

1920

Aug-Sept

15¢

A black and white photograph of a large, mature tree with a thick trunk and a dense canopy of leaves. The tree is the central focus of the cover. In the background, there is a rural landscape with a horse-drawn carriage and a building. The text is overlaid on the image.

Illustrated
Canadian Forestry
Magazine

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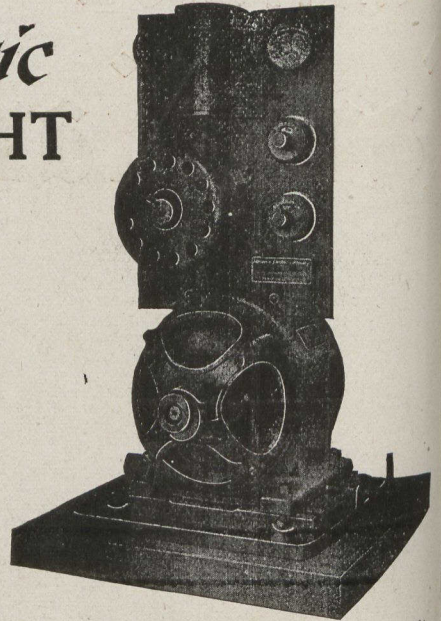
Dept. D.

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¶ The plant is 32 volt and has a capacity of 32 lights direct from the generator, or 67 lights for 5 hours when combined with TITAN 200 ampere hour battery.

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



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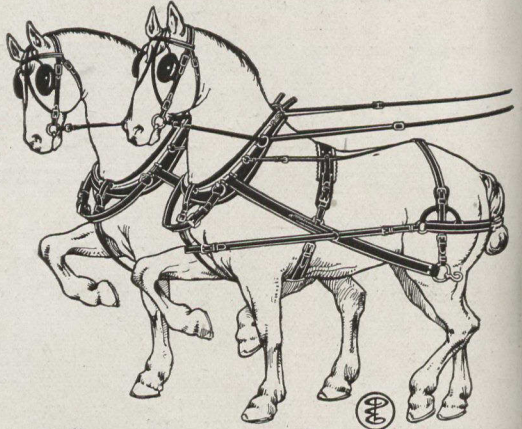
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Canadian Forestry Magazine

VOL. XVI. PRINTED AT KINGSTON, CANADA, AUG.-SEPT., 1920. Nos. 8 & 9

With Mr. Mitchell on Our Prairie Car



*Are the Western Farmers interested
in tree planting? Read this
abracing description*



Editor's Note:—The Canadian Forestry Association sent to the prairie provinces this year a Tree Planting Car, in charge of Mr. Archibald Mitchell, a well-known Western authority. The car is fitted as a motion picture auditorium, with its own projector and electric generating plant, thus being able to carry on its educational work independent of local limitations. The enterprise has been successful from every point of view. During August and September, the route of the Car will take it over the C.N.R. from Calgary to Saskatoon, thence southward on the C.P.R. into Southern Saskatchewan and Manitoba.

By Archibald Mitchell

We have just about reached the summit of our trip across the Prairie and back, and will be turning our faces eastwards for a few months of work in



Can trees grow in the dry belt of Southern Alberta and Saskatchewan without irrigation? Mr. N. J. Anderson, of Barnwell, Alberta (near Lethbridge), is helping to refute this idea. The shelter-belt shown in the picture is four years old, and stands from 16 to 20 feet high. Growth has been attained in the absence of any irrigation and during the three driest years on record. But Mr. Anderson handled his planting and cultivating intelligently, as you will gather from Mr. Mitchell's article printed in these pages.



He would have gotten better results with irrigation, but this farmer succeeded quite well in establishing trees in Southern Alberta during the three excessively dry years just passed.

Saskatchewan and Manitoba. So far, we have met some five thousand people in meetings in the car and scores beside, singly or in groups, all interested in tree growing on the Prairie in some of its phases. Very rarely indeed have the meetings not begun on time, and often six o'clock has found us still discussing somebody's tree problem after the three o'clock meeting, and many a time the eight o'clock gathering has closed at

eleven or half-past.

Interest? There is no end to the interest, people are hungry for tree and plant information. As one of them remarked the other day: "We miss the old Institute days, when we could at least once a year get all our tree troubles cleared up." The questions they ask are both numerous and varied, and range from the depth to sow Caragana seed to what to do with a plantation when the



Soil drifting is a grave problem for farmers in some of the southern prairie districts. Light soil, high winds, and no thick belts to break the force of gales has in some cases blown two sowings of flax seed completely out of the ground in one season, making a third sowing necessary. The photograph shows how the soil drifted through a settler's shelter belt because it was of insufficient density, but even then he saved his fields from extensive damage. For six miles west of him the crops and soil were completely blown away, due to lack of any wind-breaks.

grass has taken possession of it, or "Why is it my house plants don't grow?" "What varieties of apples and crabs would you advise for this country?" and "Why is it the evergreens I transplanted from the hills did not grow?" or "How would you set about planting a shelter belt across the farm?" Some are not easy to answer at first, but usually a few questions are enough to get at the root of the trouble, and we have always managed to find some solution that seemed to fit the matter in hand. It is interesting, too, how one's theories (the knowledge of experience) are confirmed time and again by someone who has reached the same result by following the same processes we have been describing. Such testimony is very valuable, and never fails to impress. It is at the same time very encouraging to the speaker.

Is the Dry Prairie Fatal?

A very striking instance of this occurred at Lethbridge, where Mr. N. J. Anderson, of Barnwell, confirmed all we had said regarding the possibility of growing trees on the Dry Prairie. Some people in the irrigated sections especially are very sceptical as to dry land tree growing, more particularly in the last three or four years, when everything has been so dry, and it was refreshing, to say the least, when Mr. Anderson was able to endorse everything we had been saying. Trees do so well with irrigation, planted even singly, and with very little cultivation afterwards, that the tendency is to expect the dry land trees to succeed in the same way, and with little or no attention afterwards, a mistake which is fatal every time.

Here's a Real Success!

A visit to Mr. Anderson's place on our way to Taber amply bore out everything he had said. His trees were obtained from the Government, the same as anybody else could get, and they were planted in 1917, just at the beginning of the dry years, and yet he had a full stand, nearly every tree growing, many of them 14 feet high now, a splendid example of what can be done in a very short time by carrying out instructions and using a little energy and common sense. On enquiry, it was found he had made a perfect summer fallow preparation,

plowed the land deep about the end of May, the year previous to planting, and kept it well tilled all summer. There were no weeds on it. He cultivated to conserve moisture, and consequently was not bothered with weeds getting much of a start. The trees were planted carefully, the soil trodden well down about the roots and cultivation was carried on frequently during the dry summer of '17, the same system of not waiting for the weeds being carried out. The years '18 and '19 were dry, but Mr. Anderson believed in the irrigation of the Cultivator, and persevered, keeping the ground stirred all summer, and the result is those trees have grown to all appearance as well as if the usual rainfall had been taking place the last three years. Fourteen feet high is as good as can be expected in any three years with normal rainfall without irrigation, and is enough to satisfy anybody. The whole plantation is a standing proof of what can be done in tree growing, even in dry years, when correct methods are carried out.

Aiding Town Schemes

Every town or village has its own local little tree problem; sometimes the wrong trees are being used, sometimes they are being injured by a too frequent use of the sprinkler, actually being injured by kindness, and sometimes insect or fungus attacks are doing damage. At every place we try to get through the town before the first meeting, taking in the local tree troubles and successes and securing specimens for the meetings in the car, so that we can speak intelligently on whatever may turn up, and advise accordingly.

We have seen a great deal of damage from soil drift in our travels, and whenever that is mentioned it is not difficult getting people's attention.

Two Crops Blown Out

Mr. Anderson's plantation is a striking example of the advantages of tree belts in checking soil drift. His trees are in three belts, about 40 rods apart, running north and south. Immediately west of the outer one there is a crop of flax which is the result of the third seeding this year, the two previous crops being blown away completely.

For six miles west of him the crops and soil were completely blown away, and yet no drift passed through the third strip to his house and garden. His belts are too narrow for perfect success as self-sustaining plantations on dry land, being only 3 to 6 rows wide. If they had been six rods wide little or no drift would have passed through the first one, and the whole field would have been completely sheltered. The third strip is the widest, consisting of six rows, and counting from the west side, rows of Willow, Russian Poplar, Ash and Maple, Maple and Ash and Ash and Maple being used. The three inner rows were almost completely smothered with the dust bank, five feet deep of it, but yet these trees are all growing through the pile of soil and have made from 2 to 3 feet growth this year, a conclusive answer to the oft-heard doubt that the tree would be destroyed by the soil drift instead of the soil drift being stopped by the trees.

Three other well-treed places were passed on the way to Taber, standing rebukes to every other farm in the vicinity, standing bleak and bare as they were when first settled years ago, and shining monuments of what can be done even in the driest years on the Prairie in the way of tree growing.

Time Lost, Time Gained

During the whole trip we have not heard a man question the fact that trees would help the country, help it in retaining snow in winter and prevent evaporation in summer, afford shelter from the winds and help to keep the land inside the fences.

There is never any doubt about these things, the question is to find the time, and when the method of planting two acres of trees, easily, quickly and well is presented, it leaves them thinking. They see it, and they also see that two or three days taken from the middle of their wheat seeding is not time lost, but only transposed, for the time taken from the middle of wheat seeding, to plant rees, is only transferred to the end of it after all, and the little frost risk they are likely to run from the change will be far more than counter-balanced by the gain

resultant from the planting of the trees. Numbers of them came into the country only to sell out after a few years, and put off their tree planting on that account; but many are now beginning to realize they have made a mistake, and that, indeed, unless they plant, they will not be able to sell their land at all. Many more have been so hard pressed to solve the bread and butter question, they have not had time to attend to trees, that is, they thought they had no time, but when it is pointed out that in most cases the bread and butter question is an almost endless chase anyway, and that a week per year spent in planting and caring for a good belt of trees would never be noticed in the annual cycle, they begin to see how much they have missed, both they and their families, socially and financially, by keeping their noses too close to the dollars-and-cents grindstone.

The truth is, the people really are tree hungry, if they would only stop to think about it, but like everything else one does not understand, they are afraid to tackle it. They forget that the planting of a tree belt is, after all, only a short job, but it is a completed job, and the time taken will never be missed out of the year's work.

TELLING WOOD BY ITS COLOR

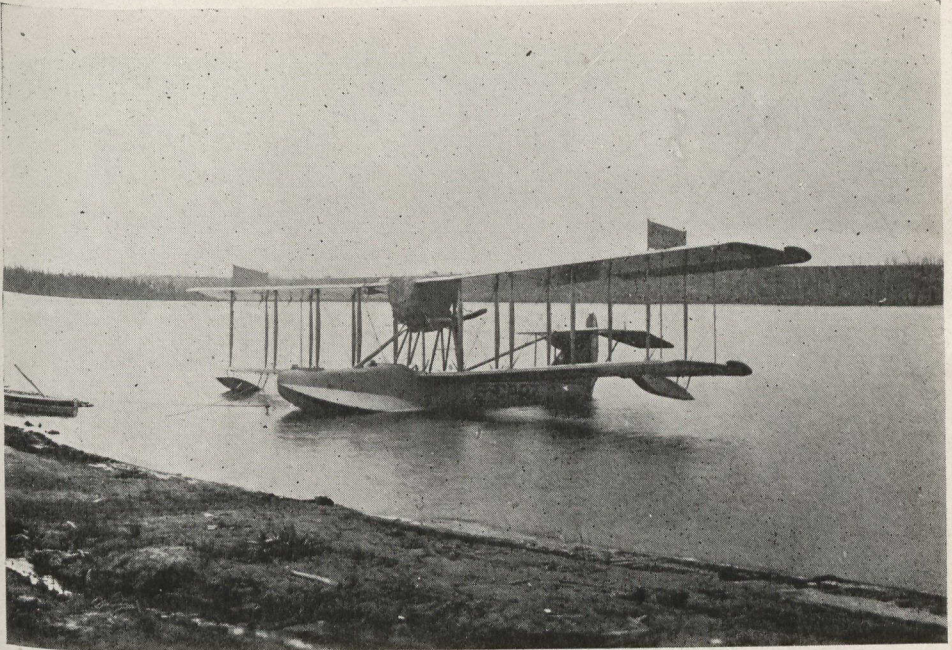
A French scientist asserts that he has devised means of identifying timber by the various reactions on coloring matter it contains and that the idea can be extended so as to prevent deception in imported woods.

FROM BLIND CHANNEL, B.C.

"Enclosed find money order for two dollars to cover subscription to the Canadian Forestry Journal. The Journal is worth twice what it costs."

FROM A PAPER COMPANY PRESIDENT

"I have your Memorandum of the Forestry Association's recent activities. I consider this splendid work."



FIRST TO HUDSON'S BAY BY WING.

Irwin Proctor, with five companions, recently completed a successful return air voyage by seaplane from Toronto to Hudson's Bay by way of Algonquin Park and the Ottawa Valley. The journey was made for a film company, and Mr. Proctor asserts that large bodies of pulpwood were seen. The photographs were taken by Mr. Ernest G. Poole, Chief Fire Inspector at Cochrane, Ontario, to whom the Forestry Magazine is indebted.



Honorable L. A. Taschereau, the new Prime Minister of Quebec, a notable champion of the Forest Conservation cause.

“The Time Has Come”--Premier Taschereau

(A verbatim copy of some striking statements made in an address at Quebec by Provincial Prime Minister.)

“First of all a jealous care and rigorous conservation of our natural resources. We have 80,000,000 acres of unleased forests which need fire protection. For some time big white birds have been hovering over them. The hydroplanes have begun their patrol to locate fires at their outset. They shall be supplemented by observation posts fitted up with wireless telegraphy.

“The time has come, it appears to us, to regularize the cutting on limits by fixing a maximum of the annual cut to prevent the destruction of the forests, and a minimum to stop speculation and to assure us a reasonable revenue from the cutting rights. We shall ask lumbermen to prepare their programme of operations to permit us to safeguard the interests of the province by a previous inspection and a constant control of their operations.

“Reforestation should be immediately undertaken and encouraged with energy. We should have no illusions, our forests are not inexhaustible. Forty-five million acres are already under cutting license, and private forests contribute only 5,000 acres.

“I am giving you a few of the plans which are dear to the heart of the Minister of Lands and Forests. Not only will he send young engineers to study forestry science in Europe, but he is thinking of creating a paper school and a school for the cullers and forest rangers.

“The forests have acquired an unheard-of value. You will readily see an anomaly which calls for urgent remedy when you note that a ton of paper, which formerly sold at \$40, now calls for \$120, that a ton of pulp which was worth \$15 is now valued at \$90, that the price of a cord of wood has been increased from \$5 to \$20, and that the Government collects about the same duty as before the rise. Far from us the idea of oppressing this fine industry of pulp and paper, and to ignore the increased cost of production, particularly in recent times. But we are to-day the masters of the market and, without waiting until another product is found to replace wood, we should get out of our forests all the revenue that they are capable of giving. Besides, we have conferred with the wood merchants and manufacturers, and I am pleased to recognize the broad spirit with which they have greeted our representations. How shall we be able to protect their limits, build roads, bridges and reservoirs for them, if they do not do their share?

Another Bill Rendered—Canada Pays



Forest Fires Set by Human Agencies Again Rob the Country of Basic Assets



The forest fire scourge will present the Canadian people with another monster bill for 1920. There are not enough accurate records to compute it at the date of writing, but the adding machine is clicking merrily, and the final red total will overtop the figures of any year since 1916.

Most of this year's forest bonfires were preventible. They started from people. Some were campers who left their cooking fires blazing; some were settlers who while clearing off a patch of land with fire cared nothing if half the countryside were consumed in the same line of flame. Many originated with the railroads, and an inexcusable number from woods' employees. The effect on Canada's reserve of wealth is the same whatever the cause.

Killing Off Our White Pine

Pine as a commercial wood has passed off the stage of scores of Eastern Canadian counties, and the areas once bearing these precious timber trees are in most cases growing up in valueless hardwoods. Canada's remaining pine stock is gathered up into a relatively small pocket of Western Quebec and Eastern Ontario. Yet with all our knowledge of that fact and of the damaging consequences to many great industries and flourishing towns dependent on pine logs, one big blaze this year cleaned out 15 square miles in a single section of Quebec. Lightning furnished the cause in this particular case, but only in a few areas of Canada is lightning a prime offender.



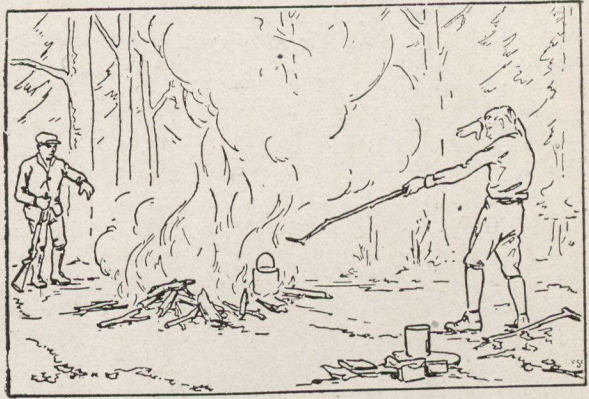
Part of "The Great Brute," on the headwaters of the Assineau River, Alberta.

Make Your Camp-Fire Small!



Build your camp fire small. It cooks better. It is far safer for the surrounding woodland. It is more easily extinguished.

Always, please, when finished with your camp fire Put It Out! Put It Dead Out!



This is the genesis of a forest conflagration. The camp fire is too big to approach, too big to cook with, and difficult to extinguish.



How much longer will we tolerate this? Canada "stands the shot" for over 5,000 forest fires, large and small, between spring and autumn, year by year.

There is a prodigious growth of young pine on many of the cut-over areas along the Ottawa River, and future harvests of mature timber are assured if fire can be kept out. The future consequences to industrial establishments dependent upon that young growth of pine should make no bill of expense for ranging or educational work seem excessive.

A good deal is being written by amateur observers as to the timber and pulpwood resources of the region north of the height of land in Ontario and Quebec, but it should not be forgotten that forest fires are annually making such tremendous inroads that the future utility of timber tracts on the northern drainage areas is at best a speculation. When single fires can run for thirty miles, as reported by travellers north of the Transcontinental this season, what hope is there of realizing on such a timber area years from now when its



A badly burned piece of country in Maligne Valley, B.C.

operation becomes commercially feasible?

Two forest fires of special violence were those at Ostrom, Ontario, about ninety miles north of Sudbury on the Canadian National, in July. The damage was as follows:

Area fire swept: 25,000 acres.

10,000 acres of young growth burned (chiefly jackpine).

300 acres of commercial timber destroyed.

150,000 saw logs and a saw mill burned.

Damage estimated at \$30,000.

At this point were 5,500 acres of slashings, where fire, once started, could not be fought.

At Makwa, 55 miles west of Ostrom, this was the record of one fire in May:

12,000 acres burned, including 500 acres of young growth, 5,000 acres of timber, white pine, jackpine and spruce; the white pine destroyed was equal to 900,000 feet, board measure; the jackpine amounted to 1,500,000 feet, together with 5,000 cords of pulpwood. Camps valued at \$5,000 also went up in flame.

While the country has been passing through a bad fire year, it is essential to point out that at no period in our history have forest protection organizations been so thoroughly organized or so well equipped. Many "old timers" point proudly to the days when their books showed very small fire losses in the timber areas, but this may be attributed to one of several causes, or to all of them. The isolation of many timber limits forty years ago was itself an effective protection, but new conditions of land settlement have introduced new population and new fire hazards. Again, the more intensive fire protective organizations of to-day make quicker and more detailed reports concerning forest fires, and in most cases map out the burned area and collect data regarding the damage done.

Lives Lost in Manitoba

About 30,000 forest fires, great and small, occurred in the United States this year. It is probable that Canada has had to suffer from at least 5,000 fires between April and September. There



Neglected fires started by settlers to clear land caused very heavy loss to hundreds of neighbors at Five Fingers, New Brunswick, this year. The main fire, as shown in this picture, is sweeping toward the railway tracks.



Commission of Conservation

St. Quentin, New Brunswick, lost \$400,000 of real property in this year's forest fires. This picture shows the railway yard where more than \$50,000 worth of ties, poles, shingles and sawn lumber went up in smoke.



Forest fires take a severe toll of property in newly settled districts where loss is hardest to bear. A scene at Five Fingers, New Brunswick, on May 27th, 1920.

have been no holocausts such as the Northern Ontario horror of 1916, but loss of life has been recorded in Northern Manitoba, and shocking loss of property in many sections of the country, notably the burning of St. Quentin, New Brunswick.

Again and again the Canadian Forestry Association has stressed the fact that when a forest burns the people pay. They pay because the private owner of a timber berth makes the smallest of all the profits that come out of a well-operated forest. He also bears the smallest of all the losses involved in the destruction of a forest by fire. This is so, because for every four dollars that come out of a log in the woods, three dollars go to wages and supplies and one goes to government taxes and interest on investment. It is reasonable to assert, likewise, that when a forest burns the loss in employment and railway traffic and supplies greatly exceeds the license holder's loss. One may the more readily agree with this by remembering how a cord and a half of logs worth perhaps \$30 at a railroad siding becomes worth \$120 when manufactured into a ton of newsprint paper. Growing in the for-

est, the wood equivalent of the ton of paper would be worth at most a few dollars. The community value of an accessible timber limit, therefore, must be counted by our governments and private citizens in terms of potential employment, potential export trade, new towns and population, railway freight, and public taxes. As a nation we have bromided ourselves with the foolish thought that when a grocery store burns down an insurance company writhes in great pain and that the common folk get off scot free. Similarly, there is a widely-held notion that when a timber limit goes up in smoke, the individual limit holder bears the entire burden. As a matter of hard truth, it is the community that "stands the shot."

What Went Up in One Fire

Only occasionally is it possible to render into graphic terms the icy statistical totals of timber fires. Here, however, are terms graphic enough for anybody; they were embodied in a statement made to the Forestry Magazine by one of the best known lumber firms in the Ottawa Valley:

"Some years ago, a settler who was allowed to locate on the edge of our



Manitoba is fortunate in having as one of its fire guardians Jas. T. Blackford, of Norway House. Mr. Blackford believes in educating all elements of the population to observe every caution while in or near the woods. Here we see the aftermath of a talk to Cross Lake Indians on fire prevention. The audience is promising to extinguish all camp fires before leaving them.

pine limits in Eastern Ontario started a fire on his land in order to clear space for a potato patch. That single fire burned from Mattawa westward towards North Bay and consumed *more pine forests than would keep our big mill running for 56 years.*"

The speaker was one who considers all public statements carefully and his knowledge of that fire was first hand.

A potato patch versus 56 years' supply of pine.

Or a neglected camp fire versus a pulp and paper mill.

Or a tossed-away cigarette versus a million railroad ties.

Or a locomotive smokestack versus a struggling half-insured village.

These are the equations impossible to escape.



At Round Lake, Saskatchewan: A fire burning rapidly in clumps of willow and poplar.



A fire-swept jackpine ridge. The trees are all dead, but still rooted in rock crevices. All the soil is consumed and the district transformed from a public asset to a public liability.

The nation that holds great forests holds the key to prosperity. If Canada can retain her forests, Canada need fear no public debt.

A Forest and a Barn

To retain forests, as to retain a wooden barn, means that fire shall be given no point of entry. A simple formula indeed with the barn, where all who approach it have a vital stake in its protection. With the forest unfenced, mostly unwatched, the remedy is not so simple. Consider the problem of the Riordon Company, which controls a timber area as large as Belgium.

Essential as is all the machinery of fire prevention and fire fighting, now in effect, the more comprehensive antidote to forest fires is to undermine the cause, which is human carelessness. Ranger patrol requires to be supplemented by Educational Patrol. The settler whose fires run riot and ruin timber tracts is usually a reasonable sort of man, influenced by intelligent appeals for his co-operation. Thousands of men who start forest fires do so out of a traditional ill-will towards limit holders, and this is often fanned by selfish agitators. Thousands of campers and fishermen and hunters are waiting to learn by experience the extreme peril of carelessness by fire while in the woods, but they are willing to learn in advance if approached from the right angle. This

all boils down to a consideration of the value of educational propaganda for the guarding of forests against the common causes of fire.

The Canadian Forestry Association, co-operating with all Government and private agencies, carries on aggressive educational work throughout Canada, aimed at preventing needless destruction of the country's forest resources. The success of these enterprises has received abundant testimony. However, in a forest estate so vast as even one province, intensive propaganda can only be achieved by large expenditures. It is not an exaggeration to say that the total revenues of the Canadian Forestry Association, now about \$30,000 a year, could be spent with great public profit in any one of the forested provinces.

THE AUGUST-SEPTEMBER ISSUE

Readers will note that the August and September issues of the Canadian Forestry Magazine have been combined in one number. This was necessitated by such considerations as paper supplies but equally as a means of issuing the magazine henceforth at the beginning of the month instead of at the end. Readers will get the October number during the first week of October, and this arrangement will be maintained in future.—
Editor.



A New Body: The Empire Forest Association



One of the most promising developments of the recent Imperial Forestry Conference held at London, England, was the formation of an Empire Forest Association, the specific purpose of which will be "to promote and develop public interest in Forestry throughout the Empire."

The headquarters of the society will be in London, and membership will be open to organizations, firms and individuals interested in forestry or the

commercial utilization of timber and other forest products.

The objects as set forth in a preliminary document are:

To create interest in and circulate information relating to forestry amongst all classes in the British Empire.

To bring about better public recognition of the identity of interest between continuous timber supplies and systematic forest management and to spread information relating to the commercial utilization of Empire-grown timbers.



What the burning over of slash-covered ground looks like from the air. A photograph taken by one of the Laurentide company's seaplanes of a slash-burning at the Proulx Nurseries, July, 1920.

To form a centre for the Empire for those engaged in forestry, and create a means of communication between the various sections in all parts of the Empire.

The First Committee

An interim committee was chosen, consisting of the following:

Sir John Stirling Maxwell and Lt.-Col. G. L. Courthope, M.P., representing the United Kingdom; Mr. Robson Black, representing Canada; Sir Claude Hill, representing India; Sir Mayson Beeton, representing Newfoundland; and Mr. H. Mackay, representing Australia; with power to add to their numbers.

The formation of such an Association was heartily approved by the Imperial Forestry Conference... While the new body will in no way trespass upon the administrative fields of Government commissions and departments, it undoubtedly will have plenty of scope for con-

structive activity in giving to existing forestry societies and their thousands of members a definite interest in Imperial needs and opportunities. Of high importance is the fact that the Empire Forest Association will combine promotion of better forestry methods in all parts of the Empire with promotion of inter-Imperial trade in forest products. This will be accomplished not through overlapping any existing agencies or by setting up new machinery, but mainly through a well-planned educational campaign, in which existing educational channels will be utilized. For example, the personal interest of the 11,000 members of the Canadian Forestry Association will be sought through the Forestry Magazine, and similarly in Australia and in the United Kingdom.

Fuller details of the Empire Forest Association will be given in the next issue of this publication.

French Speaker Rallies Support For Forest Protection

It has been the aim of the Canadian Forestry Association to concentrate the services of its field workers in districts where fire prevention propaganda will likely accomplish most good. With this in view, Mr. J. A. Doucet spent July and half of August visiting some districts of the Upper Ottawa, working from Ville Marie through such points as Fabre, St. Placide, Lorrainville, Mont Carmel, Lattulippe, Ste. Eugene, Guiges, North Temiskaming, Guerin, Nedelac and St. Isidore. The attendance varied from 150 to 400 each night, which in communities of limited population was gratifying.

Getting away from the limitations of previous years, the Forestry Association has equipped all lecturers with portable electric engines and generators, with the most modern motion picture apparatus and entertaining and instructive films. In some of the places visited, motion pictures were an entire novelty, and the lessons in forest fire prevention were, therefore, the more eagerly absorbed.

The Association acknowledges the great kindness of all parish priests and company officials, who went to much trouble to secure halls and promote publicity.

Mr. Doucet proceeded from Western Quebec to the Lake St. John district, and there covered Hebertville Village, St. Jerome, St. Andre, St. Hedwidge, St. Methode, Normandin, Albanel, Mistassini, Peribonka, La Doree. The many courtesies of Mr. R. L. Seaborne, manager of the Laurentian Forest Protective Association, and his field inspectors, greatly aided Mr. Doucet's trip.

At all places the interest of the public in the forest conservation question was manifestly brisk, and the meetings undoubtedly will result in better public cooperation in prevention of timber fires.

At a recent meeting of the Directors of the Canadian Forestry Association, the question of appointing a permanent French-speaking propagandist was discussed, and will be dealt with more definitely at a future meeting.

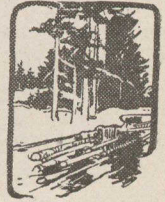
Twenty Years of Forest Tree Planting

By Joseph S. Illick

Pennsylvania Department of Forestry



An inspiring story of what aggressive public policies can do in reforesting idle lands



Editor's Note.—Realizing the deep interest all over Canada in the project of replanting with timber trees the enormous areas of idle lands and thus turning them to our economic profit, the Canadian Forestry Magazine asked Professor Joseph S. Illick, in charge of tree planting work throughout Pennsylvania, to tell the story of Pennsylvania's success.

Readers of the Forestry Magazine will find Mr. Illick's article, which is generously illustrated, a real contribution to our knowledge of forest tree planting in Canada.

At least 50 million forest trees have been planted in the State of Pennsylvania during the last twenty years. Forest tree planting began in Pennsylvania in 1728, when John Bartram acquired a tract of land near Philadelphia and planted thereon many different kinds of forest trees. But most of the early planting took place in gardens, groves and parks, on estates, by roadsides, and along waterways.

The real advent of forest tree planting for forestry purposes, however, did not begin until 1899—two years after the State began to acquire land for forestry purposes. The progressive growth of the practice on the State forests is shown in the following table:

Year.	Number of Trees Planted on State Forests.
1899	1,000
1909	738,461
1910	1,092,213
1911	1,663,661
1912	1,890,404

1913	3,164,637
1914	3,393,571
1915	4,315,436
1916	5,492,020
1917	3,595,720
1918	6,033,760
1919	6,132,547

Total since 1899 .. 33,806,338

About 50 different species of native and foreign trees have been planted. The latter, as a rule, were planted in small number and chiefly for experimental purposes. The following table lists all the species, of which more than 50,000 trees have been planted:

Species.	Number of Trees Planted.
White Pine..	20,669,172 (61% of total)
Norway Spruce	4,915,563
Scotch Pine	2,971,909
Pitch Pine...	1,638,706
Red Pine	1,058,717
European Larch	712,592
Red Oak	395,927
White Ash ...	381,733
Jack Pine ...	352,400
Douglas Fir ..	104,566
Honey Locust	103,610
Sugar Maple .	99,114
Black Cherry.	64,340
Black Walnut	63,034
American Elm	56,382
Miscellaneous (less than 50,000 each) ..	218,573

Total 33,806,338

The success of forest tree planting on State Forests was heralded widely across the State and private owners of idle forest land began to inquire earnestly about the feasibility of reforesting their

own denuded holdings. By 1908 the inquiries became so numerous and the appeals for technical help so insistent that it soon became evident that the time was at hand for a definite plan of co-operation between the Department of Forestry and prospective private planters. In response to this rapidly growing public sentiment an Act was passed by the Legislature and approved by the Governor on April 22nd, 1909, permitting the Department of Forestry to grow and distribute *at the cost of production* forest tree seedlings to private planters for the reforestation of woodlands within the State. During the first year (1910) of the workings of this co-operative plan 66,374 small trees were distributed. In 1915, with only five years of co-operative effort, forest authorities realized that a fuller co-operation on the part of the State was fully justified; consequently a new Act was passed and approved in 1915 which authorized the Department of Forestry to grow forest tree seedlings and distribute them to private planters, who are required to pay *only the cost of packing and shipping*.

What the Legislative Acts of 1909 and 1915 did for forest tree planting on private owned forest land of Pennsylvania is shown in the following table:

Year.	Number of Trees Supplied To Private Planters.
1910	66,374
1911	25,360
1912	66,854
1913	47,770
1914	108,685
1915	115,577
1916	1,471,875
1917	1,812,997
1918	2,186,899
1919	3,139,479
Total	9,041,870

The peak of planting by private owners of forest land has not yet been reached in Pennsylvania. The practice is still growing and extending its scope. Its progressive tendency is shown in the fact that only 66,374 trees were planted in 1910, while in 1919 the number was 3,139,479, the latter being 46 times as great as the former. An examination of

the foregoing table will also show that more trees were planted during 1919 than during the first seven years of the undertaking (1910 to 1916 inclusive). The total number of applicants has increased from 23 in 1910 to 798 in 1919, the latter being an increase of more than 3,000 per cent.

The average number of trees distributed during 1919 was 3,943, which indicates that the applicants reforested on an average from two to three acres. The smallest order filled called for 500 trees, and the largest embraced 180,000 trees. This shows that both small and large holders of woodlands are carrying on reforestation projects. The small owner as a rule is filling up odd corners, waste places and incompletely stocked woodlots while the large holders are reforesting entire denuded mountain slopes, particularly those protecting watersheds.



A JOB WELL DONE.

No waste nor debris. Stumps cut low, everything is being used and the brush piled for burning. Area will be planted. A photograph taken in Saxony.



THE CLEARFIELD NURSERY (PENNSYLVANIA)

Produced over 9 million trees for \$12,500. Note overhead (S'inner) watering system installed in 1915 at a total cost of \$1,306.19.

Forest tree planting is no longer looked upon as a mere pastime, but is now regarded as a real business. But just as is the case in all new lines of work, so in the field of forest tree planting, there is yet much to be learned. Private planters are looking to the Department of Forestry to develop satisfactory and economical planting methods, and make the conclusions available to them. If twenty years of forest tree planting has revealed anything it has shown conclusively that while the practice may appear simple, yet it is beset with many

difficulties and numerous technical problems. It would not be possible to discuss all the important problems of the last two decades in a short article, but a few will be outlined and discussed briefly.

Location of Tree Nurseries.

Many factors influence the location of forest tree nurseries. Unfortunately the factors which make themselves felt in the later maintenance of a nursery may not be evident at the time of the selection of the nursery site. I am informed



A devastated area in need of planting. This land once held a fine stock of timber, as shown by the number of stumps indicated by the black spots in the photograph.



What may be expected of Norway Spruce on favorable sites. This stand was not planted but reproduced naturally.

that some of the Canadian provinces and numerous pulp companies are establishing or contemplating the establishment of nurseries, and it may, therefore, be of value to brief the Pennsylvania experience along this line of reforestation.

A sandy loam soil meets most requirements for nursery stock production, but one should not be too insistent upon this factor, for much has already been accomplished in the way of soil modification. The hard clay soil in the Mont Alto nursery, located in Southern Pennsylvania, has been so amended by the use of charcoal braise that what was formerly regarded as an impossible soil for the raising of coniferous seedlings is now producing choice planting stock at a reasonable cost. This, however, does not imply that any kind of soil may be selected, but that soil conditions may have to give way in part to other factors. A level site is satisfactory in case of light sandy soil, but a gentle slope is



A plantation of Jack Pine.

generally preferable, for it permits of proper drainage.

The most desirable aspect for a nursery depends upon the latitude and altitude. Eastern and southern aspects are best in cold regions, while northern and western are best in temperate regions. Latitude and altitude are, as a rule, of more importance than slope and aspect. The Mont Alto nursery opens up at least two weeks, and in some cases three weeks, earlier in spring than the nurseries located in the northern part of the State. It is able to supply the planting stock when it is really needed for successful spring planting, while the planting material from the nurseries in the extreme northern part of the State becomes available invariably too late to get the best planting results. Hence, the Pennsylvania experience indicates that nurseries should be so located that they will be in a condition to yield their stock for early spring planting.

The Supply of Water

An adequate water supply is an absolute essential for the production of vigorous and healthy nursery stock. If possible, a nursery should be so located that a gravity water system may be installed which will supply sufficient water for all nursery purposes. The introduction of watering systems into all the large nurseries operated by the Pennsylvania Department of Forestry has made a striking improvement on the nursery output. Small seedlings may exist in the nursery beds during the drought periods of summer months without an artificial sprinkling with water, but they cannot thrive and become vigorous under such unfavorable conditions. A satisfactory water system was installed in the Clearfield nursery in 1915 at a total cost of \$1,306.19.

The two factors which have been overlooked in the location of some existing nurseries are accessibility and labor supply. These factors are not so evident at the time a nursery is established and may not become apparent until after the nursery has been so enlarged and developed that its handling requires many men and much material. These are, however, very important determining factors, and since the successful

operation of a nursery implies much work intermittently during the spring and summer months they should be located near or amidst an ample labor supply. Three of the large nurseries now operated by the Pennsylvania Department of Forestry may be abandoned because of their inaccessibility and inadequate labor supply. Plans are now in progress to establish forest tree nurseries near penal and other state institutions, which will be able to supply all necessary labor whenever it is needed.

Cost of Operating a Nursery.

Many factors influence the cost of operating a nursery. But in spite of all these factors the one striking fact about nursery production is the low cost at which forest tree seedlings and transplants may be grown. The Clearfield nursery, located on a high plateau about 10 miles from the city of Clearfield, has been handled on an unusually economic basis. The total cost of all operations by years is shown in the following table:

Year	Cost (\$)	Trees Shipped
1911	\$ 150.55	—
1912	192.91	—
1913	426.94	16,000
1914	756.02	265,000
1915	1,685.16	476,000
1916	2,195.14	1,314,515
1917	1,987.16	1,830,550
1918	2,124.42	3,306,540
(Oct. 1, 1919)	1,676.43	1,952,910
Installation of Water System (1914-1915)	1,306.19	—

Total \$12,500.92 9,162,015

The foregoing table shows that the average cost of production from 1911 to 1919 was \$1.36 per thousand trees. This figure is low, but it includes all expenditures, even the transportation of the nursery stock to shipping points, and may be attributed to extremely favorable nursery production conditions. It is, however, essential to mention that most of the nursery stock consisted of two-year-old seedlings, which have to date given satisfactory and economic results.

Nursery Stock Grading.

Forest tree seedlings and transplants, when lifted from the nursery beds show a wide variation in size, appearance,



Plantations of Northern Jack Pine (left) and Chinese Larch (right) when eight years old. (Pennsylvania)

form, stockiness, weight and volume. Some method of grading is imperative under such conditions. An accompanying illustration shows the wide range in size of three-year-old Norway Spruce seedlings. This illustration does not

show an unusual range in size and form, but presents a condition which usually exists in densely stocked beds.

In order to ascertain more accurately the degree of variation a study was made of three-year White Pine seedlings

with an average of 7,000 trees per 100 square feet of nursery bed surface. The trees were separated into the three following grades:

Grade I.—Large and thrifty.

Grade II.—Medium.

Grade III.—Small and weak (discards).

After being graded the trees were tied up in bundles of fifty each. A comparative study was then made of the three grades on the basis of size, weight and volume, and the results follow:

	I.	II.	III.
	Grade	Grade	Grade
Total height (inches)	14.0	10.5	4.0
Length of roots (inches)	5.0	3.8	1.8
Weight per bundle (ounces)	13.8	5.0	2.0
Volume per bundle (cubic inches)	274.0	145.0	55.0

Whether or not to grade forest tree seedlings does not seem to be a question any longer. The time seems to be at hand and good management recom-

mends that all nursery stock should be carefully sorted and classified.

The big question, however, seems to be what to do with grade III. seedlings. Some nurserymen entertain hopes for these underlings, while others protest against their resetting in the nursery. The former claim that the trees are inherently strong but have been unfavorably situated, while the latter insist that they possess inherent weaknesses and defects. In order to throw some light on this unsettled subject over 1000,000 small trees of different species, generally classified as culls, were transplanted in the nurseries. Their development is being watched in both the transplant beds in the nurseries and in plantations. The results are not yet conclusive, but indicate strongly that trees, such as the three small ones at the right of the accompanying illustration, are *not fit to transplant*. They are weaklings, and in many instances have been suppressed beyond recovery.



WHY NURSERY STOCK SHOULD BE GRADED.

All the trees are three-year-old Norway Spruce taken from the same bed. The three small trees on the right are culls. They should be discarded, for they have been suppressed beyond recovery.

Source of Seed Supply

Too little attention has been given to the source of the seed supply, which has thus far been used in the propagation of nursery stock. The experiments of European foresters along this line of inquiry show conclusively that good nursery management always requires a thorough knowledge not only of the locality from which seed of different species is procured, but also full particulars about the seed trees themselves.

The shortcomings of former laxity on this phase of seedling production are now becoming evident in some of the older plantations in Pennsylvania. Not all undesirable features which are transmitted through seeds become evident in the seedling or sapling stage of a tree's life, but turn up later on. It seems to follow that extra effort should be put forth to get the best possible seed for use in nursery work. Only seed, the full history of which is known, should be used. Other things being equal, it may be most advantageous to collect seeds locally from known seed trees, rather than to depend upon and take a chance on foreign or other distant supplies.

When to Sow Seeds

Much has been written and more has been said about spring and fall sowing of seed in nursery beds. The Pennsylvania experiments show conclusively that fall sowing of seeds, particularly of coniferous species, gives far superior results to spring sowing. Fall is Nature's time to sow, and what is far more important, early spring is Nature's best time for germination and growth. If the seed is not sowed until spring—and it is usually deferred until after the shipping rush is over—then the growth takes place during an abnormally late period for growth.

One-year-old white pine seedlings raised from fall sown seed in the Mont Alto nursery were fully 35 per cent. superior to those grown from spring sown seed. The advantage of fall sowing also suggests the local collection of tree seed, for so often the seed is not available for fall planting if procured from distant places.

Where to Plant

Another Pennsylvania experience is worthy of consideration. It pertains to the planting of cut-over and burnt-over areas. Immediately after vast areas were cut-over and then burnt-over repeatedly, they appeared to be completely devoid of any woody growth of value. Miles of mountain slopes seemed to be without any trace of tree growth. Then, the best informed and most widely experienced foresters agreed that planting was the only available means of restoring these vast unproductive deserts. But the unexpected has happened in many places. Time has shown that nature works in wonderful ways, and that if fires are kept out of our forests there will appear upon our hillsides a fair growth of valuable forest trees. It is quite probable that the conclusions about natural forest replacement in the early days of forestry were based upon past experiences, when fires occurred frequently and did not give nature a chance to show its power.

Restocking Idle Lands

To date almost 23,000 acres have been planted on the State Forests of Pennsylvania, upon sites ranging from abandoned fields, waste places, burned areas, lumbered tracts, Scrub Oak barrens and Fire Cherry and Aspen covered areas, to the underplanting of mature stands. The 1,200 separate plantations established in Pennsylvania during the past twenty years show that planting may be done successfully and economically, and that plantations are relatively safer from fire than other forest areas because of the interest the public takes in planted trees and the value people place upon them. But great care should be exercised in selecting planting sites, for planting should only supplement natural forest replacement and not work counter to it. In order that planting may be done judiciously the subject of natural forest succession on different sites and in different regions should be worked out thoroughly before planting is attempted. For only then, will it be possible to know what areas should be planted and where it is reasonable to expect a satisfactory natural growth. It is now clear that nature will do more to restore

THE EMPIRE JOINS HANDS IN FORESTRY.

By Robson Black, Secretary, The Canadian Forestry Association.



A Great Conference at London, wherein Canada's need for a national forest conservation programme received new emphasis.



Co-operation is the life of Forestry. Joining hands in war has no peculiar advantage that may not be shared in times of peace. In an Empire where the centre is a stupendous wood consumer and the overseas Dominions and Colonies have it in them to grow timber trees by the hundred million, the logic of the case calls for a family consultation. This feeling in all parts of the Empire finally brought about the Imperial Forestry Conference during July last in London. It is of special interest to our readers that the Conference selected Canada as its next meeting place in 1923.

How very practical and vital were the subjects laid before the Conference may be estimated by a summary of topics covered in just three days, July 12th to 14th:

- The Responsibility of the State for Forest Management.
- The Forest Authority. (How at present constituted in various parts of the Empire and what reforms are desirable.)
- Methods and Problems of Technical Forestry.
- Education and Research.
- Empire Forest Resources and Consumption.
- Scope for Imperial Development.

Practically every topic in this list represents an internal Canadian problem of the forest resources, as well as having significance for the British Isles, Australia, India and the Empire as an interdependent organization.

First came an inspection on July 5th of the Empire Timber Exhibition at Holland Park Skating Rink, Canada's forest products being well to the front. On July 7th, the Imperial Forestry Conference was officially set in motion at the Guildhall by the Lord Mayor of London, Sir Edward Ernest, addresses being given by Lord Milner and Lord Lovat. In the afternoon, at the Guildhall, all the official delegates presented their reports summarizing the forest resources of their respective countries, and con-

taining a compilation of essential facts by which the Empire situation in forest management and trade possibilities can be easily gauged.

The following three days were spent in a tour of the Crown Forests of Dean, High-meadow, and Tintern Woods, the delegates being guests of the Forestry Commission.

It is safe to say that, no matter how bright were the anticipations of the delegates, none foresaw how extraordinarily valuable the meetings were to prove. These are times when, after a century of dull neglect, Forestry is coming into its own in all Anglo-Saxon countries, as a definite item of public policy. Gone are the careless days of exploitation, of butchering trees without breeding them. The problem of future timber supplies has become the equation of national existence. In the United Kingdom, the great wood-consuming centre of the Empire, the lessons of the war have cleared the road for a forestry programme, have forced a tardy recognition that forest crops rank with farms and fisheries and mines as essentials of a well-ordered nation. At present Great Britain and Ireland have less than 4,000 square miles under wooded growth, giving the smallest percentage of forested area of any country in Europe except Portugal. The British people in the five years from 1909-13 required for their ordinary affairs 10,883,500 loads of timber (a load equal to 50 cubic feet). They grew on their home forests only 766,700 loads out of the

ten million loads required. The remainder was brought from other countries; just 17 per cent. came from within the Empire. The United States sent the United Kingdom almost double the amount of timber shipped by Canada; Russia and Scandinavia between 1909 and 1913 gave 65 per cent of the British bought timber.

TIMBER AND BUSINESS.

John Bull, with his gift of practical sense, saw with some alarm that unless he shut down his mines with their loud calls for pit props, unless he closed off his fisheries, his railways, his shipbuilding, his manufacturing plants, and house construction, there must be evolved some more secure supply-house of forest materials. Russia, Scandinavia, the United States, and away at the bottom corner—Canada. As a question of national safety, the scheme of timber supplies was a broken crutch to which the war period gave painful emphasis. As a question of wise direction of trade, it was only a degree or two better.

Today, there is constituted the British Forestry Commission. The sum of 3,500,000 pounds sterling, plus the growing produce of that sum, will be available for the first ten years of the Commission's existence. This has brought forth a comprehensive plan for the acquisition of land suitable for afforestation and the establishment of plantations thereon. Although only appointed at the close of 1919, the Commission had bought by the end of June last 90 square miles and in the first planting season had afforested 3 square miles. The basis of the Commission's procedure is that the afforestation of 1,770,000 acres is eventually necessary in order to make the United Kingdom independent of imported timber for three years in an emergency. It is probable that two thirds of the total area will be planted in the first forty years and that 200,000 acres will be planted in the first ten years.

THE LINE OF SAFETY.

From the foregoing, it will be evident to readers of the Canadian Forestry Magazine that the Government and people of Great Britain are greatly in earnest as to a national programme of forestry. But their interest extends necessarily beyond the happy expectations of gigantic Scots Pine and Larch and Douglas Fir felled on the present plantation areas—in the year 1980. In the meantime, the country must have enormous volumes of timber delivered at its doors from overseas. Will the cargoes come from Russia or from Canada? From Sweden or from Australia? Today, Canada has the only great forests of coniferous timbers within

the Empire and it is coniferous woods that Britain buys most. The British people understand quite well that if a larger share of home requirements in forest products can be filled from Canadian and other Empire ports, the arrangement increases the margin of safety and consolidates Imperial trade.

Clearly, then, the Imperial Forestry Conference was not a seance of tree sentimentalists.

It was a conscious effort to take stock of the Empire's forest resources, to ascertain whether the various responsible administrations have laid down adequate forest conservation policies, how such policies are being carried out and what is required to place the forests of all parts of the Empire upon a basis of permanent timber production.

The very fact that 35 delegates from all parts of the world, acting as representatives of the Mother Country, the self-governing Dominions, India and the Crown Colonies approved the principle of a sustained yield through systematic forest management and undertook to promote means by which this ideal, if not already in effect, should be applied to all forest areas within the public control, establishes a "base line" which no Canadian administrator will choose to ignore.

A WELL-CHOSEN CHAIRMAN.

The same broad spirit of cordial co-operation, which has distinguished so many recent meetings having as their object closer Imperial contact, also permeated the Imperial Forestry Conference. It was in the truest sense a partnership meeting, in which the relative importance of the various sections of the Empire to the subject in hand was painstakingly observed. The choice of Lord Lovat as Chairman was one of the happy inspirations of the Conference. Gifted with great tact and a faculty for vigorous leadership, coupled with a well-matured knowledge of Forestry in its technical and economic phases, Lord Lovat's service to the Conference was outstanding. His fellow commissioners of the British Forestry Commission, Lord Clinton, Rt. Hon. F. D. Acland, M.P., and Mr. R. L. Robinson well merited the appreciation of the visiting delegates.

Canada's participation in the Conference was expressed through a delegation consisting of E. H. Finlayson, Dominion Forestry Branch, representing the Dominion Government; Clyde Leavitt, Chief Forester, Commission of Conservation; Ellwood Wilson, Canadian Society of Forest Engineers; M. A. Grainger, Chief Forester of British Columbia; Avila Bedard, head of Laval Forest School, Quebec; W. H. Kilby, of the Canadian National Railways, Winnipeg.

and Robson Black, Secretary of the Canadian Forestry Association. The total of official delegates from all parts of the Empire was 35, with 54 Associate delegates. Australia, India, New Zealand, Newfoundland, and almost all the Crown Colonies, as well as the United Kingdom also took part through their official conservators or agents general or other representatives.

These journeys were highly interesting and instructive and served to bring the delegates into such intimate personal contact as proved invaluable during the days of earnest discussion that followed. In succeeding issues of the Canadian Forestry Magazine, there will be published some interesting details of the United Kingdom forests, together with some impressions gained by the Canadian delegates.

THE STATE'S RESPONSIBILITY.

Upon the subject of "The Responsibility of the State for Forest Management," the delegates found little occasion for difference of opinion. All recognized that the forest resources of a nation are in a category differing fundamentally from agriculture. In the latter case, individual initiative finds an ample financial reward and the broader interests of the people are fully safeguarded by private enterprise. With the forests, however, what Dr. Fernow called the 'providential function' of Governments is essential to develop timber crops which at best cannot mature in less than sixty to one hundred years. The long time rotation, unlike the annual harvest of a wheat field, is not ideally conducive to private investments or to a sustained private supervision. More than that, the forestry activities in each area must be under one authority. As concerns conditions in the Mother Country, the advancement of Forestry, until recently, has been almost the sole province of the private owner. The foresight and public spirit of the old families of England, Scotland, and Ireland in establishing and conserving scientifically their timbered lands has been in strong contrast to the former apathy and indirectness of successive Government commissions.

While committed to the principle of state responsibility in forest conservation, the Conference did not lose sight of the need for closer understanding and a working union between the forester and the private operator: between those who grow timber and those who convert it into useful commodities. Mr. Grainger, Mr. Wilson and others of the Canadian deputation strongly supported the view that there should be more consideration of the problems of the operator and more conscious co-operation be-

tween the forester and the converter. This was epitomized finally in a carefully considered resolution of the Conference as follows:

THE OPERATOR'S POINT OF VIEW.

"It is extremely desirable that the forestry services should be in close contact and consultation with organizations representing the interests concerned in the extraction and utilization of timber and forest products, and that they should be consulted in framing forest policy."

Surely the foregoing represents exactly the line of policy to which Canadian forestry services and wood-using industries are being committed more and more. Certainly it is directly in harmony with the aims of the Canadian Forestry Association.

Upon the more general subject of Forestry Policy, the Conference agreed upon the following after careful deliberation:

"Forestry Policy—In view of the great importance to the Empire as a whole, as well as to each of its component parts, of producing a sustained yield of all classes of timber, and of encouraging the most economical utilization of timber and other forest products, and of maintaining and improving climatic conditions in the interests of agriculture and water supply, each of the Governments of the Empire should lay down a definite forest policy to be administered by a properly constituted and adequate forest service."

INVENTORIES BADLY NEEDED.

Again and again during the Conference, delegates from Canada, Australia, the British Isles, and Crown Colonies were forced to confess the lack of any accurate inventory of the forest resources of their respective domains, and lack of satisfactory knowledge as to loss by forest fire and other destructive agencies. As to the rate of growth, the net increment of the forest stands (if any), Canada at best could offer only the hope of future investigation. The growth studies conducted by the Commission of Conservation in co-operation with Provincial Governments and private companies are, of course, undertaken with such an end in view, but no generalization covering large areas can be made from any ascertained facts now in existence. It was felt by the Conference that only through an extensive inventory of the forest resources, could there be supplied a basis for progressive public policies. Accordingly, the Conference asserted its conviction in the following terms:

"The foundation of a stable forest policy for the Empire and for its component parts must be the collection, co-ordination and dis-

semination of facts with regard to the existing forest resources of the Empire and the current and prospective demands on them.

"To this end, it is of the first importance that a systematic survey be undertaken in each part of the Empire which will not only serve as the basis of forest policy in that part but also provide a means for reviewing the forestry position of the Empire as a whole."

THE ELEMENTS OF A FOREST POLICY.

The Conference also emphasized the view that in order to attain continuity in the development of forest resources it is desirable that certain elements of stability be secured in the constitution of the forest policy.

This may be done by the following measures:

1. The definition, where this has not been done already of forestry policy in a Forestry Act or Ordinance.
2. The reservation for the purpose of economic management and development of forest land under conditions which prevent the alienation of any which is primarily suitable for forests except for reasons consistent with the maintenance of the forest policy as a whole.
3. The assurance to the Forestry Authority of funds sufficient to carry out the accepted policy for a series of years.
4. The grant to members of the Forestry service of the status of civil servants with due provision for pension.
5. The appointment as the chief officers of the forestry service of persons having a high standard of training in forestry, their selection and promotion being by merit alone.
6. The establishment in each of the larger parts of the Empire and for the Colonies not possessing responsible government, collectively of an officer, or officers, having special duties of advising as to forest policy and surveying its execution.

Clause six refers not to Canada, of course, but to what were once designated 'Crown Colonies' and in the more recent terminology are classed as 'Colonies not possessing responsible government.'

THE STATE AND RESEARCH.

On the subject of Research, a special committee laid stress upon the importance of systematic research work in developing the growing and utilisation of timber and other forest products and agreed that the State is primarily responsible for forestry research. Two main branches were defined: the growing of forest crops and the utilization of timber and other

forest products. The committee concluded its report with some specific observations as to research work in Canada:

"Forest research problems in Canada are of great magnitude and importance owing to the vast forest resources of that Dominion and the necessity of working them on sound economic lines. We understand that useful research in technology of wood has been carried out in the laboratories of the Dominion Forestry Branch, in co-operation with McGill University and that a wood-testing branch of that institution has been established in British Columbia. Important as this branch of research is, however, we are strongly of opinion that investigations into such fundamental questions as seeding and regeneration, rate of growth and outturn of forest crops are at present even more urgently required, and we consider that no time should be lost in undertaking this important work on a sufficient scale by provision of funds and appointment of trained investigators."

Mr. Clyde Leavitt was the Canadian representative on the research committee.

FORESTRY EDUCATION.

On the subject of Education in Forestry, the following expressed the general view of the Conference:

"It should be the primary duty of Forest Authorities throughout the Empire to establish systematic schemes of forestry education. It has been found for climatic and other reasons that it would not be possible for each part of the Empire to establish a complete scheme of forestry education of its own, and therefore it is essential that those parts of the Empire which are willing to establish complete systems should, as far as possible, frame such schemes with a view to combining for meeting the needs of those parts which can only themselves make a partial provision for their requirements."

It will be readily seen from the foregoing conclusions of the Conference, endorsed by official and other representatives from every part of the Empire, that there has been set up a series of guiding principles which, can be safely accepted by all our Governments and their forestry administrators as having scientific ratification and being in accord with our national and Imperial welfare.

IMPERIAL FORESTRY BUREAU.

Early in the sessions of the Conference, the idea of setting up an Imperial Forestry Bureau

(Continued on Page 420.)

a forest growth on cut-over and burnt-over areas than was formerly anticipated. Consequently, the extent and methods of future planting must be adapted to this new point of view, which will surely hold as forest protection improves.

MR. HANSSON'S PROMOTION.

Mr. Arnold Hansson, a well-known Canadian Forester, has received the appointment of Chief Forest Inspector of the New Zealand Forestry Department, under Mr. L. M. Ellis, formerly of the Forestry Department of the Canadian Pacific Railway.

Mr. Hansson is a Norwegian by birth, but some time ago became a British subject. He received his B.A. and F.E. degrees from Kristiana University, Norway, and Master of Forestry from Yale University. He has had extended experience in forest work throughout the United States and in Canada. After several years with the Laurentide Company at Grand Mere, Quebec, Mr. Hansson entered into private work as a consulting forest engineer with headquarters at Montreal. In this capacity he was retained by the Abitibi Power and Paper Company to conduct special work in connection with their forests. An excellent war record with the Canadian forces is another of Mr. Hansson's distinctions; two years he spent in active service.

A FREE BOOK FOR YOU!

"Tree Planting on the Prairies," is an excellent book of 60 pages, written by Norman M. Ross, B.S.A., Bachelor of Forestry, Chief of the Tree Planting

Division, and published by the Dominion Forestry Branch.

By courtesy of Mr. R. H. Campbell, Director of Forestry, a copy of the book, which is well illustrated, non-technical, and comprehensive, will be sent to all members of the Canadian Forestry Association in the prairie provinces who are personally interested in tree planting. There is no charge of any sort. Send us your name and address and "Tree Planting on the Prairies" will go to you by return mail.

The book is now in its seventh edition, and should be in the hands of every prairie tree planter.

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An advertisement inserted in the Co-wichan Leader, B.C., by the Genoa Bay Lumber Co.

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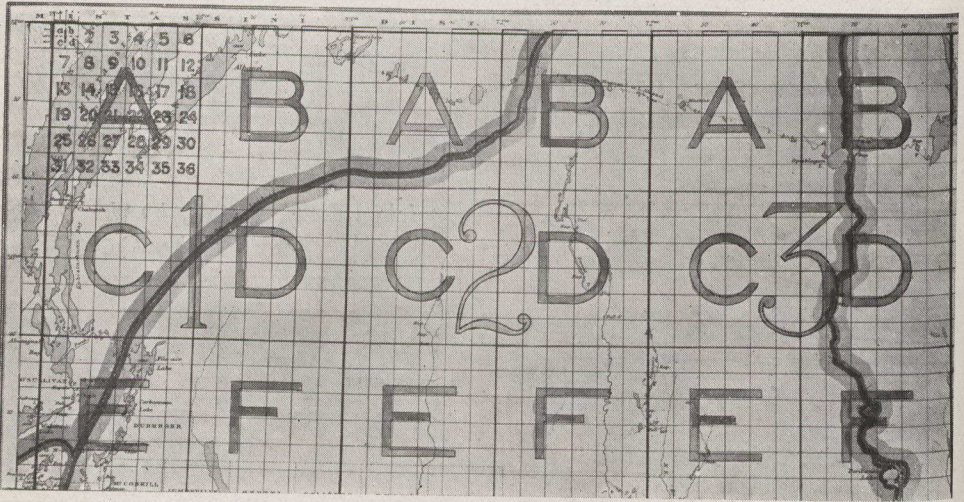
This advertisement inserted in the interests of forest protection by Genoa Bay Lumber Co., Ltd.



Air Maps For Flying Patrols



How Aerial Rangers Will Wire-
less Information to
Land Stations



In prefacing this article, it may be stated that the following method of map squaring has been adopted by the Forestry Branch, Provincial Government, Quebec, Forest Fire Protection Associations, Quebec, and several large paper and lumber companies who operate aerial surveys and fire patrols of their respective timber limits.

Maps to be used are standard topographical maps, scale 500.00 or 7.8 miles to 1 inch. These maps can be obtained from the Department of Interior at Ottawa, and are published in sheets, which can, of course, be joined up to make one large map of any given territory, and each sheet is given a distinctive reference number. Key to these sheet numbers can also be obtained at Ottawa. To proceed with the actual squaring of these each sheet is divided into 9 squares, every degree of latitude into 9 squares, every degree of lati-

tude and longitude forming a square, and numbered from top left-hand corner 1 to 9. Each of these 9 squares is subdivided into 6 squares, which are lettered "A" to "F"; the sheet is now divided into a total of 54 squares.

Proceeding along the same lines, in the process of reduction, each of the squares lettered "A" to "F" is divided into 36 squares, and numbered from top left-hand corner 1 to 36. Again, using the same method of reduction, the last mentioned squares are divided into 4 and lettered a. b. c. d. in small letters. The final reduction of squares is arrived at by dividing each of the latter squares a. b. c. d. into 10, but as the squares are not very small, graduations of 10ths are placed on two sides of the squares, these graduations serving as a scale or protractor applicable to any square. It is just a matter of measuring latitudinally and longitudinally to any given

point in square to locate same on map.

It may be here mentioned that care must be taken when squaring maps, to divide each square separately in order to follow curvature and variation of latitudinal and longitudinal lines. The accompanying photograph will serve to illustrate the method more clearly.

Suppose an aerial patrol, in reporting an outbreak of fire, sends in by wireless to the nearest station a message as follows:—"Fire 34-1a-2b-5-4, you simply look up sheet 34, square 1a, 2b, scale latitudinally .5 graduations and longitudinally 4 graduations pin point the intersection of these lines, and you have as near the exact location as possible. Of course, it will be readily understood that fire location will be more easily discovered by airmen.

By aerial photography, as used in mapping out the war zone in France and Belgium, mosaic maps will be made, and will prove invaluable in correcting positions of lakes, rivers, etc., in unsurveyed territories, but the whole operation de-

pends upon accurate squaring of maps not only as a guide to the airmen, but in compiling and joining up of mosaic maps. This method of making maps etc., is as yet in its experimental stage in regard to Canada, but there seems to be no reason why it cannot be made a success, given the right men to do this work. However, this season, it is hoped, will produce results which will be awaited with great interest by many private companies.

Reverting to fire patrol by airplane, immediately a fire is reported by the airman and map-location given, the Fire Protection Association is notified; they record same and despatch men to fight the fire. Direction of such forest fires should be observed and reported on from time to time, and fire fighters guided as to best means to combat same.

Conventional signs denoting location of the air harbour, aerodromes, supply stations, etc., will be marked on the mosaic maps as soon as same are definitely located.

Why Our Hardwoods Are Not Used For Best Furniture

Readers of the Canadian Forestry Magazine have frequently inquired why there is not a better market for Canadian hardwoods in furniture manufacture. The question was placed before Mr. J. R. Shorey, General Manager of the Canada Furniture Manufacturers, Limited, Woodstock, Ontario, and the following is his most interesting reply:

"Birch is really the only Canadian hardwood that can be utilized in the manufacture of better grade furniture. The writer is quite well aware that the quantity of standing white birch in Canada is very large. Unfortunately, as it will not float, it is inaccessible. At present the market price of birch lumber is very high, owing to excessive demand in the United States for birch for interior trim.

"We, as furniture manufacturers, can buy gumwood in the Southern States and

bring it into Canada and utilize it in the manufacture of furniture at a less price than we can buy the native white birch for, and taking it all in all, it is a preferable wood, because it is easier to work and susceptible to various finishes, whereas birch can only be satisfactorily finished in the natural or mahogany finishes.

"Birch is a strong and reliable wood, and is really the only furniture wood that is produced in Canada. Maple, elm and beech are used for the manufacture of low grades of furniture.

"There is no high grade furniture made out of birch. If you would make a piece of furniture out of birch and put a lot of work on it, you would not sell it in competition with mahogany and walnut.

"CANADA FURNITURE MANUFACTURERS, LTD.,

"J. R. Shorey,
"Managing Director."

A Canadian Forester's Training

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

*The final two years of his college
course treat the forest as a
productive organization*



For the first two years of a course in forestry, the student for the most part considers trees separately as individual organizations, but in the second two years he is taught to look upon trees, both in regard to their life history and their economic relations, collectively as stands, types, forests. Just as the town is not merely an organization of people, so the forest is not merely a collection of trees, but like the town is a community, an organization dependent for its development and growth upon certain external conditions and upon certain internal conditions of its own making. Indeed, the simile may go a step farther, for in a town the organization, the structure remains intact, but the component individuals are constantly changing, and so it is with the forest; the forest is always a forest, unless destroyed by some catastrophe—but the individuals are slowly but constantly shifting in time and in space. Because men can comprehend the laws and conditions which bring about these changes in the forest, we have the profession of forestry, since forestry is the fashioning, the moulding of a community of living trees to the needs of man, the application of brain power to the economic production of wood. Man has already applied his intelligence to the energy of lightning and falling water and directed it into economic channels, resulting in enormously increased wealth, so man can apply his intelligence to the energy of nature as expressed in the growing forest and direct it into economic channels, and it would result in enormously increased wealth for our country. The possibilities in Canada are almost unlimited, and the results would be glorious—and profitable.

Science in Forest Control

This is the point of view in regard to the forest presented to the students during the last two years of their course, and they are shown in the forest as well as in the class room how man can control and improve the forest by his knowledge of the laws of its growth, health and hygiene. For example, in reference to these laws, the students are taught how a forest cover influences the amount of light that gets through to the ground, how some trees can grow in the shade of their neighbors and others cannot. In fact, the light relation is the most important factor in determining the composition of a forest, and it is the forester's most effective tool. The students are also introduced to the mysterious cycle of forest growth and soil fertility. The forest feeds the soil by the decay of its leaves and wood. The products of decay of one year or a group of years contribute to the support of the forest life of the following year or group of years. The previous generation gives up its life that the present generation may live.

Soil and Light Factors

Light and soil fertility then are the magic keys that unlock the secret chamber wherein is contained the knowledge which man uses to fashion the forest to his wishes. The equipoise between light exposure and soil fertility on one side and forest growth on the other is extremely delicate. Minor disturbances and adjustments are constantly taking place under natural conditions, but the balance suffers great distortion under the usual logging operations and still more in the case of fire. This explains why the character of the forest usually changes and may pass through several

stages occupying several hundred years before the original forest comes back after severe cutting operations and especially after fires, and this is the fundamental reason that logging operations must be directed with intelligence and technical knowledge if our forests are to be kept continuously productive in terms of valuable species, and the reason, too, that adequate fire protection is absolutely essential to any plans for continuous supply of timber.

Woods Experience

In the third year also especial attention is given to the economic and industrial aspects of the forest, in particular the methods of converting the forests of the country into current wealth. The various steps in the creation of wealth by the application of labor to the forest resources are followed from the cutting of the tree to the production of paper or of a shoelast, or whatever the final product may be. Forest labor is discussed, its character, length of employment and methods of payment, together with workman's compensation acts. The students come in contact with the tools commonly used in bushwork. The advantages of the various types of axes and saws are demonstrated by actual use. The methods of felling and log-making and the organization of crews are studied in contact with such work. The organization and equipment of a logging camp are explained and later the students learn to appreciate certain characteristics of the average bunkhouse by living in one for several weeks. The students learn how logdecks are made and how the logs are taken down to the landings for transport by rail or water. They learn the relative costs and advantages of aerial tramways, forest railroads, river driving and rafting and the applicability of the various types of transport to the mill to the different forest regions of the country.

Learning the Markets

The methods of manufacture and use of the various forest products follow the above as a natural sequence. Here the object is not only to give the forestry student an intimate knowledge of the

final markets and uses of Canadian woods, but also to give him an understanding of the various factors that enter into the cost of production. The students are required to visit and make reports upon the organization, equipment and production of saw mills, the grading and piling of lumber, upon the manufacture of cross ties, poles, posts and piling, of flooring and siding, shingles and laths; upon the production of cooperage, veneers, boxes, matches, excelsior and various wooden-ware products. They are required to give special study to the rapidly developing wood pulp and paper industry. The processes of manufacture of mechanical and chemical pulp and their conversion into various grades of paper are studied in detail.

The Function of Forestry

Unless the felling down processes are equalled or exceeded in volume by the building up processes, life will cease, and so it is with the forest unless wood material equivalent in amount to the enormous quantities removed each year in the form of lumber and pulpwood, is replaced each year by new growth, the forest will cease—at least as a commercial asset. To recuperate, to regenerate, to restore is the function of the forester. His greatest and most important work is through intelligent direction of cutting and logging operations to replace the annual loss through the agency of the axe and disease, windfall and fire in the forests which nature has already created free of charge. A part of his work, however, is to create forests anew on worn out farm lands and on areas where forests have been completely destroyed by repeated fires. Forestry students are thoroughly prepared for this kind of work. They learn about the adaptability of different species for planting under the different climatic and soil conditions in the various parts of the country. They are taught methods of preparing the nursery, raising and caring for the young trees. They learn the different practices in field planting. At the completion of the subject, their book knowledge is reinforced by a week or ten days of actual work in the Ontario provincial nurseries.



Can the prairie produce trees? Notice this beautiful effect at Brandon, Manitoba, showing a mixture of evergreens and hardwoods. Is not this an improvement on a bare wind-swept plain?

“Do Not Use Less Timber, Grow More!”

From a Public Statement by Col. Wm. B. Greeley, Chief Forester of the United States.

Many of us who served in France were able to see at first hand the conditions of life and industry in a country where population has crowded close upon natural resources, where for the masses living has become close and hard, and, even to maintain standards of comfort far below what the average American demands, a degree of thrift and frugality beyond our comprehension must be constantly employed. In France wood is a commodity of a totally different character from what it has been in the United States. Even with the care and intelligence applied unremittingly to French forests, lumber is priced as an imported luxury. No one can become familiar with that country without appreciating how this fact handicaps the comfort of living and the industrial opportunities of the French nation. The gleaning of the forests for little fagots, the very scaffolds used in city building, which are made out of small poles carefully lashed together and used over and over again, tell the story. With all their

beauty and picturesqueness the rural districts of France often leave an impression of decadence. A new structure of any kind is a rare sight and moss-covered stone buildings of the time of Jeanne d'Arc must serve the French farmer of to-day. Only a people great in industry and foresight could, under such limitations, have built up within an area less than that of our single largest state, the great industrial nation that France is to-day.

The lesson which such things bring home is, in a broad way, the same fundamental truth which underlies many economic problems of the present time—not alone those of America, but of the whole world as it strives to get back to normal industry. It is an old and simple axiom. Aside from the will to work which is the foremost quality of any strong nation, its economic and social progress depends in the long run upon the foresight and efficiency with which its natural resources are used.

Short a Million Houses

Consider for a moment our situation to-day as a nation of wood users. The United States at this moment is short at least one million homes. In comparison with the need, new dwellings are being constructed at a snail's pace because of the high cost of lumber, with other building materials, and of labor. From the shortage of homes arise exorbitant rents, crowded living conditions, and lowered standards of comfort and family life. The average farm in the United States needs about two thousand board feet of lumber every year for new buildings and improvements. Because the average farmer can not obtain lumber at prices within his reach, farm development is handicapped and the efficiency of agriculture suffers. This is a factor of no slight importance in our vital problem of food supply and living costs.

We need six and one-quarter million cords of wood a year to make our newspapers, magazines, books, pasteboard boxes, and other products manufactured from wood pulp. We are meeting this need at present only by importing a third of our paper or paper-making materials from Canada. We require from one hundred twenty-five million railroad ties each year to keep up and extend our railroad lines, aside from enormous quantities of timber used in other forms for railroad construction and the building of cars. We have to have at least six billion feet of timber yearly for boxes, crates and barrels, a requirement which is steadily increasing. In several highly developed agricultural regions an assured supply of containers for shipping farm products to market has become a serious problem in itself.

A group of our important manufacturers, the makers of wood veneers, handles, vehicles, furniture, and agricultural implements consume one and one-half billion feet of timber yearly. It is upon this group, perhaps, that the growing shortage of timber falls most heavily, since they require largely high grade hardwoods and other timber which the virgin forests of the United States furnished so lavishly, but which it is now becoming more and more difficult to find in sufficient quantities.

A Wood-using People

All told, we demand of our forests about fifty-six billion feet of timber yearly, aside from well over one hundred million cords of small material for fuel and various chemical products. There is nothing comparable to this enormous use of wood in the history of the world. We are pre-eminently a wood-using nation. It is wood that has developed our farm lands, that has largely built and equipped our railroads, and that supports many of our most valuable and distinctive manufacturing industries. We use from two to four times as much wood for every member of our population as the most highly developed countries of Europe. The abundance and general distribution of our native forests have had a tremendous part in the domestic and industrial development of the United States and in its bid for supremacy. We can not face the future without a sober and intelligent consideration of that fact.

The Wake of Devastation

The original forests of the United States are supposed to have covered eight hundred twenty-two million acres. Over two-thirds of this area has been culled, cut-over, or burnt. There are left to-day about four hundred sixty-three million acres of forest and cut-over land of all sorts, which contains about two thousand two hundred and fourteen billion feet of timber of merchantable sizes. Three-fifths of the timber originally in the United States is gone.

All told we are taking about four times the amount of wood out of our forests every year which we are growing in them. We are cutting more of every class of timber than we are growing. We are even using up the trees too small for the sawmill, but upon which our future lumber supply depends three and one-half times as fast as they are being produced.

Of still greater significance is the fact that the timber left is not in the right place. The crux of timber depletion is the exhaustion, or partial exhaustion, of the forests most available to the great bulk of our population. Less



Idle forest land in Canada which rapidly denegerated to dangerous sand dunes, and was later planted with pine and spruce.

than five per cent. of the virgin forests of New England and but twelve per cent. of her original stand of timber are left. New York, the leading state in lumber production in 1850, now manufactures only thirty board feet per capita yearly, or not more than a tenth of the requirements of her own population and industries.

The original pine forests of the Lake States, estimated at 350 billion feet, are now reduced to less than eight billion. In 1892 the sawmills in the region bordering the Great Lakes cut nine billion board feet of lumber and largely supplied the softwood markets of the Prairie and Central States and eastward to New England. To-day their yearly cut is a single billion. These four densely populated regions, stretching from the Atlantic to the Prairies, which formerly were lumber exporters and still contain enormous areas of forest land, are now partly or largely dependent upon timber grown and manufactured elsewhere and are becoming increasingly dependent upon timber which must be shipped the width of the continent.

The bulk of the building and structural timbers used in the eastern and central states during the last twenty years was grown in the pine forests of the south. But the cut of southern pine is now falling off and within another decade promises to exceed by little, if at all, the requirements of the southern states

themselves. The shifting of the hardwood industries has followed much the same course. The principal reserve of hardwoods is in the Southern Mississippi Valley, and even here it is doubtful if the cut of hardwood lumber can be materially increased for any great length of time. The scarcity of high grade oak, poplar, ash, hickory, walnut and other standard hardwoods is now confronting many industries with a difficult situation.

Must be Close at Hand

One-half of the timber remaining in the Continental United States is in three States bordering the Pacific Ocean. Sixty-one per cent. of it lies west of the Great Plains. Since 1894 western timber has been filling gaps in the eastern and middle western markets. Within the past year it has assumed a dominating place in the principal markets of the States and has largely replaced southern pine at many consuming points in the Central States. It is estimated that within the next decade the shortage of nearer timber will compel the eastern and central states to increase their annual consumption of western lumber by eleven and one-half billion board feet.

The true index of timber depletion is not the quantity that is left but its availability. This is shown partly in the cost of transporting the average thousand feet of lumber from the saw mill to the

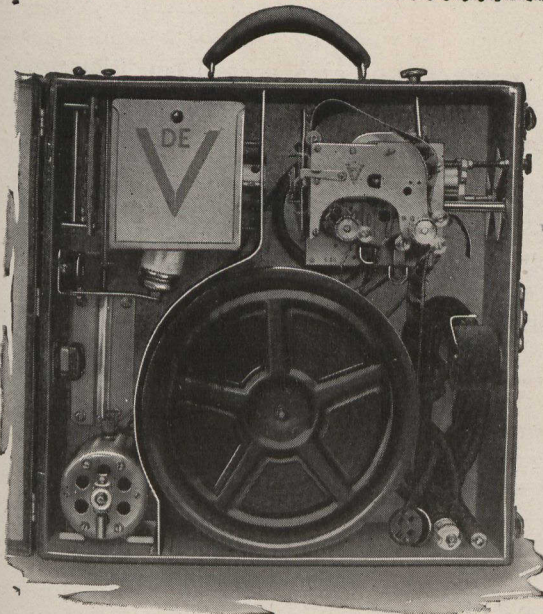
bulk of our lumber was manufactured user. Prior to 1850, when the great near the points of use, the transportation cost averaged less than \$3 per thousand board feet. To-day it is probably \$10. In another decade, at the freight rates now prevailing, it will reach \$15 per thousand feet. But aside from rising freight costs, the exhaustion of nearby supplies of timber imposes upon the consumer all the disadvantages of being dependent upon distant and restricted manufacturing regions. These include congestion of transportation, the effects of labor shortages and bad weather in limited regions, and a narrowed field of competition.

Not only is the quantity of timber left in the United States being used up much more rapidly than wood is being grown; the availability of the remaining timber to the average consumer is steadily decreasing. The situation which confronts

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us now will be different only in degree if we allow the western forests also to be exhausted and are compelled to import most of our lumber from Siberia or South America.

Doubtless the extreme conditions of the present lumber markets will be relieved in no great length of time and more moderate prices will prevail. The outstanding fact remains, however, that lumber price levels higher than those existing before the war must be expected because of the depletion, or approaching depletion, of our forest regions east of the Great Plains. We are fast losing that great leveler of lumber prices, the competition between different forest regions available to a common market. The scarcity of forest products of high quality, cut from old growth timber, will not be readily or quickly overcome. Meantime forest depletion is going steadily on unchecked. It must lead inevitably to rising price levels under normal conditions. It will contribute to sudden and excessive increases in lumber prices in any future transportation, labor or other crisis.

Why Timber Depletion?

The real cause of our timber depletion is idle forest land. Shortages of wood have not resulted primarily from the use of our forests, but from their devastation. The kernel of the problem lies in the enormous areas of forest land which are not producing the timber crops that they should. There are 326 million acres of cut-over timber lands bearing no saw timber in the United States. Their condition ranges from complete devastation through various stages of partial restocking or restocking with trees of inferior quality, to relatively limited areas which are producing timber at or near their full capacity. On eighty-one million acres there is practically no forest growth. This is the result of forest fires and of methods of cutting which destroy or prevent new timber growth.

The area of idle or largely idle land is being increased by from three to four million acres annually as the cutting and burning of forests continue. The enormous area of forest land in the United States not required for any other eco-

nomie use, estimated at four hundred sixty-three million acres, would provide an ample supply of wood if it were kept productive. Depletion has resulted, not from using our timber resources, but from failure to use our timber-growing land.

It is unthinkable that the United States should be compelled to steadily contract its use of timber—down to the level of civilized existence as in the countries of western Europe. We are not an old world nation. We will have millions of acres of raw agricultural land to be developed. We still have millions of homes to be built and thousands of miles of T-rails to be laid. We are at the threshold of the greatest opportunity to expand our world trade in manufactures which we have ever had. It is unthinkable, I say, that in the face of these vast requirements and opportunities, the people of the United States should be content to watch one of their essential and readily renewable raw materials become steadily scarcer and less available; that they should accept famine prices on timber as a normal condition, with enforced contractions in its use, embargoes, and governmental restrictions. And such a course is as unnecessary as it would be disastrous.

We have an ample area of forest growing land, over and above any probable demands for farm crops, most of it indeed unfit for cultivation—an area ample to meet all of our timber requirements if its timber-growing capacity is put to use. From every hand, during the last few months, we have been told to increase production as the cure of our economic ills. I submit that increased production from land is as necessary as increased production by human labor. The idleness of millions of acres of forest growing land may be even more disastrous in its ultimate effects than the idleness of hundreds of thousands of skilled mechanics. And we have in America to-day an area of idle forest land equal to the combined forest of Continental Europe aside from Russia.

The answer to the forestry problems of the United States is not to use less wood but to grow more—to put our idle

acres of burned and logged-off timber land at work growing trees. This is not inherently a difficult thing to accomplish. Three-fourths of it lies in preventing forest fires. But it does require an aggressive national policy of reforestation.

SAYS THE CALGARY HERALD

"The Canadian Forestry Association has undertaken a very practical work for Western Canada production. It will send through the west this summer a special car carrying exhibits of tree planting, to be shown to the farmers of the three prairie provinces, with accompanying lectures and moving pictures. The idea is to get the farmers of the plains interested in planting windbreaks for the benefit of their crops.

No one who has lived in the west for any length of time can doubt the importance of tree planting for wind-break purposes. The remarkable thing is that so few farmers seem to have taken the trouble to do anything of the kind. In the south country, where winds are more persistent and violent than elsewhere, and where the nature of the soil is such that it drifts easily, one may travel for days without seeing anything but the bald prairie, treeless, and uninviting. The few farmers who have been wise enough to plant trees around their grain fields have reaped enormous benefit therefrom.

In this connection, it is worth while relating the story of one Englishman in southern Alberta who came to the land when it was bare and bald, and who, at the very outset, planted windbreaks all around his holding. In fact, he did more than this. He located his building spot and started a real grove of young trees around it. Success attended the effort, and today, in addition to the ordinary grains of the south, this man grows within the circles of his windbreaks strawberries and small fruits in abundance; while the driveway from the gate to the house is a fine replica of an old English flower garden, where English perennials grow and flourish in profusion. And, on all sides of this man's farm,

are other grain farmers who are constantly complaining of soil drifting and all the other attendant evils of the treeless, wind-swept prairie.

If the Forestry Association is able to persuade western farmers generally that the tree planting game is profitable, and can get them started at it, it will have done good service for the west. The pity is that more of this sort of thing had not been done before.

ADDRESS TO BOY SCOUTS

At the request of N. O. Eaman, Provincial Commissioner of Boy Scouts' Association, G. H. Prince, Provincial Forester of New Brunswick, addressed the Boy Scouts on August 16th at their summer camp on Belleisle Bay on the importance of fire protection in order to maintain and conserve the forest and game resources of New Brunswick.

Mr. Prince pointed out the great loss that has resulted from forest fires in the past, and how that much of the loss was due to carelessness which was avoidable. He also pointed out the importance of maintaining the forests in producing capacity from the standpoint of Provincial revenue and general prosperity of the New Brunswick people.

There were 65 Boy Scouts present from all parts of the province. The boys took a deep interest in Mr. Prince's remarks regarding their province and many questions were asked regarding the administration of the Crown lands, forests, and game.

THE FORESTS AND FINANCE

Premier Taschereau, at a banquet in Quebec the other day in his address referred to the subject of the destruction of the Canadian forests and indicated that his government would give all possible encouragement to the movement for the preservation of existing forests and the reforestation of denuded areas.

Every thoughtful person is aware that Manitoba in the future will do much more in forest culture and tree planting than it has in the past. This will mean untold millions in money and even more in the matter of more pleasant living conditions.—Manitoba Free Press.

THE FOREST FIRE MELODY

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Temporary or partially alienated forest land	14,700
Unalienated forest lands	115,000
Total forest land area	149,000

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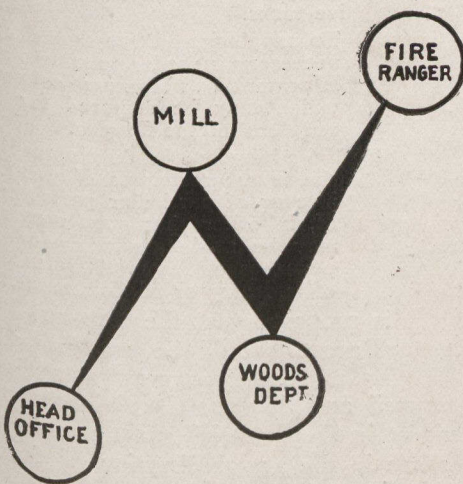
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Vancouver, B.C., June 18, 1920.

Editor, Canadian Forestry Magazine,
Ottawa, Ont.

Dear Sir:

Your magazine has been a welcome addition to my waiting-room table for over a year. I believe it is read more than any of the others. It has three good things; brightness, cogency and pictures. It avoids three poor things: dullness, long articles and lack of purpose.

Wishing you every success,

Yours truly,

ERNEST P. FEWSTER, M.D.

IMPERIAL FORESTRY CONFERENCE (Continued.)

was mooted. It was felt that as the forestry agencies in all parts of the Empire have a focal point of mutual interest, with problems sometimes strikingly similar, there ought to be a common channel for intercommunication and a clearing house for information. The best advance advertisement of success for the Imperial Forestry Bureau was indeed the Conference itself. Delegates realized at the first session what an excellent plan it had been to project the Empire's forestry problems upon a single screen, to demonstrate the common objective shared by the foresters of Scotland and the foresters of Canada, the man at Dehra Dun and the man at Wellington. Accordingly, the Imperial Forestry Bureau sprang into being, the precise objects being defined as follows:

- (1) To collect, co-ordinate and disseminate information as to:—
 - (a) Forest education, research, policy and administration; the constitution, organization and management of forests; and matters arising out of or incidental to the growing of timber and other forest products.
 - (b) The resources, utilisation, consumption and requirements of timber and other forest products.

- (2) To ascertain the scope of existing agencies with a view to avoiding unnecessary overlapping.
- (3) To devise means whereby existing agencies can, if necessary, be assisted and improved in the accomplishment of their respective tasks.
- (4) To supplement these agencies, if necessary in order to obtain any information not now collected which may be required for the purposes of the Bureau.
- (5) To advise on the development of the forest resources of the Empire or of particular parts thereof, in order that such resources may be made available for the purposes of Imperial Defence or of Industry or of Commerce.

It is proposed that the Imperial Forestry Bureau should be established at London, under a director and an advisory council and that the Dominions should assist in the financial maintenance and share in the actual direction of the institution.

Forest Journeys

Had the Imperial Conference consisted only of parliamentary sessions from morning until night, there might have been complaint that forestry was solemn business indeed. That, however, is not the custom of Old Country organizers. Interspersed with the discussion at Lon-

don were many fascinating journeys as guests of the British Government. For six days, the delegates were taken on a special train to Scotland and there by miles of tramping and motor car runs saw something of the healthy progress of private forestry on the large estates and what has been initiated already by the recently appointed Forestry Commission. It was in common evidence that the soil conditions and abundant natural moisture under which plantations have been established guarantee the fullest success to the British Forestry Commission in building up a reserve of coniferous timbers. Such exotics as Douglas Fir and Sitka Spruce attain remarkable height and diameter in even sixty years, quite equal to, if not

beyond, the best records on the Pacific Coast of Canada. More details of the British forests and the planting programme of the British Government will be given in future issues of this magazine.

As every elaborate plan depends upon its executive officer, the Imperial Forestry Conference was most fortunate in having the tireless aid of Mr. O. J. Sanger, M.C., who as Secretary of the Conference performed a prodigious amount of work and made the day-to-day life of the delegates so free from anxiety as to quite unsettle many of them for the rough going of their normal existence.

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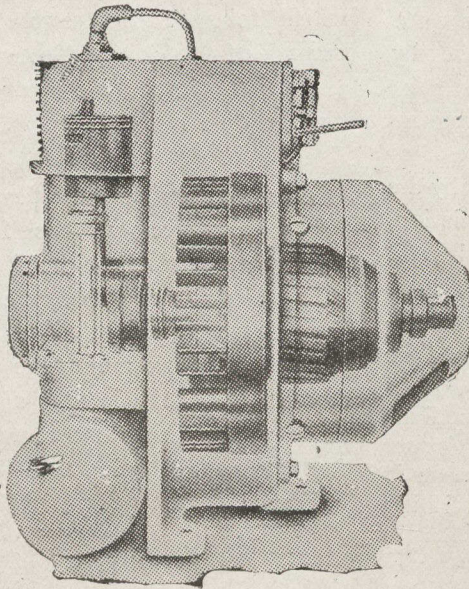
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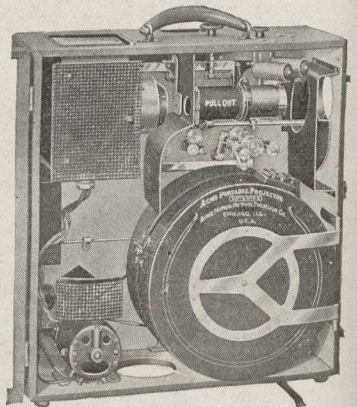


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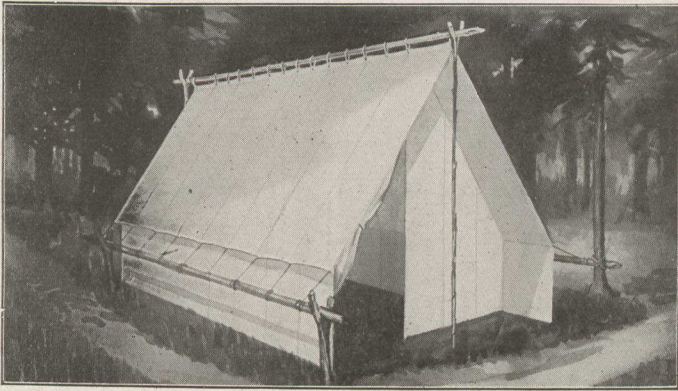
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Sir William Schlich on Canada's Policy

From a letter written by Sir William T. Schlich, until recently head of the Forestry Department at Oxford University, to Mr. Ellwood Wilson, Chief Forester of the Laurentide Company, Grand Mere, P.Q.

"You have 85% of the Canadian Forests as State Forests, but they are not sufficiently protected and systematically managed. You must, under a proper forest law, demarcate out a sufficient area to be placed absolutely under the management of the Forest Department, which must take steps to regulate the management, to thoroughly protect the areas, to prevent any settlement in the areas without previous permission and consent of the Forest authority. Also, to prevent the springing up of new rights."

Irrigation and Watershed Forests

Editor's Note:—Irrigation will prove the magic wand over millions of acres of agricultural land in Southern Alberta and Saskatchewan. It is well to bear in mind, also, that irrigation projects do not create water; they distribute the contents of existing streams. These streams, as far as concerns the two prairie provinces in question, take their rise on the Eastern slope of the Rockies and are dependent for their proper regulation on the protective ground cover provided by the forests. Wherever the sources of streams are bared of forests, the Spring "run-off" of melted snow and rains rushes without obstruction to the lowest levels, overflowing the river banks, washing away the best soil of farms and leaving a weak and insufficient flow of water for the later months when most required.

In perusing the following interesting excerpts from an address by Mr. G. R.

Marnoch, President of the Lethbridge Board of Trade, Chairman of the Irrigation Development Association and a Director of the Canadian Forestry Association, the reader doubtless will hold in view the close relation of irrigation and forest maintenance, also the fact that while it is possible to grow trees on "dry" prairie, it is a much more certain and rapid process to grow them on irrigated land.

Farming under irrigation has proved so successful and profitable in the areas east and south of Lethbridge where it has been increasingly practiced during the past fifteen to twenty years that one might wonder why the demand for the extension of the use of the mountain stream waters has not hitherto been more clamant. The reason is simply this—that grain growing on dry land, in spite of the drawbacks of an erratic climate,

was, up till a few years ago, apparently more profitable.

In the opening up of a new country the situation may always be described tersely in the terms that land for some time is always relatively cheaper than labor. Quick development, or, as wiser men put it, quick exploitation of land, leads to the extensive use of land, with labor as the limiting factor. It took us some time to realize that there was another limiting factor—moisture. And now we realize that we have still another factor of limitation in the soil drifting, which has been a growing problem in the last few years all over Western Canada, which this year (1920) became so serious in parts of Southern Alberta as to be disastrous in its effects.

Farming under irrigation, while it must make agricultural operations more intensive, leading to the use of less land per unit of labor, will provide against the lack of moisture, and will provide means absolutely to control soil-drifting—further than that, it inevitably leads to the maintenance of the fertility of the soil, a matter that has received, unfortunately, far less than the attention that is its due in Western Canada.

Replace the Humus

We have been prone to think that our soils had illimitable quantities of nitrogen, phosphoric acid and potash to draw from; and while this may largely be true if the top soils stay with us, it certainly is no longer true when these rich soils blow away. The one sovereign remedy against this is the replacement of humus in the finely tilled soil. And there is, practically speaking, but one means for the provision of this humus available for us, and that is cow-dung. We cannot have that without cows, we can't have cows without pasture, and we certainly can't have many cattle on the farms unless we have irrigation to provide the necessary pasturage and feed. Then again, one of the most profitable crops under irrigation is alfalfa, which is in itself both a humus-builder and a nitrogen provider.

Remedy Close at Hand

It so happens, very fortunately, that in the area where the effects of soil-drifting have been most severe, the re-

medy is closest to hand. The Lethbridge Northern Irrigation District, which will draw its water from the Old Man river—an all-Canadian stream—is prepared to proceed at once with construction work just as soon as financing can be arranged. Every detail has been carefully studied by the Reclamation Service of Canada. At the instance of the Alberta Government the proposed project has been reported upon by George G. Anderson, an irrigation engineer of continental repute, having great practical experience both in the United States and Canada, who thoroughly understands all the engineering, financial, agricultural and human elements involved. The water supply at the very lowest stream measurements over a long series of years is guaranteed. There are no engineering works of any magnitude necessary, and the engineer of the district, H. B. Mucklestone, has had long experience as assistant chief irrigation engineer with the Canadian Pacific Railway Company.

The farmers who own the 110,000 acres that will be irrigable under the project are most anxious that construction should be proceeded with at once. Estimates of cost, generously conceived even at the present prices of labor and materials, indicate that when tenders are called or, they will show that the work can be carried through to a finish at a capital cost of less than \$5 per irrigable acre. That the farmers will amply be able to pay the interest, and repay the capital on this expenditure during a term of say thirty years is clearly demonstrated.

Irrigation Will Pay

Taking wheat alone as an index, wheat production on "dry" land averages 30 bushels per acre, which, allowing for summer-fallowing half the acreage each year, gives 15 bushels annually; against 53 bushels annually on irrigated land—an increase of 3½ times in production. Even at pre-war prices of around 80 cents a bushel, and cutting down the estimated production to 40 bushels, there would be a gross return of \$32 per acre per annum. Or, again, figuring in terms of alfalfa at the low rate of 3½ tons per acre at say \$10 per ton, there would be a gross return of \$35



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Is Keystone Project

The progress of the Lethbridge Northern is looked upon as the keystone to further irrigation development. The lands now under irrigation around Lethbridge, roughly 82,000 acres, made a gross production record in 1919 of \$54.71 per acre; so it is hardly to be wondered at that those other areas to which water may be brought are most anxious for irrigation.

There are three other districts whose lands can be watered, like the Lethbridge Northern, from all-Canadian streams. They are the United District, west of Cardston, 15,000 acres irrigable; the

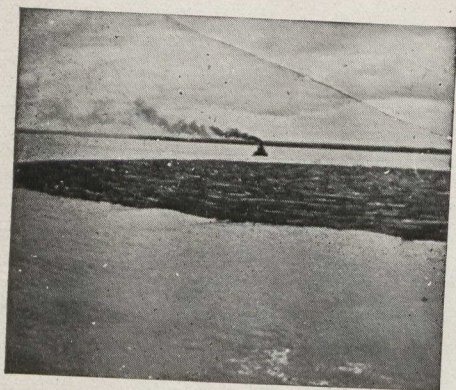
Lone Rock, north of that, 10,000 acres; and the South Macleod, 30,000 acres.

The Dominion Reclamation Service is completing surveys on some of these, as well as on lands around Lomond, Travers, Enchant, and Sundial, north-east of Lethbridge, which may get water for 100,000 acres on an extension of the Lethbridge Northern canals.

In addition to these, irrigation may be carried to great areas south and east of Lethbridge, roughly 400,000 acres, from the waters of the St. Mary's and Milk Rivers; but these streams are not all-Canadian and the question of the division of the use of the waters is now under discussion and adjudication between United States and Canada before the International Joint Commission. An early solution of this situation is eagerly looked for.

With all the safeguards that have been devised for the management of irrigation Districts; with the Irrigation Council of Alberta in direct supervision of the farmer-trustees; and by the general overlooking eye of the Dominion Reclamation Service, there is no need to fear that every project will be carefully scrutinized in all its operations; and no doubt need be felt that these public irrigation projects will, very soon after their practical inception, command the sound financial credit to which they will be entitled.

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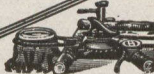
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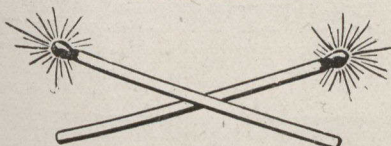
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