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A scene in woods operations of the 224th Canadian Forestry Battalion in the North of Scotland. The pine shown here is about 150 years old.

In Scotland with the Canadian Forestry Battalion

A Running Description of Unique Conditions Encountered by the Khaki Woodsmen from the Dominion

By D. H. Smith.

Perhaps one of the most interesting emergency committees arising out of the world war is that of "The Home-grown Timber Committee," which had its rise in the Department of Agriculture in the British House of Commons.

As the vastness of the war began to impress itself upon the minds of our statesmen, and the submarine tactics of Germany became a factor in the struggle, the Government was brought face to face with the problem of the supply of the great quantities of timber products required to carry on operations in France. The submarines of Germany were causing trouble on the sea, and bottoms were fast becoming too scarce to permit of large lumber shipments. The American firms, while anxious for orders for lumber from our Governments, were not in a position to contract to lay the material down in Europe owing to the absence of an adequate American merchant marine. Norway and Sweden

were not willing to impoverish their own supply by meeting too large a demand. Hence the British Government were forced to look for their supply within their own forests, and it was these conditions which led to the creation of "The Home-grown Timber Committee," as we have it to-day. This committee was to procure timber when and where it could in the British Isles, and for this purpose they were given the right to confiscate.

Solving the Labor Problem.

Upon large tracts of timber being procured, the Committee were met by the problem of getting labor for its manufacture. Men were brought from Ireland, and operations started in various parts of the country. German prisoners and coolies were also employed in this manner, but the demand continued to be greater than the supply, and it was at this point that the 224th Canadian Forestry Battalion, of which the writer is a member, was brought into existence. As has been already stated in your columns, this battalion came over to Britain last spring, bringing with them a full equipment of mills, waggons, cant hooks, axes, etc., all ready for the bush. Part of the men and equipment were started working in England, and the remainder came to Scotland, of which it is our intention to speak.

Forests Clean as Parks.

One of the first things which strikes the "Colonial" upon entering the wooded areas here is the absence of windfalls and underbrush, the ground being clean like a park. This condition is largely due to the fact that areas are reforested ones, and the stands for the most part are as yet far from mature, and are in a very healthy condition. The stands are composed nearly altogether of lodgepole pine and larch. One can see some white birch and a little white fir in certain localities.

On one of the operations where cutting is being carried on the stands are of two ages, i.e., sixty-five and one hundred and fifty years. At sixty-five years of age the pine may give ten thousand B. M. per acre, considering the closeness of utilization, while the hundred and fifty year-old stand should yield about twenty thousand B. M. One hundred and ten trees to the acre seems to be about the average.

Larch Reproducing Well.

The larch appears to be reproducing very well from its own seed, but of course there is no reproduction from the pine. The British Government advances money to landlords for reforesting purposes at a rate of 2½%. Approximate cost of reforesting an acre in Scotland is £25, and from observations on an operation it can be seen that at sixty-five years of age an acre will give an approximate return of £50. Taxes on wooded areas must be considered in any such computations.

Methods of Felling.

In felling, the trees are of course cut close to the ground, and every part of the tree is utilized. The trunk is cut in the following manner: Up to 10″ in diameter and 9′ in length for ties (sleepers); from 10″ down to 7″ in diameter for logs; from 7″ down to 3″ in diameter for pit props, and from 3″ to 1″ for firewood. Thus to the "Colonial" mind a logging operation here seems more like a land-clearing operation at home. The standing timber has been purchased on a basis of a shilling per cubic foot, which figures out to $25.25 per thousand feet board measure.

Ties are in the greatest demand at present, as they are used not only for railroads but also in the moving of the big guns, being laid end for end, also in setting up these guns. They are cut 9′ in length, and are sawn in several sized faces, from 6″. A tie is worth $1.75 in England to-day. Pit props, which are used in mining operations at the front, and for erecting wire entanglements, and in the revetment of trenches, are not in great demand at present, in comparison with ties.

Scotch Saw Mills.

The Canadians mills in use are semi-portable ones, cutting from 20 to 30 thousand feet B. M. per day. A Scotch mill, with a capacity of from 3 to 5

thousand feet B. M. per day, is utilized on some operations.

These Scotch mills are a source of amusing interest to the Canadian lumber jack. The engine sits on top of the boiler, and the mill is driven by a fly wheel. The logs are fed to the saw on a platform which lies on rollers. These rollers are forced to turn by a man turning a crank, and the platform is pushed forward, thus causing the log to go forward against the saw. Some mill!

Everywhere one turns in England and Scotland one sees large areas of shrubbery and of trees of little value from a commercial point of view, areas which might be contributing in a goodly measure to the nation's demand for timber if planted in proper species. This is especially so in England, and yet, if it had not been for the action of landlords years ago in planting the areas we are now cutting, the timber problem would be a serious one indeed. Whether the land owners were actuated in the matter by a far-sightedness or merely as a hobby to have wooded areas as a place for game, it is difficult to say, but one thing is certain that as soon as the war is over the British Government will put into force a permanent and comprehensive forestry policy which will ensure reproduction of commercial species of timber on at least the areas now being cut over.

The Future Market.

Of course Canadians would like to see this timber supplied from our own vast and superior forests, but we may well take time to consider that if the abnormal demand created by the war is being supplied in Britain, more of the normal demand in peace times must of necessity be supplied by Canada, as the reserves are being used up in Britain. Thus we see that the submarine warfare has not caused us to lose our market for the supply of this timber, but rather caused its postponement.

Forest Fires in Manitoba.

(Winnipeg Telegram, Oct. 27, 1916.)

As a result of the loss of two hundred and sixty-two lives in forest fires in Ontario last summer, the government of that province is now considering the advisability of adopting regulations to prevent a recurrence of the disaster. It is probable that Ontario will imitate the example of Quebec and British Columbia in requiring settlers to take out a permit before burning the slash and deadwood on their clearings. Such permits are not issued in the dry season nor under circumstances where there is danger of the fire spreading.

The Canadian Forestry Association has issued a leaflet giving a number of excellent reasons why a similar policy should be adopted in Manitoba. People are not accustomed to think of Manitoba as a forest province, but as a matter of fact it contains quite extensive timber areas which are gradually being penetrated by settlers, and, unless precautions are taken in time, there will some day be just such a holocaust as has caused so much suffering and financial loss in Ontario.

It is found by experience that a permit law actually facilitates settlement and that where it has been tried the settlers quickly appreciate its advantages as safeguarding their homesteads from dangerous conditions. As a further consideration it is to be remembered that in northern Manitoba much of the soil is non-agricultural, and if stripped of its forest by haphazard fires the loss will be practically permanent.

Presumably the Canadian Forestry Association has brought, or will bring, the matter to the attention of the Manitoba provincial administration. Without raising the question of who should pay the cost of protecting our natural resources, it is the manifest duty of the province to look after the safety of settlers. The expense involved would not be large, and the benefit accruing would ultimately be very great.

Near Sprague, Manitoba, showing Poplar type of growth. The dense undergrowth here indicates very favorable conditions.

Better Protection for Western Forests

Governments Asked to Stop Needless Destruction by Settlers' Clearing Fires—A Promise of Improved Conditions

The effect of the war in bringing Canadians to appraise natural resources from the point of view of broad public interest has had its share in the improved relations of the prairie provinces toward their local timber possessions. Beyond any doubt, the West is coming to see that irrespective of questions of eventual provincial control, the guarding of the forest assets plays into the hands of the Western people, while forest neglect through indifference of local or federal governments collects its toll from within the provincial boundaries. Despite an impression to the contrary, the Dominion Government makes no gain on a year's operations of the Western forests, but is out of pocket many thousands of dollars for protection and administration. Without taking sides on the claim of the provinces for control of natural resources, it is manifest that the forests must continue for many years a financial liability on whatever government undertakes their management, and that thorough protection from fire and all forms of waste at the present day can have only a good result, the enhancement of an essential public asset throughout Manitoba, Saskatchewan, and Alberta, thereby increasing the quantity and cheapening the costs of the local wood supplies, and finally making a large and permanent contribution to the public revenues.

While one might point to many most necessary reforms in the handling of the Western timber lands. Government toleration of such disadvantages can be ended only by a vigorous and well-informed public opinion. The pressure must come from the West itself. If the political patronage system is playing hob with the efficient administration of the forests, as who may doubt, the protest must come from the Western people who know the facts at first hand and are most directly concerned. In this great public service, the Western members of the Canadian Forestry Association are possessed today of a fine opportunity. They realize the necessity for better conditions, and have plenty of public spirit to impress their enlightened ideas upon tardy administrations. Only continual publicity and agitation will set aright the forest policies affecting the West. Wrong methods, extravagant systems, have their consent in public ignorance. Education puts them to flight.

A First Step.

A few weeks ago the Canadian Forestry Association set out to obtain at least an elementary concession in the interests of fire prevention in the timbered lands of Manitoba, Saskatchewan, and Alberta. We refer to the adoption of a form of "burning permit" law which would keep down the losses from settlers' clearing fires in all timbered areas.

It is well known that most of the new immigration is homesteading in the northern forest-covered lands. That introduces the same sort of fire peril as startled the country through the Claybelt Horror of North Ontario last summer. The settler must use fire to clear his land. No one seeks to deny him that right, but clearing fires are points of grave danger to human life and to public-owned timber properties. The greater part of the northern areas has no soil fit for farming, and if the millions of acres are to be kept out of absolute desert, they will have to be retained under timber crops. In other words, the farmer must arrange to employ fire for its legitimate purpose, namely, clearing his

BURNED JACK PINE, STURGEON RIVER DISTRICT, SASKATCHEWAN.

land for field crops, but he must not be allowed to burn off neighboring lands of no use for field crops and profitable only under timber. That seems a very reasonable business proposition.

Damage Through Settlers.

The fires of settlers have been the main source of forest destruction throughout the West. Rangers have had no authority to prevent them, and have been forced to take responsibility for numerous damaging fires which could have been nipped in the first place by simple restrictions on the careless settler.

The Provincial Governments have full authority to devise and enforce a law along lines somewhat similar to the "permit law" in Quebec, British Columbia, Nova Scotia, and part of New Brunswick, penalizing a settler who lights a clearing fire in the danger season without first obtaining a "permit" from a ranger. This permit stipulates several reasonable precautions such as selection of proper weather conditions, piling brush away from standing timber, vigilance in guarding against spread, etc.

If the Provincial Governments prefer to give the administration into the hands of the Dominion Forestry Branch, the "Journal" understands that this condition would be acceptable, and further that the Dominion Forestry Branch would place on duty sufficient extra rangers to make the issuing of permits convenient to the settlers. This would relieve the provinces of most of the expense in putting the new law into operation.

Dr. Roche's Good Work.

An excellent move in the matter of overcoming fire hazards in forested lands of the West was made by the Minister of the Interior, Hon. W. J. Roche, recently, when he authorized a proviso in all future homestead patents that settlers in timbered country must not set clearing fires without permits from officers of the Dominion Forestry Branch. This safeguard will take care of the fire troubles of future settlements. But the present body of settlers in the danger zone must be covered by an enactment of the provincial governments.

Scores of Western members of the Canadian Forestry Association have written, at our suggestion, to their local representatives in the Legislatures, also the Ministers of Agriculture, ex-

pressing support of the Association's proposals. We urge similar action upon all our members residing in the prairie provinces. The effect of such letters is incalculable in holding up the hands of the provincial authorities willing to accede to sensible public demands.

AMOUNT OF TIMBER IN PRAIRIE PROVINCES.

(From Address, "Timber in Canada," by R. H. Campbell, Director of Forestry, Ottawa, delivered at San Francisco, 1915.)

Province	Total Land Area.	Estimated saw timber area.	Estimated stand.
Alberta	161,000,000 acres	5,416,000 acres	21,000,000,000 board feet.
Saskatchewan	155,764,080 acres	3,584,000 acres	14,000,000,000 board feet.
Manitoba	148,432,640 acres	1,920,000 acres	6,850,000,000 board feet.

In the Forest Reserves.

		Percentage of total area.
Alberta	16,711,776 acres	14.00
Saskatchewan	6,197,707 acres	3.97
Manitoba	2,606,400 acres	1.75

	Population per square mile.	Percentage of total area in permanent forest.
Belgium	652.	18.3
France	189.5	18.7
Germany	310.4	25.9
Switzerland	234.8	22.7
Sweden	32.4	47.8
Russia in Europe	64.6	31.0

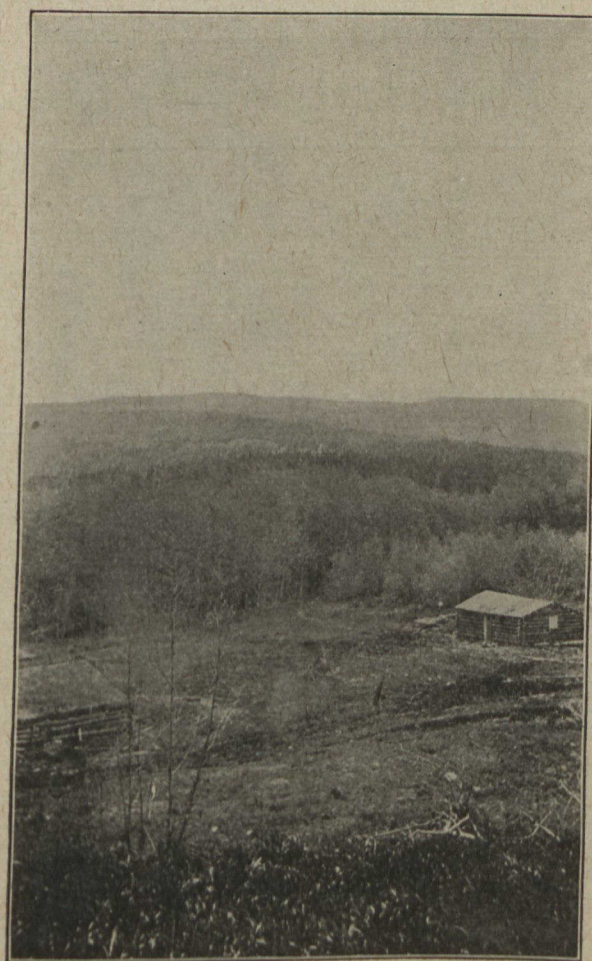
YOUNG MIXED FOREST OF PINE AND SPRUCE IN ATHABASCA RIVER VALLEY, ALBERTA.

Oregon Fire Losses $500.

Oregon, which enjoys modern forest protection, suffered practically no loss from forest fires this year, according to State Forester Elliott, despite the fact that the timbered and brush area owned by the government and private individuals and companies comprises approximately 22,000,000 acres. The entire damage from fires, Mr. Elliott says, will be less than $500. Last year the loss on privately-owned timber lands totaled $29,000.

Oregon has 13,125,000 acres within the National Forests, of which about 10,000,000 acres is commercial timber land. There are 10,000,000 acres of privately-owned timber land patroled by the state and timber owners. In addition to this area there are approximately 2,000,000 acres of brush land in the southern part of the state.

"A total of 114 fires were reported to our office in July and the first part of August, 52 of them being in Jackson and Josephine counties. These fires were extinguished without damage of consequence."



A SETTLER'S CLEARING IN THE TIMBERED COUNTRY OF SMOKY RIVER VALLEY, ALBERTA.

GROWTH IN VALUE OF EXPORTS OF FOREST PRODUCTS

For the first eight months of the present year, January to August, inclusive, the increase is 18 per cent. as compared with 1915, and 25 per cent. as compared with 1914:

	1913.	1914.	1915.	1916.
January	$1,983,980	$2,159,088	$1.811,049	$3,243,360
February	2,212,485	1,961,206	2,342,590	2,595,420
March	2,359,351	2,694.986	3,440,941	3,247,691
April	1,869,715	1,847,739	1,929,440	2,287,939
May	3,039,563	3,296,455	3,487,103	4,174,038
June	4,323,636	4,511,249	4,904,152	5,846,672
July	4,938,716	5,097.065	5,876,784	7,257,805
August	5,063,551	4,256,635	5,846,897	6,209,357
September	5,347,458	4,945,471	6,527,625	.....
October	4,505,067	4,935,715	5,503.343	.....
November	4,107,090	3,439,970	4,556,502	.....
December	2,782,061	2,698,804	3,553,083	.....
Totals	$42,532,673	$41,871,383	$49,779,509	*$34,862,282

*Eight months.

White Pine Endangered by Disease

During the past summer several inspectors under direction of Mr. E. J. Zavitz, Provincial Forester of Ontario, have conducted a systematic examination of areas of the province infected with blister rust, a dangerous disease of White Pine. The results of their work are now being prepared for publication in the annual report of the Department of Lands, Forests and Mines. The disease has been found in several points throughout the older part of the province, in Simcoe, Durham, Wellington and Victoria counties; the latter are said to be of limited scope and from present appearances can be eradicated. The most seriously diseased area is along the Niagara Peninsula, and in this region action to overcome the trouble presents a difficult problem. During the fall and winter a considerable number of pine will be taken from diseased areas. The Minister, Hon. G. H. Ferguson, is giving every aid to the solution of the problem.

The following bulletin issued by the Massachusetts State Board of Agriculture is informing:

Trouble in the U. S.

State nursery inspectors, state foresters and other official representatives from New Hampshire, Vermont, New York, Pennsylvania, Rhode Island and Massachusetts, met at Fall River, Massachusetts, on September 25, at the invitation of the Massachusetts State Board of Agriculture, to examine a serious outbreak of the white pine blister rust on native white pine. This examination proved plainly to all that the blister rust is a deadly enemy of the white pine.

Reports given by the representatives of the states showed that the white pine blister rust is already widely prevalent throughout the New England States and eastern New York, and as this dangerous disease uses the currant and gooseberry as a host plant to grow upon, and spreads very rapidly from currant to currant and from the currant to the pine, it was the unanimous opinion of all present that, as the only way to avert the impending catastrophe and save the white pine would be through a complete destruction of all currant and gooseberry bushes and flowering currants, the public should be given this information at once.

New Ways of Taking Dollars from Forest Waste

How Forest Possessions Are Being Increased by Making One Tree Do What Two Did Before

By Frank J. Hallauer,

In Charge, Section of Review, Forest Product Laboratory, Madison, Wis., U. S. A.

(In view of the excellent work being accomplished by the Forest Products Laboratories at Montreal, the following article describing the far-reaching activities of the Forest Products Laboratory at Madison, Wisconsin, will be of great interest to our readers.—Ed.

The press is almost daily calling attention to what necessity and science are doing toward the development of forest products abroad, products necessary for feeding and clothing the people, for safeguarding public health, hospital supplies and ammunition for carrying on the war. The advantage of the publicity which the war has given to these developments lies in the fact that we will have a greater appreciation for the possibilities in our own forest resources. It will probably be a surprise to most people to learn that no country, with the exception of Germany, has made such a systematic effort at developing her forest resources as has the United States. The Forests Products Laboratory at Madison, Wisconsin, established in 1910 by the Forest Service of the United States Department of Agriculture, in co-operation with the University of Wisconsin, was the first of its kind in the world.

Wood Uses in War.

Abnormal conditions have aroused new interest in some lines of forest products, including the older products such as charcoal, acetone, etc. Charcoal is used in the manufacture of black powders and in driving bullets from shrapnel. The successful use of nitrocellulose powders depends upon a solvent which will probably gelatinize the nitrated fibres, and all the acetone employed as a solvent is made from acetic acid, a product of hardwood distillation. Great Britain is dependent upon the United States for acetone in producing her cordite. Black walnut has been the standard gunstock, and the demand has so nearly exhausted our supply that other woods, notably birch, are being substituted. There is also complaint of a shortage of willow for wooden legs.

Even in times of so-called peace we have battles to fight in which we are dependent upon forest products. Disinfectants have found their place in the sun as necessities of life, at least human life as against some other forms of life, and it is worth while to point out that pure wood alcohol is the only substance which can be converted on a commercial scale into formaldehyde, which is used universally for disinfection against such contagious diseases as smallpox, scarlet fever, diphtheria and tuberculosis. It is also used to prevent crop diseases by disinfecting the seeds.

Forests are of most immediate importance, however, as a source of raw material for our industries. Our for-

est products industries employ over one million wage-earners and the products, including re-manufacture, are valued roughly at two billion dollars annually. These industries have been cutting timber at three times the normal rate of growth, and it is estimated that already 2,300 billion feet of the original 5,200 billion have been consumed. Such a rapid rate of consumption carried with it the danger of a timber famine, which would be killing the goose that laid the golden egg. The timber famine meant a loss in national wealth represented by this vast resource and an industry employing ten per cent. of our wage-earners.

What Conservation Means.

Conservation in the utilization of our forest products has averted this end. We are doubling our forest resources by making one tree do what two did before. To illustrate:

The pulp mills and distillation plants will use woods and mill waste;

The lumberman will take twice as much material from the woods as formerly;

The life of turpentine operations will be doubled by shallow chipping, etc., etc.

Such developments are no longer hypothetical; their practicability is actually being demonstrated; **for example, one lumber company in the Lake States region reports the removal of three times the material from the forest and the employment of twice the number of men formerly employed in producing an equal amount of lumber. A lumber company in Pennsylvania—one of the most progressive in the country—is securing from its waste a gross return of $124 per acre, or thirty-four per cent. of the total gross return from its hemlock and hardwood logs.**

More intensive manufacture provides for industrial growth, which was previously provided for by expansion of lumbering operations. A natural increase in the value of a tree will make possible the practice of advanced forestry methods, which will react by increasing the products of the forest, thus completing the cycle.

With one-third of the tree coming through the mill as lumber, the greatest opportunity for conservation is in the utilization of the other two-thirds. This conservation means the manufacture of a greater diversity of products and a development of uses or markets for these products. Briefly, that is the purpose of the Forest Products Laboratory.

As a Fertilizer.

The early practice of leaching wood ashes as a part of the home soapmaking has disappeared, but it is now being revived as a source of potash to offset the shortage of fertilizer due to the war.

In the Red River Valley of Texas the Indians long ago used osage orange for dyeing, but it had never gained commercial recognition as a dyewood. Within the last year, however, the laboratory has succeeded in getting it into the market as a substitute for fustic which we import from Jamaica and Tehauntepec, and over a million dollars' worth of this dye is now being made by our American manufacturers, and this from mill waste.

While making a chemical analysis of western larch it was noticed that there was an unusually high percentage of water-soluble material. This was found to be "galactan." Now if this material can be converted into a fermentable sugar, which seems probable, western larch would have a considerable advantage over other woods as a raw material for grain alcohol. The laboratory has been working on the production of grain alcohol from wood for over five years, and has been successful in experimental work in raising the yield and lowering the cost of production. The process has the advantage in that it uses small material, unselected, except that coniferous species give higher yields than do hardwoods, and to most mills producing waste in excess of their power requirements its disposal means an actual expense.

The extraction of rosin from fat wood has not been particularly successful because of the excessive loss of solvent and because the rosin is only medium grade. The wood is chipped before it is extracted, and these chips after extraction were practically a waste. Experiments at the laboratory

have shown that if the chips are made of the proper size they can first be put through the extraction process as before and then converted into pulp.

Converting cellulose into a gelatinous material known as viscose opens up still another field of research for the utilization of wood waste and adding a new line of products running all the way from sausage casings to tapestry. Many of the "silk" socks, neckties and fancy braids now on the market contain artificial silk made from wood.

Employing Kraft.

Experimental kraft has been made at the laboratory, using longleaf pine mill waste, which compares favorably with the best krafts on the market. Kraft differs from other papers in that it is much stronger, due to the less severe action of the chemicals. It is brown, like what we usually think of as wrapping-paper. Large quantities of it are used for that purpose, and it is particularly suitable for large envelopes. It is used for book covers, for imitation leather and for cardboard suitcases, etc. Gummed strips are used in place of string for tying packages. Cut into strips, either with one side gummed and spread with a fine lint or used plain, it is run into a spinning machine and twisted into threads. This thread is then woven into such products as onion and coffee bags, matting suitcases and bags, wall covering similar to burlap, furniture resembling the reed, coarse mattings, twine, etc. So far attempts to make binder twine from kraft have not been successful, but should the diculties be overcome this alone would provide for the utilization of a large amount of wood waste and at the same time build up a home industry independent of foreign raw materials.

There is much of the work of the laboratory which is of considerable importance to the industries, but is of less popular interest.

Over a hundred thousand tests have been made on commercial American timbers on which to base specifications for timber construction. Supplementing these tests, further tests on boxes and barrels have resulted in a revision of specifications of the Interstate Commerce Commission for containers for shipping explosives.

It is estimated that sap stain causes an annual loss of over $7,000,000, which experiments have shown can be prevented.

The wood-block pavement is frequently objected to because of swelling and bleeding. By bleeding is meant the oozing of oil from the treated blocks. Means are being developed for overcoming both difficulties.

A study of the operative features in a destructive distillation plant resulted in one case in increased yields of products to the amount of $15,000 annually.

This is only representative of what has been done in the comparatively few years that forest products investigations have been under way. The per capita consumption of lumber is gradually decreasing with increases in population, whereas the per capita consumption of other forest products, notably paper, increases. These natural tendencies and scientific investigation will together operate toward complete utilization of our forest resources, which, as previously stated will mean much for the economic and industrial welfare of the country. It will not be necessary to increase continually the annual cut of timber, or the annual lumber output, in order to maintain a normal growth of industries dependent upon the forests for their raw material.

Dyes from Osage Orange.

The manufacture of dyes from the waste of osage orange wood has become a commercial success as a result of investigations. Carloads of wood are now being shipped to eastern extract plans from Oklahoma, and the dye is being produced at the rate of about $750.000 per year. Before the establishment of this industry, the waste of orange wood had no market value and the extract plants were importing dye wood from Mexico and Central America.

The Relation of Forests to Our Civilization

A Survey of Past and Present with a Prophecy for the Ethical Value of Forests

By Dr. Bernard E. Fernow,

Dean of Forest School, University of Toronto.

(Article reproduced from University of California Journal of Agriculture.)

In a volume entitled "Inquirendo Island," the author describes a community, descendants of a ship-wrecked crew, on a woodless island, iron being the only structural material and coal the fuel. While such an existence is thinkable, everybody who looks about him and realizes to what extent wood enters into our civilization will admit that such existence would be full of inconveniences. Indeed, our civilization is built on wood. From the cradle to the coffin we are surrounded by wood Next to food, wood is still the most needful material, although in many directions it has been supplanted by metal, stone, cement, etc. Yet even with all these substitutes, we are still pretty nearly correct in asserting that no article of civilized life, whether of food, shelter, clothing, of necessity, convenience or decoration, is produced or brought to the user without somewhere in the process relying on wood, be it only to furnish the mold or pattern or the handle of the tool with which it is shaped, or the package in which it is marketed.

It may be reasonably asserted that especially the beginnings of civilization would have been greatly hampered by the lack of wood; they are made most readily with wood. There are several intrinsic reasons for this: wood is the easiest material to shape, the simplest tools suffice to give it form. It is light, hence easy to transport, and, relatively to its weight, strong. It is most easily obtained and found, a natural product over a large part of the globe.

The phenomenally rapid development of our own country could hardly have been attained but for the vast forest resources which made it easy for the settler to build his houses and barns and to provide him with fuel. Even the rapid development of the forestless prairie became possible only through the ease with which wood materials could be transported in wooden cars over the wooden railway ties. The splendid wood supply of our country has also been largely responsible for the rapid industrial development during the first hundred years during which wood was one of the cheapest commodities.

Pulp and Printer's Ink.

Out of the many wood-using industries we might single out one which most strikingly exhibits the increased reliance on wood supplies. While in 1880 the consumption of pulpwood was almost nominal, less than three hundred thousand cords, twenty years later the consumption had grown to two million cords, and in ten years more this had more than doubled, and at present it has grown to around six million cords, attesting to a most remarkable growth in the consumption of paper in a particular direction, with the accompanying spread, let us hope, of intelligence due to the printed matter it has conveyed to the people.

The timber wealth of the United States has led in the past to extravagant use of wood to a per capita consumption which at one time exceeded 350 cubic feet, or eight times that of the German people and twenty times that of Great Britain, which latter country has to import practically all her wood materials and may therefore represent the minimum which modern civilization requires. This great timber wealth has been reduced to more than half its original greatness. The time for curtailing our lavish wood consumption has arrived.

Value of Substitutes.

But a few years ago we have begun passing through our second period as regards wood consumption; the "inexhaustible" supplies of natural woods having been in some cases and places nearly exhausted, prices having risen, and the substitution of other materials where possible having begun in earnest. Just now the Federal Trade Commission is trying to find out why news print paper has so advanced in price, indeed trebled in the last six years. The answer is easy. Raw supplies of spruce wood, the main staple for such paper, have been, within reasonable distance of transportation to the mills, reduced to such an extent that the end of the operation of many mills is in sight, and either the extent of the paper industry will have to be curtailed or substitutes be used. Railroad cars are being built of steel—an improvement over the less safe wooden car. Railroad ties are being at least impregnated with rot-resisting substances to make them last longer; while the superior steel tie is still awaiting adoption by American railways.

The development of the use of concrete seems almost providentially designed to fill the gap, as structural timber is getting scarcer. Brick and stone and steel or iron replace the wooden building materials, and in some respects, notably fire danger, we are thereby the gainers. Basketware, which in Europe is widely developed, will more and more become substitute for more solid packages. And so in many directions we see an adjustment to new conditions, a reduction in the use of wood setting in as our supplies are waning and wood prices are rising.

Presently we will pass into the third stage of development, when the mature virgin woods are practically cut out and the age of the forester—the timber farmer—has arrived, when human skill will be applied to secure wood crops, just as it is applied for securing food crops, when wood prices will soar and wood consumption will be reduced to the absolute necessity, as it is nearly so in England—when timberlands are managed and not any more exploited.

Then, also, another economic problem will call for simultaneous solution, the problem of the poor acres. For forestry is the art of utilizing non-agricultural lands, or those which by their topography, their physical condition or their lack of fertility withdraw themselves from farm use as plowland or pasture. More than half the natural forest area of the United States is now waste land, producing nothing of value, not even useful timber crops. The restoration of these lands to useful production will be the task of the foresters; and within less than a generation this reconstruction work will be quite generally undertaken in all parts of the country. That such recovery is not private, but communal work, and principally belongs to the State and preferably Federal Government agencies, is self-evident, largely on account of the long time which must elapse between expenditures and returns.

Future Problems.

With the increase of population more intensive use of all resources becomes necessary, and especially of those which through more intensive application of labor, knowledge and skill can be made to produce more fully. Intensive farming on farm lands will take the place of agricultural rapine, which is still extensively practised, and intensive forestry on forest lands will take the place of the present forest exploitation; from the same acreage the forester will produce five to ten times as much of useful material as Nature unaided could produce. A proper classification of lands and

their assignment to the best use will be the problem of the new era.

A third economic problem will at the same time find its solution: the re-establishment of a forest cover on hillsides and mountain slopes liable to erosion and unstable water conditions; for the absolute forest lands, those which are still fit for wood production, are mostly located where also the influence of forest cover on water flow and stability of soil is desired.

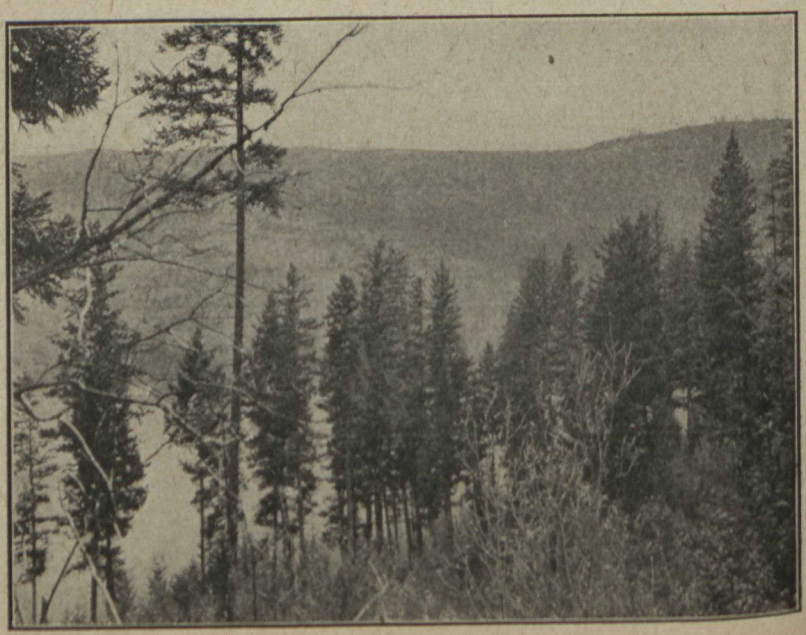
The importance of the influence of forest cover on cultural conditions has been in controversy ever since such influence was discovered. Generalizers on both sides have ridden the argument to the ground, when actually it can be used only for given specific conditions and localized environment.

There is, however, enough experience in the world to assure us that the retention of a forest cover on the slopes is in most cases favorable to stable soil and water conditions. The ideal civilized condition of a country will from many points of view, and always, be an alternation of forest and farm; even on the prairies this condition will be preferable to the open country under the constant sweep of winds. Here the climatic influence of the forest will be appreciated in full measure.

Lastly, we may not forget and not underrate the ethical influence which the forest has had in the past, has in the present, and will have in the future.

Who will question that the laborious work of hewing farms out of the virgin forest has bred a race of men of sturdier character, of more enterprise and self-reliance than the nomadic life of the plains and prairies could ever develop?

More and more the chances of these beneficial influences are reduced, as the virgin woods give way to the axe and fire. Much of the romantic wild-woods life will be lost as the economic principle is applied to the forest cover. Yet when the forester is in full action, a new beauty, the beauty of orderliness and usefulness, will attach to his plantations and natural regenerations. Even though his main aim will be an economical one, he may satisfy it without sacrificing the ethical one. At least the forester will be in all ages cognizant that the object of his care is an important factor in civilization, be it from the ecomonical, the environmental, the ethical point of view.



Developing the Forests of Japan

The forestry situation in Japan has been described by Mr. A. Nakai, a district forester from Tokio, in the following terms:—

"The total forest area of Japan, including Honshu, Skikoku, Kyushu, the Luchu islands, and other smaller islands, is 56,820,000 acres. The forests cover 78.3 per cent. of the total area of the Japanese islands. Of the 10,000,000 acres of forests in the principal islands of the group, two-thirds is in standing timber and the remainder is being reforested. The forests are classified into state, crown and private areas, and the timber is chiefly cedar, spruce, birch and Japanese pine, which is similar in appearance to the red and white pine of the United States and Canada, but of different physical characteristics. It requires about 100 years for forest trees to attain a diameter of 14 to 15 inches at a point about 5 feet above the ground surface.

"Japan exports more timber products than it imports. Korea, and parts of China and Europe, Australia, and the United Kingdom consume most of the lumber exported, although the United States takes large quantities of our oak. The large timbers used in Japan come from the Pacific north-west.

"Conservation methods work successfully in Japan and complete re-foresting of denuded areas can be accomplished in from 80 to 100 years. Re-foresting was commenced in Japan about 30 years ago, and the system is now complete.

"Patrol methods are followed in protecting Japanese forests from destruction by fire, a ranger's district covering from 5,000 to 6,000 acres. Volunteers fight the fires. When areas are cleared for re-foresting, lines of about 40 yards in width are left open and kept clear to prevent the spread of fires. In Japan there are seven major forest districts and within these are 205 subdivisions, all under comprehensive control. Areas may be cleared for farming, but in Japan the farm units are small, averaging only three acres for each farm.

"Taking the timbered areas of Japan, including the southern portion of Sakhalien, which is 90 per cent. timbered, Formosa and Korea into consideration, it will be observed that Japan has a very large forest area—estimated at 54,000,000 acres—in her colonies of Sakhalien, Formosa and Korea."

Riordan Company to Plant Up Waste Lands

Plans for extensive planting up of cut over areas are being developed by the Riordan Pulp and Paper Company at St. Jovite, P.Q. Mr. A. C. Volkmar, Forester, is arranging for the placing of 400,000 plants next spring. During the present year 35,000 Norway Spruce and white pine plants were set out, and a beginning was made toward a forest nursery, about 100,000 plants having been developed from seed. Gradually, the nursery will be developed to an annual capacity of at least 1,000,000 plants of spruces and pines for use in replanting burnt and non-producing areas within the limits held by the company. Until the nursery is fuller grown most of the stock will be bought from the Quebec Government nurseries at Berthierville, and about 400,000 plants a year will be required.

The Laurentide Company and the Pejepscot Company have already developed forest nurseries of considerable proportions, and out-planting has been under way for several years.

THE START OF A FOREST FIRE, MONT ALTO STATE FOREST, PENNSYLVANIA.

VIEW TAKEN ABOUT 15 MINUTES LATER, SHOWING RAPID SPREAD OF THE FIRE, MONT ALTO STATE FOREST.

A FOREST FIRE IN THE ROCKY MOUNTAINS, ROSEBUD COUNTY, MONTANA.

ANNUAL SPRING "WOODS BURNING," LONGLEAF PINE, NEAR OCILLA, GEORGIA.

Growth of Canadian Forestry Association in Ten Months

List of New Members will Inspire Workers to Greatly Increase Association's Strength Before the Year Closes

The Canadian Forestry Association has grown by over 750 new members since January last. This very appreciable gain in strength would have been much greater had times been normal. The object of presenting the roll-call of new members in this issue is that our readers may learn which of their friends have responded to their nominations and which continue outside the membership. Here is an opportunity for urging upon two or three friends the worth-whileness of a permanent connection with the Canadian Forestry Association. There are but a few weeks before the year closes. It would be a fine stroke on the part of our members to build up the Seven Hundred to the edge of One Thousand. All you require is to obtain the consent of a friend to nominate him for membership. He will be added promptly, and in January next a memorandum of the annual fee of one dollar will be submitted to him.

Secretary, Canadian Forestry Association,
Booth Building, Ottawa:—

Make the fololwing a member of the Association, on the understanding that he will receive all publications and that in January, 1917, a memorandum of the annual fee of one dollar will be sent to him.

(Write very plainly) .....

.....

Name of sender .....

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J. K. MacLennan, Sudbury, Ont.
Prof. C. H. McLeod, Montreal.
J. McLoughlin, Quebec, P.Q.
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H. N. MacNeill, Dauphin, Ont.
John B. McRae, Ottawa.

M

A. N. Mack, Mill Village, N.S.
Melfort School District, Melfort, Sask.
H. A. Mackie, Edmonton, Alta.
Ray. R. Manbert, Oakville, Ont.
Manicouagan & English Bay Export Co., Quebec.
Manitoba Land Surveyors, Winnipeg, Man.
A. J. Manley, Sudbury, Ont.
J. S. Markle, Red Deer, Alta.
R. R Marsden, Grand'Mére, P.Q.
Alfred Marshall, Chicago, Ill.

M Continued

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A. S. Matheson, Edmonton, Alta.
Wm. Maund, Toronto, Ont.
Geo. H. Mead, Dayton, Ohio.
Wm. J. Medland, Toronto, Ont.
A. Megraw, Hedley, B.C.
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J. H. Menard, Berthier, Quebec.
Hon. H. Mercier, Quebec.
A. Metherell, Hamilton, Ont.
Michigan Land & Lumber Co., Bay City, Mich.
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G. L. Miller, Fredericton, N.B.
G. M. Miller, Sudbury, Ont.
J. A. Milne, Toronto, Ont.
L. H. Minard, Milton, N.S.
W. H. Miner, Granby, P.Q.
T. H. Moffat, Pembroke, Ont.
E. G. W. Montgomery, Regina, Sask.
W. H. Montgomery, Sturgeon River, Sask.
Montmorency Lumber Co., Quebec.
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S. F. Morey, Sherbrooke, P.Q.
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S. A. Morrison, B.A., Morrisburg, Ont.
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F. A. Moses, Mitchell, Ont.
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S. A. Mundy, Bradford, Pa., U.S.A.
John Murphy, Ottawa.
Paul E. Murphy, New Westminster, B.C.
J. W. Murray, Belleville, Ont.

N

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O

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P

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Perth Collegiate Institute, Perth, Ont.
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G. B. Prince, French Lake, N.B.
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J. K. Putnam, Ottawa.

R

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Henry B. Rainsford, Fredericton, N.B.
W. F. Ramsay, Killarney, Man.
J. E. Ray, Birmingham, England.
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O. T. Ring, Ottawa.
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E. Robinson, Canning, N.S.
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D. H. Ross, Melbourne, Australia.
J. W. Ross, Shanghi China.
W. J. Ross, Sudbury, Ont.
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J. Rowan, Melville, Sask.
F. Albany Rowlatt, Toronto, Ont.
Philippe Roy, Paris, France.
Gerard Ruel, Toronto, Ont.
Rev. M. C. Rumbal, Morden, Man.
Dr. R. F. Ruttan, Montreal, P.Q.

S

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St. Maurice Lumber Co., Portland, Me.
Robt. G. Sanderson, Portage la Prairie, Man.
Rev. Arthur Santmier, Hecla, Man.
J. L. Sasseville, Ste. Anne des Monts, P.Q.
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S Continued

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W. H. Schmalz, Berlin, Ont.
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J. Schofield, Windsor, Ont.
Wm. Scott, B.A., Toronto, Ont.
A. A. Scott, Norman, Ont.
Frank Scott, Montreal, P.Q.
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Alfred Shaw, Thessalon, Ont.
George Shaw, Thessalon, Ont.
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A. W. Sherwood, Indian Head, Sask.
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R. Sissons, Quebec.
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J. Smart, Fredericton, N.B.
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W. J. Smith, Toronto, Ont.
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Joseph Spears, Burks Falls, Ont.
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Statsredet Herr A. F. Tigerstedt, Koira Station, Finlande.
B. Stead, Winnipeg, Man.
G. F. Steele, New York.
F. S. Stevens, Enderby, B.C.
C. A. Stewart, Quebec.
R. B. Stewart, New Glasgow, N.S.
R. H. Stewart, Toronto, Ont.
Wm. Stewart, Toronto, Ont.
Stirling N. School, Stirling, Ont.
C. H. Stockdale, Maple Creek, Sask.
Richard Storey, Franklin, Man.
H. F. Storrer, New York.
J. T. Stuart, Pembroke, Ont.
Arthur Surveyor, Montreal, P.Q.
Robert Swayne, Sask. Landing, Saskatchewan.
Earl Swim, Doaktown, N.B.

T

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W. E. Talbot, Calgary, Alta.
The Agent, T. & N. O. Railway, New Liskeard.
The Agent, T. & N. O. Railway, Earlton Jct.
The Agent, T. & N. O. Railway, Timmins.
The Agent, T. & N. O. Railway, Englehart.
The Agent, T. & N. O. Railway, Matheson.
The Agent, T. & N. O. Railway, Iroquois Falls.
The Agent, T. & N. O. Railway, Porquis Jct.
The Agent, T. & N. O. Railway, Cochrane.
Adam Taylor, Guelph, Ont.
Edgar Taylor, Apple River, N.S.
J. F. Taylor, Hull, P.Q.
G. A. Taylor, Fredricton, N.B.
W. R. Taylor, The Pas, Man.
C. A. Thomas, Toronto, Ont.
Oliver Taylor, Snowflake, Man.
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Allan Thornton, Revelstoke, B.C.
W. C. Thuerck, Charlton, Ont.
Geo. Todd, Cardale, Man.
M. N. Todd, Galt, Ont.
J. W. Treleaven, B.A., Clinton, Ont.
W. J. Trenaman, Grand'Mére, P.Q.
J. H. Trimble, Toronto, Ont.
A. V. Trimble, Toronto, Ont.
William Turnbull, London, Ont.
J. B. Turney, Lethbridge, Alta.
J. J. Turner & Sons, Peterboro, Ont.
A. M. Tyson, Vancouver, B.C.

U

Miss Urquhart, Montreal, P.Q.

V

Dr. R. E. Valin, Ottawa.
Wm. Vance, Spanish, Ont.
Vancouver Lumber Co., Vancouver, B.C.
A. E. Vanderburgh, Toronto, Ont.
Antonio Veaugois, Macaza, P.Q.
John W. Venderbeck, Millerton, N.B.
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W

T. J. Wadman, Revelstoke, B.C.
Mrs. Ewart B. Walker, Toronto, Ont.
Walkerville Brewing Co., Walkerville, Ont.
Thos. J. Wall, Montreal, P. Q.
Duncan Wallace, Mamette Lake, B.C.
Peter Wallace, Blind River, Ont.
N. N Walley & Son, Sherbrooke, P.Q.
J. H. Walsh, Sherbrooke, P.Q.
John Wanless, Toronto, Ont.
J. C. Ward, Grand'Mére, P.Q.
A. E. Warren, Winnipeg, Man.
Watrous Engine Works Co., Ltd., Brantford, Ont.
Harrison Watson, London, E. C., England.
John Watson, LL.D., Kingston, Ont.
R. I. Watson, London, Ont.
Woodstock Collegiate Institute, Woodstock, Ont.
R. M. Watt, Dauphin, Man.
Eric E. Wells, Toronto, Ont.
C. R. Westland, Ottawa.
J. Hunter White, St. John, N.B.
Estate of John Whiteside, Duluth, Minn.
E. T. Wilkie, Toronto, Ont.
John N. Williams, Parry Sound, Ont.
Norman T. Wilson, Rockland, P. Q.
W. Wilson, Perigord, Sask.
Jas. Windle, Sudbury, Ont.
J. S. Wolkof, Plum Coulee, Manitoba.
N. Vernon Wood, Banff, Alta.
N. J. Wootten, Perth, N.B.
J. P. Wright, Fort Frances, Ont.

Y

Yahk Lumber Co., Ltd., Yahk, B.C.
Yarmouth Public Library, Yarmouth, N.S.

Cyril T. Young, Toronto, Ont.

Z

R. H. Zavitz, Sudbury, Ont.

E. A. Ziegler, Mont Alto, Pa.

A Look-out in British Columbia.

The accompanying illustrations show the Huckleberry Hill Look-out, erected this year in the Lillooet forest district of British Columbia, and the outlook obtained therefrom, looking N. E. over Horse Lake.

While this Look-out is similar in character to many others in various parts of the Dominion, some details concerning it may be of interest. The railed platform is 8 feet square and 30 feet above the ground. The time occupied in construction was ten days, the work apart from hauling being carried out by two forest guards at a time when the low fire hazard permitted their transfer from patrol. The total cost, including the guards' time, hauling and supplies, was a few cents over $58.00, and is small in proportion to the assistance the look-out will afford in the protection against fire of the area controlled.

Lookout Tower, Huckleberry Hill, North Bonaparte Fire District, British Columbia.

Decreased Losses on B. C. Coast

In British Columbia Coast Forests.

1915 forest fire damage	$85,000
1916 forest fire damage	10,505
Merchantable timber killed in 1915	73 million feet
Merchantable timber killed in 1916	1,135,000 feet

Of these amounts, over one-half has been regarded as salvable.

Victoria, B.C., October 30th, 1916.

The fire season of 1916 has been an extraordinary one on the British Columbia coast. Until the last week of July the weather was particularly favorable, so that during July no fires occurred in the Vancouver and Island Forest districts. The expenditure for fire-fighting during May and June was about normal. Commencing about the end of July a long drought set in, which was not broken until October 25th, making about three months with hardly any rain. In these months logging debris became dangerously dry, and the hazard was intensified by dying vegetation in the woods and on cut-over areas.

The close season ended on September 15th, and many settlers set out clearing fires after the season, which in a few cases got out of control, although little actual damage was caused. The opening of the hunting season increased the human hazard very considerably, numerous fires in outlying districts being ascribed to that source.

At the end of the close season (Sept. 15) it was found inadvisable to dismiss all the patrol force, as conditions at that time were more hazardous than they had been at any previous time this year. Twelve or fifteen guards were kept on duty until Sept. 30th, and a smaller number until rain came on October 25th.

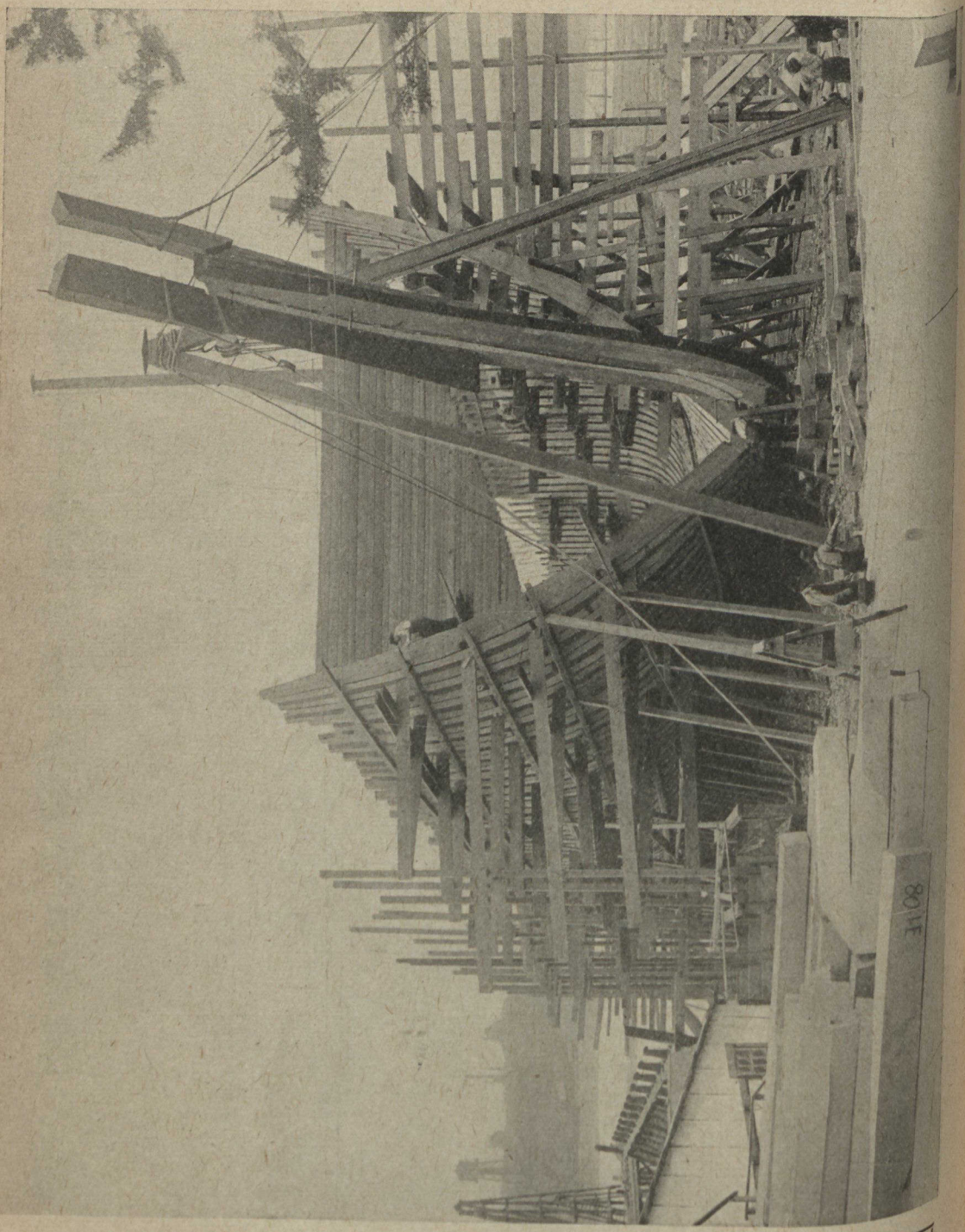
In September and October the spread of fires was checked by damp, cold nights, and also partly by heavy fogs. In green timber fires would not run to any serious extent, and were easily held in check by small fire-fighting forces. Logging slash was frequently set on fire by the unavoidable hazards incident to logging, and considerable areas were in several cases cleaned up without any damage to timber and equipment, although in other cases cut logs, logging equipment and camp buildings were destroyed.

The fire-fighting expense in Vancouver and Island districts was about $7,500, which is only half the amount spent in 1915.

The area burned over this year in these two districts is 10,000 acres, compared with 140,729 acres in 1915. Included in the area burned this season is 300 acres merchantable timber and 8,648 acres logging slash, etc.

The damage done last year amounted to $85,000, so that this year's loss, amounting to $10,505, compares very favorably with the previous season.

In all, 1,135,000 feet of merchantable timber was killed on the British Columbia coast in 1916, of which about one-half will be logged without much loss. Last year 73 million feet were killed, of which about 43 million feet was reckoned to be salvable, being accessible for immediate logging.



Creation of B. C. Lumber Fleet: First of three vessels laid down at yard of Cameron-Genoa Mills, Shipbuilders, Songhees Reserve, Victoria, B.C.

The fleet is expected to partially solve the difficulties attending the export trade in lumber.

Unique view of Lumber schooner under construction. Inside the hull of "Mabel L. Brown," the first lumber schooner of its class being built in British Columbia. It is 225 feet long at the keel, 44 feet beam, and 22 feet deep; 265 feet in length over all.

(Courtesy "Industrial Canada.")

A Forest Travelogue—Free to Local Speakers

The fololwing is taken from the introduction of one of the Canadian Forestry Association's "Ready Prepared" Lectures which are being sent to local speakers in various parts of the Dominion.

The introductory section serves to bring the audience into sympathy with the subject—"Guarding the Forests." At its close the stereopticon throws upon the screen No. 1 of a set of 56 lantern slides. The manuscript in the local lecturer's hands contains descriptive paragraphs adapted closely to the pictures, which he proceeds to read.

A Nova Scotia school's superintendent wrote of one of these lectures: "The lecture was well received and apparently heartily enjoyed throughout. Our pupil-teachers who saw it should be able to do much to help along the conservation of forest land by their teaching next year. It is an excellent way to make impressive forest truths. I would be obliged if you would notify me when your new lectures are ready for the public."

An Introduction.

"I feel confident that the time devoted to our travelogue will make us better acquainted with a most interesting and benevolent friend, the Canadian Forest.

"We may have met him before in various guises, as the friend of the camper, the guardian of hunter and fisherman, the inspiration of painter and poet, but in our brief time together I would like to widen this acquaintance. I would like you to look upon the forests of Canada with more than a mere personal recognition, to regard them in their fuller utility as a *national possession*, building up a very considerable part of our commercial strength, co-operating with every constructive interest we have, and asking nothing in return for their multitude of benefactions.

Looking Over Canada.

Were we to take a journey by airship from coast to coast of Canada, there would be unfolded to our eyes a picture of our national possessions and activities, oddly inconsistent with some of the ideas we form as residents of town or countryside. Limited as our average outlook is apt to be, we reach conclusions colored a good deal by local conditions. Thus, if the question were put to us, individually, what are the biggest and most important activities of Canada, what answer would we make? Assuming that we should all agree on Agrictulture for the place of honor, what second choice would be forthcoming? Would not you or I who live, let us say, under the prestige of mighty steel industries in Nova Scotia, hazard an opinion that steel-making ranked with the first of Canada's interests? Or, hailing from a British Columbia town where salmon-packing occupied half the population, would not our sense of proportion expand on the side of the national fisheries? As we mounted mile high over the roofs of cities and farms, the chains of lakes and the dark matting of forests, how the merely local outlook would dissolve away! We would gaze upon a very old Canada, but with a new sense of proportion. Beneath our eyes would loom even larger than ever the immensity of Agriculture from Nova Scotia and New Brunswick through Quebec and Ontario and over the wide plains of the prairies. But the thought would clear the way for a true surprise. We would se manufacturing industries and fisheries and mining take their proper relation in the map of the nation's activities, and make humble obeisance to a mighty older brother—the great Canadian forests.

Nature's Plan for Canada.

No sooner have we satisfied ourselves of the vastness of the nation's forest riches than we indulge our speculations upon another point. What was Nature's scheme in shaping the soil of Canada so that more than half of our total area will profitably grow noth-

ing but trees? What purpose is served by this splendidly picturesque blanket of green? The answer is immediately at hand. Nova Scotia—and we select it only as an illustration—possesses great coal and iron mines. Not a ton of coal could be mined without timber to support walls and roof. If all the wooden mine props used in Nova Scotia in a single year were stretched end to end they would reach from Halifax to the coast of Ireland. Nova Scotia's fisheries could exist not a month without wooden boats, wooden barrels, and boxes, and buildings. The towns and villages look to the nearby forests for lumber, for fuel, for furniture. The farms must have timbers for buildings, and fence posts, and what is much more important, they must have neighboring forests to protect and nourish the crops. Exactly as in Nova Scotia, so we find the forest walking, hand in hand, with the farmers and townspeople of New Brunswick and Quebec and Ontario, upholding them in a thousand needs, catering to their comfort and adding richly to their pocket books. The lumbering and paper making industry of New Brunswick and Quebec and Ontario are of enormous proportions, employing the bulk of the 110,000 men who constitute Canada's wood-manufacturing army, and numbering fully 4,000 wood-using industries within their boundaries. You may sometimes think of the forest existing only in a northern wilderness, but as a matter of fact it is the foundation of every city and every farm. Though you have your house in the middle of a treeless plain in Southern Saskatchewan, the commercial forest *stands beside you.* It provides two hundred million dollars a year to purchase your wheat and live stock. It provides you a residence and barns and fence posts. It furnishes your house and keeps it warm. You could never have set foot on a railway coach for the West were it not for millions of tamarack and cedar and jack pine railway ties, wooden telegraph poles and wooden coaches. You could enjoy not one ton of coal from the Alberta and British Columbia coal fields were those mines unable to secure train loads of props to keep themselves in daily operation. Whatever the province, whatever the town or city or farming section, throughout Canada, there is no escape from the benevolence of the great forest riches that Nature provided in such abundance.

A Deforested Land.

On the other hand, one can scarcely overstate the condition of any province were it *stripped* of its forests through wholesale destruction by fire. A fuel situation would develop, the tragedy of which, in our wintry climate, we can scarce reckon. The greatest industry we have, that of wood manufacture, would fall to the ground. Our mines could not continue. Fisheries would be helpless under such a handicap. Fruit growing would give up every means of transportation. Many of our best streams, denuded of forest, would prove worse than useless as developers of light and power. Carriage factories and implement works depend upon wooden parts, and with scores of other industries could not long survive a stoppage of the supply. Indeed, one could enumerate with entire reasonableness and exactness our complete dependence upon what our forests do for us day by day, and the disastrous consequences to which the present pace of forest destruction is leading us. To some, such a gloomy picture might seem far-fetched, but we cannot run away from truth by that easy exit. The history of the stripped and ugly regions of north-western China, the once fertile and prosperous valleys of Palestine, large areas of Spain and Italy and Greece, point warning fingers to us as guardians of Canada, and bid us assure ourselves of a different fate while there is yet time.

An Important Move.

Hon. W. J. Roche, Minister of the Interior, has issued instructions that hereafter all homestead entries on Dominion lands of Western Canada will contain a proviso that settlers must take out a "permit" before setting out fires for the purpose of clearings lands. This places in the hands of the Dominion Forestry Branch a most necessary device for the prevention of fire losses in timbered country.

Mechanical Aids in Fire Fighting

The use of mechanical equipment for the extinguishing of forest fires is steadily gaining ground, with correspondingly good results in both efficiency and economy, says "Conservation." A recent development in this direction is the increased use by the Canadian Pacific Railway of tank cars for the protection from forest fires of the territory immediately adjacent to its lines.

This company, having previously secured excellent results from the use of tank cars on its lines in Maine, has now extended this method of protection to include a portion of the Muskoka district in Ontario. Two tank cars, comprising a single unit, have recently been placed at MacTier, Ontario, for use between Pickerel and Coldwater Junction, a distance of 116 miles. On one of these cars is a pump, and on the other a hose rack. Each car carries also a tank holding 7,000 gallons of water. The pump has a capacity of 400 gallons per minute. A total of 4,000 feet of 2.5 inch hose is supplied, so that fires may be reached at a considerable distance from the track, if necessary.

While the primary object of such equipment is the suppression of fires due to railway causes and the protection of company property, a great deal has actually been accomplished in the direction of controlling fires coming in from the outside.

Other Canadian lines making closely similar use of tank cars for fire-fighting purposes are the Grand Trunk, Temiskaming and Northern Ontario, and the Canadian Government Railways. It is reported that the use of one of the tank cars on the Temiskaming and Northern Ontario Railway during the great fire of July 29 and 30, was the direct means of saving the greater portion of the village of Porquis Junction from total destruction.—C. L.

$14,000,000 Saving to Nation Since 1910

Henry S. Graves, chief forester of the United States, who was in Denver recently on an inspection trip of Colorado and Wyoming, called attention to the splendid work of the forest service in cutting down the former enormous losses caused by forest fires. In round figures, the reduction since 1910 amounts to $14,000,000.

Mr. Graves drew comparisons by showing that in 1910 damage to timber on the public domain amounted to $15,000,000, whereas in 1914, in the North-West alone, 7,000 forest fires threatened the destruction of timber valued at $100,000,000, and the damages were held down to $300,000, owing to the alertness and efficiency of the Federal Foresters.

"The record of 1916 will excel the past in value of property preserved and in efficiency attained," Mr. Graves explained. "The principal work in connection with the administration of National Forest reserves is to protect from fire and to open up hitherto impenetrable forests with trails first and roads afterwards.

"In the past the average damage in normal seasons was not less than $10,000,000 per annum. In extraordinary years, it was greater."

Mr. Graves stated that 20,000 miles of forest trails have been built this year, and 20,000 miles of telephone wires have been strung, in addition to many other valuable and important improvements.

A Valuable Report.

The focussing of public attention in Canada upon the problem of strengthening our national organization through increased industrial and commercial efficiency lends special value and interest to the Seventh Annual Report of the Commission of Conservation which has recently been issued.

The résumé of the past year's work is notable primarily for the progress recorded in the constructive programme entered upon by the newly formed Town Planning branch, with respect to one of our greatest and most urgent national problems, viz., the proper use and development of land, particularly in urban areas.

A second noteworthy feature is the attention devoted by the Commission to the reduction of the heavy economic handicap imposed upon Canada through her enormous annual fire losses.

The section of the report containing the results of an agricultural survey in four representative counties presents accurate and definite data regarding the deficiencies of Canada's chief industry and affords a valuable indication of the lines along which efforts to improve rural conditions, economic and social, should be directed.

Steady progress has been made by the Commission in the huge task of national stock-taking, the urgent necessity for which becomes daily more apparent. Recent experience has served to emphasize the need for accurate knowledge of the nature and extent of the Dominion's wealth in lands, forests, minerals, water powers, fisheries and wild life, as a guidance to intelligent and permanent national expansion.

Insuring Timber Limits.

Standing timber is one fire risk that hitherto has not been regarded with favor by the fire insurance companies. Some insurance of this sort has been written in Canada by the London Lloyds on separate limited tracts and an excess loss only, the insured bearing all losses below this limit. The Phoenix Insurance Co., of London, is, however, this year writing some insurance upon green standing timber in Oregon and Washington, with certain restrictions, and at rates varying from 1 and 1½ per cent. The timber must be accessible to markets, not unduly exposed to fire hazard, and only one risk is taken in each fire zone or area indicated by the Company. No risk is written greater than $17,500 in any one such area.

W. R. Brown in an article on this subject in "American Forestry" goes in to some detail in discussing the possibilities of this subject. He summarizes the fire experiences within the territory of various fire prevention associations, and his figures include the 22,000,000 acres under the supervision of E. C. Allen in the twelve western private fire prevention associations which he supervises; the New Hampshire Timberland Owners' Association with 1,000,000 acres; the Northern Fire Protective Association of Michigan with 2,000,000 acres; the St. Maurice Valley Fire Protective Association of Quebec with an area of 8,000,000 acres—the total of the four associations being 33,000,000 acres. The expenditure for forest ranging and fire prevention is approximately 1 cent an acre for the first three and ¼ cent an acre for the Canadian organization. In the western associations the fire loss for the year 1910 was one-half of 1 per cent. In each association since that time it has been much less than that figure, except for 1914 in the Canadian association, when one fire got away and the fire loss of the year was three-fourths of 1 per cent upon the timber valuation. Taking all four areas together and summarizing the figures for each which Mr. Allen gives, the average yearly losses respectively were as follows:

1910, .005; 1911, .000171; 1912, .0002328; 1913, .0012636; 1914, .00253; 1915, .00427.

The writer concludes from these figures that in such protective areas fire insurance should cost for the loss ratio not over one-half per cent. annually, with another one-half per cent. added for administration cost of the insurance plan. He gives some further experience upon which to base this conclusion. In Minnesota during the last ten years, with its forest wealth of $280,000,000, the average fire loss has been about $100,000, or one-thirty-fourth of 1 per cent. annually.

Siamese Hardwoods.

In Siam the rosewoods are worked more particularly from the regions lying north-east and east of Bangkok, and are exported in the form of roughly trimmed round logs, the average size of which is 12 to 24 inches in circumference and 80 to 120 inches in length. The rosewood forests have been heavily over-exploited, and as the Siamese government is now taking measures to protect this wood by requiring workers to take out permits and by fixing a minimum girth at which it may be felled, restriction in general output is likely to ensue. The ebony woods are found to the west of Bangkok in the district of Kanburi, Petchaburi, and to the south toward the Malay penisula. They also are exported in the form of roughly trimmed logs 12 to 20 inches in circumference and 80 to 120 inches in length.

The exploitation of these woods is not a regular industry in Siam, but forms one of the desultory occupations of the people when they are not engaged in rice growing. The wood is bought by Chinese, who are either middlemen or agents of Bangkok Chinese firms, and, as it will not float, it is brought to Bangkok by boat or by train. It is sold by weight, the unit for export being usually 100 piculs (about 6 tons), and the average price in Bangkok ranges from £22 10s ($109.50) to £37 10s ($182.50) for rosewoods and about £22 10s per 100 piculs for the ebonies. The ebonies are apparently more uniform in quality than the rosewoods. None of these woods appear to be dealt with in Bangkok in the sawn form.

Pine Trees of Finland.

The pine trees of Finland are the gold mines of the country, and really its chief trade. Pines and silver birches flourish on all sides. Everything or anything can apparently be made of birch bark in Finland; shoes, baskets, large or small, salt bottles, flower vases, even an entire suit of clothing is hanging up in Helsingfors Museum, manufactured from the bark of the silver birch.

The lakes of Finland, of which there

are five or six thousand, cover about one-sixth of the country, but these lakes, rivers, and waterways all take their share in the wood trade. In the autumn the trees are felled and left for the first fall of snow. The timber is conveyed to the nearest waterway, where it is stamped with the owner's registered mark and rolled upon the ice of lake or river to await the natural transport of spring. On they voyage, these soldiers of the forest, for hundreds of miles to the coast, till finally, arriving at such an enormous wood export station as Kotka.

Forest Fires and Fire Prevention.

(Kitchener, Ont., Record.)

That Canada's losses through forest fires in 1916 total $9,000,000 is a statement which has been repeatedly made in the public prints. It seems incredible, yet when it is recalled that 1,200 square miles of timbered land in Northern Ontario was burned over last summer, the figure at which the losses is placed may not be a whit too high.

Government and people, when reports of the losses of life and resources in the Northern Ontario conflagration of 1916 came in, exclaimed, "Oh! Dear! Dear!" And afterwards apparently treated the matter as a visitation of Providence. Not so, however, the Canadian Forestry Association of Canada. It looked for causes and discovered that forest fires generally are preventable to a large extent. It recommends a reorganization of the fire-ranging organization, with particular attention to the timber lands of the Crown and the enactment of legislation which would prevent settlers starting brush or clearing fires without the authority and the personal supervision of government officials.

The third member of the British Columbia Forest Service to be awarded the Military Cross is Lieut. Edwin A. Ketteringham, of the Norfolk Regt., formerly a sergeant in the Canadian Cyclist Corps, who at the outbreak of hostilities was clerk in the Cranbrook district office. The official records state that "he entered the enemy's trenches, gathered useful information, inflicted considerable loss, and brought back a wounded man under fire."

Corporal A. Reece, of the machine gun section, 16th Battalion Canadian Scottish, recently awarded the Military Cross, has since died of wounds received in action. Both he and his elder brother were members of the field staff of the Provincial Forest Service, and enlisted for active service in the same battalion.

Pte. A. G. Malcolm, another member of the field staff, has been wounded for the second time, while serving with the 48th Battalion 3rd Canadian Pioneers.

Capt. John Brine Mitchell, 8th London Regiment, Deputy District Forester of the Vancouver district, Rhodes scholar, holder of the Military Cross, a forester of the greatest promise, and a man whose friendship was deeply cherished by his associates, was killed in action on Sept. 15th, "somewhere in France."

Captain R. A. Spencer, of No. 1 Tunnelling Company, who in civil life is on the staff of the Forest Products Laboratories in Montreal, has won promotion and the Military Cross. How he earned the distinguishing decoration is told in brief but expressive terms in the official order. It says:

"During five successive nights he patrolled 'No Man's Land' in order to locate a mine gallery, and then wrecked it."

Keeping the Iron Hot.

The following editorial appeared in "Industrial Canada," official organ of the Canadian Manufacturers' Association:

"It is a good thing that we have a Forestry Association in Canada to keep alive the agitation for better forest protection. Already the alarm and indignation aroused by last summer's holocaust in Northern Ontario are dying down. The event has become historical. It has passed from the immediately impressive to the remotely observable. Unless the effect of the tragedy can be made to live in men's minds until the Legislature is compelled by the strength of public opinion to do something drastic to prevent a recurrence of the catastrophe it will be a national misfortune. The Forestry Association is valiantly doing its part to preserve the impression made immediately after news of the fire was flashed across the country.

The latest reminder from the Association takes the form of an expression of opinion by various experts on the value of the permit plan of controlling settlers' fires. The conclusions arrived at are impressive and are well worth emphasizing in these columns."

AFTER THE WAR—AN AMERICAN OPINION.

Readers of the Journal who have followed the discussion of post-bellum tariff arrangements in the lumber trade may be interested in the following discussion in the "Timberman" of Portland, Oregon.

"The question of an imperial preference on Canadian lumber entering Great Britain and her dependencies, was the subject of a conference at Victoria in September, before the Dominion's Royal Commission.

"The principal evidence relating to the British Columbia export lumber trade was given by H. R. MacMillan, former chief forester, who maintained that, if Great Britain would lend to the province some of her ability and experience of methods of transportation and brokerage and generally co-ordinate with the efforts being put forward in this part of the Dominion on behalf of the timber industry to a greater extent, British Columbia would be able to hold her own against all competitors.

"Sir George E. Foster, Dr. William Lorimer, Sir Edgar Bowring and Mr. Joseph Tatlow, accompanied by the

two officials of the committee, Messrs. E. J. Harding and A.H. Bridgman,were met at Vancouver by Sir Robert Sinclair, of New Zealand, and Sir John William Langerman, at the close of the conference. At the present time the allied powers have been discussing the question of closer trade relations after the war. This idea springs from the antagonism to the Central Powers. Whether, when the war is over and commence is relieved from the straight jacket tension in which it is now en compassed, this feeling will be as dominant is another question. The nations are war-mad. The arbitrament of the sword as a means of settling territorial expansion and changing political policies may be essentially ethical, but when it comes to dealing with the laws of commerce, which are grounded on the basic principle of buying in the cheapest market and selling in the dearest, the problem is essentially different. Service and price go hand in hand with the law of supply and demand. If any nation can make an article which is better adapted to the service to which it was designed than that of another, in the end it will be adopted. This is inevitable. At the present time the whole business world is in a chaotic condition. The United States' lumbermen are clamorous for a protective duty against Canadian lumber and shingles, the British Columbia lumber interests are petitioning for an imperial preference. The republic of Chile has increased its lumber tariff. New Zealand's state-owned railroads impose a higher rate on foreign woods moving on its lines than that of native manufacture. In the meantime the export lumber interests of the Pacific Coast have wisely decided to form an export company which has for its object the securing of a better price for its foreign market. It is quite reasonable foreign market. It is quite reasonable to suppose that the lumber interests of British Columbia will form a similar selling organization. At the present time the British Columbia mills are securing from the British Government a price of $12 for Douglas fir ties, which have been purchased from American mills at $9. This is an example of discrimination, blended with an earnest desire for national unity due to the stress of war."

Stimulating Growth of Ornamental Trees

It should be the aim of every woodlot owner to keep the crowns or tops of the trees over the whole area touching each other in such a way that the ground below the trees is kept shaded. This prevents the growth of grass and weeds, and permits seedling trees to establish themselves. Once the ground becomes well covered with small seedlings, opening up the crown by the removal of a few of the old trees and letting in the light will be beneficial and encourage rapid growth. Old, over-mature, spreading trees which prevent the proper development of younger trees coming up beneath them should be removed. As a rule, however, it is not advisable to make an opening in the tops or crown cover which will not be filled in again in three or four years either by the spreading of the surrounding trees or the development of younger ones that are coming in below.

One of the best methods of stimulating the growth of shade and ornamental trees is to improve the physical condition of the soil beneath them. For a radius of two or three feet about the stem the soil should be kept cultivated. The air is thus permitted to reach the roots, and at the same time rapid evaporation of moisture is prevented.

Where the decline of trees is caused by a deficiency of nutritive elements in the soil the condition can be improved by mulching with manure in the fall. This should be allowed to remain all winter, and in the spring should be turned under. It will not only enrich the soil but improve its physical condition. An occasional dressing with hardwood ashes is to be recommended, and will often be found to be all that is required in the way of fertilizer. Ten pounds to the hundred square feet should be sufficient.

There are several chemical fertilizers which can be used instead of manure for improving the soil. One of the best is the following mixture, which should be applied to the soil early in the spring:

1 lb. of nitrate of soda,
5 lbs. of cottonseed meal,
2 lbs. of acid phosphate,
2 lbs. of muriate of potash,

the whole to be mixed before spreading. One pound will suffice for one hundred square feet.

Boy Scout Forestry Test.

To meet Canadian conditions, the Dominion Council of the Boy Scouts' Association has authorized a Forestry badge, in lieu of the Woodman badge. The conditions under which this badge may be secured by the boys are very comprehensive, and will do much to interest Canadian boys in the Canadian forests and the wild life found therein. are:

The scout must—

1. Identify the principal tree species in own locality, and explain their principal distinguishing characteristics.

2. Identify five kinds of shrubs.

3. Describe the principal uses of ten species of Canadian woods. Visit a wood-using factory, if practicable.

4. Explain the aim of forestry, and compare with agriculture and unregulated lumbering.

5. Tell what are the effects of fires on soil, young forest growth and mature timber; principal causes of forest fires and how best to overcome them; three general classes of forest fires, and how to fight each.

6. Describe how the forest lands are protected and administered in own province.

7. Describe the general features of a lumbering or pulpwood operation; how the cutting is done in the woods; method of transportation to the mill, and of manufacture there. Visit some portion of woods operation, or sawmill, or pulp or paper mill, if practicable.

8. (Optional.) Discuss one or more of the enemies of trees, such as insects (leaf-eaters, bark-borers, wood-borers), or decay (fungus diseases), and tell something of how damage from these sources may be lessened or overcome.

Northern Ontario Fire Losses

Reports to the fire marshal's office from northern Ontario fire are now closed, and after a thorough survey of the territory, the following figures were given by provincial fire marshal E. P. Heaton, as the official record of the loss to created property:—

In all, 849 people have suffered loss, some having more than one property involved, but no effort has been made to ascertain the total number of buildings destroyed.

The aggregate loss sustained reaches total of $2,134,349. The insurance recovered or claimed upon licensed and unlicensed companies is $1,045,585, and the loss sustained by the people in excess of insurance is $1,088,764. About 50 per cent, of the actual loss on property is covered by insurance.

No provision is made for loss on standing timber, but included are pulpwood cut, stacked and ready for delivery.

Of the claims upon insurance companies $654,922 is borne by the regular licensed companies, and $390,663 by unlicensed insurance companies. Of the latter, at this date, practically all has been paid, or will shortly be paid, with the exception of $28,200. This amount represents claims upon a number of small unlicensed companies, the payment of which is not yet due. All, however, is due, and should be paid before the end of this month, and the fire marshal will then be in a better position to know what, if any, is to be the extent of the default in payment et the unlicensed companies.

At Cochrane 203 people had a total loss of about $960,000, with $525,000 of insurance.

At Matheson, 51 people had an amount of $126,000; the total insurance was only $12,800.

At Iroquois Falls, which includes the loss of the Abitibi Power and Paper Company and their tenants, the loss was distributed among 31 people, with a valuation of $316,000, and an insurance of $289,000.

Pulpwood, not including the Abitibi Power and Paper Company, cut and ready for delivery, is represented by a total of $63,000, which carried insurance of $43,000.

In the fire of August 2nd, which occurred in the New Liskeard district, and which involved the townships of Harley, Dymond, Harris and Casey (including the Casey Cobalt Silver Mine and the Croesus Mine), the loss was distributed over 124 people, who suffered to the extent of $254,000, with insurance of $135,000.

The settlers constitute by far the greatest number of sufferers, and represent the balance of the amount to the number of 345, with a loss of a little over $300,000, upon which the total insurance was less than $12,000.

Having thus obtained as full, complete and accurate a statement as it is possible to get, the fire marshal has now under consideration a mass of testimony taken in the country from settlers, prospectors, woodsmen and insurance men as to how a repetition of this disaster can be averted.

The testimony is mixed in its character, but the whole subject is being considered and the fire marshal's conclusions will be presented to the Minister of Lands, Forests and Mines.

The Canadian Forestry Association

(Seventeenth Year)

119 Booth Building, Ottawa, Can.

The Association prepares and places through its Publicity Department, many hundreds of special articles every year, reaching the Canadian Public through daily and weekly newspapers, weekly and monthly magazines, including agricultural, financial, religious, literary, engineering, juvenile, and practically all divisions of Canadian journalism.

Co-operates actively with forest protective associations, Government forest departments and commercial organizations in distributing information on forest affairs to the Canadian public.

Campaigns for forest protection through its Publicity Department, the distribution of illustrated literature to settlers, campers, etc., the presentation of lantern slide cartoons in motion picture theatres, and many other methods calculated to bring practical results.

Holds series of illustrated public lectures on forest protection in various sections of the Dominion.

Issues an illustrated monthly, "The Canadian Forestry Journal," which goes to 3,500 members, and to 200 Canadian editors by whom it is quoted extensively.

Holds conventions in various sections of the country to discuss local and general forest problems, and to arouse interest in public forest policies.

A Free Cartoon Service is supplied to newspapers, also a free "cut" service, campaigning for forest protection through interesting illustrations.

These are a few of the concerns of the Canadian Forestry Association.

Support is entirely from voluntary sources. The Association is not identified with any Government or special interest whatever.

MEMBERSHIP APPLICATION BLANK.

Secretary, Canadian Forestry Associaition,
305 Booth Building, Ottawa.

I hereby accept membership in the Canadian Forestry Association entitling me to a year's subscription to the Canadian Forestry Journal and all other publications. I enclose $.....

Class of Membership.

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