sawdust was wet or dry.

The efficiency of sawdust is greater on viscous than on thin liquids, as it floats more readily on the former than on the latter. The sawdust itself is not easily ignited, and when ignited it burns without a flame, and the burning embers have not sufficiently high temperature to re-ignite the liquid. Mixing sodium bicarbonate with the sawdust increases its efficiency materially.



WILD OLIVE TREES IN ALGIERS

The land not only furnishes sustenance to these revenue-producing trees but also excellent grazing for the numerous sheep seen browsing there.

BEARS 1200 LITERS OF ACORNS YEARLY

The food value of the annual crop of this evergreen oak tree near Algarve, Portugal, with its spread of fifty feet, is indicated by its record production of acorns.

Courtesy of "American Forestry."

Timber Owners Place Over Million Acres in Care of Technical Forester

A few years ago, Gifford Pinchot in addressing the Camp-Fire Club of America said: "Forestry in the State of New York is flourishing everywhere except in the woods." It looks as if the old order were about to change. Professor A. B. Recknagel of the Department of Forestry, at Cornell University, has been granted a year's leave of absence from his university duties in order to accept the position of Forester to the Empire State Forest Products Association; he will take up his new duties on the first of July. He will establish headquarters for the Association at Albany. The work which Professor Recknagel will undertake marks a new departure in the practice of forestry by private owners in the United States. The Empire State Forest Products Association is made up of prominent lumbermen and paper manufacturers in New York; the members of the Association own upwards of one million two hundred thousand acres of timberland in this state. The Association, at its last annual meeting, decided to establish a rational and constructive system of forestry for the handling of these lands.

Canadian Foresters in British Camps

A letter received from one of the Staff Sergeants of the Canadian Forestry Corps says, "All the forestry battalions have been fused into a Corps, and in addition constant reinforcements are being drafted into it from the medically unfit of the infantry. The Corps is at present about five thousand strong, of whom 1500 are operating in France, and increasing every day. There are about twenty camps in England and Scotland. One Branch at Headquarters is called the Forestry Branch and this handles the technical forestry work and also all lumber returns. Captain Weir, a graduate of Ontario Agricultural College, McGill and Cornell, is in charge, and Sergeant Bricker, a student from Toronto Forest School, is his Assistant. Men in the field were given the title of Forestry Representatives and handled several camps each, sending in general forestry reports embracing silvical studies, soil studies, growth studies, etc., as well as reports on progress, accompanied by maps. Several Toronto men were on this work. Our rank was the high and lofty one of full private except Parker, who was a sergeant before this work was started. He has recently gone to France where he will be associated with the lumbering end of the work, I believe. At present we are planning some new work at the instigation of the British Forestry authorities. A party is to be sent out to visit all our camps making volume and increment tables. We are going to use the forms which were used at Toronto University for stem analysis and volume tables. This is going to be very valuable experience for us and our time spent as soldiers will not be wasted. Since

the British authorities think that this is necessary, we can assume we are 'doing our bit.' There is a very serious shortage of timber, accentuated by the submarine blockade and all production work is being speeded up. The forestry exponents are using their influence to see that the government takes up the question of reforestation as soon as possible, some even advocating that this be commenced before the end of the war."

"MON PREMIER LIVRE SUR LA FORET."

To date, fourteen thousand copies of this 32-page booklet, prepared by the Canadian Forestry Association for circulation in Quebec and in other French speaking districts of the Dominion, have been placed in the hands of school children.

As a means of assisting their educational campaigns, 4000 copies were purchased (at printer's cost) by the newly-formed Southern St. Lawrence Forest Protective Association and 2500 copies by the St. Maurice Forest Protective Association.

REACHING TRAVELLERS

On three of the Canadian railways, the Canadian Forestry Journal is now installed as part of the parlor car reading equipment. Five copies are now used on the Canadian Government Railways, nineteen copies on the Grand Trunk and Grand Trunk Pacific, and the number required by the Canadian Northern is yet to be reported.

GRAIN MEN IN LUMBER LINE

The Grain Growers Grain Co., Ltd., with headquarters at Winnipeg, are now building a sawmill on their timber limits 60 miles east of Fort George, B. C., on the Grand Trunk Pacific Railway. The Company has been conducting a large retail lumber business for the past few years. They now plan to manufacture their own lumber and supply the farmers direct. The new mill will cost about $185,000 and will have a capacity of twenty-five million feet per year.

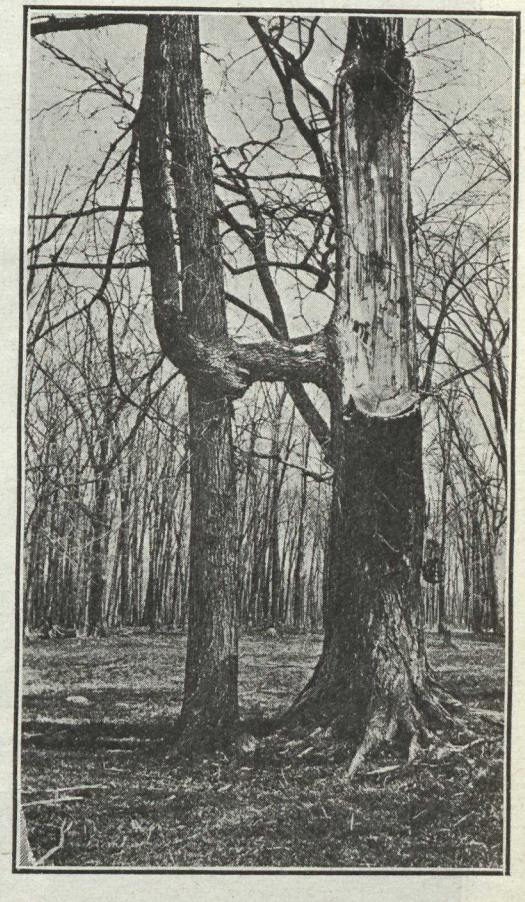


Photo by Joseph Boucher, Ottawa.

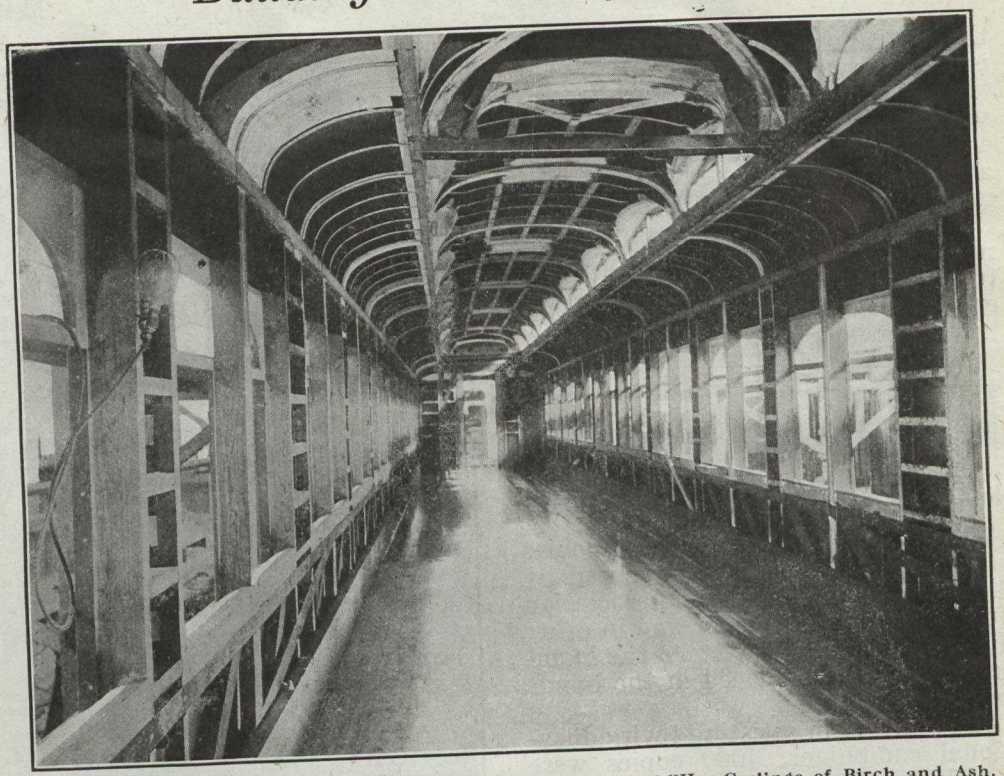
A CURIOUS EXAMPLE OF A "WIND GRAFT" OF TWO ELMS.

The elbow from the larger elm is firmly grafted to the neighbouring tree, the parent meanwhile being killed by lightning.

There is $500,000,000 invested in United States lumber plants.

"I want to assure you that our Association is ready to co-operate in any way you can suggest. While the direct object of our Association differs from yours, the work you are doing must necessarily appeal to us." Rev. T. J. Crowley, President, Sudbury District Game and Fish Protective Association, Copper Cliff, Ont.

Building a Railway Coach



THE WOOD AND STEEL SKELETON OF A PASSENGER COACH.—Carlings of Birch and Ash, Floor of Maple, Stanchions of Hard Pine, Truss Planks of Hard Pine, Sash of Mahogany.

THE FINISHED COACH.—Seat Arms and Finish of Mahogany. Built by Canadian Car and Foundry Co., Ltd., Amherst, N.S.

Nature's Warfare in Field and Forest

ELLEN R. C. WEBBER, PORT HANEY, B.C.

The World Would Last Three Years If Animal Vigilantes Were Overmastered.

THE greatest enemy man has to fear is the insect life of the world. You are all more or less acquainted with the ravages of grasshoppers, the devastating march of the locusts, and the work of the destructive and ever dreaded "seventeen-year beetle." You have read of them, or experienced them to a certain degree.

I, myself, have seen in Wyoming, the "Army Locust" on his marsh across the grass-lands, when the train upon which I was traveling was held up for nearly three hours while the vast, greedy, greasy army was crossing the R. R. tracks. No wheel, depending upon its grip on steel, could make headway through the crushed, oily bodies.

In solid mass, half a mile in width, they crept leisurely on; and as far as the eye could see on either side of our steel roadway, they were coming, and going; and the land they had passed over was left bare of any vegetation.

We know that a farm of green grain or of corn, beautiful in the morning and ready for the harvesters' early coming, is, by a sudden raid of grasshoppers, but barren land at sunset; with labor, investment and hope all dead loss; as is the devoured crop.

Here in our own neighborhood you see the stripped gooseberry bushes; the eaten, dying leaves of some tree; the pale, yellowy green of some sickly appearing plant or shrub; all the result of the ravenous appetites of insect pests.

Our fruit trees are eaten through and through with the larvae of insects; the bark is sucked dry of its juices by tiny insects; the fruit injured and made valueless by their depredations. In the forests timber is destroyed; young trees killed; and in the garden our vegetables and flowers are attacked and lost; and insect life, in some form or stage, is the direct cause of our trouble.

World Would Last Three Years

It has been estimated by those who give this question study and thought leading into actual statistics, that, were there no friends allied by nature, in the great struggle between man and his enemy insects, that in three years time there would be no life left on the earth;—vegetation would disappear first, and animal life would accompany and follow it.

Yet, daily, these tiny, allied soldiers of ours, to whom we owe our very existence; little soldiers recruited and trained by Almighty God for our

especial aid and service, are wantonly slaughtered by us; and only because we neglect to become acquainted with our natural—that is—God-given friends!

At this season of the year you may see along the country roads, almost any day, the crushed and battered body of a dull-hued snake. He was in life harmless, timid, without venom. Had he, through accident, and wholly without intention, intruded into your home or into the grateful warmth of your camp bed even, he would not have harmed you, for he had no weapon of defence only his swift speed, and his coloring, which blended so well with the ground;—his *uniform*, it is, for the Great Captain placed him, little, humble soldier,—to destroy man's enemies,—beetles, cockroaches, worms, mice, etc., such as congregate and multiply under stones, boards, low growing shrubs and crevices.

As long as he lives, daily during the season of multiplying insects and pests, he seeks and devours your enemies, and during the season when insect life is quiet, this little allied soldier is "off duty," and so goes away to rest and sleep, after a long unbroken stretch of active service. We see no snakes in winter; they are torpid; tired and "dead to the world" as you say, when you sleep heavily after a hard day's work.

With the warm spring days comes the rush of battle; and when, knowing this, he wakens from his rest to resume the fight for us, we, who should fight for him and his little life,—deliberately slay him!

Why?——Simply through an influence coming from an unenlightened age, by which we have for centuries been taught a mythical story, a legend older than Abraham by many hundreds of years, that snakes are accursed; a legend which well might have originated and carried weight in the earliest days of man, when the monsters of the Reptilian period were still numerous and powerful over the face of the earth. But through the periods during which man has grown into possession and need, the venomous snakes have grown less, and the harmless ones are now in the great majority.

That they are not accursed, is shown in the fact that they were given a work to do; and he to whom God gives a life of work, no matter how lowly, is not accursed, but loved and trusted.

The Lizard and His Insect Hunger

Sometimes, in our woods, you see a tiny lizard; a minature crocodile; with bright beadlike eyes, a tapering body which elongates into a "tail" as we call it; and limbs, a close reproduction of those of the big crocodile you see in pictures. This is a little "swift;" a lover of sunny spots and rotten logs, upon which he is usually found; as here he seeks his insect food to a certain extent.

I was earnestly instructed lately, by a small boy, not on any account to go near one of these tiny reptilian, as he was a very dangerous fellow and might bite me, and so end my life! Poor, busy, little soldier Swift! How little is his friendly battling work understood and appreciated by those who should know him better.

Place him on your window sill, where the sun comes warm through the glass, and see how quickly and eagerly he will clear the flies away. To the forests, and through the forests to man,—he is a friend to be treasured, protected and cultivated.

Frogs also are insect eaters; and as such deserve to be spared the stoning that boys and girls thoughtlessly give them. Aside from the assistance they give us in our fight for existence, we should not ignore their musical ability; and their welcome Spring concerts;—who has not enjoyed them?

Toads, despised through ages of superstition as the embodiment of poison, and killed when found in gardens, as it was believed that persons had been known to die through eating a plant "at whose root a toad lay hidden," are still held in repugnance as the aftermath of this old, old belief.

But lovers of woodland friends and life know that the toad is a gentle, harmless friend; working night and day to destroy slugs, caterpillars, earwigs, flies and the thousand and one pestiferous insects that gather about our fruit, vegetables and flowers.

Take him into your house, and he will clear out flies, cockroaches, crickets and other small and unwelcome guests in the enemy line. How does he catch them? He "plays sleep" and when an insect comes near that which it considers a lump of earth, or a stone, Toady, who has been "peeking" through his nearly closed eyes, darts his long, thin, sticky tongue forward and quick as lightning, drops Insect down his wide, dark dungeon of a throat. The toad's tongue is like a spring; it is fastened to the front of his mouth, and folds back; and acts as quickly and surprisingly as a "Gee whiz" mouse trap.

"Lady bug" invited by a Government

To be carefully guarded also is the little "Lady-bird" of "Lady-bug"—bright red, or yellowy brown, black spotted. You all know her, for you have all, in days passed, sent her home to her children in their burning home.

This tiny friend was introduced into British Columbia at Government expense; for she had not been placed here by Nature. She devours the, aphides; or green plant lice, found on the under side of plant foliage; or leaves

Do not permit her to be injured; but place her on some green plant in your garden, or by the wayside. Her value is far beyond her "weight in gold," many times over.

Other insect friends, disloyal to the traditions of their species perhaps. are the bee, the wasp, and the humble-bee.

The production of honey by the bee is only one of its benefits to man. The gathering of pollen and carrying it from blossom to blossom and tree to tree, serves to fertilize the blossoms of fruit and vegetables; and thus insures to us a good crop. This is a far more productive work than the manufacture of honey.

Wasps not only fertilize plants, but they also destroy spiders and flies. In each tiny cell of a wasp's nest, lies an egg of the mother wasp; and with it is sealed the body of a fly, preserved and torpid; stupified by the sting of the wasp, and left with the egg, to provide food for the young wasp until it is sufficiently developed to go forth and seek food for itself. The "mud-dabber," so named by the boys, makes the same provision with this exception, that she prefers spiders; nice large spiders, for the nourishment of her young.

So, in addition to the fertilization of plants, which is not done by them to the same extent as by the bee, the wasp aids in the destruction of health destroying insects.

The busy humble-bee, with his legs laden with yellow pollen, fertilizes shrubs, grasses, flowers, etc. His work lies more in the wildlands than in the garden, though he works there also.

Probably the one friend least known, most abhorred, despised, most eagerly put to death, is the skunk. His only offence is his defence; and it is quite sufficient. I know that he is blameless of much of which he is accused. I know, for I have personally cultivated his acquaintance, and have had as daily companions nine busy little skunks.

A Good Word for the Homely Skunk

I could write a long chapter on skunks alone; but time only permits me to assure you that my close acquaintance with these little animals has taught me that chickens and eggs are as safe in their presence as with the canary in the cage. But beetles, moths, grubs—any and all insects were pure sport as well as food. In the garden, hills of squash or cucumber seed or corn were very seriously studied; and many were passed as perfect by these little hunters, or foraging parties. Others were eagerly and hastily dug open with the handlike fore-paws, and—were the seed eaten? Never! But always these

keen detectives picked out with one little paw hand, a white grub; and with much chattering among themselves and a curious, investigating sort of manner in looking the prize over. Sir Grub was quickly eaten, and the next hill studied.

In some mysterious way they seem to know just which hills contain the destructive but delicious grub; and these only are opened.

Moths were chased, as a kitten chases a feather; and when caught, as they nearly always were, the skunk sat up, and holding the moth in one hand, picked wings and legs off and threw them away; looked the stripped body over carefully, then ate it, and proceeded to catch another. If the skunk visits your garden in the night or early evening when the cabbage moths are busiest, or opens a hill or two of squash or corn, your garden needed him, and was better for his coming. If you and your dog would discreetly remain indoors as he made his skirmish against your enemies, he would not annoy you with his defensive, and would soon depart to the forest, there to resume his duties as a valued worker in the forestry department, in defending our timber from the enemy beetle.

We must not forget, in passing, our little friend the bat, who with the "night hawk," skims the air through the night hours, while the swallows are off duty.

Working Day and Night Shifts

As daylight dawns, these night guards retire to rest with stomachs and crops well packed with insects; and as they go off duty, the swallows come on, and so the work in man's fight for existence is systematically carried on by his little allies, whose slaughter of insects exceeds all computation, and even exceeds the imagination.

Even the hated cherry-bird, or Cedar Wax-Wing, whom I must admit appears to be an enemy, is in truth a friend; and saves for man far more fruit than he destroys through his warfare on insects and tree-destroying beetles. It would pay the farmer well to plant more rows of cherry trees for the use of the birds alone, as a trust and a reward for their services.

Owls and hawks destroy rats, mice and moles; as well as beetles; enemies whose damage could not be remedied with the price of a dozen hens from each farmer.

Sparrows destroy noxious weed seed; as do buntings, snowbirds, and many others of the same species.

Tree sparrows alone, in one small district are statistically reported to have destroyed, in one season, 875 tons of noxious weed seed.

Birds' Eyes with Special Lenses

Some tiny birds seek the eggs of insects; and are fitted, or armed, for this particular duty by the Great Captain; so that they are given microscopic lenses for their eyes; sharp claws to their feet, that they may cling to the bark of trees and hang back down as they peer under and around leaves, twigs and branches, in search of the, to us, invisible eggs which they destroy by millions.

The crows are scavenger birds, and work in the Health Department. We might count them in, almost, as a medical corps; for, while they do not cure sickness or wounds, they prevent sickness through the destruction of decaying and foul matter, which would pollute the air and breed disease.

The tiny humming bird lends a beak, and eats what he can of spiders and insects. All small birds which perch on trees, fences or shrubs, or dart through the air, are insect eaters, or weed destroyers, and should be protected by mankind, shielded and cared for.

I think that the saddest sight one recalls in bird slaughter, one which cries aloud of treason to friendship and allied service, is the wanton slaughter of woodpeckers.

The woodpecker is chief warden of our forests; our forests which mean to us not only the wealth of a great lumber industry, but also our water supply; our reserve of moisture for the long dry seasons; our daily conveniences,—but think this all out for yourselves; look about you and consider how you would be inconvenienced by the loss of your daily wooden comforts.

Our Government spends thousands of dollars each year; hundreds of thousands for wardens and utilities for the protection of these grand trees and their young growth, from destruction through the agency of man; but the Great Captain gave the guardianship of these very necessary forests into the keeping of this vast army of wardens, which we might call the Woodpecker battalions; of which there are three hundred and fifty; with subdivisions of companies in each battalion; commonly spoken of as "varieties."

Just note, in your camping weeks and forest jaunts, the many sorts of "Flickers," of Pileates; and "Sapsuckers."*

Note the differing numbers of toes; and the wonderful tail common to all, which acts as a prop and support against the branchless, perpendicular tree from which the little warden is extracting the destructive grub or beetle.

The Woodpecker Wardens

Very, very busy are the Woodpecker wardens; for we must remember that the wood-boring beetles alone, are an army opposed to man and his forests; and they outnumber the Woodpeckers in thousands against one; yet the beetles are, again, only one of many insect armies, kept in subjection by the valued woodpeckers.

Of course, we must not overlook the kind services of the skunk, the coon, the owl and the snake, who are, in a manner, the pickets or outposts; and gather in many hundreds of thousands of the enemy while they are in the beetle stage. But while all this helps, and greatly too, yet, alone it would prove inadequate; for the eggs and larvae of these enemies are so very numerous, that they supply two-thirds of all the food for these numerous woodpecker families, with their three hundred and fifty known branches, and hundreds of subdivisions.

It has been claimed that the woodpecker often cuts into a tree deeply and cruelly. So he does. But the death to that tree was lying curled securely at the end of the woodpeckers deeply cut tunnel; and, permitted to complete its stages of existence, would carry death to hundreds of other, otherwise, healthy trees.

Not only does woodpecker seek diligently for the great yellowy-white larvae, but he also gathers most industriously, by millions, the tiny eggs which he is enabled to discover through the wonderful lenses God gave for this purpose, in the gift of microscopic eyes.

The woodpecker, while denied the gift of song, is yet a lover of music? Only the male bird, in the wooing season, tries, through the agency of instrumental music, to atone for the vocal lack, imposed by nature? This is true. The long, rolling tattoo, so often heard in early summer, or spring, made by the iron-like beak of the woodpecker, in rapid vibration against a resonant dead tree or tall stump, is his music; his love call; his lure to his mate. So far as I have been able to note, this is his only recreation; this little half hour or so of music; indulged in for the wooing and for the entertainment of the mate as she sits on the nine white eggs, deep in the heart of some old hollow stump;—a well earned interval from the more materialistic duties of securing grubs from some afflicted tree, with which to feed his loved one.

I one day watched a woodpecker as he trolled out his love notes from a tall steel tower near my open window. It may have seemed a soothing note to the nest-tied wife of the musician, who spent just four bright, sunny hours

*As to the value of the "yellow-bellied sapsucker," Dr. Gordon Hewitt, Dominion Entomologist, pointed out in the May Forestry Journal that this variety is the only one of the woodpecker family that commonly attacks healthy trees.

in earnest endeavor to please her; though had I not been consumed with curiosity to know how long he would insanely hammer against that steel surface, I should have considered it nerve racking.

Now, just one little plea for the Flicker, locally known and misnamed "Sapsucker"—and most unjustly and falsely accused of being a destroyer of apple trees.

Apple trees, as you doubtless know, are often killed by the "apple-borer," who penetrates to the very heart of the tree, through a tiny tunnel which she bores for herself prior to depositing an egg at the end thereof.

Sometimes a tree will have thirty or more of these life-sapping holes; the tree grows weak, its foliage pale; and in spite of well intentioned remedies, (wrongly root-applied) the tree consumptively fades away. Were these larvae, result of the eggs in the tree, left to complete their development, soon the entire orchard would be dead. But friendly little Flicker, while extracting these deep hidden grubs with his long slender beak, breaking away the bark with which the eaten passages are covered,—is accused of being the originator of the deep inroads to the tree heart; and is further blamed for a habit of which he knows absolutely nothing;—that of "drinking the sap of the tree!"

A Friendly Word for the "Sapsucker"

In trying to save the orchard from further injuries through the borer, poor Flicker is misjudged; and pays for his friendly act with his truly valuable little life.

I have opened the crop of Flickers still warm after death at an apple tree; and have never found any signs of sap, or moisture beyond that naturally existing where a tightly packed mass of worms, insects and larvae were to be found; a quantity beyond belief, gathered by one tiny industrious, hungry, feathered ally.

It is hardly fair to all concerned that I should close even this incomplete introduction to our woodland friends, without mentioning the good work done by moles, gophers and ground worms; chiefly angleworms.

These little friends may seem of a doubtful order; but their endeavor lies largely in opneing and loosening the soil; admitting warm air, pulverizing and enriching soil, carrying leaves below the surface to decay and form loam; admitting moisture. The debt we owe to the despised angle worm, would, in itself require the resourses of an able paper to unfold.

The gopher in some localities becomes a menace; but the tiny mole no bigger than a mouse, is of more benefit than harm. It has never been proven that it eats the root of any plant; while his ventilation of the soil, preventing souring, and packing, is a great and good work for so tiny and helpless an animal.

WOODLOT PRESERVATION

While Old Ontario farmers are being instructed how to plant and care for trees, and admonished to care for and conserve their wood lots if they are so fortunate as to have them, the impression still prevails in New Ontario that the tree is the natural enemy of man, to be destroyed at sight wherever found. As a result, there are already farmers within a few miles of New Liskeard, says the Temiskaming Herald, who are compelled to buy wood from neighbors.

The wise farmer, however, will keep a few acres of his lot in timber to supply himself with firewood in time to come, and twenty or thirty years hence the Temiskaming farm with a wood lot will be worth more than an adjoining farm from which every last tree has been removed. On a great many farms, it is true, fire has been through every part of the bush and killed it out, but there are still quite a number where this is not the case, and where quite large patches of live timber can still be found.

Such bits of bush which it may be desired to keep can be preserved from danger by future fires by the clearing up of any dead-wood or underbrush

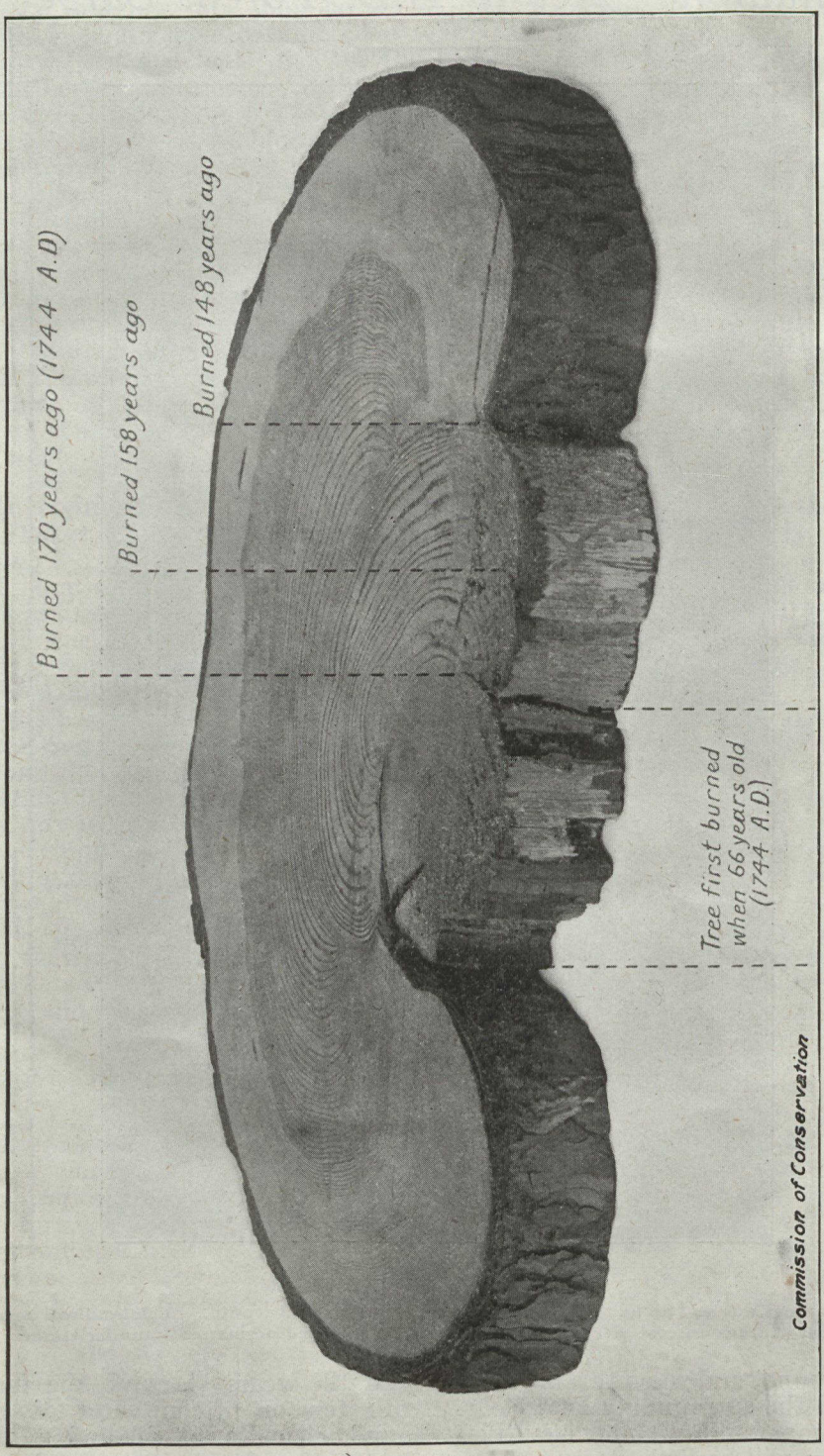
Conditions Met in N.B. Forest Survey

STONEY SOIL, HURLEY BROOK

The pile of stones was dug up by the farmer while removing a small stump. Such land will never pay interest charges on cost of clearing and should be retained permanently under timber.

on the ground, and when this has been done and the surrounding land cleared of stumps, and put under cultivation, there will be little danger of the isolated woodlot falling a prey to flames.

In the years to come the farmer with ten or fifteen acres of good, sound, clean bush will find it about the most profitable bit of land on his farm.



SECTION OF A TREE TRUNK TO SHOW HOW THE DATES OF FIRES ARE ASCERTAINED FROM THE REMAINING SURVIVING TREES. Each fire which injures the tree leaves a permanent scar and the date when it occurred can be determined or at least very closely approximated by counting the number of annual rings between the scar and the outer circumference of the tree.

Notes on Newfoundland's Forests

Replying to a request of the Canadian Forestry Journal, Mr. J. D. Gilmour, General Logging Superintendent of the Anglo Newfoundland Development Company, and formerly of the British Columbia Forest Service has briefly touched upon some of the forest conditions of the island as follows:

The Anglo-Newfoundland Development Company owns a continuous block of timber lands, amounting to 2,316,000 acres, and comprising all the drainage area of the Exploits River from Grand Falls where the mills are situated, to the head. Twenty-five thousand horse power are developed at Grand Falls. The plant has a daily capacity of 184 tons sulphite and 192 tons newsprint. The product is shipped over a Company railway 22 miles long from the plant to Botwood Harbor. The usual difficulties in shipping to England have been met during the war, and part of the product has accordingly gone to the United States.

The timber is spruce and fir, the former being mostly black spruce. The white and red species also occur. The limits are well served by water, so that everything is driven to the mills and comparatively short hauls are necessary in the woods.

Logging is all done in winter from Oct. 1—May 1. More men are available then, and in summer the fire danger is great if camps are operated.

The company maintains a fire patrol, and uses lookout points with telephones. One feature where Canadian limit holders have a little advantage is that Canadian railways in timbered country must patrol their tracks at their own expense. Here an informal association of limit-holders, with Government assistance, performs the patrol on the Reid-Newfoundland Railway. However for five years they have succeeded in keeping down the fires from this cause, and that is the main thing.

This country as a whole is timbered best along the valleys and around the lakes of which there are an immense number. Wherever the land is flat, or away from a drainage system, there are bogs, some very large. At elevations of 1,000 feet above sea level barrens and bogs, the habitat of thousands of caribou, are the rule.

The greater portion of the island bears no timber, partly on account of these natural bogs and high barrens and partly on account of many disastrous fires in the past. This is the oldest British colony, and has suffered from fires longer than any other. As in other places, it is only in the last generation that any thought has been given to the matter of preventing them. The population for 400 years has always got its living mainly from the sea, so that there was, and is more indifference here than in the U.S.A. and Canada. However, in this respect an improvement is noted in recent years.

Clean cutting of all spruce and fir down to 5 inches D.B.H. is the method followed here, and careful inspection of logging operations leads to conservative cutting, low stumps, tops utilized to 4 inches, etc. The result is a very fine natural growth of fir and spruce, partly from volunteer growth, and partly from seed in the ground. If fires can be kept out (and there have been none in ten years logging since this company started operations) there is no question about a second crop.

The use of tank cars for fire-fighting purposes is now in effect on the Canadian Pacific, Grand Trunk, Temiskaming and Northern Ontario and Canadian Government railways.

Henri Mason, of Brussels, estimates the total loss of Belgium in buildings, equipment, stores and loss of trade at $1,060,288,000.

Turning the Tree to New Account

BY DR. JOHN S. BATES,
Sup't. Forest Products Laboratories, Montreal.

How Canada Depends on Forest Supplies to keep the National Machine Running.

By far the most important and extensive utilization of wood consists in the manufacture of lumber and other products by mechanical processes, whereby the wood still retains its identity.

Under the heading of wood used in the rough, firewood takes first place and in value accounts for about 30 per cent. of the primary wood products. Air-dry wood has a calorific value rather more than half that of coal, pound for pound. The normal annual consumption of railway cross-ties in Canada is about 20,000,000 with an average value of about 45 cents each. Half of these are used for renewals showing the tremendous destruction which is mainly due to decay rather than mechanical wear. Only about 7 per cent. of the ties receive preservative treatment indicating the scope for extension of modern wood preservation processes in the case of a number of the Canadian tree species. Treatment with creosote and other preservatives is practised very extensively in the United States and especially in Europe with the result that the life of the tie is doubled in most cases.

Making Track Ties

In order of importance the Canadian tie woods are jack pine, eastern cedar, Douglas fir, hemlock, tamarack, western larch and small quantities of other species. Hardwoods such as birch and maple are now coming into use, as creosote treatment successfully overcomes the low durability of hardwoods, and the ties have the advantage of high mechanical strength. Large numbers of wooden fence posts are used throughout the country but there are no accurate figures. The fence post problem is particularly important in the Prairie Provinces where the perishable poplar and willow are the only local woods available. An investigation of preservative treatment is now being carried out. The annual consumption of round mine timber is over 53 million linear feet with a total value of $524,000, while the mines consume sawn timber to the extent of 23 million feet board measure valued at about $304,000. About 140 coal and ore mines in Canada use timber, the leading woods being Douglas fir, spruce, balsam fir, lodgepole pine, jack pine and hemlock. The high humidity and elevated temperature in the mines promote rapid decay and it is likely that preservative treatment of mine timber will be taken up in Canada, at least for timber used in permanent haulways. The demand for poles has fallen off in recent years largely on account of decrease in telephone line construction. In 1914 the returns show 283,184 poles used with a value

of $660,262. The leading woods are eastern cedar, western red cedar, spruce and tamarack. Spruce and other piling is used quite extensively in Canada and forms an important export item.

Spruce Most Widely Used

The term lumber is used to include a wide range of material and constitutes the most important manufactured product A large proportion goes directly from the saw-mill into general building and construction without passing through an intermediate wood-working factory. In 1915 the lumber out in 3,239 mills totalled 3,242,676,000 feet board measure with a total value of $61,-919,806, which include a good deal of "structural timbers." Twenty-five kinds of wood are reported which represent about 50 distinct species. Spruce, white pine and Douglas fir account for about 75 per cent. of the total lumber out in Canada Hardwoods are of minor importance representing only about 6 per cent of the total lumber cut; birch is the leading species in point of quantity available The term "structural timbers" covers wood so used that its strength is a factor of first importance and includes timbers for mill construction, trestle and bridge timbers, wharf timbers, larger ship timbers, etc. The Divisions of Timber Tests and Timber Physics of the Forest Products Laboratories are now establishing authoritative data on the mechanical and physical properties of Canadian woods for the benefit of engineers, architects and others concerned with the grading of lumber and design of structures. The Canadian species in order of merit and resources are Douglas fir, western hemlock, eastern hemlock, western yellow pine, western larch, red pine and eastern larch. Douglas fir is fully equal to southern longleaf pine as a heavy structural timber and with the tremendous untouched resources in British Columbia is destined to become Canada's most important tree.

3 *Billion Shingles*

The rough manufactured products are too well known to require much discussion. Canada produces over 3 billion shingles annually, valued at nearly $6,000,000. Over half of these are made in British Columbia mostly from western red cedar. About 800 million laths are produced with a value of over $2,000,000, these being for the most part by-products from slabs and edgings. Treated wood-block paving is now used in a number of Canadian cities and throughout the world is placded in the first rank of city paving materials. Wood flour or wood meal is the fine, fluffy, absorbent fibre made by grinding wood chips in a stone mill or steel burr roller mill with a limited amount of water. It is used in the manufacture of dynamite, inlaid linoleum, oatmeal wall paper and wood plastics. Canada imports considerable quantities from Europe and the United States chiefly for the manufacture of dynamite and there is no reason why the industry should not be established in Canada for both local and export trade. Wood wool is a fine excelsior used in Europe for surgical dressings, filtering, stuffing mattresses and as a substitute for cotton waste.

Specially manufactured products include hundreds of different kinds of articles wholly or partly constructed of wood. In Canada this group accounts for 15 per cent. of the total wood cut. An economic principle underlying the proper use of wood is that each species of wood has a legitimate field of usefulness within which it should be employed. Custom, prejudice and lack of information frequently prevent the use of a species for some purpose for which it is naturally adapted. A large amount of accurate data still remains to be established and there is a wide field for technical research in determining the mechanical, physical and chemical characteristics of Canadian woods.

Some By Products

Special mention should be made of the by-products of the lumber industry since they constitute an enormous amount of wood material which for the most part is now going to waste. Utilization is retarded in

Canada on account of the scattered population and limited markets as well as the technical nature of many of the processes. It is estimated that the logging waste which is left in the woods represents about 25 per cent. of the original trees. Obviously the opportunities for utilization are limited and the main problem in Canada at present is to rigidly enforce the proper burning of slash in the wet seasons to remove this serious fire hazard and leave the woods in better condition for second growth. Other losses in the forest are due to fire, insects, fungi, wind, thick growth, scattered growth, local predominence of inferior species, mature trees not up to cutting standard, inaccessible timber and land-clearing operations. These are some of the problems which confront the forester and the importance of the forest protective movement is emphasized when we remember that forest fires in Canada have destroyed perhaps ten times as much wood as has been taken out by the lumberman. The federal and provincial forestry branches and the various associations have done a great deal to safeguard our widespread forest resources and to secure the co-operation of the public in overcoming carelessness in the woods.

40 *Per Cent. Waste*

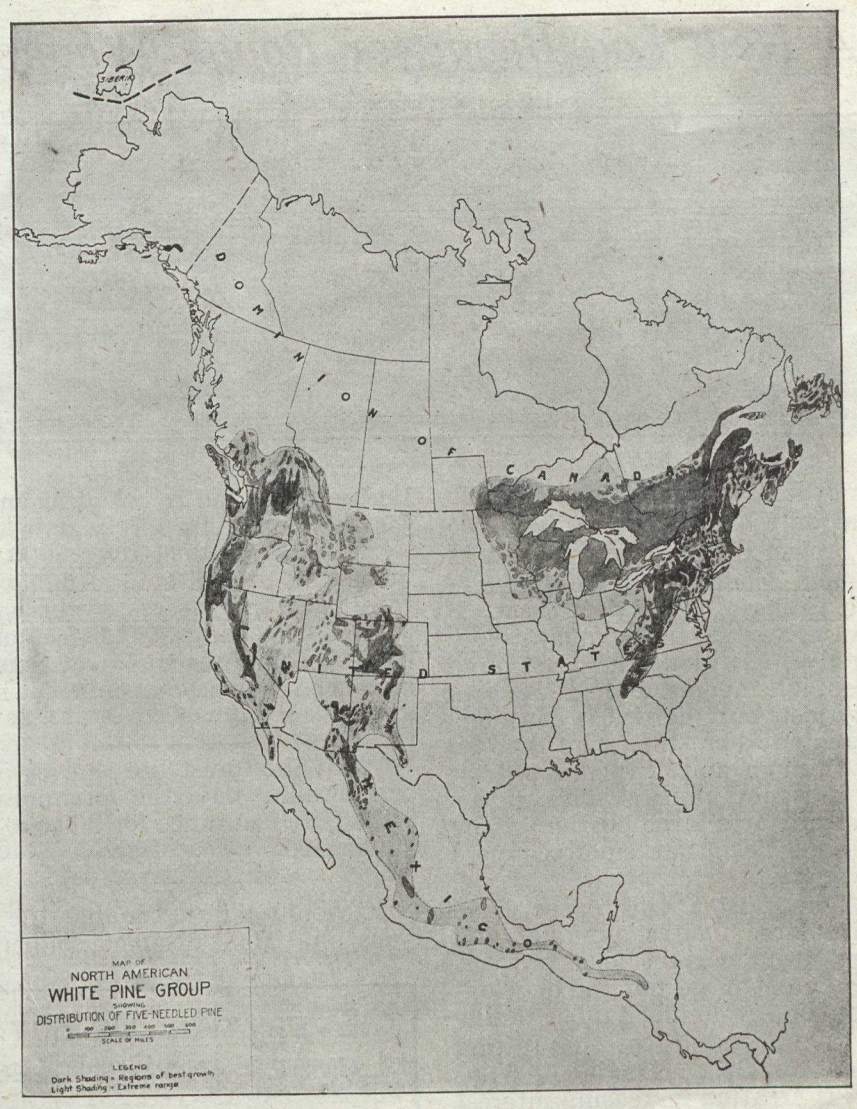
Saw-mill waste amounts to about 40 per cent. of the original tree, so that the finished lumber on the average represents from 30 to 35 per cent of the tree. New developments in the utilization of wood waste are being made continually but it is false economy to handle waste unless the by-product industries can be carried on at a profit. Effective utilization calls for a variety of chemical and mechanical processes which must be adapted to the form, species and quantity of wood waste available at any point. Slabs, edgings and trimmings represent 15-17 per cent. of the tree. Among the more common uses are fuel, laths, box shooks, small slack cooperage, small wooden articles, kraft and sulphite pulp, excelsior, wood flour, wood wool and producer gas. Sawdust accounts for another 11 per cent. and is used to some extent for fuel, producer gas, briquettes, polishing metals, insulating, packing, bedding in stables, floor sweeping compounds, composition flooring blocks, linoleum, improving clay soils, smoking meat and fish, blasting powders, wood flour, plastics, porous bricks, mixing with mortar and concrete, distillation, ethyl alcohol, oxalic acid and carborundum. Bark amounts to about 11 per cent. of the tree. It is usually used as fuel, although hemlock and oak barks are important in the tanning industry. A recent development is the use of spent hemlock bark for mixing to the extent of about 30 per cent with rag stock in the manufacture of roofing felts. Experiments on its use in wall board, indurated pails, conduits and wall paper give promise of success. In the manufacture of special wood products a good deal of wood is lost during seasoning by decay due to poor methods of storage and also by warping and splitting. There is a large waste in converting wood into the desired shape for the finished article. Proper co-ordination with plants making small wooden articles brings about a great economy of material. Shavings find use as fuel and to some extent for packing, bedding, drying wet land and manufacturing fibre board. Beechwood shavings are required in large quantity by vinegar factories but this is another case where specially cut wood is usually used instead of relying on by-product wood from various plants.

(*To be concluded in July issue.*)

PLANTING WHITE PINE

The Pennsylvania Department of Forestry has not suspended white pine planting because of the white pine blister disease. Almost fifty per cent. of the 3,750,000 trees planted on the State Forests this spring were white pine.

Canada has not one tree too many for present and future needs. We own just one quarter of the timber possessed by the United States.



Courtesy N.Y. State Conservation Commis.

MAP OF NORTH AMERICAN WHIT PINE GROUP SHOWING DISTRIBUTION OF FIVE-NEEDLE PINES.

Dark shading represents region of best growth, light shading—extreme range.

SAVE THE WHITE PINE

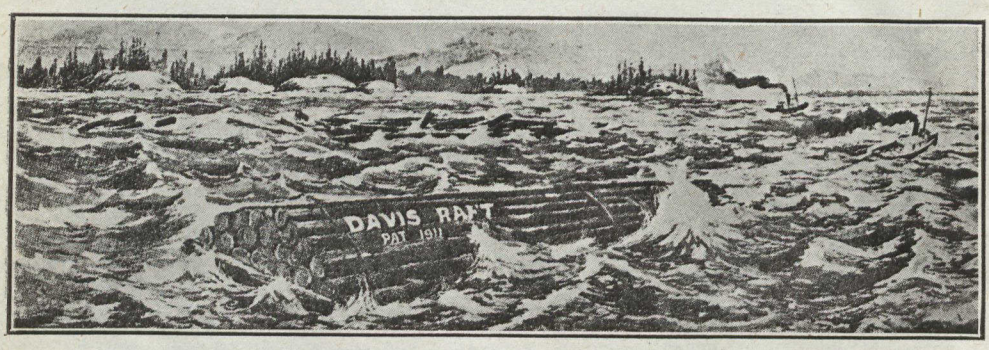
Canada's two hundred million dollars worth of white pine is menaced by a deadly disease, "Blister Rust."

Every reader of the Canadian Forestry Journal, residing near white pine areas has a public duty to perform in 'scouting' for infections of the disease. A special pamphlet, with graphic illustrations, has been issued by the Forestry Association.

Learn what the disease is and how it develops on white pine and on the 'host' plants, the currants, and gooseberries. The latter are essential to the transmission of the disease for it will not pass direct from pine to pine. Destruction of the 'host' plants will stop the progress of the Blister Rust. All trees infected should be destroyed by their owner.

Send your name to the Association office, 119 Booth Building, and secure a few copies of the pamphlets.

A New Log Boom for Rough Waters



The ordinary form of log-boom, so familiar on the Pacific coast, is liable to be broken up and the logs lost, if the boom should be unfortunate enough to meet rough weather while in tow. Even in the comparatively sheltered waters along the coast large and valuable booms of logs are frequently lost, but the risk is considerably greater where the boom is to be towed through more exposed waters, where it is not unusual for the tow to go adrift, or a large portion of the logs escape with but small chances for recovery.

The losses from this cause have run into large figures annually and the risk from certain localities has been too great to permit the development of some valuable timber limits.

The new system of log-rafting patented by G. G. Davis, of Vancouver, is creating increasing interest among the loggers and mill men in British Columbia.

The illustration reproduced herewith will give an idea of the principles of the new system. This form of rafting may be constructed at a cost of 12c to 35c per M., depending on the locality and kind of timber. The percentage of loss in this system has been extremely low, while in the old method the loss in exposed waters, such as the west coast of Vancouver Island, has occasionally been as high as 50 per cent.

There was one Davis raft lost in Queen Charlotte Sound, the weather and sea having become so rough that the tug boat had to cut clear and run for shelter. This raft was last seen by a Japanese liner over 2000 miles at sea and still intact. Among other records of the success of this system is that of towing 30,000 feet of logs from Ocean Falls to Puget Sound, a distance of over 500 miles, without any loss whatever.

What the forest fire thieves in one year would pay the premiums on $1,000 life insurance for 300,000 Canadians at 25 years of age.

It would almost double the pensions on 19,000 disabled soldiers.

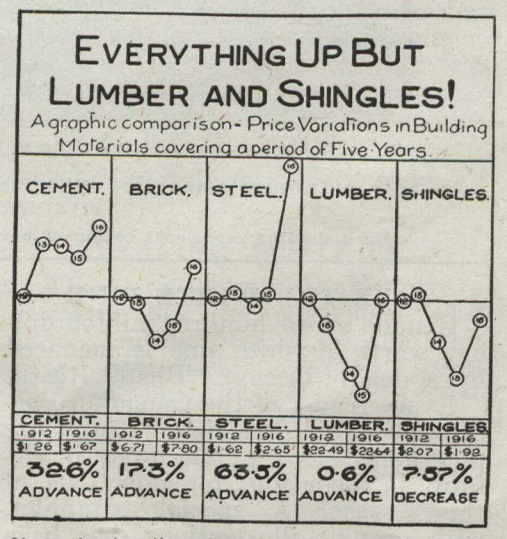


Chart showing the relatively small advances in the prices of lumber and shingles as compared with other building materials during the past five years.

Peat Bogs as Sources of Fuel

As the fuel situation in Canada, and particularly in the prairie provinces, is drawing much public discussion, the Journal reproduces an interesting statement made by Mr. J. M. Macoun at a meeting of the Canadian Forestry Association some years ago.

"I would like to speak of the utilization of our peat bogs for fuel purposes. For at least 20 of the last 27 years my work has been in the parts of Canada lying between Hudson's Bay and the Mackenzie River. That is the part of Canada in which most of our large peat bogs are found. Without going into figures, I will venture to say that between Hudson's Bay and the Mackenzie River there are at least as many acres of peat bogs as there are of green growing timber. I don't mean on timbered land, because we know a great part of that country has been denuded. But I am quite certain that there are as many acres of peat bogs as there are of green growing timber. Now the natural question, not only for the whole country, but especially for this Forestry Association, is, what can we do to utilize those bogs? My work last summer, beginning in Ontario and extending through Manitoba and Saskatchewan, was to examine many of the larger bogs to see what they are worth for fuel purposes; that is, to ascertain their depth, the quality of the peat, and especially the possibilities of draining them. While I was working on that special question I naturally learned what I could, from the point of view of the forester. Speaking from this point of view, I think our Canadian bogs are of three kinds.

(1) The bogs that cannot be drained. When I say bogs that cannot be drained, of course we can drain anything; it is a mere matter of money—I mean bogs that from their situation, being in basins and that sort of thing, cannot profitably be drained. There are many of these bogs in Canada, and perhaps we cannot consider them at all from the forestry point of view.

(2) There are the bogs that can be completely drained without very great expense. I am entirely ignoring the question of the utilization of the bogs for fuel. A bog that can be completely drained will eventually be used to a very great extent for agricultural purposes.

(3) As far, however, as my experience goes, and that of those with whom I have talked, a great proportion of our bogs in Canada are of the kind that can be only partially drained. That is, it would be difficult to drain them completely, and yet some surface water can be taken off. When water leaves a bog it goes for good. That is, if you can lower the average height of the water in a bog one foot, even if it goes up to a higher level in the spring, still the average level will be permanently lowered. A somewhat trifling incident drew my attention to this matter whilst I was working on the Canadian Northern Railway, between Hudson Bay Junction and the Pas Mission. On the right of way between the rails and where the fences will ultimately be, the bog has been sufficiently drained to allow of a growth of aspen poplar along the whole length of the line, which for 89 miles runs through bog and swamp land. The bog itself is covered with spruce and tamarac, but I found young aspen poplar from one to two years old along practically the whole line, thus showing the effect of a little drainage. A year later, whilst working along the muskeg near Winnipeg—the largest muskeg in Canada—I found not only well grown poplars on either side of the track, but that the spruce and tamarac which had been growing on the bog for a great many years was very much larger where the land had been partially drained than it was fifty or one hundred yards away. The inference is that if we partially drain a bog, without reforesting at all, the young spruce and

tamarac already on it will have a much better chance to grow. The question of reforestation in our country must be left in the main to nature. If that fact is admitted, I am confident that a very little drainage of our bogs at a slight expenditure of money will work wonders.

DISCOURAGES SPECULATION

A bill entitled "An act to amend the 'Forest Act'" has been introduced in the British Columbia Legislature by Hon. T. D. Patullo, Minister of Lands. The act contains a number of amendments to the existing act, which include regulations regarding the sale of crown timber for the manufacture of wood pulp. One clause states that in connection with such sales the Minister may require proof that the intending purchaser has spent not less than $350,000 upon the erection of a wood pulp and paper mill to be operated exclusively in connection with the limits under consideration; or, alternately, may require the intending purchaser to furnish a bond of $50,000 and other suitable guarantees for the expenditure of not less than $350,000 for the erection of such mill, of which not less than $100,000 shall be expended during each of the first two years of the license. Pulp licenses shall be limited by the output capacity of such mill, and shall not comprise at any one time more than thirty years' supply of pulpwood for the said mill.

ABOUT BLACK SPRUCE

The extent and value of black spruce in Canada are frequently underestimated. The following correspondence appearing in the "Pulp and Paper Magazine," Montreal, will interests readers of the Forestry Journal:

"In the March 22nd issue of the "Pulp & Paper Magazine" I read an interesting article by P. L. Buttrick, on "The Red Spruce." In this connection may I call attention to the statement regarding black spruce (picea mariana). Mr. Buttrick says, " . . . it is a small and straggling tree, mostly confined to swamps and semi-barren hill-tops. Its only value lies in the occasional specimens which happen to get large enough to be harvested with red or white spruce."

Speaking of the forests of Quebec and Ontario I should like to add that though black spruce does grow as "a small and straggling tree" on "semi-barren hill-tops and swamps," there are also thousands of square miles of black spruce forests running anywhere from 4 to 40 cords per acre. In the clay belt and flat lands of Northern Ontario and Quebec, probably 60 to 75 per cent. of the spruce is black spruce—a vast quantity considering that there must be more than two hundred million (200,000,000) cords of pulpwood in that region.

The black spruce is of course smaller than the white spruce, but the mature trees in the average black spruce swamp attain a height of 60 to 75 feet, giving 40 to 70 feet of timber, measuring 9 to 13 inches at butt, and 4 inches at top. In the virgin forests of the north as many as 500 to 600 black spruce trees (of 7-in. to 14-in. diam.) per acre have been counted.

Regarding the red spruce, Mr. Buttrick refers to it as the "epinette rouge" of the French Canadian. Now, strange to say, the French Canadian, when they speak of "epinette rouge" do not mean red spruce, but they have reference to tamarac. Epinette rouge is known as far north as the James Bay region, hundreds of miles out of the red spruce localities. "Epinette rouge sec," or dry tamarac, furnishes the best camp fire fuel of the north country.—R. O. Sweezey.

SUNSHINE IN THE FOREST

"Sunshine" is a beautifully printed and arranged magazine issued by the Sun Life Assurance Company from the head office in Montreal. The last issue gave first place to articles on the forest resources of Canada, copiously illustrated, and clearly presented. Editors Emory and Steedman merit congratulations.

Printer's Ink as a Fire Preventive

The willingness of leading Canadian firms to co-operate with the Canadian Forestry Association in inserting special advertisements in local papers setting forth the need for "Thrift in Forest Fires" this year is one of the most gratifying evidences of an awakened public spirit.

The Association submitted to four-hundred lumber and other wood-using firms a special form of advertisement, suggesting that it should take the place of the firm's regular ad. twice a month until September next.

With what good spirit the firms in question accepted the suggestion may be judged from the following excerpts representative of numerous letters received. Incidentally, it will be noted that many newspaper publishers have benefitted by the plan in the creation of new advertising customers. The excellent effect upon public sentiment in all the provinces, is self-evident.

From Dominion Match Co., Toronto:—"We are entirely in sympathy with the splendid work your association is doing in fighting the waste of forest fires.

We do not advertise very extensively but we will provide for the insertion of the 'copy' you sent us in a number of Canadian papers."

From Keewatin Lumber Co.:—"We have your favor of recent date enclosing advertisement copy which we will be pleased to have inserted in the three local papers in which we are carrying an advertisement."

Colonial Lumber Co., Pembroke, Ont.:—"I will have the advertising enclosed inserted in a Pembroke newspaper. The idea, I think, will produce results."

Schofield Paper Co., St. John, N.B.—"The only paper that we have any regular space in is the Maritime Merchant of Halifax and we will insert the copy there as requested."

The above letters suffice to illustrate how, in many parts of Canada, the advertising plan was carried out by the help of vigilant local firms.

BLISTER RUST QUARANTINE

The U. S. Secretary of Agriculture has amended the white pine blister rust quarantine promulgated April 21, 1917. This amendment is made effective May 1, and prohibits the movement of white pines and black currant plants from the New England states to points outside of New England. This action was necessitated by the considerable movement now under way of possibly infected white pines, and to a less extent, black currants, from New England to states lying west and south. Both of these plants are important carriers of the blister rust disease, and most of the states to which these shipments were being made have state quarantines prohibiting the entry of such stock.

State Forestry in Ireland

BY H. R. MACMILLAN

Ireland, alone of the four divisions of the United Kingdom, has made an organized beginning in State development of forestry. That this should be so is one of the fruits of the remedial land legislation of the last two decades. Mainly through the exertions of Sir Horace Plunkett and the movement for better use of the land, which he initiated and to which he lent such steady support, an Act was passed in 1899 creating for Ireland a Department of Agriculture and Technical Instruction, charged with the supervision of matters so unrelated as agriculture, forestry, technical instruction, fisheries and light houses.

Previous to the passing of this Act, Ireland had become the most distinctly agricultural portion of the United Kingdom. The area of woodland was steadily decreasing, and though there was a certain amount of tree planting by private owners, chiefly for shelter or beauty, there were practically no well managed woodlands. The land area of the island was, according to use, roughly divided as follows:

	Acres
Use for agriculture (crops and pasture)	15,250,000
Mountain land	2,208,000
Peat, bog and marsh	1,575,000
Woods	304,863
Water, roads, fences	1,033,000

The cultivated land was broken into very small holdings, averaging 25 to 30 acres each. The mountain land, which, according to many writers dealing with forestry in the British Isles, and according to the reports issued by various Commissions considering the subject, is the land most readily adaptable for forest purposes, could not be taken unreservedly as

available for timber production. The small average size of the farms, the pressure of population, the dependence of agriculture upon farm stock give mountain land a high value for grazing during certain seasons of the year.

The value of such land in many localities may be taken at one sheep per acre. To withdraw the land from grazing, and it is probable that the best grazing land only would repay planting, would seriously disturb the agricultural population. Such disturbance could only be accomplished by a gradual change in the habits of the population, and by demonstrating that the profit from forest planting is greater than the profit from grazing, and that the plantations are on the whole, by affording employment for labor, more of a source of support to the community than the animals they displace

A large proportion of the mountain land cannot be expected to profitably produce timber. Due chiefly to the prevailing Southwest wind, which dries the trees out and checks growth, the upper limit of commercial forest in Ireland is about 1200 feet absolute elevation; the limit of the growth is in the neighborhood of 1500 feet. Towards the West coast, where the influence of the wind is more strongly felt, the limit of commercial forest is about 900 feet. As the upper limit of tillable land over the greater part of the island is around 700 feet there is not a great area, even not allowing for the grazing, available for commercial forest.

Woodlands Broken Up

The woodlands which go to make up the 300,000 existing acres of tree growth are chiefly in bodies of 1,000 acres or less. Previous to 1899, none belonged to the state. Small areas were degenerated forest, the remnants of early royal forests and perhaps of the forest primeval of the island. The greater part were plantations made within the past century. Unfortunately, the productivity of these forests is not what it should be because of the lack of silvicultural knowedge amongst farmers and landowners, this lack leading to poorly planned, poorly thinned and poorly tended plantations. The slow progress of forestry under private initiative in the past was undoubtedly due to the lack of silvicultural knowledge. Owners who made plantations received such poor financial results that neither they nor their neighbors were tempted to proceed farther with forest plantations.

The Department of Agriculture and Technical Education, therefore, had a varied problem to face when it undertook the improvement of the forest situation.

The first necessity was the building up of a competent technical staff. Soon after the passage of the Act, a Scotch forester, Mr. A. C. Forbes, entered the service of the Department as Chief Inspector of Forestry. The Department at that time was unable to devote money to forest work. The duties of the Chief Inspector were for a time confined to giving advice to private owners and making a forest survey of several Irish counties.

One of the most pressing needs for the improvement of existing woodlands was a higher standard of forestry knowledge. The Department, therefore, acquired in Wicklow, a well wooded county, the old homestead of Parnell, consisting of 300 acres of woodland and 200 acres of grassland upon which to conduct experimental planting work and establish a training school for foresters who might later enter the service of the state or of various owners of woodlands or plantations. Six working apprentices were taken in annually and given a course extending over three years. The number trained annually is not now so great owing to

the supply having caught up to the demand.

The chief attention at this, the leading forest station in Ireland, is now centered on conducting experiments in the planting of species presumably adapted to Irish conditions. An Arboretum has been established and over 100 acres of sample plots of various species planted. The average cost of planting with two-year-old plants at the rate of 3,000 per acre has been about $34.20 per acre.

Many North American species have been tried and the results given during the first five years by the North American species, as compared with European and other species, are interesting. The plantations are on a light loamy soil. The rainfall averages 40 inches per annum. While the winter temperature does not go below 10 to 20 degrees F., there are frequent frosts in May and June which seriously affect many species. The climate is typical of that of the greater part of Ireland. The elevation varies from 200 to 450 feet. The plantations are in nearly all cases evenly mixed with nurse trees of European larch, and are spaced about 4 by 4 feet, the plots varying in size from one to three acres. North American species are evidently better adapted to Irish needs than many of the European species. Those species from the Pacific coast seem especially provided for Irish condtions. Nine of the eighteen conifers showing the best results up to date are North American and of these, eight are from the Pacific coast.

Effects of Land Policy

A Land Act passed in 1903 had resulted in the purchase of estates by the government in order that the agricultural lands comprised within the estate might be distributed amongst the tenants in pursuance of the policy of breaking up the large estates. There frequently remained wooded areas for which no disposition was possible to the Government Estate Commissioners except the sale and clearing off of the timber. Under this policy the area of forest land was actually being decreased through Government action. According, in 1908, an annual grant of $28,000 was made for the acquisition and management of such tracts. The Department had up to 1914 acquired ten timbered areas varying in size from 240 to 1900 acres and totaling 7,000 acres. These are under permanent management by the Department as demonstration areas and as local sources of timber. About 800 acres have been planted in these woodlots.

A Departmental Committee on Forestry in Ireland, of which the Chief Inspector of Forestry was a member, recommended that an area of 200,000 acres of mountain land should be purchased and planted for forest purposes. It was estimated that of the 2,000,000 acres of mountain land in the country this much at least might safely and profitably be used for timber production and that argument about the total area available might reasonably be left until action had been taken on 200,000 acres as a start. Obstacles are numerous in the way of public purchase of land in the British Isles. A strong fear of the nationalization of land exists in certain quarters. The titles and usages existing over the land are frequently complicated, making it difficult to secure the land required from the various parties interested at a reasonable valuation. The agricultural habits of each community have become so settled that the removal of a few hundred or a few thousand acres from the grazing resources of a valley inevitably involves difficult readjustment. The Irish Forest Department alone has overcome these difficulties in any measure by actually purchasing land for planting. An advance of $120,000 was made in 1910 by the Development Fund for acquisition and replanting of mountain land. Up to 1914, 7,000 acres, in three blocks, had been purchased, and further purchases were under consideration. The cost varied from $9.60 to $14.40 per acre. Planting is now started in these areas. The aim of management of these areas is to increase the block of public forest in each centre of an economical size for management of 2,000 to 5,000

acres, and produce timber for the needs of the surrounding population.

No Regard for Tree Values

Land Acts passed in 1903 and 1909 provided for advance of money by the government to tenants to enable them to purchase the land under their occupation. Numerous purchases have been made in this manner and it has been found that the tendency of the new owners has been to destroy the existing woodlands.

The Forest Department has therefore been given power to require the preservation and proper management of this timber, and is thus placed in the position of being able to further influence farm forestry. Important educational work is being carried on by the officers of the Department in making working plans for and giving advice to private owners.

Powers, granted under the Agricultural and Technical Instruction Act allow county councils to raise taxes for the acquisition and preservation of woodlands. Three counties have acquired forest land in this manner. Counties may also, guided by the advice of the Department, raise money by taxation for the purchase of trees for distribution to agricultural owners. Altogether, up to 1914, about 1,000,000 trees had been distributed to planters by counties.

The forest work of Ireland is now carried on by an annual vote of $48,000, in addition to the $120,000 advance from the Development Fund.

The superior staff consists of the Chief Inspector of Forestry and two foresters as Assistant Inspectors, in addition to a trained foreman in charge of the chief planting and forest stations.

Schemes too Radical

The work can only be increased when the funds are increased, which is unlikely at present. The start already made, in addition to breaking the ice for the British Isles, cannot help but be of great effect in influencing the standard of forestry practised by land owners and (by showing results) in leading to the further state purchase of land for forest planting. The propaganda work carried on in Great Britain has not been of the proper type. The schemes proposed have been too sweeping and have frightened governments, land owners and tax payers alike. The published details, by being interwoven with plans for the utilization of the unemployed and by providing for the planting of areas not likely to produce timber at a profit, and by sweeping away grazing rights and moor lands at a stroke have earned for forest planting more opponents than friends. The industrial side of the question does not appear to have been sufficiently treated. It has not been made sufficiently clear, in a local manner, how the existence of even small forest areas would benefit towns and industries. Though the utilization of home resources is a burning topic in Britain, but little has been said of the present wasted forest opportunity, bound to continue so long as the planted and managed forests of France supply pit props to the coal mines lying beneath the denuded hills and valleys of Wales.

CANOES STAMPED FROM VENEER

A new use for wood has been developed in Michigan in the making of canoes by a new system. The new idea is the stamping out of the finished canoe, from veneer, instead of the old-fashioned manner of building up a canoe from ribs of prepared wood, and the cutting of the thwarts and gunwales, and the covering of the whole with canvas.

No wonder newsprint is scarce. There are 2,580 daily newspapers in the United States. Over 800 have gone out of business since the rise in paper prices began.

Clergymen Aid with Fire Warnings

One of the many plans employed by the Canadian Forestry Association to head off the fire season by appeals to the Canadian public for care and co-operation, was the sending of letters to four thousand Canadian clergymen of all denominations and in all the provinces, suggesting Sunday, June 3rd as a "Forest Conservation Sunday." To the French-speaking Roman Catholic clergy of Quebec, the date of June 10th was suggested, the notices being arranged in French and with special reference to Quebec.

The English form of letter and the pulpit announcement were as folows:

"Sunday, June 3rd, 1917, has been suggested as Forest Conservation Sunday throughout the Dominion. Annually the needless loss of life and property through individual carelessness with fire in the forests has been the subject of many sermons. Last year a score of effective pulpit addresses were based upon the Northern Ontario holocaust.

Do you not regard it as desirable that a few words should be spoken *in advance of* the season of forest fire hazard so that 1917 may be spared the tragic sacrifice of 265 lives and a loss of from four to six million dollars worth of property such as characterized 1916?

A pronouncement by the clergymen of Canada at this time will help achieve a result of the highest national importance.

Yours sincerely,

CANADIAN FORESTRY ASSOCIATION.

The Pulpit Notice

"At this season when the hazard of forest fires throughout Canada is reaching its height and the country is threatened with tragic loss of life and property, I have been asked by the Canadian Forestry Association of Ottawa to bring the following statement to the attention of this congregation:

Every year the careless conduct of settlers, campers, sportsmen, prospectors and others in or near the forests causes a needless property loss to Canada of from four to six million dollars. In this loss every citizen shares. It may be stated with truth that the Canadian people bear nine-tenths of the damage caused by forest conflagrations and that, therefore, he who does not seek at every turn to preserve our timber possessions from fire is playing false to his country.

Canada's power of recuperation after the war depends upon the productive state of her natural resources. A century of neglect has so reduced the timber supply that only the most careful husbanding will enable us to meet the needs of the future. When we realize that our forests are growing mainly where no other crop can thrive, and that ten trees fall by fire to one that falls by the axe of the lumberman, the cause of forest conservation is clearly identified with good citizenship.

A few practical hints may be adopted with valuable result: No camp fire should be built except among rocks or gravel, never in a bog, or in leaves, or evergreen needles. The camp fire should always be put dead out before leaving. Take no chances with a smouldering fire, but use a few extra pails of water or shovels of earth to make absolutely sure it is extinguished. Lighted tobacco or matches, carelessly thrown away in the forest, have started hundreds of bad fires.

By personal co-operation in this nation-wide programme of forest guarding, it is believed that the country's losses in this most easily-destructible resource will be greatly reduced and many human beings saved from death in forest fires."

How U. S. deals with Settlers' Fires.

(From a letter of U. S. Forest Service to Canadian Forestry Assoc.)

In the National Forest States of the United States fires have frequently occurred in the past caused by settlers burning brush and debris on lands being cleared by them, and considerable damage to National Forest timber has resulted in several instances. Such settlers' fires are often a grave menace to nearby Government and privately-owned timber lands. I am glad to state, however, that this menace to the timber in the western States is lessening each year, as the people, and especially the settlers themselves, realize the great danger involved in such brush burning in the dry season without adequate precautionary measures for keeping the fires under control.

The Federal Government relies largely upon the laws on this subject which have been passed by the legislatures of the respective States. Under those laws, the most general requirement throughout the country for the burning of brush, grass, and similar materials in or near woodlands for agricultural or pasturage purposes, is the one prescribing a closed season, corresponding to the fire danger season in the State, during which no burning is allowed. In some States burning may be done during the closed season if a written permit is first secured from a Fire Warden, or if the officer himself or his representative, is present. The period of the closed season varies considerably in the different States. In some it even covers the entire year, while in two of the States the township boards are empowered to declare a closed season whenever in their judgment there is danger of fire spreading. In one State the closed season restriction does not apply to the burning of log piles, stumps, or brush heaps, in small quantities, under adequate precautions and personal control, and if in accordance with regulations adopted by the board of forestry for that State; but if any such burning without permission results in the escape of fire and injury to the property of another, that fact is held to be *prima facie* evidence that the burning was not safe and was a violation of law.

Various other restrictions are also added in certain of the States, as, for instance:

(*a*) In one State the law prohibits the issuance of a permit until the dry snags, stubs, and dead trees over 25 feet in height within the area to be burned have been cut down, and such other work has been done on or around the area to prevent the spread of fire as may be required by the forest officers, who may also employ watchmen to supervise the fire until the permittee himself is able to control it.

(*b*) Another State issues, but does not require, a special permit giving certain directions for the proper care of the fire; to follow which is *prima facie* evidence that the permittee took proper and reasonable precautions to prevent the spread of fire.

(*c*) Other States, including some that have neither the closed season nor the permit provision, require the area immediately surrounding the fire to have previously been cleared or made safe so as to prevent the fire escaping.

(*d*) Notice to one's neighbors at specified periods, usually several days before burning, is provided for in a number of States.

(*e*) Watchmen to guard the fires when burning are required in certain other States.

In addition to criminal proceedings for causing the unlawful burning of woods, practically all of the States have made special provision also for civil liability and, in regard to those which have not, there is of course the usual common law right

to action for damages. Certain of the States allow the recovery of double the amount of damages suffered if the fire is caused through wilfulness or negligence, and one State provides also for liability for injury to young growth, the damage being calculated as the expense of artificially planting and cultivating the trees to the point of development at the time when the fire occurred. Other States make persons who cause fires liable for the cost of extinguishment, as well as for the amount of injury done.

As a result of the recent visit of Chief Engineer Nicholas J. Melnikoff, of the Russian Cabinet, to the United States and Canada, a renewed activity in the development of Russia is observed.

An exploitation company known as Russian-American Development Co., has been organized. M. Albert, formerly of Prince Rupert, British Columbia, of the firm of Albert & McKaffrey, Ltd., is en route to Moscow, via Vladivostok, to confer with Russian authorities regarding the establishment of a number of sawmills in Siberia to furnish material for the double tracking of the Trans-Siberian railway. It is stated by Mr. Albert that the Russian government contemplates building 4000 miles of railroad annually for the next 10 years. Mr. Albert, himself a Russian, states that the Russian-American Co. will make a preliminary investigation of the timber possibilities of Russia, and if conditions are favorable, will prosecute development, as the company has abundant capital.

Los Angeles was the first city in California to establish a vacation camp in the national forests. A tract of land in the Angeles forest has been rented, and a large camp built, costing about $8,000. This camp consists of a log and stone lodge, 46 furnished cottages, tennis and croquet courts, baseball grounds and handball courts. A ten-day trip can be made at a cost which is within the reach of practically everyone. By this means thousands of residents of the city have been able to spend their vacations in the mountains.

In order to overcome the loss of water through diffusion through stems and leaves of the plants, the advantage of shelter belts in the form of trees, is pointed out by scientists, the tree belts obviously cooling and moistening the air and breaking its force.

The total removing of forest trees, from a country that is naturally wooded is a mistake from more than one point of view and is a sign of too much desire for immediate cash returns through cultivated crops, on the part of the farmers, without consideration for the future. There are few people that prefer a treeless stretch of country, as a place to live in but nearly all wish to have the benefit of the presence of trees within view, at the expense of a neighbor.

The planting of wind breaks is becoming more general in the North-West because farmers in that section recognize, at least, the comfort that results from such shelter, while those who take note of the results of such practice see that their crops benefit from the presence of the trees. Sheltering belts of trees are now needed in many parts of Eastern Canada, and in order to maintain comfortable and safe farming conditions the land owners should start planting as soon as possible.

New Devices in Protective Work

BY COERT DUBOIS,
U. S. Forest Service

About a year ago there came across my deck a newspaper clipping about a small wireless apparatus operated by the power generated by four dry batteries, invented by one Dr. H. Barringer Cox, of Bedford Hills, New York. On a chance I wrote Doctor Cox of our interest in a low-power wireless, described our communication problem in protection work, and asked him what he had. He, in turn, was so interested in the project of developing his invention in co-operation with forest protection work that he packed up and came out to California. He arrived last January, and established his laboratory and workshop on a canyon ranch in the Santa Barbara National Forest.

The essentials of Doctor Cox's system are what he calls the sending and receiving "loops:" these correspond to the aerials in wireless telegraphy, and, as finally worked out, consist of two 2-inch galvanized iron pipes about 30 feet high, set upright

about 60 feet apart, connected underground by an iron strip 6-inches wide buried to a depth of 18 inches. Above ground, the uprights are connected by an uninsulated No. 12 telephone wire broken in the middle by a bamboo insulator 18 inches long. His sending equipment consists of one to four ordinary Blue Bell batteries, a key, a coil, and six minute spark gaps arranged in two parallel series of three each. The receiving apparatus is an improved wireless detector and an ordinary head-set of telephone receivers. He has installed and experimented with stations one and a quarter miles, three miles, and thirteen miles away from his headquarters station. At the first two distances, telegraphic signals have been delivered. The 13-mile station was wrecked by range horses before it could be tried out.

The plan is to perfect, first, the cheapest efficient loop, then the coil and spark gaps for clear transmission to the determined loop at all distances up to 50 miles, with not to exceed two battery cells. Then to perfect the transmitter, which, with the same apparatus, will send the human voice.

When I visited the operations last April Doctor Cox was already sending telegraphic signals three miles with seven one-thousandths of a kilowatt.

Doctor Cox's principle is the inverse of the ordinary commercial wireless system. It uses the ground as the medium of transmission—not the air. To prove to himself that he was using what corresponds to the ground position of a regular grounded telephone circuit, he made some slight changes in his apparatus and telephoned successfully over a single wire with no ground.

Reporting by Shots

Reporting fires from lookout stations by shots has been frequently discussed as a possible method of communication, but until this summer I know of no actual tests having been made. The forest ranger on the division overlooked by the Fuego Vista Lookout Station on the Angeles National Forest, had trail work to do with a crew of men and was in consequence out of telephone communication. Arrangements were made whereby the lookout, on discovering a fire on which the ranger might be needed, was to discharge three sticks of dynamite, and the ranger was to "beat it" for the nearest 'phone. Two shots meant the fire was on the ranger's division. This system of communication was used on three occasions, and the shots were easily heard at an air line distance of three miles.

PACKRATS DEVOUR PINES

On parts of the Angeles National Forest in California the packrats are so abundant that many of the young pines planted by the Forest Service have been killed or injured by the rodents. The damage seems to take place chiefly in the late summer and fall and is more extensive in dry than in wet seasons. It is thought that the rats tear off the tender bark of the trees to obtain moisture at times when water is scarce.

HOW TREE PLANTING SUCCEEDS

Of the 22,000,000 trees planted on the Pennsylvania State Forests to January 1, 1917, over 15,000,000, or about seventy-two per cent. are now living. Over 11,000,00 of the 15,-000,000 are white pine. Figures are not available on the present status of the private plantations, but up to the end of 1916 about 3,000,000 seedlings were planted by corporations and individuals, and at least 2,000.000 should be in good condition now.

Are you a railroad employee? The Forest Fire is doing its best to thin out your pay envelope. Deserts play traitor to freight and passenger traffic. and Forest Fires are the breeders of deserts. Forests when kept *alive* produce lumber mills, pulp and paper factories, busy towns, heavy tourist traffic, job for everybody. Five thousand forest industries look to you to keep their wood supplies fit for use.