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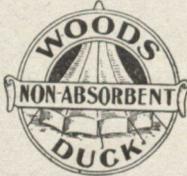
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Canadian Forestry Journal

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ROBSON BLACK, Editor.

Vol. XIV.

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No. 11

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On the Road to Emerald Lake, B.C.

Building a Canadian Aeroplane

By Alfred Rubbra, Jr.

How a Modern Flying Machine is Put Together at a Toronto Factory.

The manufacture of aeroplanes in Canada has created a great demand for the finest quality spruce, ash, birch, oak and white pine. The proper quality wood is very difficult to procure and there has never been a great reserve supply at an aeroplane factory.

The wood must be of a straight grain and pass the many inspections of the government and the manufacturer. The spruce used in the aeroplane industry in Canada comes from British Columbia. The Imperial Munitions Board have opened large mills in the various timber sections of the province. The output of these mills is many millions of feet of lumber a month. They supply the British and Allied Governments as well as the Canadian Government.

Great care is exercised to prevent poor quality wood from getting through. The first inspection takes place before the log enters the mill and the wood is again inspected before being shipped. On arriving at the aeroplane factory the lumber is inspected and cut into different sized lengths as required. It is then piled very carefully to prevent warping. A slight warping cannot be avoided so this is allowed for in the cutting of the lengths.

In order to dry the lumber to atmospheric conditions it is placed in a kiln, which is heated by steam. The air in the kiln is kept humid to boil out the sap and acids. This process is called case-hardening. This is done by allowing some of the steam to escape from valves in the radiators. If the air in the kiln was perfectly dry the wood would not dry to the condition required in aeroplane manufacture.

Ash, however, is an exception. It is not kiln dried. If it were the process would remove the properties required

Finding Wood Moisture

When the contents of a kiln are considered to be in the proper condition samples are taken by the inspector. These are weighed and put into a small furnace and dried absolutely. The inspector then weighs the wood again and is thus able to calculate the amount of moisture the wood in the kiln contains. If the result is satisfactory the contents of the kiln are taken to the mill. Many samples have to be examined to find out whether the wood is just from the river or has been piled for some time. In the mill it is cut into the required lengths for struts, beams for the wings, and the many other parts.

In the construction of aeroplane wings, spruce plays an important part. Great difficulty is experienced in getting the long beams necessary for the wings. The smaller pieces are not so difficult to obtain as the grain runs straight for short distances. One of the chief defects in the wood and the most treacherous because of the difficulty to detect it, is spiral grain, rammy grain and cross grain. The inspectors are, however, rapidly mastering it.

The ribs, which support the fabric, are in some machines made of spruce and are steamed and bent into the proper shape across a drum. In others they are supported by a webbing of white pine. The snow skids which are used in the winter in place of wheels are of ash. They are steamed and bent across a drum in the same manner as the ribs.

Making the Wings

When the frame of the wing is completed it is trued up and braced by means of steel piano wires of great tensile strength. The wing then has to have the fabric sewn on. The fabric is made in the form of a huge envelop. This must fit the frame perfectly. The fabric is of cotton or linen and is pulled on over the frame. A large number of women are employed in this department. They do the sewing.

After an inspection the wing goes to the paint shop. Here the fabric is given several coats of dope to preserve it and two coats of varnish. In the case of the flying boat the wings are painted naval grey instead of being varnished. The completed wing then goes to the stockroom.

One of the most important parts of the aeroplane is the propeller. In Canada the propeller is made of white oak. Birch is being used to some extent but has not yet been generally adopted. In England a great deal of walnut is used in making propellers.

The propellers differ in size according to the type of machine for which they are designed. The first step in the construction is to glue together the laminations which are pieces of wood an inch thick and slightly longer than the propeller in order to allow for shaping. When the laminations are properly glued they are put in a huge press which is then tightly screwed down. They remain until the glue is perfectly dry. They are then put on a lathe and roughly cut to shape. After this they are allowed to stand for six days in order that all strain due to cutting away portions and gluing, may be relieved. They are then placed upon an upright frame on which is a model propeller. The operator in charge of this machine runs his cutter over the model and the cutters on the machine follow his guidance. The process is repeated several times, each time cutting over the entire surface of the blade.

The propeller is sent to the benches where it is accurately clamped to

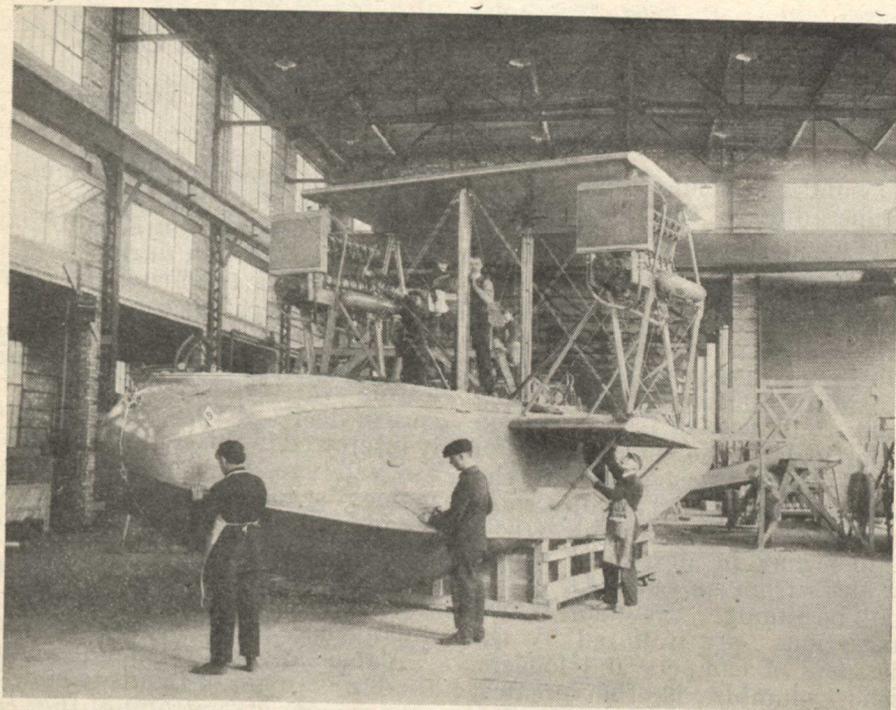
metal surface plates, similar to surface plates used in tool rooms, roughly balanced and after final sandpapering it is finally balanced. Expert workmen hand carve it to exact pitch. At the different points in its construction it undergoes very rigid inspections. At the final inspection it is tested for pitch, which is the angle of the flat side of the blade upon which the greatest strain is laid. The track is taken, that is to say the set of the blade from the centre of the hub to stations near the end of the blade. It must balance horizontally and vertically. The last step in the construction is the varnishing. After being varnished it undergoes the final inspection and balancing. A drop of varnish would throw it out of balance.

Once in a while a propeller gets as far as the final inspection only to be rejected for some flaw in the wood that cannot be detected from the exterior. The inspector pointed out one that to the inexperienced of the writer looked perfect. There was, however, a short dark streak in the wood which the inspector said was rot. This is one example of how minutely the parts of an aeroplane are inspected.

Care with the fusilage.

In the construction of the fusilage of an aeroplane, the longerons, or the beams which stretch from the head to the tail of the machine, are of white ash. It is impossible to get the wood in sufficient lengths with a straight grain to make the longerons out of one piece of wood. On this account they are spliced together. This is done by gluing the pieces together and bolting them, after which the joint is wrapped with cotton. These joints are so arranged that they come at the points in the fusilage where the least strain is brought to bear. The longerons are supported by several struts of white ash, although spruce is used wherever possible as it is much lighter. The fusilage is trued and braced by steel piano wires in the same manner as the wings. It is covered with fabric, doped and varnished.

In the construction of the flying



Working on an F-5 Flying Boat. Canadian Aeroplanes, Limited, Toronto.

boat which differs from the aeroplane the keel is of white ash. The ribs are secured to the keel as in a boat and the frame built up. The flooring and the frame is covered with three ply birch rotary cut.

Installing Engines.

The finished parts of the aeroplane and the flying boat are brought as required to the assembly room. Here the parts are assembled and the engines installed, before the machines are sent away from the factory. Each complete machine is carefully inspected and the engine started. Then if the aeroplane is in all respects satisfactory it is taken to pieces and packed very carefully. It is loaded on a flat car and is ready to be shipped.

Packing the finished machine plays a very important part in the aeroplane industry. The wings are crated separately and if there is any part of them that is likely to touch the crate precaution against damage is taken by padding the crate well. The wing is covered over before the lid

is placed on the crate. The body of the aeroplane is also packed in this way and the whole deposited on a flat car and carefully secured.

A great quantity of lumber is required in crating the machines and for this purpose a special grade of stock is purchased. Some idea of the size of the crates may be obtained from the fact that the wings of a flying boat are over one hundred feet from tip to tip. The body when crated occupies a whole railway car.

In the construction of aeroplanes little or no perfect wood is wasted. What cannot be utilized in the long beams, which are most difficult to obtain, can be made into smaller parts.

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The Aeroplane in B. C. Forests

By J. H. Hamilton, Editor of "Industrial Progress," Vancouver.

The wonderful achievements of the aeroplane during the Great War foreshadow its use in many peaceful lines of industry and development.

One of the greatest assets of the Province of British Columbia is its enormous stand of merchantable timber which is valuable on the coastline in proximity to tidal water, owing partially to its ease of transportation and particularly to its density of growth. The greatest enemy to the forest is fire. Under unfavorable conditions, immense valuable tracts of timber may be destroyed within a few days from an outbreak of fire of small beginning. Frequently these conflagrations are initiated by the carelessness of campers and loggers. British Columbia is the greatest forest province of Canada. Her forests contain approximately half of the entire stand of the timber of the entire Dominion and twenty-four per cent. of the total stand of the Pacific Northwest.

The economic importance of the timber to British Columbia and to Canada as a whole may be realized when it is stated that the forest revenue of this Province is already larger than that of any other province of the Dominion; aggregating approximately \$2,500,000 annually from provincial crown timber lands alone.

The manufactured value of forest products of the province is from thirty-five to forty million dollars annually, and in 1917 the value exceeded the entire output of the mines of British Columbia.

It is therefore quite obvious that the most essential factor of the exploitation of our forest growth is protection from destruction by fire.

The British Columbia Government operating under the Forest Act, maintains a staff of forest guards, and patrol men which, immediately prior to the war, consisted of 395 men. War conditions and the financial situation have made it necessary

to institute severe retrenchment, and in 1915 the staff was reduced to 218 and further reduced in 1916 to 200.

The fire situation during 1917 and more particularly during the current year demonstrated conclusively the disastrous results that may be logically anticipated from the policy of letting the forest so largely take care of itself. Every citizen is directly interested in this important matter, as will readily be seen from a moment's consideration of the local economical importance of lumber. For this reason any factor which will tend to afford better fire protection than is at present feasible is of prime importance at the present time.

A realization of this point unduced the Department of Lands to make the experiment of patrolling the coast area by means of hydroplanes. An order was given to a local firm—Messers. Hoffar Brothers, Vancouver—for the construction of a flying boat or hydroplane which was completed and ready for delivery in August of this year. It was taken over by the Government on the first of September and made several successful trial flights over Burrard Inlet and Vancouver. On September 4th a trial flight under the pilotage of Lieut. Bishop, R. A. F., ended disastrously by the machine making a nose dive of twelve hundred feet, crashing on to the roof of a house in the West End of Vancouver and smashing the hydroplane to matchwood. The pilot miraculously escaped death or even severe injury, but the seaplane was irretrievably damaged.

Great regret is expressed at the untimely end of the first hydroplane constructed for this purpose, as its use would have been experimental and, if successful, would undoubtedly have led to a larger employment of this means of forest protection. It is stated, however, that the Government will immediately have con-

structed for them a new machine to replace the one destroyed, which will be ready for use at the beginning of the next forest fire season.

If the results attained are satisfactory, it is expected that the whole of the coastline will be regularly patrolled by this means, at a very considerable saving in men and with an increased efficiency. The great rapidity of motion of the hydroplane

combined with its wide range of cruising radius, would appear to make it the very finest means of fire patrol it is impossible to conceive. It is to be hoped, therefore, that the experiment will be made in due course and without a repetition of the unfortunate accident which put an untimely end to the experiment so far as the present season is concerned.

Women a Success in Planting Work

By G. P. Gordon, B. Sc. (Oxon.)

British Experiments Show Good Results in Care of Forest Nurseries and Even Felling.

During the year 1915, the Royal Scottish Arboricultural Society placed a number of women in forestry work on various estates throughout Scotland. These women were employed in estate nurseries and at certain branches at forestry work; in addition they took part in general estate work.

The women so placed were drafted from the working classes, and they had not undergone any course of training preparatory to their taking up employment in forestry. Many of them were unemployed women, who were idle because of slackness in certain industries, e.g., fishing, spinning mills, etc.

Experience of working squads of these women throughout Scotland has proved that this type of worker without training is not altogether suited for rural work on the land. Although in many cases good individuals and good squads were encountered, the average individual was too unsettled to obtain the maximum value from her work. It is thought that women of this class, for true economy, must be constantly in touch with their own homes, as they were found to be less adaptable than more intelligent and better educated women. Further, it was found that the supervision of this class of worker was somewhat costly, as initiative

so necessary in land work was almost entirely lacking.

Adapting Female Dress.

A problem which had a considerable influence on the efficiency of these workers was the question of dress. It was found that ordinary foot wear was quite unsuitable, and experiments were made with clogs, high boots, leggings, etc., and finally it was decided that stout boots and leggings were the most useful. The ordinary apparel of the women was found to be unsuited for wet weather, and experiments were made with waterproof skirts, which were not, however, found to be very successful. In nursery work skirts are always a drawback, as they damage young plants in the nursery lines, and also break down the edges of seed beds. In addition, in wet undergrowth they are a decided hindrance to freedom of action. For outdoor land work it is essential that women have the equivalent of a man's jacket, which can be donned during a shower and cast off in hot weather or for strenuous work.

A characteristic squad is seen in the illustration. It comprised some twenty women obtained through the Labour Exchanges in Glasgow, Edinburgh and Leith.

The question of housing this ty



English Women
Planting Trees.

(See accompanying
article.)

English Women
Felling Trees.



of woman from her home was one which was attended with many and varied difficulties. In the first instance comparatively few of the women were able to do for themselves properly. Further, although they had their food prepared for them they were not able to purchase food in a thrifty manner, and therefore had to suffer many discomforts. Probably as a result of this the women were difficult to control, and were somewhat unreliable as regards time-keeping.

Training Required.

A certain allowance must of course be made, due to the fact that the work and the conditions of labour

were entirely new to the women, most of whom were unacquainted with outdoor work and rural conditions generally.

The experience gained during the years 1915 and 1916 forced one to the conclusion that this class of untrained labour was not the most efficient for the purpose in view. An attempt was therefore made to partially train the women to at least a knowledge of outdoor conditions. In this connection the West of Scotland College of Agriculture organised at Kilmarnock in 1917 a scheme for this purpose. The women went into residence at the College farm for a few weeks, and were thereafter drafted to forestry work on different

estates throughout Scotland. There was no attempt made to train the women technically in forestry work, but they obtained an opportunity of experiencing land conditions. It was found that the type of women willing to undergo this period of probation was a more intelligent one than those formerly dealt with. In addition she was more adaptable, more reliable, and gave better satisfaction to her employer. These women were drafted to various kinds of forestry work, e.g., seed collection, forest nursery work, planting work, draining, bark peeling, timber felling, brushwood burning, and bracken cutting.

The important feature of this system was that it allowed of the selection of suitable women for the kind of work to be undertaken. The matron in charge at Kilmarnock was able to tell within a few weeks which women were suited physically, and temperamentally for land work. Reports from the estates on which these women were placed indicated that they were of the right type, and were giving complete satisfaction.

It soon became evident, however, that for their work to be economic, and to warrant their being paid a reasonable living wage, they must be trained to some extent. In arranging for the placing of the women, it was found to be unsatisfactory to have to state that, although they were of the right type, and were reliable, they had had no previous training. In a word, this simply meant that their employer had to train them. An attempt was made by the Ministry of Labour to establish small training centres in different estates, to which to send the women. This attempt, however, met with only partial success, as the underlying principle of training and education is a concentration of the agencies and resources available, and not a decentralisation of these facilities.

A School for Apprentices.

Accordingly, the West of Scotland College of Agriculture, in conjunction with the District Committee of the Middle Ward of Lanarkshire,

instituted this year a training scheme at Hairmyres, near Glasgow. The advantages to be derived from such a scheme are at once obvious. The training centre, Hairmyres, is situated about eight miles from the College in Glasgow, and is easily accessible from the city. It is thus possible to keep in close touch with the teaching staff of the College. Intending students are interviewed at the College, and are thereafter drafted to Hairmyres. The facilities on the estate of Hairmyres for training in forestry are probably quite unique. A large forest nursery of some ten acres is in full working order, and there is a staff of skilled workers in charge. The head forester has direct control of the women in training, and supplements their practical work with special lectures and demonstrations. In addition, there is a considerable area of newly planted ground—drained and planted by women labour—also young plantations and old standing timber. By means of these agencies it was found possible to give the women a fair idea of the more important branches of forestry. They gained experience in draining, planting and fencing; nursery work of all kinds was engaged in—e.g., lining out, sizing, seed sowing, etc. Special facilities were also made available for training the women made available for training the women in timber work. A plantation in the neighborhood was taken over and was felled, snedded, and cross-cut by the women. Fig. 2 shows that women are well able to undertake a large amount of the work connected with timber cutting.

Female "Fellers."

Although the period of instruction is too short almost to warrant the term training being used, reports from the employers of these women show that the scheme has been more than justified. Since the inception of the course in April, about 150 women have been passed through it and drafted on to forestry work elsewhere. Their work has included draining, planting, fencing, nursery

work of all kinds, felling timber, "sneeding" and cross-cutting timber, measuring timber, and saw-mill work. Further, they have engaged in general estate work, bark-peeling, bracken cutting, clearing up and burning brushwood. During haytime and harvest they have been drafted to this work, which has the advantage of giving that variety which experience shows is so necessary in women's work on the land.

The sustained brisk demand for the services of these women is the best indication of their value. This demand has come from estates, trade nurseries, timber merchants, farmers, and contractors. These employers have shown that they regard as feasible this dilution of their labour, by their keen desire to make conditions as reasonable as possible for the women. They have gone to considerable expense and trouble to make the accommodation suitable and have even made alterations in the length of the working day. Experience has proved that it is more economic to work the women on a slightly shorter day than men, say start at 8 o'clock in the morning, and continue to about 5 o'clock in the evening, with an hour's break at mid-day. As regards working overtime, it is not considered

advisable to attempt this, as they require a fairly long evening to make necessary preparations for the next day.

The usual conditions of labour are free accommodation, with coal and light and, in some cases, potatoes, and a wage varying from 20s. per week to 25s. per week. In some cases, where the women are employed on piece work, they earn as much as 30s. and 35s. per week.

Improved Health.

The effect on the women of this kind of work, under the above conditions, has been noticed, and in no case has it been found to be detrimental. They have all been able for the work undertaken, and have quickly become fairly expert at it. Their health has, in all cases materially improved with the out-door occupation, and this has been so even in cases where they have been employed all winter.

In conclusion it might be allowed that in view of the foregoing, and having regard to the widest national interests, the training and organization of this woman power, which was formerly dissipated in unproductive labour, has been justified.

Merchantable Timber a Great Asset

Eric W. Hamber, Pres. B. C. Mills Timber and Trading Co., Vancouver.

There are few better assets for people to possess than good merchantable standing timber in this province. The supplies of the world are being depleted, and whilst there are large bodies of timber in Russia and other places, they can in no way be compared to the forests of British Columbia. Once cut, the forests of B.C. can never be replaced. There will be a new growth, but never the majestic growth that stands here to-day. It therefore behooves us to make the best of this natural resource fund nowhere else in the world except on the Pacific coast, to conserve it in every way possible, par-

ticularly against the ravages of fire and waste, in order that not only to those interested in the industry itself, but more so to the people of the province, should accrue benefits that at the present time they have but little conception of.

We must build our commercial structure on the solid rock foundations of our natural resources, or else we build them on foundations of shifting sand. Let me, therefore, urge that we all put our shoulder to the wheel and by co-operation of interest attain for this, the premier industry of this province, the maximum of result.

Do Forests Increase Rainfall?

By Dr. B. E. Fernow, Dean, Faculty of Forestry,
University of Toronto.

A Speculative Problem on Which Convincing Data is Yet to be Developed.

This question, often asked, includes two questions, namely, whether such increase is found over the forest itself, or whether the forest increases the rainfall over the adjoining field; the latter being, of course, the one practically most important. To ask the question is to throw doubt on what is axiomatic natural philosophy with every popular writer, but the candid professional student of the influence of forests on their surroundings will have to admit that we cannot yet demonstrate positively that, how, and to what degree the rainfall of a locality is influenced by forest cover. This ignorance is due partly to the complicated character of the problem, partly to the inefficiency of meteorological instruments for measuring rainfall, so that an exact proof cannot, as yet, be reached by measurement. Natural philosophy, however, leads us to assert that there is no condition on earth that does not have an influence on all other conditions more or less, and hence we can infer such an influence of forest on rainfall. Whether this influence in one or the other direction is of practical import is still another question.

A human rain maker.

Some years ago the Congress of the United States appropriated several thousand dollars for the writer—to his dismay—to be devoted to the production of rain by artificial means. This reference of the appropriation was made, because the writer had published a bulletin on the influences of forest cover on its surroundings, including rainfall. The experiments, however, were not to be made by forest planting and waiting a half century or so for an answer, but by bombarding the atmosphere, in the belief of the assertion that large bat-

les were usually followed by rainfall—an assertion which was found then not supported by the existant evidence, although a book under the title, "War and the Weather," had brought together the statistics in this respect, leaving out, of course, the battles which were not followed by rain. In looking up the history of rainfall, it was amusing to find that in France suffering from floods the opposite effect, namely of driving away thunder clouds by bombarding the air, was expected to prevent these floods. The efficacy of prayer in breaking a drouth, and in some villages in the East Indies an official rainmaker is employed to perform the miracle. The Snake Dance of the Hopi Indians is such a prayer for rain.

The cause of rain.

At any rate, it became necessary for the writer to find out what was known as to the conditions under which and by what means Nature herself produces rain. It was found that even this fundamental knowledge was not very fully developed beyond the primary physical law that air at a given temperature and under a given barometric pressure could contain only a given amount of moisture and that by decrease of that temperature, as when a cold wind blew into a moisture-laden, warm current or by decrease of barometric pressure, as when such a current had to ascend a mountain, some of the moisture in the current would have to be precipitated as rain or snow. The same would take place if a warm, moisture-laden air current added its quota of humidity to bring to saturation a passing current.

In the first place, then, the sun, the oceans, the distribution of land and water areas, the air currents due

to the movement of the earth and due to differences of temperatures over large areas, are the causes of what we may call the *cosmic* climates; and by local modifications of these conditions the *local* climates are produced.

It stands to reason that our means are too puny to attempt an influence on the causes of the cosmic climate, and even the local climate can be influenced only in a limited way; especially if a practical issue or considerable degree of difference is considered.

Even if we have found, as we have, that temperature and humidity conditions in a dense and extensive forest are different from those of an open field, it remains still an open question of how and how far the forest condition influences the open field conditions and vice versa; and how large the area affected or to be affected must be to produce an influence of practical value.

Influence of large forests

We know without measuring that by interposing the shade of a single tree between us and the sun we have influenced the temperature of the air; by building a house around us we influence our local climate. A small plantation on the open prairie breaks the velocity and modifies the temperature of the air on the leeward side, but on the windward side such an influence would not be noticed.

We realize that a forest cover may produce certain air conditions, but their communication to surrounding country would depend on its location with reference to the prevailing winds: the forest located on the leeward side will therefore have different influences than on the windward on the neighboring field according to their location. The whole exchange and mutual modification of conditions, and whether the one or other condition will prevail in a practicably sensible degree will depend on the size or area of the same. Not only the size of the area under forest, but the character of the forest, its density, its soil cover, its composition, elevation and exposure, its age and height will determine the degree of its influence. We can, therefore, not readily generalize from place to place.

All we can safely claim is that the forest condition, due to its lower temperature and greater relative humidity, is favorable to precipitation as against the open field with its higher temperature and drier air, which furnish less favorable conditions for precipitation. Extensive forest areas are as a rule favored by large rainfall, but is an open question whether the forest is the cause or the result.

We must doubt, however, whether the small woodlot is a rainmaker.

B. E. Fernow.

Wind Screen to Cost 20 Millions

Our government, says Pearson's Weekly of London, has a scheme in hand to create a wind screen of trees along the top of the cliffs of the exposed western coast, at a cost of twenty millions. This screen will not only supply much wanted wood, but will prevent the salt Atlantic gales sweeping over and souring the land behind it, so freeing millions of acres of land for wheat and other cereal cultivation.

QUEBEC'S FORESTS.

Quebec province possesses 130 million acres of merchantable forests of which about 48,000,000 acres are included in the fire-protected territories of the St. Maurice, Ottawa River, Laurentian and Southern St. Lawrence Associations. Another fifteen million acres of Quebec's forests are privately owned, about nine million acres being in the seignories.

The West Asks for Its Forests

Possession of the natural resources in the three prairie provinces remains for a while longer vested in the name of the Dominion Government. A meeting of the Provincial premiers at Ottawa in November brought this interesting question again into the realm of discussion, with the net result that the House of Commons will have to adjudicate the claims not only of the West but the counter claims of the East for Federal aid.

The Canadian Forestry Journal has frequently pointed out that entirely apart from the merits of their case, any expectation by the Western provinces of reaping an income from their forest possessions is a gross misapprehension of facts.

The Dominion Forestry Branch spends \$100,000 annually on forest protection in Manitoba. The total revenues do not exceed \$12,000.

On the Forests of Saskatchewan \$145,000 is spent by the Branch and \$9,000 is received.

On the forests of Alberta \$200,000 is spent and \$18,000 is received.

Even counting in the receipts of the Timber and Grazing Branch, the Dominion Government spends about \$200,000 a year on the prairie forests that is not covered by income.

The real and costly job.

Not all the premiers of East and West can alter the situation that actually exists. Some one will have to find \$200,000 and more every year to pay the cash deficit in the honest handling of the prairie province forests. The devastation of forest fires has been so tremendous that the business of any custodian, Dominion or Provincial, is to nurse back the timber growing lands into a self-supporting state.

If the West is willing to meet this outlay from provincial taxation, if it is willing to better the conservation methods at present in vogue, then who could quarrel with the transfer of the control from present hands?

These points were discussed by the conference at great length. It is understood that the Dominion Government interposed no objections to provincial management of lands, mines, etc. Protest came mainly from British Columbia, Ontario, Quebec, and the Maritime Provinces.

The Eastern and Pacific provinces did not object to the Prairie Governments getting their lands, but they claimed that, as it is a domain in which all the provinces have a common interest, they are entitled to extra subsidy in consideration of the transfer. Five millions is what was asked. Ontario and Quebec would get about \$2,800,000, and the lower provinces \$2,200,000.

The West at once entered a demurrer. It would not concede that the East had any proprietary interest in its domain upon which additional subsidy should be based. It did not object to extra subsidies for the Maritime Provinces, but held that Ontario and Quebec were wealthy states and could afford to let well enough alone. At this impasse the matter rests. The Federal Government may consider the whole problem during the next session of a Parliament.

WHITE PINE SKY-ROCKETING

Readers of the Forestry Journal will be interested in a recent sale of white pine by Gustave Boswick, of Berthierville P.Q., at \$17 per thousand board feet, standing. Such a price for standing white pine timber has seldom been equalled. Nothing below 16 inches diameter was allowed to be cut on Mr. Boswick's property.

ERNEST POOLE MARRIED

At Cochrane, Ont., the marriage is announced of Miss May Gertrude Bryerton, daughter of Mrs. Theresa Bryerton to Ernest J. Poole, Fire Superintendent of the Ontario Forest Service.

British Aid for Research Enterprises

That Great Britain expects an increasing utilization of land for public purposes is indicated by the fact that one committee is working out ways and means of taking over land for community use. Another is at work creating a permanent national policy in regard to the employment of women. Incidentally, the plans for demobilization of the army are so minute and complex that there is a special committee at work planning to find positions for wounded and invalided officers in India, Burma, the Eastern Colonies and the Malay States. Great commercial development of India is hinted at in the plans of the industrial development commission. Subsidies to Indian industries when necessary, elaborate bureaus of technical information about new enterprises, and Government demonstration of the practicability of new industries are being considered.

Recognizing "the special need for new machinery and for additional State assistance in order to promote and organize scientific research with a view especially to its application to trade and industry," the Board of Education in 1915 proposed a scheme for the organization and development of scientific and industrial research. The machinery consisted at first of a Committee of the Privy Council with a smaller Advisory Council.

The work of the Committee increased so rapidly an' plans for the future developed to such an extent that in December, 1916, the Government established a separate Department of Scientific and Industrial Research. At the same time the Government voted \$5,000,000 to meet the first five years expenditure. This Department, which in the view of the Balfour Committee will greatly strengthen British manufacturing industries, is promoting industrial research in four distinct ways. It is encouraging firms in the well established industries to undertake a co-operative study of the scientific problems affecting their processes and raw materials, and it is prepared to make substantial grants to Associations of firms established for the purpose with the approval of the department. It is undertaking at he public cost investigations which from their nature make them unsuitable for effective handling by any single industry, however powerful. It has taken over the property and financial control of the National Physical Laboratory and has assumed responsibility for the establishment of standards on a scientific basis. Finally, it is making energetic efforts to increase the numbers of trained research workers. The Department itself has established 21 Research Boards or Committees, the most important of them being the Fuel Research Board.

Central Institute for Research

At a meeting of the Reconstruction and Development Committee of the Dominion Cabinet, Dr. A. B. Macallum, administrative chairman of the Council for Scientific and Industrial Research, advanced the long-considered proposal of the Council for the establishment of a central institute for research.

The scheme, which is considered vital to a successful and permanent Canadian competition with the highly

organized industries of the United States, Great Britain, France, and other countries which have already the benefit of similar Government institutions, contemplates the immediate erection, at or near the capital, of a central laboratory building costing approximately \$500,000. The building, as planned, will provide room for expansion as the needs develop, but will at first have accommodation for some fifty laboratories,

covering all the essential industrial research subjects.

In a general way it is designed to fulfil for Canada the functions now performed for the United States by the Bureau of Standards at Washington and the Mellon Institute at Pittsburg. It will provide modern scientific equipment and methods for investigations of Canadian raw material, industrial processes, and manufactured products. It will serve as a national laboratory for standards of all sorts, for the testing of materials, for the discovery of methods of utilizing by-products of manufacture hithert wasted, and generally for experimental work in the application of science to industry. The proposed national research laboratory will also be of incalculable value to the various trade guilds now being promoted by the Research Council in the leading Canadian industries. In fact, the national laboratory with its free ser-

vices and adequate equipment is almost a necessary first step to the formation of these trade guilds for mutual advancement.

In Great Britain the trade guilds under the direction of the British Research Council are now taking full advantage of the National Physical Laboratory near London and of similar institutions. In the United States similar advantage is taken of the facilities of the Bureau of Standards and of the Mellon Institute. It may be noted in this connection that the Governments of Great Britain and of the United States are annually spending millions for scientific research in industrial lines, to say nothing of many millions more spent by large private enterprises in connection with the laboratory work of large industrial establishments. In Canada the total annual amount thus expended is not more than \$200,000.

Labor and Capital Favor Research

The systematic starving of technical education and scientific research just because neither is what is called a "live political issue" apparently is coming to an end. At a meeting held in Ottawa, a committee consisting of Messrs. G. M. Murray, representing the Canadian Manufacturers' Association; W. Maclachlan, of the joint committee on technical organizations, and Tom Moore, president Trades and Labor Congress of Canada, presented to the cabinet a memorandum of joint recommendations drawn up at a meeting of the foregoing bodies. It embraces important suggestions of policy agreed upon by capital and labor as applicable to Canada's reconstruction period, and its adoption is strongly urged upon the government.

Among the important representations made by the joint committee is one relating to scientific and industrial research as follows:—

Having regard to the important

part which research must necessarily play in Canada's industrial reconstruction, the appropriation for that purpose should be increased to not less than one million dollars annually. The board handling that work should not be merely advisory as at present, but should be clothed with specific executive powers which powers should preferably be exercised by a board of managers, upon which labor, manufacturers and engineers would all have representation.

PROGRESS IN TECHNICAL SCHOOLS

In view of the exacting demands upon industrial skill and efficiency which will be made of every people in the competition for the trade of the world following the period of reconstruction, it is the intention in the next session of the House of Commons to bring in a bill to give force to a Federal policy for technical training of the rising generation. In

the various Provinces there have been more or less successful beginnings along this line, and in some cities like Toronto and Montreal some creditable institutions have been developed.

It is not intended in any way that the Dominion Government shall attempt to compete with or supplant these, or even supplement them, because the thorny question of Pro-

vincial rights always crops up whenever the Government devises a policy with regard to road construction, education or anything of the sort. In this case it is expected that the legislation will take the form of providing a sum of money to be divided among the Provinces on the basis of population and the progress already made in the direction of technical education.

Hydroaeroplane for Forest Protection

By Hy. Sorgius, Manager, St. Maurice Forest Protective Ass'n, Quebec.

Although only conversant in a general way with reference to the possible application of the hydroaeroplane to forest protection, I am of the opinion that this machine will in the future be a valuable feature in forest protection work, both for the locating and reporting of forest fires. In other words we may call it "a moving observation tower."

The directors of the St. Maurice Forest Protective Association, at a meeting held on November 15, agreed to purchase a hydroaeroplane for the patrolling of our area beginning next spring. We have already corresponded with the Canadian manufacturers, asking them if they could build us a machine which would suit our purpose.

The advantages in the hydroaeroplane patrol, in my opinion, would principally be the locating and reporting of forest fires, and also in the rapid transportation of a small crew of men and equipment to the fire. The main feature in forest protection is prevention; secondly, to get at a fire when it is in its infancy, and we believe that, with the use of a hydroaeroplane, we will be able to detect and reach almost every forest fire before it has a chance to make any headway. In a country like ours there are large areas where, should a forest fire start it would take from a couple of days to a week to get the necessary help and equipment to the scene of the blaze. Dur-

ing all this time the flames are burning large areas of valuable timber, but with the use of the hydroaeroplane we shall be in a position to get men and equipment to the fire in a short time, thereby giving the men a good chance to extinguish same.

The State of Wisconsin had the hydroaeroplane patrol for one year and the Commission of Conservation is so greatly taken up with the efficiency of such a patrol that it is the intention to establish a permanent aeroplane patrol throughout Wisconsin, now that the war is over.

I may say that it is the opinion of our members that the hydroaeroplane is of great value for forest protection work and that it will be economical and satisfactory. Whether or not this will prove practical in our work, we are going right ahead with the establishment of the same for next spring.

The Laurentide Co. has, in its forest nurseries near Grandmere, Que., nearly 4,000,000 seedlings of different ages, to be used in planting operations between 1919 and 1921. These will be supplemented by purchases from other nurseries, until the capacity of the Grandmere nurseries can be increased to cover the entire planting programme of the company. The company's forester, Mr. Ellwood Wilson, reports that the cost of planting, usually with 3-year-old seedlings, is from \$9 to \$10 per acre.



Some Excellent Timfler on the Limits of the Adams' River Timber Co., of British Columbia.

The History of Familiar Trees

By E. B. Luke, Montreal.

Where do trees and plants come from? What their history and habits of life? How are they produced, multiplied, and improved, for all fine fruits and flowers are artificial products, subdued, and ameliorated from the wild state by the hand of man?

You have doubtless heard of the giant Sequoia (the big tree of California), growing from 300 to 500 feet high and having diameters of from 20 to 60 feet, single trees of which are known to have lived for over 4000 years, with a possibility of nearly double that age. When one of these large trees in California fell not long ago, 4000 rings were counted. That tree was 40 centuries old. It was a strong, young tree when Abraham went into Egypt. It saw the destruction of Sodom and Gomorrah. It was nearly a thousand years old when David slew Goliath, and older when Christ was born, than the Christian religion is to-day, or the Jupitor Oak in the forest of Fontainebleaut

supposed to be 700 years old, or the olive trees in the Garden of Gethsemane at Jerusalem at least 2000 years old, and which, according to traditions, were in existence at the time of Christ. All these, though, were mere infants compared to the *Dragon trees* of the Canary Islands, one of which we are told was 42 feet in diameter when the Spaniards landed in 1402 and when destroyed by a storm in 1851 was supposed to be over 8000 years old.

By the Swimmin' Hole.

Then there is another class of trees historically important, a class closely interwoven with our boyhood life and as dear to our hearts as the old home-stead. I refer to the old Elm or perhaps it was a Hickory of Willow that marked and spread its protecting branches over the favorite swimming hole of the gang. What stories of bovish pranks and good times it could tell? Or the big

Maple growing near the little district school into whose bark was cut the initials of all the boy celebrities of yours and previous generations.

Time doesn't permit any extended reference to the luscious Bartlett Pears, Black Heart Cherries, Damson, Lombard, and Gage Plums, or the juicy pippins or huge pumpkin sweet apples that used to grow on the old homestead, and that somehow, notwithstanding that they tell us fruits are constantly improving, we have never been able to taste the equal of since.

Unfortunately, it is only within the last seventy-five or one hundred years, that any serious attempts have been made to trace back the manifold forms of tree and plant life to their obscure beginnings.

Interesting as this subject is, I have only space to give you very briefly a few of the imperfect results thus far obtained in tracing back the thousands and thousands of species, (about 200,000, to be more exact), in the vegetable, plant, and tree kingdom, but let me emphasize that man has not discovered and cultivated in the last two thousand years a single species that can rival maize, rice, cereals, the potato, the date, the banana, and which date back three, four, five, and in some cases, six thousand years.

Where the Fruit Trees Originated.

Briefly the origin of the apple as far as it has been able to trace it back, is eastern Europe and Asia; the Peach, China; the Pear, Temperate Europe and Asia; the Apricot, China; the Quince, Persia; the Turnip, Western Siberia and Europe; the Watermelon, Africa; the Banana, South Asia; the Onion, Persia, Afghanistan and Palestine; the Cucumber, India; Barley, Western Temperate Asia; Rice, India and Southern China; Wheat, the regions of the Euphrates; Potato, native of Peru, Chili, Mexico; Grapes, Western Siberia and Europe; Tea plant, native of China; These are all known to have been in cultivation upwards of four thousand years.

The following very incomplete list is known to have been in cultivation

for more than two thousand years:— Radish, Temperate Asia; Carrot, Europe and Temperate Asia; Celery and Lettuce, Central and Southern Europe Northern Africa, Western Asia. Asparagus, Western Asia; the Cherry and Plum, Persia and vicinity; Oats and Rye, Eastern Temperature, Europe (says nothing about Scotch.)

Among those that have been under cultivation for less than two thousand years, can be mentioned the Orange, a native of India and China. Parsnip, central and southern Europe; Spinach, Persia; Raspberry, Temperate Europe and Asia; Strawberry, Western Asia and eastern North America.

Tobacco is a native of Central America. From the first it was detested by all Governments, Kings and Emperors prohibited its use. Cromwell sent his troops to ride down the growing crops. Chas. the Second imposed a penalty of 1600 pounds per acre and now comes along our own Government with its new taxes on our old friend and companion, yet I feel sure the herb of amiability will still flourish even as it has done since ancient times.

The Origin of the Rose.

The origin of the rose is lost in antiquity. It is certain that they abounded in Palestine and that the Jews possessed great knowledge of their culture and held them in high esteem. The Egyptians grew Roses on the bank of the Nile and as early as the days of Homer, the Greeks had them in abundance. The Romans delighted in the luxury of roses and used them in incredible quantities. Nero spent 30,000 pounds for a single rose bouquet. Then the rose found its way into Persia where love and honor awaited it.

I do not imagine our Creator ever intended to endow the earth with perfect fruits, flowers or plants in the beginning, but rather to place with us an average lot of material to work on and to leave to the ingenuity of mankind the working out of his destiny in this as in all other respects, and man being superior to the beast

of the fields and forest, set about improving his condition.

He found that in the wild state every genus of tree consists of one or more species or strongly marked individual sorts. For instance, the wild cherry, the sour cherry, the mazzard cherry, etc. These species in their natural state exactly reproduce themselves. That is, they come true from seed. This they have done for untold generations and will continue to do as long as they exist under natural conditions only.

Cultivating New Species.

On the other hand, suppose we gather the seed of one of these species and plant it in our gardens. We shall find that the leaves and habit of growth of many of the seedlings it produces do not entirely resemble the original species, while of course having some of its characteristics, and when they come into bearing there will also be a great diversity in the size, color, and flavor of the fruit. Each one that differs

from the original type constitutes a new variety. Once in possession of a new variety—an artificial product—especially if it has marked differences or shows improvement over the original, we have in our hands the best material for the improving process.

Why do not varieties produce the same from seed? Why if we plant the stone of a Lombard Plum will it not always produce a Lombard Plum, or if we plant the seed of the Fameuse apple will we not always get a Fameuse? It will be remembered that our garden varieties of fruits are not natural forms, they are the artificial products of our culture. They have two strong tendencies: one to improve, the other to return to the wild state. Between these two tendencies it will be generally seen how unlikely it is for the progeny of varieties to reappear in the same forms. In fact, if culture were abandoned for a few years, cultivated varieties would disappear and return to their original forms.

Canada's Tree Farm of 250 Million Acres

(From Dominion's Royal Commission Report.)

The forest resources of Canada undoubtedly form one of the most valuable assets of the Empire. The extent of the timber lands of the Dominion is so vast and so varied in character that no adequate survey of their area and commercial value has yet been undertaken. Estimates of the Forestry Branch of the Department of the Interior place the extent of land covered by timber in the Dominion at between five hundred million and six hundred million acres, or about a quarter of the land area of Canada. A large proportion of this, however, does not yield commercial timber. Estimates of the amount of merchantable timber vary greatly. The Minister of the Department of the Interior has given us a figure of 250,000,000 acres as the estimated area covered with trees which could be used for sawing into

timber. In addition, there is land covered with timber which is valuable as pulpwood, and for other purposes.

The main distribution of the commercial timber throughout the Dominion has been estimated by the Forestry Branch of the Department of the Interior to be as follows:—

	Acres
British Columbia.....	50,000,000
Alberta, Saskatchewan, Manitoba.....	11,000,000
Ontario.....	70,000,000
Quebec.....	100,000,000
New Brunswick.....	9,000,000
Nova Scotia.....	5,000,000

In the north of Alberta there are very large areas covered with wood which is of no commercial value, except for local purposes such as firewood and fencing. The North-West Territories and the Yukon

contain wood which can be used locally, but the forest areas there are regarded as having no commercial value. Enormous tracts have been

burnt repeatedly by forest fires, and a considerable proportion of the most northerly part of the country consists of tundra.

France's Profit from Forestry

In France, in the last 60 years, 2,300,000 acres of absolute waste land of various descriptions were reclaimed by forest planting at a total cost of \$15,000,000. These areas are now estimated to be worth \$135,000,000 and furnish annual crops valued at \$10,000,000. or in other words, yield 67% on the initial outlay. These examples of the profitableness of practical or, if you will, scientific forestry can be multiplied indefinitely wherever it has been carried on long enough.

What does this scientific treatment that leads to such results consist in? First of all, in a difference of attitude, namely, in considering timber as a crop capable of reproduction, and not looking on the forest as a mine which is bound to be exhausted. Instead of allowing a lumberman to cut down and carry off all that is good and marketable, and leave the poorer materials and the slash to

burn, or permitting a reproduction of the good, bad and indifferent species which nature unaided might chance to establish, the forester first of all ascertains in detail the character and composition of the forest property. He then makes a plan—a working plan—in which it is determined how much of a felling budget may be taken properly and yet assure continuous crops. He then proceeds to cut with a view to securing the new crop, first improving the composition by removing or killing the weed trees to give better chance for the valuable species, and then cutting the old crop gradually, as the young crop needs more light. Or else, he may clear the entire stand and replant the area, a method under which 65% of the Prussian forests is managed. There are a number of other methods, each adapted to given conditions.

B. E. F.

Spinning Out the Tree Supply

R. O. Swezey in "Financial Times."

The Province of Quebec possesses three hundred million cords of spruce and balsam pulpwood in her standing forests, Ontario's forests are roughly estimated to contain two hundred million cords—facts that should impress the economist and to many no doubt it suggests the idea that our forests are inexhaustible.

That the larger province of Ontario should possess so much less than Quebec, naturally prompts enquiry and the reason is found to be FIRE, FAULTY LUMBERING METHODS and WANTON DESTRUCTION of the forest at a time when it had no particular value; Quebec suffering less because railroads did not

reach into her hinterland to the same extent as in Ontario. But since spruce, about 25 years ago, became the all-important wood in the production of fibre for the manufacturers of newsprint paper, the forests of Quebec and Ontario have acquired a monetary value that is simply incalculable, especially considering the wonderful distribution of water powers around which the growing pulp and paper industry leads all others in creating and developing new urban communities.

Viewing the rapidity with which this industry has grown in Quebec and Ontario and considering the vastness of the forests, still virgin and into

which yet greater expansion of the industry may be looked for, the thinking economist must surely ask how long the forests will resist the onslaught. And he may perhaps logically base an answer upon such a statement as contained at the beginning of this article: namely, that in Ontario and Quebec there are 500 million cords of standing pulpwood—an estimate that the writer has made

after covering most of the forest areas of the two provinces.

On such a basis these forests could be regarded as providing a perpetual supply of pulpwood at a rate sufficient to operate all existing paper mills in Canada and the United States. Even at that the annual increment would be less than one per cent—a growth much below what is possible by scientific forestry.

Forestry and Imperial Safety

By M. C. Ducyene, F. S. I., London.

I have emphasized the connection between timber supplies and the safety of the Realm. I would remind you that with the comparatively small trade in the time of our ancestors, there was then a good reserve of timber in Great Britain. Nevertheless *they* fully appreciated the importance of ensuring Oak reserves for the British Navy and the safety of the Realm. With our enormously increased national turnover, is not the importance of creating reserves here now extended to *all* the varieties of timber so important to our collieries and other national industries? The safety of the Realm surely demands that forestry should be encouraged by every section of the community.

Let me remind you of the scheme for national afforestation outlined in the Forestry Report. The benefits to be derived from a comprehensive scheme are too many to enumerate and their value is beyond estimation. What assessment could we place upon the safety of the Realm; the revival of rural life; robust country industries; Imperial development? These things cannot be computed in money.

And what of the cost of a scheme? Let me give you a single fact. The outbreak of war found us deficient in reserves of timber. We had to buy supplies from abroad, pay whatever price was asked for them, and were very fortunate to get them at all. During only the first two years of

the war the enhanced cost of imported timber—over the pre-war price—was 37 millions pounds sterling. The figure represented by the increased cost of imported timber during this war will probably exceed the total cost of any scheme of afforestation.

We hear of enormous sums freely advocated for the nationalization of public houses and other purposes. Many of these problems can be solved by measures of reform on broad lines or by reasonable restrictions imposed in the national interest. I hope that the limited funds available after the war will be utilized mainly for financing remunerative schemes relating to the development of our own country and the Empire.

PUBLIC FORESTS IN CANADA

"The Globe," Toronto

"A forest is not a thing that the average Canadian capitalist cares to tackle on any other basis than a complete sweep of the standing timber. To provide the sort of forest that will yield an annual crop in perpetuity plans must be laid for periods far longer than the life of a single generation. That is why if we are to have forests in Canada of the sort that are to be found all over Europe they must be civic, provincial and national—controlled for the public benefit by public authorities."

Air Fighters for Timber Guarding

On the subject of aerial forest patrol the Montreal Star thus quotes Mr. George R. Sighthall, honorary secretary of the Canadian Division of the Aerial League of the British Empire:

Among the best services these aviators will be able to render to their country will be forest ranging. The Dominion has such vast territories of timbered lands that it is impossible at present properly to patrol even the fringes of them; and the fire losses of Canada run into millions upon millions of dollars. The forest rangers now go on horseback or by canoe, taking days and weeks to travel from one point to another from which they can take a survey of the surrounding country, and then, owing to the illimitable territory, are only able to guess at the exact place where the fires are raging. Then it takes them days to get back and set in motion the fire fighting forces of the countryside.

By the establishment of an aerial forest ranging service, aviators could cover hundreds of miles in a day, and with the knowledge of map reading and other sciences they are now learning overseas, would be able at once to locate the position of a fire and fly to the nearest habitation to send out the alarm, and save thou-

sands of acres of timbered lands from destruction. Mr. Lighthall expressed the belief that by the establishment of such a service the fire losses of Canada would be better than cut in half, and the appalling destruction of the country's timber resources limited. The amount of property that would be saved in one year by such a force would pay for the cost of such service many times over.

Senator George E. Foster, chairman of the Aerial Transit Committee of the Aerial League also believes in the practicability of such service. He says:

"Those of us who realize the immense value of the timbered area of Canada must appreciate the fact that the great destruction from fire of our forest reserves must cease if we are to provide pulp and paper for the world, as some of us dream. I am one of those who hope that the Government will see its way to assist in this development. I am satisfied that if we do not do so we will be blamed by that splendid band of Canadian heroes who will come back from France and Italy and other fronts, imbued with dreams of national development, and who will blame us if we fail to take the preliminary steps necessary in order to gratify their ambitions."

To Victory Loan Subscribers

A letter to the Canadian Forestry Journal, by Talbot Lee, Toronto.

You are now in partnership with the Dominion Government.

As a Canadian citizen you have always been interested in the conservation of Canada's national assets. Now more than ever it is your concern to see that these assets, one which your loan security is based, are not in any way depreciated.

The forests of Canada, occupying in the main, areas unfit for agricultural development, form one of the most important components of our

national wealth, the exported products of which equal those of all other manufactured goods put together.

Negligence in the past, has consigned to the flames two-thirds of Canada's original timber wealth.

The most potent factor in preventing a continuance of this disastrous state of affairs is to be found in the activities of the Canadian Forestry Association.

Their power to extend these activ-

ities is conditioned by the amount of support they receive from the general public.

All those possessing any degree of public spirit are interested in maintaining unimpaired the sources of national prosperity and you have

now an increased solicitude towards furthering that end.

If you are already a member of the Canadian Forestry Association it is your duty and in your own interest to secure other members.

If not already a member you should surely join without delay.

A Forestry Mosaic of British Columbia

The exhaustive investigation of the forest resources of British Columbia by the Commission of Conservation, extending over a period of three years, discloses the fact that of the total land area of the province, 355,855 sq. miles, approximately 200,000 sq. m. is incapable of producing forests of commercial value. About 145,000 sq. m. lie above the merchantable timber-line, and on 55,000 sq. m. though below timber-line, the soil is either too rocky or wet, or the forests have been completely destroyed by fire that there is no hope for the natural re-establishment of forest conditions for centuries to come.

A great forest area.

Of the remaining 155,855 sq. m. which is capable of producing forests only about 28,000 sq. m.—less than one-fifth—carries sufficient timber to be classified as statutory timberland. (The Land Act defines "timberland" as that, which when situated west of the Coast mountains, carries at least 8,000 b.f. per acre; when east of the Coast mountains, 5,000 b.f. per acre.) In the interior of the province there are areas of forest land, aggregating 23,800 sq. m. which, though not reaching this standard, carry between 1,000 b.f. and 5,000 b.f., part of which may be utilized. Only very meagre data have been obtained, as yet, as to the area of land which can be used for agricultural purposes. It appears from our forest land classification that somewhat over 5,000 sq. m. is grass land or very open forest, some of which is suitable for cultivation, but the greater proportion is of value only for grazing.

In addition, there is, perhaps, from 12,000 to 15,000 sq. m. cleared or under forest which is, or may be more valuable for agriculture than for forest production. Deducting this potential agricultural land, say 20,000 sq. m. from the land capable of producing commercial timber, there is 135,855 sq. m. of absolute forest land which should be devoted permanently to forest production.

The Record of Fire.

The timber on about 100,000 sq. m., or two-thirds of the land once forested, has been totally destroyed by fire, and on over half of the remaining 55,855 sq. m. has been seriously damaged. Using the timber still standing as a basis, it is estimated that the province has lost, through forest fires, at least 665 billion feet board measure. When one considers that the total stand of saw material in the whole Dominion probably does not greatly exceed this amount now, the seriousness of this loss, which can be attributed very largely to public carelessness, becomes apparent.

The total stand of saw timber and pulpwood material, in British Columbia, as ascertained by the survey of the Commission of Conservation, is 366 billion board feet.

Of the species which are used in the manufacture of pulp and paper (hemlock, balsam, spruce and cottonwood), there is 170 billion feet, equivalent to 243 million cords of pulpwood, which may be increased to 250 million cords by utilizing smaller-sized timber. In view of the fact that the limited supply of pulpwood

is becoming a very serious matter in eastern North America, it is of interest to know that so considerable a supply may be obtained in British Columbia.

The estimate of the forest resources of the province submitted in the report of the Commission of Conservation is based on a much higher percentage of detailed timber cruises

than any forest report of a similar nature heretofore issued. It is believed, therefore, that the information will be valuable, not only to the governments, which control the forest policy in the province, but also to timber owners and financial interests, on whom the development of industry so largely depends.

The Fire Fiend's Work on Pacific Coast

Statistics compiled by the British Columbia Forest Branch of the Department of Lands and authorized for publication recently, go to show that the 1918 Forest Fire season was noteworthy in the latter part of June and the first week in July for the greater fire risk since 1910. What looked as if it would be a season of moderate risk was broken by three weeks of extremely hot and dry weather, and the major portion of the total damage resulting from forest fires occurred during this danger period. The number of fires which were fought by the Department at an expense number approximately 200 for the Province, the total number of fires being 900.

Co-operation of Public.

Efficacy of the light car patrol service, inaugurated by the Department last year and expended this season, is emphasized by the number of "no-cost" as against "cost" fires. Added to this, the report acknowledged liberal co-operation on the part of the general public on a far greater scale than hitherto. Promptitude in reporting incipient bush fires resulted in the saving of a considerable expense to the Department.

Total Losses.

Total fire loss to the Forest Branch is given as \$34,726; total area burned over, 70,559 acres; total damage done (timber, stock range, logs, equipment, buildings, etc.), \$143,153.

Merchantable timber: area acres

killed, 4,175; thousand board feet killed, 16,752; thousand board feet salvable, 9,100½; net stumpage loss, \$10,060.

Other forms of property: forest products cut, \$43,080; buildings, \$4,950; logging and railway equipment, \$75,000; miscellaneous, \$300.

Preparing for Next Year.

Considerable expenditure was made during the fall on slash burning, notably in the Vancouver, Vernon and Cranbrook Fire Districts. Several thousand acres were burned over, which will materially lessen the fire hazard for 1919. During the year 140 miles of fire line were constructed; two new telephone lines installed for forest protection purposes and several new trails were cut with the same object, all of which are intended to increase the efficiency in handling forest fires.

Forest rangers and patrolmen this season numbered 160, as against 183 for 1917. This smaller force had, however, an increased number of light cars allotted, and the general result was a greater mileage covered in less time; the vital factor in dealing with forest fires.

The Forestry Journal will be sent to any address in Canada for One Dollar a Year.

The Basis of Canada's Supremacy

"Canada's supremacy as a paper-producing country rests upon the possession of large areas of pulpwood forests estimated, according to Government statistics to cover about 350,000 square miles of territory, together with abundant water-powers. While this supply of wood is by no means inexhaustible—some authorities, in fact, predicting its complete exhaustion within a comparatively

few years at the present rate of consumption—it is sufficient to insure the reasonable prosperity of the industry for some time to come, and, with due regard to scientific cutting and reforestation for future needs, which is just now beginning to receive attention, it can be made practically self-perpetuating.—*F. J. Campbell, President, Canadian Pulp and Paper Association.*

Where the Forest Dollar Goes

*By the Secretary of the Canadian Forestry Association,
in Quebec Telegraph.*

"Last year, Ontario completely over-turned its old forest protection system, and now employs over 1000 rangers and has spent \$500,000 on timber guarding since March last. New Brunswick last year built up an entirely new forest service at a cost of \$100,000 a year. Nova Scotia is now considering the appointment of a Provincial Forester to combat timber destruction. In all parts of Canada, the public is rapidly realizing that "timber-guarding" is just another name for steady employment, thriving towns, busy railways, a buoyant Provincial treasury, an eager home market and an expanding export trade.

Of every dollar that comes out of a log, four parts go for wages and supplies and the other part pays taxes and interest on the investment. The man who carelessly burns down \$1,000 worth of timber is robbing his community of \$800 worth of wages and merchandise purchases. Guarding the nation's timber from needless destruction is, therefore, simply a matter of guarding the bird that lays the golden eggs.

"If Quebec insists upon retaining and developing its great spruce forests during the next 25 years, it will hold the trump card in bidding for new industries. New wood using factories must locate near the

source of supplies. They cannot do otherwise and survive competition. The horoscope of Quebec province, therefore, shows up the standing forests as the great magnets to new population and new wealth.

Some other provinces may boast gold, silver and copper mines of spectacular richness, but they endure only a brief time and once used up can never be replenished. A few forests of Quebec spruce are to be valued vastly more than silver fields, inasmuch as forests produce immediate wealth and can be so handled as to yield repeated harvests of precious timber for all time to come.

"We often encounter the notion that the limit holder and the farmer are necessarily antagonistic in aim. This is foolishly untrue. The lumber or pulp mill use a tree crop gathered from land mostly unfit for farming. Nobody wants timber retained on good agricultural soils. All that any reasonable Canadian suggests, is that every acre should produce some form of wealth. Those acres of no value for agriculture are usually of supreme value for growing timber. Has any farmer a real quarrel with the idea of retaining timber crops where plow crops cannot prosper? That is "forest conservation" in a nutshell."

Look to the Raw Materials!

By the Editor of the Montreal Financial Times.

Practically half the Canadian pulp mills are situated in the province of Quebec. Geographically, the Province of Quebec is ideally situated in this respect. Quebec is much nearer the ultimate market for most pulpwood products than any other district containing an equal supply of the raw material. The rivers in Quebec, with possibly but one or two minor exceptions, flow to the south ward, and here again is Quebec's position unique, for it places her mills in direct connection with the heart of the timber lands. It has been stated that in no matter what part of the province timber is cut, it can be floated to market with ease.

The war has done much to broaden the scope and value of this—Canada's premier industry—and to make her manufactured article known and favourably thought of the world over. It has been the means of bringing the Canadian product into direct competition with the product of the Scandinavian mills—and it has stood the test. The day is not far distant when the paper which is manufactured in Eastern Canada will create a new standard of quality for the world.

But the industry must not be abused, particularly in sections of the country where it is now most strongly entrenched.

The supply of wood can be made practically everlasting if each section of land is properly cleared and precautions taken to ensure another crop in a given time. These precautions have been the matter of much discussion and extensive study on the part of foresters and various means to bring about this end have been and are being tried out.

In such times as the present when paper mills are operating at a high rate of capacity some such measures must needs be taken. When it is mentioned that within the past six or seven years the consumption of pulpwood in the St. Maurice Valley

alone has increased nearly 250 p.c. this point can readily be appreciated.

Much Constructive work

Protective measures are necessary against man's most dreaded enemy—fire. In the St. Maurice Valley, with a watershed of 16,000 square miles, some 35 p.c. has been burned over, while about the same percentage has been lumbered, so that the balance of virgin forest is not large in proportion. Methods for saving the natural forest resources of the province, are, of course, continually being improved and this is a most satisfactory point to note from a national viewpoint.

The importance of this work cannot be under-estimated and should receive every possible encouragement. It will ultimately make the Province of Quebec the greatest pulp and paper producing area of its size in the world, bringing into the country untold millions of dollars each year and assuring Quebec its "place in the Sun."

ONTARIO'S FOREST REVENUE

The important part the Crown timber lands of Ontario play in defraying the costs of civil government is indicated by the fact that during the last provincial year forest revenue was collected aggregating \$1,695,703, a gain of \$360,382 over the previous year, and including \$115,327 collected from limit-holders as fire-ranging dues. Nearly one hundred million feet less pine lumber was cut than during the precedent year, labor shortage operating largely toward this diminishment, although the progressive depletion of the white pine forests is clearly recognized. The total pulpwood "cut" for the province was 445,978 cords, of which approximately equal amounts were cut from settlers' lots and Crown timber areas. It is regarded as beyond question that the pulp and paper interest will continue to expand and this development will materially aid in the redemption of Canada's war debt.



Leanchiol Mountains, near Glacier.



Natural Highway, Rocky Mountains Park.

New Brunswick to the Fore! And Why?

By G. H. Prince, Provincial Forester.

Go-ahead Policy of Practical Forest Management—Political Control of Rangers Outlawed.

The present marked development in forest administration in New Brunswick, may be traced largely to a Forestry Convention held in Fredericton just eleven years ago. At that important gathering of practical and scientific men, the many problems of Proper Utilization, fire protection and forest conservation were fully discussed and many far-reaching resolutions were presented to the Government. The most important and immediate result of the convention was the establishment of a four years' course in Forestry in the University of New Brunswick in the following year.

In all, twenty-four foresters have since graduated from this university a small number, but well worth the effort when you consider the great part they have taken and are taking in the development of forest conservation in Canada.

Before attempting to state further what the Government has done, let us consider the progress of forestry with owners of granted forest land. One company owning over one and one-half million acres of forest land in New Brunswick early started the surveying and cruising of their limits. This forest survey, a task that took over five years, furnished the company with accurate timber maps, timber estimates, reports on the conditions and growth of the timber, etc. This information has had much to do with shaping this company's policy in regard to the disposal of its timber towards an increased income and a perpetual supply. Quite extensive surveys have also been made by two other large owners of private lands.

Learning true Conditions

The Government of New Brunswick, no doubt realizing, as the

private companies have done, that the best results in the management of its greatest resource, the forest, could not be obtained without a full knowledge of that asset, passed the Act which provided for the Forest Survey and classification of the seven and one-half million acres of Crown Lands. This survey, commenced in 1916, has been continued as rapidly as possible, consistent with war conditions, and already nearly one-quarter of the total area has been surveyed and mapped, at a cost of approximately four and one-half cents per acre.

The objects of the survey as defined by the Act, are, briefly: First—To report with as much detail as possible upon the character and quantity of the lumber, estimating the quantity of timber and the reproductive capacity of the forest.

Second—to estimate as accurately as possible the annual growth of timber upon each area or tract.

Third—To report upon the accessibility of the timber on each section estimating cost of logging on the different areas and cost of driving.

Fourth—To report the location of lands deemed suitable for agriculture, distinguishing them from other lands that might be regarded as suitable for the growth of timber only.

In order to obtain the above information the most modern and scientific methods of timber estimating and mapping have been employed, and this survey is said to be the most extensive of any survey of its kind in regards to area in North America.

What the Survey Does

Of what use is the Forest Survey to New Brunswick. Briefly:

(1) It will give definite informa-

tion of the quantity, quality and value of the timber on any area, from which the stumpage value may be determined. It will show the quantity and quality of species now of little commercial importance because of lack of market demand, and possibly it may show that these species can be marketed profitably, or where quantity justifies it, to induce industries utilizing these inferior species to operate within the province, thus profitably utilizing material which is at present going to waste.

(2) The estimate of the annual growth will determine whether or not the annual cut can be increased, or whether to perpetuate the industry restrictions should be placed on certain species to regulate the cut.

(3) The information on soils will permit of directing agricultural settlement to districts offering the greatest prospect of success, thus protecting both the future settler and the licensee.

Value in Fire Prevention.

(4) In what way will this Forest Survey benefit Forest Fire Protection in New Brunswick?

First of all we have an excellent base plan from which to build our Forest Protection plan. Our map will show all passable portages, all old portages, and trails, all roads passable for wagons, and all roads passable for automobiles: it will show all telephone lines, all canoeable streams, all camps, the location of all green timber, burned areas, bad slashes, and dangerous points, possible lookout stations, area visible from them, possible observation points and areas visible from them.

From the network of portages and canoeable streams we can plan an efficient system of control; we can see clearly where the tool caches are most needed, where look-outs will be most beneficial. When fires do occur it will show the Forest Ranger where the heavier timber is, and whether the fire is being blown towards timber, a swamp, a heavy slash, and many of the things he needs to know at once. The plans will also show the areas of most danger, where the most of the

recent burns have occurred, etc. Our Chiefs of Party are instructed to collect all local knowledge available regarding all matters of fire protection and to prepare a plan of patrol whether by auto, saddle horse, canoe or by foot as the case may be, showing the location of possible lookout towers, observation posts, tool caches, where fire permits will be necessary to protect the timber from settlers clearing fires, and where the public opinion is so far advanced as to give excellent fire protection at the present time without further development. Our reports will show where debris has accumulated near public highways, railroads and settlements, which should be burned in order to avoid a great fire risk to even human life as well as property. You will see from this that the Forest map of New Brunswick will undoubtedly be of greatest value in planning a comprehensive and efficient fire protection system.

Mapping by Aeroplane.

The great development in the use of the so-called "flying machine" during the last four years gives rise to the expectation that most of our forest fire patrol work will eventually be done by this method, and further it is not unreasonable to expect that before our survey is completed many of our rivers and lakes will be mapped by the highly developed aerial photography.

The figures already compiled by the Forest Survey have shown an enormous loss to the Province of New Brunswick by forest fires. This startling fact, together with the active influence of the Canadian Forestry Association and the Commission of Conservation, resulted in the passing of the new Forest Fires law which was designed to assist in preventing the recurrence of so great a national disaster.

The Fire Permit system of regulating settlers burning slash as provided under the new fire law is recognized as one of the most important advances in Forest Protection and although this law was in force for only a short time during the past

fire season it has given excellent results.

Cutting out Politics.

The Government early recognized that without a permanent, properly disciplined and efficient field staff of Forest Rangers, unhampered by the influence of politics, very little could be accomplished by way of fire protection and forest conservation, consequently the 1918 Forest Act was passed, providing for a Forestry Advisory Commission of five members, consisting of the Minister of Lands and Mines, Deputy Minister, Provincial Forester and two others,—one elected by the Crown Land licensees and one chosen by the Minister to represent the granted forest land owners. This Advisory Board has the power to make all permanent appointments and to supervise all matters in relation to the Forest Act.

This Advisory Board has had several meetings and the results obtained have shown the wisdom of its creation. The practical contributions to the deliberations of this Board by the two representatives of the lumbermen of the Province has been invaluable. Among the Board's first duties was the appointing of an examining committee to carry out the Act in relation to the appointment of rangers by competitive examination on a merit basis. The rangers' duties include forest fire protection, scaling of the logs cut from Crown Lands, and the protection of game.

The Board of Examiners was made up of three members, the Provincial Forester as Chairman, an expert scaler and a practical woodsman and lumberman. The examination consisted of a written test on Forest Ranging, Fire Protection, Game Protection and Scaling, an oral test, and, most important, an actual scale of a large number of logs by the applicant. The examination was modeled after the U. S. Forest Service Examination through the kindness of the U. S. Civil Service Commissioners.

It is very interesting to note that of the 151 men examined only 76 qualified. The large number that

failed to qualify was due to the fact that many men lacked sufficient experience as scalers. The Government is entitled to great credit in view of the fact that the appointment of the Forest Rangers and Inspectors has been practically completed from the pass lists on a merit basis, irrespective of any political influence or patronage.

Through the continued co-operation of the New Brunswick Government with the Railway Commission of Canada, the work of fire protection along railway right of ways was continued with beneficial results, and it is worthy to note that it was the first year that systematic inspection of the fire protective appliances on locomotives was carried out by the Provincial Inspectors in New Brunswick.

Fewer Railway Fires.

The co-operation between the New Brunswick Government and the Canadian Government Railways in regard to fire prevention has been considerably extended. The concession of the General Manager of this Railway to the New Brunswick Government's inspectors to examine their locomotives for fire protective appliances, the appointing by the railway of an ex-locomotive engineer to devote his whole time to locomotive inspection in New Brunswick, and the issuing of a circular by the General Manager to all employees of the C. G.R., outlining their duties in regard to forest fires long practically the same lines as railways do under the Railway Commission, resulted in considerable improvement in the fire situation; nevertheless it is felt that much better results can be obtained if the Canadian Government Railways were placed under the jurisdiction of the Railway Commission of Canada. Considerable improvement in fire protection along private railways in New Brunswick has been secured by close inspection and considerable pressure brought to bear on their managers—one railroad was forbidden to operate trains until engines were properly equipped and fire patrol established.

The necessity of this work and its great importance will be seen when it is stated that a very large percentage of the locomotives examined had serious defects in their fire protective appliances, which were immediately remedied at the request of our Inspector. The seriousness of the forest fire hazard along railroads is easily realized when it is stated that over 788 fires occurring from the smokestacks and ashpens of locomotives, operating through the forests were extinguished by our patrolmen during 1918.

Public Sentiment Improved

Considerable improvement in general fire protection throughout the province and greater interest by the public has been noted, due to a considerable extent to the educative propaganda recently adopted. Over 15,000 attractive and warning posters were placed throughout the Province. The Press was used to a large extent. Through co-operation with the Board of Education, circulars on fire protection were read in 1500 country schools by the teachers, and the children urged to be careful with fire in the woods. Five hundred (500) fire protection posters were placed in railway smoking cars through the permission of the railroads. One thousand circulars on slash burning were distributed. Over 100 various interesting slides on fire protection were distributed and shown in many of the forty motion picture houses in the Province. Envelopes for all correspondence carried fire protection data during the fire season; several thousand pocket whetstones carrying fire protection information were distributed to woodsmen, hunters and fishermen; a course of ten lectures on the Crown Lands was given to the Provincial Normal School students last year, and it is considered that this brought beneficial results, and it is probably that the course will be continued; 1000 copies of the Fire Act were distributed,—the whole tending to create a healthy sentiment regarding the importance of fire protection. The need of all this publicity is fully justified when the following sum-

mary of the fires reported is considered.

The above tabulations show that over 80 per cent. of the damage done was caused by the carelessness of fishermen, campers, hunters and smokers neglecting their camp fires or throwing away burning matches, and by the railroads through defects in the fire protective appliances on their locomotives.

It is therefore absolutely essential that carefulness with fire, and a proper appreciation of this our greatest national resource, should be so impressed on the minds of our citizens, especially those whose business or pleasure takes them within the forests, that in the near future the neglected camp fire will become unknown, and forest fires will no longer destroy the people's heritage.

Railway fires: 788 of which 759 were on Government-owned roads. Total damage \$2606. Area burned 637 acres.

	No. of fires	Estimated damage	Acreage burned
Fishermen, hunters, campers, picnic parties, neglecting camp fires.	29	\$55817	17874
Settlers burning slash	15	8950	18t
Industrial operations	5	2743	62
Unknown causes	10	2150	318
Incendiary	3		4
Grand Total	850	\$72266	19080

WIRELESS FOR FOREST FIRES.

Dunwoody Institute, Minneapolis, on October 13th, volunteered the use of its wireless plant in maintaining communication with Duluth, should other sources be broken by the forest fires. Dunwoody has the only authorized radio plant in the state, except the Government station at Duluth. It has been able to maintain the station only through the fact that naval operators have been trained at the institute.

Nova Scotia Getting Ready!

Campaign for Provincial Forester Strengthened by Recent Conference at Halifax.

A public conference on Nova Scotia's forest problems and the need of a Provincial Forester was held at the Parliament Buildings, Halifax, on December 10th under the auspices of the Canadian Forestry Association. There were present about forty representatives of various provincial interests, including the Dominion Coal Company, the Nova Scotia Steel and Coal Company, the Davison Lumber and Manufacturing Company, S. H. Dunfield and Company, the Fraser Companies Limited, the Dominion Atlantic Railway, Mr. McKeen, Mr. Musgrave, S. M. Brookfield, Dr. Howard Murray, President of Dalhousie University, Prof. Blair, F. C. Whitman, and many others delegated by lumber companies, or concerned as private citizens. There were also present Mr. Clyde Leavitt, Chief Forester of the Commission of Conservation, Mr. Ellwood Wilson, Chief Forester of the Laurentide Company, Mr. G. H. Prince, Chief Forester of New Brunswick, and Mr. Robson Black, Secretary of the Canadian Forestry Association. Mr. Whitman acted as Chairman of the meeting and both sessions were favored by the presence and active participation of Hon. O. T. Daniels, Attorney General and Commissioner of Lands.

The Financial Question.

The immediate consequence of the meeting was that Mr. Whitman was asked to select a committee so as to further the objects of the meeting and place before the Provincial Government a concrete proposal expressing not only the reasons for the appointment of a Provincial Forester but outlining a plan whereby the financial cost of such a new office could be met.

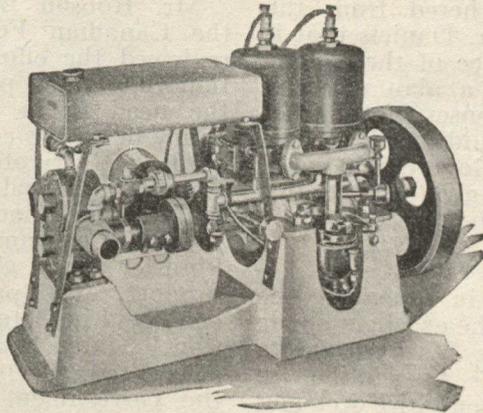
Various speakers gave the meeting their opinions as to the precarious state of Nova Scotia's timber supply.

For example, Mr. J. W. Revere, buyer of pit props for the Dominion Coal Company, during the past 25 years, and Mr. A. M. Seeley, acting in a similar capacity for the Nova Scotia Steel and Coal Company, gave a detailed and, at the same time, alarming resume of the difficulties besetting the coal companies in securing timbers within reasonable distances of the mines. Lumber buyers, as Mr. Musgrave and Mr. McKeen, declared that difficulties were now almost insurmountable in obtaining the sizes called for in orders. Other speakers, drawing upon practical experience in wood using industries, strongly advocated the appointment of a Provincial Forester and an organized fight against timber waste through fire and unwise cutting. Emphasis was given to the service that a Provincial officer could render to the small woodlot owners.

Hon. Mr. Daniel's Reply.

After hearing the views of the conference, Hon. Mr. Daniels, spoke of the comprehensive nature of the present Nova Scotia Forest Fires Act and declared that the appointment of rangers had been kept entirely free from political influence. He did not directly question the value of a Provincial Forester but said that such an appointment depended upon the Government's ability to pay the upkeep of a new office. With an annual deficit and all avenues of taxation occupied, he did not see how the Treasury was to pay the proposed Provincial Forester. Mr. Daniels made it plain that he welcomed the propaganda to arouse public sentiment to the need of forest conservation.

Discussing the working of the present system of County fire wardens, the Attorney-General remarked that the forest fire loss in 1918



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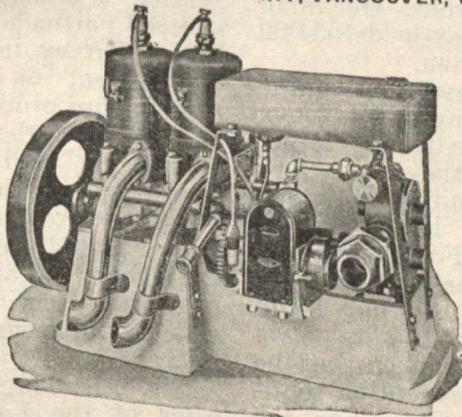
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amounted to \$92,975, of which \$60,545 was due to Government railway fires; \$3,750 was spent on fire fighting and 57,558 acres were burned over.

The meeting gathered from the remarks of Hon. Mr. Daniels that if the special committee of the conference could suggest a plan whereby the salary and expenses of the Provincial Forester could be paid, the co-operation of the Government could be counted upon to give effect to this new branch of administration.

Nova Scotia's Real Task.

Mr. Whitman, in opening the meeting, reviewed the excellent spade work done by the Western Nova Scotia Lumbermen's Association in developing the present Fire Act and securing the appointment of County Wardens. On the forest lands where fifteen years ago an export trade of 150 million feet a year was built, very little mature timber was now growing. Taking Western Nova Scotia as a whole, the task had become one of growing timber before operations could be resumed. Coincident with the decline of timber production on the non-agricultural areas of the province there had been a marked increase in the price of lumber, therein doubly emphasizing Nova Scotia's loss. The increase in value of timber was so great that investors were now buying cut-over lands to hold for speculative profit. One man in the Annapolis Valley held 155,000 acres, said Mr. Whitman.

The Chairman gave an outline of the dependence of numerous Nova Scotia towns upon contiguous timber areas inasmuch as they had very little agricultural land from which to draw sustenance. He then described the Provincial Forester's possibilities of service to practically every commercial activity. Not only could he supervise and direct the fire patrol work of the county rangers but he could work up fire prevention sentiment through education. For the latter highly important duty in forest protection, Nova Scotia now had almost no provision. The Forester could also advise the Government in the most efficient handling of the

remaining Crown Lands and would be at the service of all limit holders and woodlot owners in improving the productiveness of their holdings.

Mr. Robson Black, Secretary of the Canadian Forestry Association reviewed the efforts of the Association to awaken public sentiment on the need for a forward Provincial policy in timber conservation. Hundreds of private citizens, lumber companies, coal companies, ship-builders, etc., had addressed appeals to the Government to appoint a Forester and give him adequate support. Ten public meetings had been held in October by the Association. Many Boards of Trade had considered the question and notified the Government of their favorable opinion.

Mr. S. M. Brookfield, a well-known builder, expressed the belief that enough time had elapsed already without meeting the timber situation squarely. He was strongly in favor of the immediate appointment of a Forester.

Dr. Howard Murray, President of Dalhousie University, added his support to the objects of the conference.

Mr. G. H. Prince, Chief Forester of New Brunswick, who was invited to be present, gave a comprehensive description of the excellent work accomplished by the new Forest Service organized last year. He stressed particularly the value of the Forest Survey in order to give the Government an intelligent working plan for fire protection, timber sales, and land settlement. Ranger appointments had been held strictly free from political influence by a Forestry Advisory Board. Mr. Prince placed great importance upon the proper organization of the fire protection service and the use of educational means for prevention of loss.

Mr. Ellwood Wilson, Chief Forester of the Laurentide Company, told of the world-wide and rapidly growing interest in proper forest management. Forest protection had now become a specialist's job, demanding the keenest standards of

efficiency in personnel and organization. The old days of unsystematic patrol were now intolerable. As the tabulating of timber losses became more and more accurate, people were beginning to see the money-saving qualities of timber guarding. Mr. Wilson showed that Nova Scotia offered a relatively easy proposition in fire protection, but that fact did not release the Province from its responsibility for adopting the only adequate protective scheme that experience had yet uncovered.

The Coal Companies' Side

Mr. J. W. Revere, of the Dominion Coal Company, gave many facts concerning the troubles of the coal companies in getting a pit prop supply. The present output of 3,500,000 tons required 1,200,000 pieces of pit props annually. Mr. A. M. Seeley, of the Nova Scotia Steel and Coal Company strongly reinforced Mr. Revere's warning.

Mr. Clyde Leavitt, Chief Forester of the Commission of Conservation, said that if the non-agricultural lands of Nova Scotia were not now growing timber, the wealth producing possibilities of the province were greatly reduced. The chief problem facing the province was to grow a new crop on its forest areas. The management of timber resources could not be left to chance. All other provinces owning forest properties found a carefully organized Forest Service essential; the need was no less in Nova Scotia. Fire protection would have to be organized if a new growth was to come up. While recognizing the financial limitations of the Provincial Treasury and the marked difference between New Brunswick with handsome Crown Lands revenues and Nova Scotia with very meagre Crown Lands income, Mr. Leavitt did not see how the latter province could profitably postpone remedial action when every provincial activity was suffering and was bound to suffer more from neglect of a basic resource. Mr. Leavitt summoned many convincing arguments for the engaging of a Provincial Forester and mentioned

the especially valuable consequences of co-operation of such an officer with the Board of Railway Commissioners in lessening railway fires.

A Ground Plan Now Ready.

Mr. Whitman brought out the point that Nova Scotia, like New Brunswick, has a Forest Survey (made by Dr. Fernow and party in 1909-10) which would be a ground plan for the Provincial Forester's organization.

Mr. McL. Robertson, representing the Davison Lumber and Manufacturing Company, spoke strongly in favor of having a Forester who could organize fire protection and assist all woodland owners in increasing the production of timber.

A vote of thanks was passed to Hon. Mr. Daniels for his courtesies to the Conference.

It is essential to point out that the campaigns hitherto carried on by the Canadian Forestry Association to promote public interest in protection of Nova Scotia's forests will be continued even more vigorously than before. The main effort is now to band together all lumbermen, pulp mill owners, shipbuilders, fishing companies, coal mine operators, and others with a direct or indirect interest in local timber supplies to supply an answer to the Government's query: "Where will the revenues come from for the support of a Provincial Forester?"

Not only must this point be answered, but the influence of the Special Committee will be so brought to bear upon the members of the legislature and the cabinet as to make further postponement of action inexpedient.

*The Forestry Journal will
be sent to any address in
Canada for One Dollar a
Year.*

Airplanes Directed by Wireless Phone

Squadrons of American airplanes fighting in France up to the moment of the armistice were manoeuvring under the vocal orders of the squadron commander that reached each pilot by radio telephone.

News of the successful development of this device, hitherto a military secret, though some inkling of it had reached the Germans just before hostilities ceased, is now allowed to become public by John D. Ryan, U. S. director of aircraft production.

"There are some details concerning it which we cannot discuss yet," Mr. Ryan said, "but the radio devices worked out during months of experiment went into actual service some weeks ago. I have myself, standing on the ground, given orders to a squadron flying in the air and watched them manoeuvre accordingly. The

transmission of the voice is clear enough to be heard distinctly through the sound of the airplane motor. It is in every way the most satisfactory means of communicating between planes in the air and from the ground to planes."

Mr. Ryan said he could not discuss the distances over which the radio telephone has worked, but it is known to be a matter of some miles.

W. C. Potter, of the equipment division of the bureau, explained that the idea of the radio telephone was conceived some time ago by a number of experimenters.

"For some months it has been possible in our offices in Washington to hear the airplanes flying miles over the city," he said, "talking to each other and to the ground as they worked out and perfected the device."

PIT TIMBER IN N. S.

The coal mines of Nova Scotia furnish a constant market for mine timbers, utilizing an average of twenty-two million feet yearly. These include pit props of spruce or fir five feet long and five inches at the small end. The average price for these is about one and one-quarter cents per foot. Pit ties from four to five feet long and from four to six inches in diameter fetch from five and one half to twelve cents each. Railway ties of hemlock, six by seven inches and eight feet long bring fifty-five cents each. Booms of black spruce from eleven to seventeen feet long with an eight inch top fetch from sixty cents to ninety-four cents each.

Wood is used in mines in preference to other material because it will give way slowly when subjected to great weight, gradually splintering and cracking, giving the miners warning and a chance to get away. Wood decays rapidly in mines owing to the damp conditions, so it must be replaced often. The chief sources of supply in Nova Scotia are Cumberland, Colchester, the Cape Breton Counties, Guysboro and Antigonish.

MARITIME BARREL SUPPLY

In the western part of Nova Scotia and in all the fishing centres there is an increasing demand for barrel hoops, staves and headings and there the question of an adequate supply of cooperage material is of equal importance to that of fuel. Such material that formerly came from the waste stock of the large saw mills has lately been very much curtailed and in future more dependence must be placed on direct production and manufacture where the wood is grown. Accessibility is a prime factor in this industry and consequently a sufficient supply of cooperage material depends largely on the quantity the farmers can furnish. The practise of a yearly cut of hoop poles is recommended, with the object of getting regular crops. This practise also allows the smaller trees to grow to a proper hoop size and prevents overgrowth that is unsuitable for cooperage and yet of little value as fuel.—From "The Farm Woodlot in Nova Scotia."

An Improved Forestry Journal.

The January issue of the Canadian Forestry Journal will take a step forward. Henceforth the Journal will be printed on the finest grade of coated paper, which will bring out in their full values all illustrations and at the same time will render the text more readable.

The pages will be slightly larger and a feature will be made of interesting pictures.

The quality of contents, too, will be given special attention. The January issue will be headed by a special article written by Sir George E. Foster on "Forest Conservation and Canada's Trade Abroad."

"What the Canadian Tree gave to the War." is a unique story in which every reader will be much interested. It recounts the unsuspected service of the Canadian forest in making the Allied victory possible.

Mr. Gifford Pinchot, former Chief Forester of the United States, has written an inspiring message to Canadians identifying Forestry as one of the great planks in national readjustment.

Westerners will find special interest in two special articles telling of the remarkable service of forest protection in irrigating British Columbia's fruit-growing valleys, and the good work done at the Saskatoon forest nursery of the Dominion Forestry Branch.

Hon. E. A. Smith, Minister of Lands of New Brunswick has written a strong message on "The State's Responsibility in Forest Management."

Mr. Ellwood Wilson, Chief Forester of the Laurentide Company contributes a timely and stimulating discussion of "Forestry and Reconstruction."

Each month's issue hereafter will contain a special article telling how the tree is "fabricated" into such products as matches, alcohol, etc., with plenty of good illustrations.

The Forestry Journal during 1919 will prove a considerably more expensive product to the Association than previously, but the great growth of membership amply justifies the move.

Lumbermen Co-operate for World Trade

Co-operation to the fullest possible extent, confidence in themselves and in the future of industry were the keynotes expressed at the executive meeting of the Canadian Lumbermen's Association held at Montreal on November 26th. The meeting was one of the most largely attended, ever held by the directors of this organization. W. G. Powers, president, was able to enthuse the directors with his own courage and optimism and as a result of the meeting the Canadian Lumbermen's Association and affiliated organizations are going out to capture a larger share of the world's business.

By coincidence the Eastern Spruce Manufacturers' Association met in Montreal on the same date and on invitation of the Lumbermen's Association the spruce dealers attended the gathering and discussed their common problems together. As a result of this conference thirty members of the Spruce association from Maritime provinces joined the Canadian Lumbermen's Association. The directors of the association decided to hold their next annual meeting at St. John, N.B. Many questions were discussed at the gathering including such matters as domestic consumption of lumber, trade with the

United States and with devastated countries of Europe, transportation matters, embargoes, labor, etc. Resolutions were passed urging the necessity of immediate co-operation between the Canadian Lumbermen's Association and other organizations having to do with forest products, the provincial governments and their forestry departments and the Federal Government. It is felt that the present situation as well as future development of industry required the closest possible co-operation between all interested parties.

The resolutions ask not only for Federal and provincial assistance of a financial nature, but also in the matter of organization and moral support. The plan is to have one representative in a European country instead of half a dozen or more representing separate provinces or separate branches of industry. In

the opinion of the association directors, lumber for reconstruction purposes ranks next in importance to food, while demand for lumber together with decreased production means that prices will remain on a high level for some years.

Other matters discussed had to do with standardization of their product, also the formation of soldier's employment bureau and other measures for taking up slackness in labor caused by the closing down of munition plants. The association went on record as being willing to co-operate in every possible way with the Government in its efforts to assist in the readjustment period following the coming of peace. Altogether the meeting marks a new era in history of the Canadian lumbering industry. Plans for the future developments were of a comprehensive and far reaching nature.

Replanting Barren Lands in Canada

In all the provinces of Canada, there are large areas of non-agricultural lands which have been so completely denuded of forests by unwise methods of cutting, or by fire, or both, that they are in a wholly unproductive condition, due to the complete destruction of all young growth and seed trees. Only by planting can such lands be restored to productivity within any reasonable length of time and, thus, be made to play their proper part in the economic life of the country.

Nowhere in Canada has such an excellent start been made toward commercial forest planting as in the province of Quebec, and even here the work done constitutes only a small beginning, in comparison with the real needs of the situation. The lead in this direction has been taken by the Laurentide Company, and the Riordon Pulp and Paper Company. Both companies have, for some time, realized the slow progress which nature, unaided, makes toward restoring

the stand of commercially valuable pulpwood species on our northern lands after they have been heavily cut over.

The Laurentide Co. is the pioneer having commenced planting operations in 1908. Up to the present, a total of 453 acres has been planted up by this company, mostly with Norway spruce and white spruce, with a smaller representation of white pine, Scotch pine, red pine, poplar and other minor species. About 1,500 trees are planted to the acre, so that the total number planted to date aggregates some 680,000. During 1919, the Forestry Division of the Laurentide Co. expects to plant about 500,000 young trees, mostly Norway spruce and white spruce. The programme for 1920 includes the planting of 700,000 trees, and, for 1921, 1,000,000 trees, mostly white spruce. The rate of planting is to be increased until it totals 2,000,000 trees per year. C. L.

THE WESTERN FOREST.

Hon. J. A. Calder, Minister of Immigration and Colonization, has given out the following statement dealing with the question of the natural resources of the western provinces:—

“Numerous statements are appearing in the press of western Canada to the effect that the Federal Government has refused to deal with the question of the transfer of the natural resources to the Prairie Provinces. Those responsible for these statements must know that they do not represent the existing situation as regards this problem. Briefly stated, the following are the facts:—

“Early in the year it was decided by Sir Robert Borden, upon the request of Premiers Norris, Martin and Stewart, that the question of the transfer of their resources would be made the subject of discussion at a general provincial conference to be held later in the year, which conference was finally held last month.

“At the conference it was clearly intimated that the Federal Government agreed with the principle of the transfer of the resources, and the whole discussion proceeded along the line of endeavouring to arrive at an agreement on the terms and conditions under which the transfer might be made. All the provinces of Canada, except the Prairie Provinces, maintained that they had an interest in the matter, and that the Prairie Provinces should not be permitted to retain their grants in lieu of land and at the same time have transferred to them their natural resources as well.

“Tentative suggestions were made by the Federal Government to the effect that it might be advisable for the Dominion to retain control and ownership of the forest reserves, national parks, and water-powers, and that in the public interest some provision might be made whereby the Federal Government in the future, if it so desired, could secure limited collieries. These were merely suggestions for discussion.

“At the close of the conference it

was apparent the representatives of the provinces could not agree, and finally the Prairie Provinces, the Eastern Provinces, and British Columbia submitted their views as to the question either by formal resolution or statement.

“As yet the Federal Government has reached no decision regarding the final settlement of the question. The matter is still under consideration, and the purpose of the Government is to endeavour to find an equitable solution of the problem. Any policy which may be formulated must of necessity be submitted to and approved by Parliament. The Government itself cannot decide a question of this nature.

MAKING BUTTONS FROM WOOD

The wooden button industry in the United States has received a decided impetus, as a result of the activities of the Government in the prosecution of the war, according to a bulletin just issued by the United States Tariff Commission. The centre of this industry is in Providence, R.I., although some wooden buttons are being made in other New England cities.

Before the war the industry had an extensive foreign trade, exports going to England, Germany, France, Belgium, Austria and South America. England was perhaps the largest customer until shipments ceased, as a result of Great Britain placing an embargo on the enameled wooden button.

White birch from the forests of New England provides the raw material for manufacturing these wooden buttons. The trees are cut in the winter and the logs are sawed at the mills into squares four feet long, each side measuring from $\frac{1}{2}$ to 4 inches, the squares differing in size. They are seasoned or cured for about six months so that the wood may be worked into all shapes. At the factories these squares are known as “Spool Stock.”

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IN DEFENCE OF THE CROW

(A letter in the Manitoba Free Press.

Sir—I trust you will pardon me for again taking issue with you relating to the preservations of our game and wild birds generally. In the present instance under the heading "Corvovs the Malefactor" you print in your issue of the 16th, a very severe denunciation of the crow which might well leave your readers under the impression that this bird is wholly obnoxious. The article is obviously written by one who views the question entirely from the view of the sportsman; forgetting, apparently, that there is another side equally important, namely the bird's relation to agriculture.

The crow, as is well known, is a native of North America. It has, therefore, existed side by side with the various species of grouse long before man settled in these parts. Yet the grouse survived in abundance. That the crow has increased in late years is possible, but that it occurred

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in its thousands even in 1882 is manifest on reference to Thompson Seton's "Birds of Manitoba." Still, as we said before the grouse survived. Surely the inference is obvious. It was not the crow but man who upset the balance nature had provided.

It is impossible here to go into details as to the crow's actual economic standing and also unnecessary when the work has been done so thoroughly by the U.S. Biological Survey. See Bulletin No. 621 "The Crow and its Relations to Man." This is a work that all should possess who wish to gain the real facts. It is for sale by the Superintendent of Documents, Govt. Printing Office, Washington, D.C., at 15 cents. This work is one of very wide application, and is the result of a very comprehensive weighing of evidence, both from the examination of stomachs and field observations. The evidence provided includes many crow

stomachs collected by my brother Stuart, in Manitoba, a single one of which contained no less than 45 white grubs, an insect recognized as extremely noxious. However, my object is to call attention to this work not to quote it. I think when it has been read impartially that the reader will conclude that the crow is not quite such a malefactor as you have described it and that while it unquestionably does some harm by destroying eggs and young birds, its value to the farmer, as a consumer of noxious insects, is also worth considering.

Personally, I am still of opinion that an effective carrying out of the law, as it is at present, would in itself be sufficient to re-stock our preserves with the birds which man, with his automobile, has been the chief factor in diminishing.

NORMAN CRIDDLE.
Teesbank, Man., Nov. 23, 1918.

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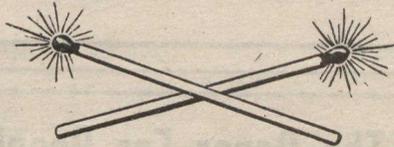
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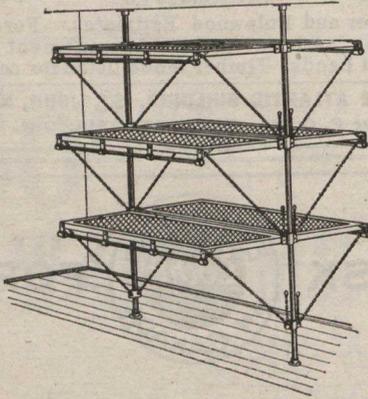
Forest fire losses during the 1918 season on the U. S. Pacific Coast exceeded the three million dollar mark and perhaps reached or passed the four million dollar figure. More than 300,000 acres were burned over and more than three billion feet, board measure, of merchantable timber was damaged, about two-thirds of it beyond salvage.

The fire season lasted so long that reports from many sources are not yet available. Approximate figures on National Forest losses show between 60,000 and 70,000 acres burned over in Oregon and about 75,000 acres in Washington. The loss in the National Forests of Oregon was greater, however, as about 50,000 acres burned over in the Cispus forest tract in Washington was "burned over" land and bore virtually no merchantable timber.

IN NORTH ONTARIO.

In the Cochrane division of the Ontario Forest Protection Service nearly double the number of fire permits over the issue of last season has been made to settlers. Of the total number of rangers in the division 95% have their homes north of North Bay, well illustrating the sensible policy of the Department in employing men with a personal knowledge of and interest in the district where their fire ranging duties lie.

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