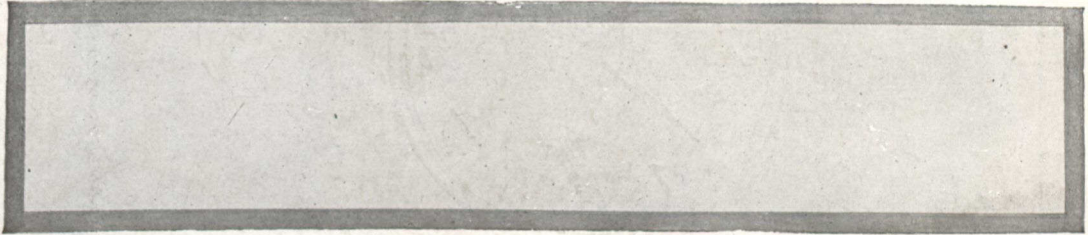


Canadian Forestry Journal

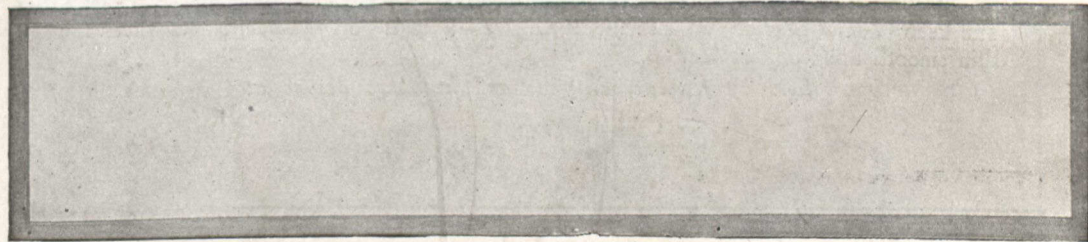
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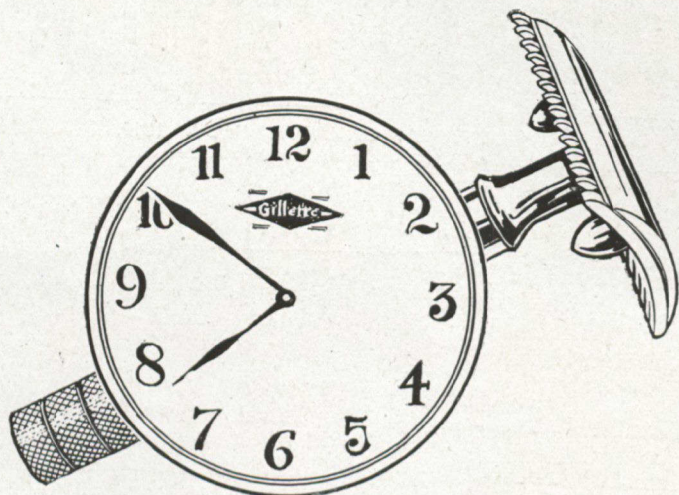
OTTAWA, CANADA, JULY, 1919.

No. 7.



A forest fire at Nordegg, Alberta, caused by sparks from chimney of shack.
Photograph by kindness of J. S. Fullerton.





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\$5.00 The Set



13th Street, Brandon, Manitoba, showing a handsome arrangement of Manitoba Maples. A hedge of Caragana is visible on the inside of the walk.

PLANTING SUITABLE SHADE TREES

By *F. E. Buch*, Assistant Dominion Horticulturist,
Central Experimental Farm, Ottawa.

An Authoritative Guide to Right Selections That Will Help the Planter of Memorial Trees.

Trees not less than architecture determine the beauty of the city. Trees proved certain factors in the life of cities which, from the sanitary standpoint, are invaluable. For example, the Commissioner of Health of the City of New York some years ago investigated the cause of the high death rate in that city and found that the extreme heat was one of the main causes. It was, therefore, resolved that "one of the most effective means for mitigating the intense heat of the summer months and diminishing the death rate amongst children is the cultivation of an adequate number of trees in the streets." The 81,000 trees in the City of Paris are an example of what can be done when tree planting is undertaken by the city as a business-like proposition.

The economic value of shade trees, both to the city and to the individual home, is also inestimable. A certain farm in Ontario possessed a fine avenue of pine trees leading to the

house. For some reason these trees were cut down and it is vouched by first-hand authority that when the farm was sold a few years later its value had depreciated \$5,000 owing to this one factor.

Trees, as one of Nature's finest products, which constitute an environment to our everyday life, are not appreciated as they should be. Remove the trees and place humanity under desert conditions and its life would be lowered in morale. It is reasonable to expect, therefore, that one of the ways many individuals will wish to commemorate the great war will be by planting trees. Fortunately the choice of suitable trees is large, but, owing to that very fact, sometimes trees of an unsuitable type are planted through ignorance. The qualities which a good street tree should possess are as follows:

1. **Hardiness**—especially in regard to the handicaps of city conditions.

WHAT TO PLANT IN EASTERN CANADA

SUGAR or ROCK MAPLE
NORWAY MAPLE
RED MAPLE

AMERICAN ELM
RED OAK
MAIDEN HAIR TREE

WHAT TO PLANT IN PRAIRIE PROVINCES

MANITOBA MAPLE
RUSSIAN POPLAR
BALSAM POPLAR
GREEN ASH

ALSO IN SOUTH MANITOBA:
ELM and BASSWOOD
CANOE BIRCH
NATIVE COTTONWOODS

2. **Straightness and symmetry.** One decrepit tree on a street may mar the whole effect.
3. **Freedom from the attacks of insects and fungous diseases.**
4. **Good foliage habits to give abundance of shade.**
5. **Cleanliness in habit of growth during flowering and fruiting stages.**
6. **Longevity.** Street trees must not be short-lived or easily broken by winds.

Six Good Trees for Eastern Provinces

Sugar or Rock Maple (*Acer saccharum*).—A well known native tree, rather large, shady and upright in form. It thrives in most soils, except those of a heavy clay type. It makes a magnificent street tree, and one which is not troubled in Canada to any extent with fungous diseases, and does not require much pruning. In the autumn the leaves turn to brilliant shades of scarlet, orange and yellow. It has been found that it does not thrive in some American cities so well as the Norway Maple, as its foliage is sensitive to dust and smoke. This is the tree from which maple sugar is principally made.

Norway Maple (*Acer platanoides*).—This maple is a native of Europe. It is a fairly large and handsome tree with a compact, round head, not quite so large as our native maples. It is quite hardy in Canada, and is frequently used as a street tree. In the spring, the bright greenish, yellow flowers which come out with the bursting of the buds makes the tree a conspicuous object. The leaves are rather larger and darker than those of the native maples. In the autumn, it colors yellow and makes a pleasing contrast to the red and sugar maples.

In the eastern provinces of Canada the six trees described later on are at the top of the list for street planting. In the prairie provinces these trees are not hardy, consequently certain varieties which we look upon as too inferior for planting in eastern cities have to be used. The best of these are (1) the Manitoba Maple, (2) the Russian Poplar, and the Balsam Poplar, (3) the Green Ash. In the southern parts of Manitoba the Elm and Basswood succeed fairly well. The Canoe Birch and the native Cottonwood are also varieties which succeed well.

It is a tree which is very easily transplanted and for this reason it is very much used for a street tree in many cities on this continent.

Red Maple (*Acer rubrum*).—Although not quite so desirable a street tree as the Rock Maple, it is a tree of upright form, with a comparatively narrow round head. It is also a native of Canada and has most of the good points of the maples. It is very conspicuous in early spring on account of its bright scarlet flowers, which come out before the leaves.

American Elm (*Ulmus americana*).—A large handsome tree particularly adapted for wide streets or avenues. It combines size and strength with beauty and grace of form, perhaps more than any other tree. It is one of the most rapid growing of all trees, will stand adverse conditions fairly well, and does well in many types of soil. No other tree in the whole list stands out so conspicuously as an all-round useful tree for street and avenue planting. Unfortunately, however, it is in some parts frequently troubled by insect enemies.

Red Oak (*Quercus rubra*).—The oaks are not so extensively planted as street and avenue

trees as they should be. They make the finest appearance and produce a very pleasing effect on a street. The Red Oak grows faster than any other oak, and will do well in any fairly good type of soil. It has a symmetrical round-topped crown, and the glossy leaves are a dark dull green, turning orange to scarlet in the autumn. It is not so easy to transplant as some trees, but good nursery-grown specimens may be expected to succeed.

Maiden Hair Tree (*Gingko biloba*).—A tall and hardy tree from China with horizontal branches and curious leaves resembling the foliage of the maiden hair fern. It is a new and very promising tree for street use, and is entirely free from enemies of any kind. Although rather a slow grower it is very beautiful after it has obtained its full growth.

Choosing Trees for Parks and Estates

In addition to these trees which are the most desirable for street planting, there are others which are better suited for planting around the home or in public parks and large estates. The most distinctive of these are:

Purple-leaved Norway Maple (*Acer platanoides Schwedleri*).—This is a variety of Maple which, on account of its purple foliage, makes a very handsome lawn tree. The leaves in the spring are bright purplish and crimson, which later in the summer turn to dark green.

Cut-leaved Silver Maple (*Acer Saccharinum Wieri*).—A beautiful weeping form of maple, with deeply cleft and divided leaves. The branches are very pendulous and generally reach the ground. A rapid-growing popular and handsome tree for planting around the home.

Horse Chestnut (*Aesculus Hippocastanum*).—The European or Horse Chestnut is sometimes planted on streets, but more fittingly for shade on lawns. It is rather a handsome tree with large palmate leaves, and produces white flowers in the spring. Of late years, however, it has been badly affected by a fungous disease and should be planted with caution.

Siberian Pea-Tree (*Caragana arborescens*).—This is a large-sized shrub or small tree producing abundance of yellow-pea-like flowers in the early spring. It is perfectly hardy, and makes a desirable lawn tree when a tree of limited size is required.

Mountain Ash Trees (*Pyrus*) (*sorbus*) (*Aucuparia*) and (*americana*).—*Aucuparia* is also known as the Rowan Tree. It produces a

symmetrical round-topped crown; the leaves are compound and attractive, and the flowers are also pretty; but it is chiefly desirable on account of the large clusters of bright red berries which are very showy in the late summer and fall. A weeping variety is also to be had of this tree which is very effective when planted on the lawn. *Americana* is the native species and although not as large a grower is as desirable for Canadian conditions as the European species. It is more variable in form.

American Larch (*Larix laricina*).—The Larch is one of the deciduous cone-bearers. It grows into a handsome pyramidal tree with a very light and graceful appearance. It does well in swampy lands, and makes a beautiful lawn tree, but is somewhat difficult to transplant except when quite young.

Flowering Crab Apples (*Malus*, species and varieties).—The Flowering Crab Apples, of which there are several varieties, are the showiest of spring-flowering ornamental trees. They are hardy and do well in most soils. Bechtel's double-flowering crab, producing abundance of small rose-like pink flowers, fragrant and beautifully double, is one of the best. Other good varieties are *floribunda Parkmani* and *f. Scheideckeri*.

Laurel-Leaved Willow (*Salix petandra* or *laurifolia*).—A medium sized tree of compact habit with dark green and shining medium-sized leaves which gives the tree a particularly clean and fresh-looking appearance. One of the best willows for ornamental planting, quite hardy and rapid growing.

Plant One Species to a Street

It is of considerable importance that the systematic planting of one variety of a tree to a street should be encouraged. Nothing is so distressing from the aesthetic standpoint as the indiscriminate planting of several varieties on the same street, and especially when they are planted without regard to regular intervals between the trees themselves and the property line. A good example of a well-planted street, such for

instance as Clemow avenue, in the City of Ottawa, makes a lasting impression upon the mind of the visitors. Now that the war is over and trees are to be planted as memorial avenues or individual specimens, it is particularly desirable to call attention to these few hints relating to suitable varieties and their value in the beautification of the home or city.

BRITISH COLUMBIA FIRE RECORD

The following telegram was received by the Canadian Forestry Journal from the Chief Forester of British Columbia:

July 15, 1919.

"Situation in the interior and southerly Brit-

ish Columbia hazardous. On the coast conditions are fairly safe. The number of fires to date is 170. The damage so far is exceedingly light.

FOREST BRANCH."

B. C. MUNICIPALITIES ARE SUPREME

The Canadian Forestry Journal has received the following letter from the Department of the Attorney General of British Columbia, giving the status of municipalities in regulating the trimming of shade trees:

"Municipalities in this province have the right to regulate public utility companies, and to authorize the use of the public highways by late (notwithstanding anything contained in any such companies. They have the right to regulate (special or private act) the placing of poles, wires, etc. This would carry with it the power to protect shade or ornamental trees. Outside of municipalities the private acts incorporating public utility companies sometimes contain provisions reserving to the Minister of Public Works the right to regulate the placing of poles and wires."

MEXICO STARTS FORESTRY.

In order that a scientific knowledge of forestry and the protection of existing forests of the country may be obtained, the Mexican Government has established a National Forestry School at Coyoacan, Federal District. The course of instruction will cover a period of three years. The students come from nearly all the states and the school was opened on March 1 with a large attendance. The forest areas of Mexico are very large, but up to this time no scientific regulations or knowledge have been applied to the cutting of the timber. The government plans also to reforest the more barren sections of the country as rapidly as the work can be carried on.

TRIMMING AND RE-TRIMMING ROADSIDE TREES

The Canadian Forestry Association is gathering evidence as to the practice of public utilities bodies in trimming trees so as to convenience their wires. An important point is brought up in a letter from Mr. Thomas Rowley, president of the Erie Co-Operative Company of Leamington, Ontario, who protests strongly against what he claims to be the unnecessary hacking of valued trees. Says Mr. Rowley:

"These trees were trimmed by the Essex Light and Power Company, and we see no reason why they should again be trimmed. We may be dense on this power and light question, but we fail to see why it is necessary to cut ten feet below the wire, which the Hydro are doing. We claim that so long as there are no branches touching the wires, that is all that is necessary and I don't think we would object seriously to that much trimming being done. It does seem strange that in some cities and towns the councils compel the power and light companies to put their wires underground, while in the rural districts they will not even put up higher poles or arms on the poles to avoid cutting the shade trees.

"If the Hydro people can find any limbs on these trees that are actually touching the wires we would have no objections to their trimming any branch or twig found in that position, but we do absolutely, and I believe will strenuously oppose any idea of cutting any limb or branch of tree that is not actually touching the wire."

To Mr. Rowley's complaint, Mr. W. W. Pope, Secretary of the Hydro-Electric Power Commission wrote the Forestry Association in great detail giving the results of a special investigation in Mr. Rowley's vicinity. In part Mr. Pope says:

The Hydro-Electric Reply:

"One of the most serious difficulties in an electric line are the limbs overhanging the wires and these limbs breaking and falling on the wires, thus doing damage, not only to the service but oftentimes to property and persons.

"About a year ago, shortly before the taking over of the line by the Commission, a limb broke and parted a wire, the live end falling on a wire fence. A cat got into trouble with this and a Mrs. Mitchell went out to relieve the cat and in so doing was killed. There were several other accidents in this district caused by limbs falling on the wires and breaking them.

"All of this, you will readily understand, has to be taken care of and the cause of the trouble removed and the line made fairly safe.

"As to the trimming of trees whose limbs do not touch the wires. While the limbs might clear the wires under ordinary circumstances and conditions, directly there is a sleet, snow or windstorm, these limbs are bent toward the wires and entirely spoil the working of the line.

"The ten-foot clearance has been maintained throughout the Hydro's operations. Six feet was at first tried, but this was not sufficient. The clearance was then increased to eight feet and the Commission still had serious trouble and were compelled to make the clearance ten feet.

"As to high poles. That again is impossible as the cost of these poles would be prohibitive and it would only be a matter of time until the trees grew to the height of the poles and they would only require to be cut later on."

EYE PROTECTORS FOR LOOKOUTS.

A United States Forest Service ranger has devised an eye protector for the use of lookouts. The device is simple. It is made of cardboard, painted black, fitting over the eyes, and has a long horizontal opening lined with narrow strips which prevent the entrance of light from the sides, also from above and below. A test will be made by several lookouts. The ranger states that his device will successfully protect the eyes against the bright glare in the atmosphere at high elevations.

SURVEY IN FRASER VALLEY.

The Dominion Forestry Department will be asked to make a survey of the lower Fraser Valley for timber suitable for pulp and paper making. This was the decision of the Greater Vancouver and Lower Mainland Bureau of the Board of Trade. Considerable discussion had taken place at previous meetings regarding the possibilities offered in the valley for a paper plant, but it was thought advisable before any definite action was taken toward interesting capital in the matter to have authentic information available regarding the supply of timber.



A unique picture of the commencement of a forest fire on Campbell River, B.C. Picture taken on deck of a steamer and herewith published by courtesy of the Pacific Coast Lumberman.

TO CHANGE QUEBEC'S CUTTING REGULATIONS

(Resolution passed by Woodlands Section of Canadian Pulp and Paper Association, June 25, 1919)

"Resolved, that in the opinion of this meeting certain changes in the regulations of lands and forests governing the cutting of timber on Crown Lands are essential to the preservation and perpetuation of the forests, and it is respectfully requested that the executive committee of the Pulp and Paper Association appoint a committee to co-operate with the existing committee of the Province of Quebec Limit Holders' Association in waiting upon the Government with a view to urging upon it the necessity of an early revision of these regulations to meet present day conditions.

"Resolved, that this meeting takes the opportunity of expressing its gratitude to the Government of the Province of Quebec, and the Hon. Jules Allard, Minister of Lands and Forests, for the invaluable work in organizing the preservation and perpetuation of the forests in this province, and in view of the vital nature of this organization in the interests of the future welfare of this province that it is urged by this meeting on the Government, to preserve its present status in order to insure the various problems being brought to a satisfactory conclusion."

LINEMEN AND SHADE TREE SLAUGHTER

From information acquired by the Canadian Forestry Journal shade tree owners in Eastern Canada are by no means as happily placed in their legal rights as those of British Columbia or many of the States of the American Union. In British Columbia, the municipality is supreme in regulating the tree trimming by electrical transmission corporations. In Pennsylvania, no lineman dare touch a hand to a shade tree whether in a city or the open country until permission has been granted by municipal authority. No state or federal charter has priority in such matters. This is quite a common condition in the New England States.

In Ontario however, recent powers acquired by the Hydro-Electric Power Commission give its tree trimming orders priority over any claims of private tree owners or protests of municipalities. The Forestry Journal judging by its correspondence with the Commission, does not believe that the legal authority in this matter will be used ruthlessly. Indeed, the Commission appears to have taken pains to follow a policy of compromise and conciliation. At the same time, the Journal is convinced that damage to city and rural shade trees has proceeded far beyond the necessities of efficient electrical transmission and telephone operation. It is beyond question that

unless shade tree owners place a high value upon their property and insist upon the minimum degree of trimming, the beauties of roadsides and town streets are sure to suffer. One difficulty has been that not one municipality in fifty has considered the care of its trees as more than a side line of the county or town engineer. When a dispute arises, the power or telephone company is confronted by one or two individual owners, without organized backing and lacking sometimes in skilled judgment. If county and town councils regarded their shade trees as a really vital asset and placed their care in the hands of a skilled individual or even a committee, there is little reason to doubt that far fewer complaints would be received about the aggressions of linemen. The Canadian Forestry Association intends to develop this question of shade tree preservation and invites expression of opinion by tree owners and others.

In the last issue of the Journal the point was raised whether the present compensation offered by public utilities bodies was at all adequate and whether a higher rate would not decrease the extent of destruction. There follows an article on this subject for which we are indebted to "American Forestry".

THE CASH VALUE OF SHADE TREES

By *W. W. Colton, City Forester of Newton, Mass., U.S.A.*



How to Estimate Compensation for Ruined Trees.—One Dollar an Inch of Basal Area.



How are we to determine the value of our individual shade trees?

It is generally admitted that shade trees are valuable not only from an economic standpoint, but also from their aesthetic, historic and physical properties, but as my purpose is to show that there must be some definite method of determining their value, I am going to consider only the economic value.

The development of a street requires the removal of a tree at a certain point. Mr. A. says he wouldn't have that tree removed for \$1,000.

Would it damage his property to that extent? Would he pay that amount for replacing it? On what does he base his estimate of value?

A private corporation or individual damages a tree in such a manner that it dies. Mr. B. brings suit and claims damages of \$500 or \$1,000. The court allows him perhaps (?) \$150.

A city or town has a row of trees killed by gas. The gas company is sued, and here again the court awards an arbitrary figure of perhaps \$100 per tree, doubtless altogether regardless

of size, species, or condition. What method is used in determining these valuations? Up to the present time there have been a number of methods used.

\$500 for a Single Tree.

First, the arbitrary method; as for instance, in Massachusetts, where a State law formerly gave the court the privilege of placing a fine of not less than \$5, nor more than \$150, on a person found guilty of destroying a tree. This left it optional with the judge as to how much it should be. In New York State the court has established a record by handing down a verdict of \$500 apiece for the destruction of a tree by a construction company. In some cases an arbitrary value has been placed on the tree by means of its diameter, as for instance, \$2.00 per inch; that is, a tree 18 inches in diameter would be worth \$36.00.

Second, the replacement value, under which would come such cases as are settled on a basis of the cost of replacement.

Third, is the method of placing an arbitrary value per square inch of basal area taken at breast height, or 4½ feet from the ground. The usual figure used in this case is \$1.00. This is used principally because it is easy to figure with. In this case a tree 18 inches in diameter having a basal area of 254.47 square inches, would be considered worth \$254.47. This is rather different from the first example and obviously quite as much too large, for an average case, as the first is too small.

The Parker Method.

The fourth, called the Parker method, is a variation of the above. In this case \$1.00 per square inch of basal area is allowed, but a reduction is made for position, species, trunk, condition, top condition, and general desirability, scenic value, etc. Twenty per cent is allowed for each of five heads when perfect. An optional reduction is made for defects and the resultant figures added together and multiplied into the basal area valuation. This is by far the best of any system that has yet been advocated. It, however, has certain defects, as it tends to give too high a value to certain species.

For a number of years I have given much attention to a study of the valuation of trees and am convinced that some standard of valuation should be adopted.

In analyzing the various methods now in use it seems that the most accurate way of estimating the value of a tree is by means of its basal

area, as this is the best graphic indication of the tree's size of crown, which, after all, is the real valuable part of the shade tree.

No accurate basal area factor can be derived that will be equally valuable for all species. It becomes apparent then that we must first obtain a value per square inch for basal area that has some definite foundation, and then arrange a sliding scale of deduction factors for various species, according to their specie value, that is, rate of growth and resistance to insects, disease, climate and present physical condition.

To obtain the first, the sugar maple was selected as a standard species, because it has been more commonly planted for the past fifty years than any other tree, and we have more available data in regard to it. In order to reach a definite figure to apply to the basal area, we based our calculations on the amount of money invested in growing a tree to a diameter that would produce that basal area. This includes the original cost of the tree, its planting and maintenance. By using the best available figures for a sugar maple, we found that the average value per square inch of basal area at the end of fifty years is 64½ cents. This is the value of an ideal tree under perfect conditions.

Reduction Factors.

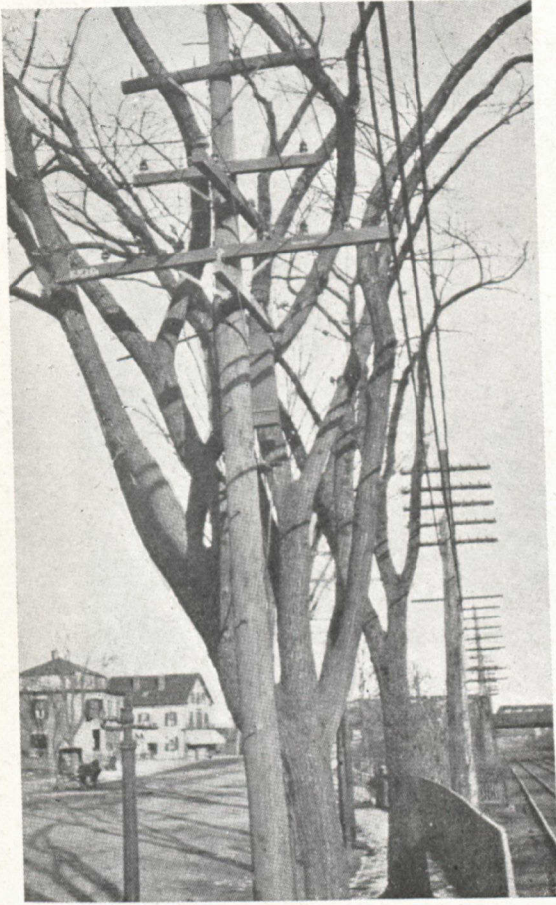
The next step was to obtain a scale of reduction factors for species and condition. It is evident that by the use of this method the value placed on a 12-inch fast growing tree would be the same as on a 12-inch slow growing tree, whereas the actual value of the slow grown tree would be much more. For instance, from a standpoint of interest on investment and maintenance, a 12-inch beech would be worth very much more than a 12-inch poplar.

To obtain a deduction factor, the most common species were divided into five classes, according to their rate of growth, and a proportional deduction made for each class.

As all trees are not equally valuable on account of their susceptibility to insects and diseases, they were again divided into five classes and the same deductions made.

One more reduction factor was necessary to complete the list, that for the present physical condition of the tree. To obtain this a reduction was made for the condition of the top and trunk, and the resulting figure used as the factor.

By applying the factors, obtained from the above deductions, to all common species of shade trees, we found that the sugar maple was



WHAT IS YOUR PRICE ON THIS DAMAGED
ELM?

City Forester Colton says it is worth \$142.55, and if uninjured by high tension wires would be worth \$199.56.

15 per cent below a perfect tree. Therefore, if the value of a sugar maple was $64\frac{1}{2}$ cents per square inch of cross-section, the value of a perfect tree, or a standard value, would be 75 cents.

A table has been prepared, using 75 cents as the value per square inch of basal area for a perfect tree, and showing the proper deduction factors for all species of shade trees. This table is being used by this office in obtaining values, and has been found very satisfactory.

There is one point in the discussion of the value of a shade tree which has not been touched upon in this article, and that is "location". Viewed from some angles, this is a very important point. From the fact, however, that there is such a chance for diversity of opinion as to the proper and improper location of a shade tree, I have purposely neglected to take

this into consideration in my factors for deductions. The opportunities for deductions of all kinds are so great, and the possibility of arriving at any definite figure for abatement so uncertain, that it has seemed best to eliminate this factor entirely. It is my belief that this deduction can safely be neglected, unless the tree is most obviously out of its proper location. If, as stated above, there can be no question about its improper location, then the party or parties judging the value should make some arbitrary reduction from the value placed on the tree by the prepared tables.

As a concrete example for the usefulness of some set value for shade trees, we have established an approximate value for all the street trees of Newton, Massachusetts.

In the summary of data gathered from the shade tree census, we have grouped all our trees by species, diameter classes and conditions. For instance: sugar maple, 1/6-inch; 7/12-inch, etc., and either Good, Fair or Poor condition.

Species.	No. of trees.	Value.
White Maple -----	355	40,206.00
Sugar Maple -----	6,531	\$612,851.00
American Elm -----	2,471	417,867.00
Norway Maple -----	1,130	98,737.00
White Ash -----	382	85,112.00
Red Maple -----	480	72,324.00
All other species -----	1,228	189,505.00

Total valuation ---- 12,577 \$1,516,602.00

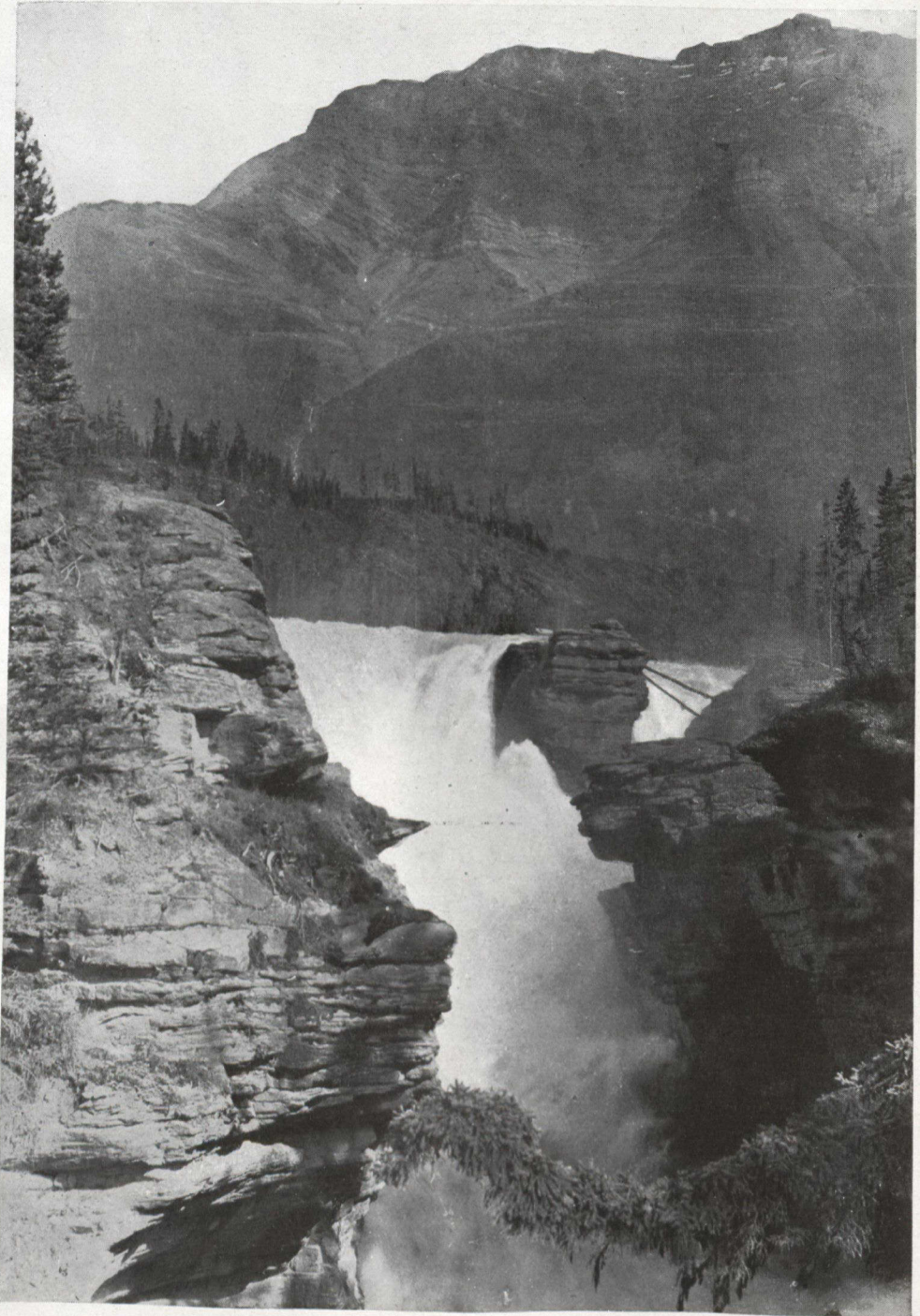
To obtain an approximate value for these, we have eliminated those classed as Poor altogether, and then based our calculations on an average valuation for trees in each diameter class. The average value was then reduced for species and the resulting value applied to the number of Good and Fair trees of each species in each diameter class, with the above result.

This is discounting entirely 2,320 trees classed as Poor, which would, of course, have some value.

It can readily be seen that with a permanent value established, the above figures are of unmistakable assistance to a city forester or arborist in convincing the city government or town fathers that it is a good investment for them to appropriate a sufficient sum of money to properly care for these trees.

PHOTOGRAPHS WANTED.

The Canadian Forestry Journal will pay \$1.50 each for unusual photographs of shade trees or of wild life.



In the depths of Athabasca Canyon, B.C.

PUBLIC NECESSITY AND PRIVATE RIGHTS

Canada Concerned in Principles Underlying American Efforts to Establish National Forest Policy.

Great interest and some alarm has been created in the United States by a proposal of Henry S. Graves, Chief Forester, that through Federal and State co-operation a national forest policy should be designed sufficient to place the nation's timber resources on a basis of sustained yield. The point of maximum friction, obviously, is that of proposed state interference with the handling of privately owned woodlands. Mr. Graves' tentative plan declines to allow the private owner any compensation for expenses incurred in carrying out a programme of constructive forestry. He allows compensation, however, in special cases where the timber must be kept standing for watershed protection, or maintained for a long period as a reserve, or destroyed as a preventive of insect depredations.

To all of which Mr. R. S. Kellogg, a former member of the Forest Service and now secretary of the Newsprint Service Bureau, makes an emphatic reply of which this is a part:

"Forestry Must Pay."

"It seems to me that the time has come when the professional foresters of the United States should be frank enough to acknowledge what those who have had practical experience saw long ago, namely, that the growing of large sized timber of ordinary commercial species is an operation too long in time, too hazardous in risk, and too low in rate of return to attract private capital, and that an attempt, national or state, to force private capital by legal enactment to engage in undertakings that are not profitable is doomed to failure. Forestry must be economically sound or it will not succeed."

Mr. Kellogg then suggests taking a timber census and land classification, the wider purchase of cut-over lands, the acquisition of a reserve supply of timber in the West, and better fire protection. In general, however, Mr. Kellogg advises against any mandatory action respecting management of private woodlands which, it is important to note, constitute four-fifths of the United States timber assets.

The Feeling in Canada.

Mr. Kellogg's criticism is not unlike what is

commonly heard in Canada in respect to any state interference with old-established logging methods that in certain places and in certain particulars may be the very antidote of conservation. In Canada, however, one finds progressive lumbermen and paper manufacturers openly critical of such ill-working blanket regulations as is involved in the diameter limit and not at all unwilling to adopt improved methods **if only they are made mandatory and at least province-wide.** Local forestry, patchy conservation, has taken no hold whatever in Canada, nor can it get far anywhere.

Many Canadians have said, after Mr. Kellogg's manner, "Forestry must be economically sound to succeed. Forestry must pay." This is open to a dozen interpretations. Is a cutting system that makes a tidy fortune for a jobber and yet so exhausts a timber tract as to close down an industrial town, economically sound? It is sound indeed, within the limited sense of the jobber's economy. It is quite unsound, and politically crazy, as a community enterprise. Whose economic soundness is to receive first consideration? Apparently, the head of the United States Forest Service makes the security of the state his starting point. No doubt Mr. Kellogg also would subscribe to that. The rest is a matter of method. Mr. Graves inclines towards legislative compulsion, believing that twenty years of educational method have not affected conditions on private-owned lands and that while logging methods may be uncomfortably regulated, the changed order will be uniform, and therefore acceptable.

Agreed on Need of Survey.

Mr. Kellogg calls for a preliminary timber survey. In all probability there is no better way of reaching a common ground for accurate discussion, whether as concerns United States or Canadian forest management.

One cannot fail to appreciate the intricacies of any American effort to govern the conversion of timber values on lands that have been completely alienated from public control. Many of the title deeds have been transferred again and again. To impose regulations deferring the cut-

ting of part of the timber thereon is, of course, to cut off a portion of the private profit in order to serve public necessity. Canadians may again

congratulate themselves that by the good sense of successive governments less than ten per cent of the forest area of the Dominion has passed out of state control.

TECHNICAL MEN WANTED IN THE WOODS

While forestry advocates generally acknowledge the cordial spirit and ready aid of Canadian lumber trade journals which have time and again opened their pages to discussions of better forest management, one or two of the United States lumber trade publications appear to get entertainment from pot-shooting technical foresters and the practice of scientific forestry. Not so, however, with the "Timberman," of Portland, Oregon, which in place of hiding its head in the sand of "We should worry", demands an awakening of all timber operators to the need of applying technical knowledge to cutting operations. The following is from a recent issue of the "Timberman":

"Perhaps no clearer statement of the needs of trained men in the lumber industry has been presented than that issued by the Oregon Agricultural College of Corvallis, Ore., in announcing its courses in Forestry:

An industry without leadership is as surely doomed as a rudderless ship. Of all the industries on the Pacific Coast the timber and lumber business is richest in exclusive worth. One-fifth of all the standing timber of the country is in Oregon. The harvesting of this great wealth so as to conserve essential values and serve the public to best advantage, is a task for thoughtful men who are specialists in handling forest products. These men must have the aid of modern science and modern engineering methods. Hence they must have training in a technical school of forestry.

The war crisis revealed to the world how essential to the nation is the timber wealth of the Pacific Coast. It revealed also the necessity of a far-seeing and consistent effort to conserve our forests as a permanent resource at the same time that we harvest the timber that is ripe and accessible for market. The activities in shipbuilding and the revived interest in private construction, as well as the extensive programmes for public construction that have been commenced throughout the country, all give assurance of great activity in the lumber business. Hence the need of live and resourceful youths to go out from

the School of Forestry as future leaders of approved principles of harvesting, manufacturing and marketing timber products. Such men are few and far between in practical lumbering operations to-day; since forestry is comparatively new in technical education. They will be needed, however, and demanded with greater emphasis, from year to year. The call is already insistent. The largest and most efficient companies are the ones who are keenest for employing technically trained men. They recognize the permanent worth of scientific leadership.

"The Timberman has always contended that the practice of scientific forestry methods would develop through the graduates of logging engineering schools where the young men, after engaging in operations, gradually will blend their theoretical ideals with those of the more practical side of lumbering.

The men who served in the Forestry regiments in France have learned an appreciation for timber conservation and its maximum use which will be exemplified in their future life's work, and in time will be reflected in the forest policies of the country at large."

MACHINES TO FELL TREES.

(*American Lumberman*)

The American Lumberman has private information to the effect that an American patent has been applied for (and will be followed by foreign patent applications) upon a new type of tree felling machine which uses an original design of chain saw as the cutting tool. It is driven by a small gasoline engine. The main frame, which rests upon the ground, is provided at one end with wheels so that it may be readily moved, and a sliding carriage operates upon it which carries both the saw and engine and may be moved forward toward the tree which is to be felled. The device appears to be mechanically very well designed, and while in its original design it is adapted only to tree felling, a combination design adapted also to cross cutting could be very readily worked out.



Photo by F. Johansen.

Where Canada's Forest Stops Growing.

On the Coppermine River, North West Territories, in "Arctic Canada". Many of the trees have been partly killed by forest insects.

THE FOREST'S LOSING FIGHT IN ARCTIC CANADA

By Frits Johansen, Geological Survey, Ottawa.

Intense Cold of Changing Climate Has Killed Young Trees—Remainder an Easy Prey to Insects.

The general outline of the northern limit for white spruce in Canada has long been known. It is found in the greater part of Ungava (Labrador Peninsula) and comes fairly close to the west side of James and Hudson Bays. North of Fort Churchill the line runs inland and follows roughly the Aylmer Lake-Coppermine River watersheds and makes a big bend north of Great Bear Lake to the Mackenzie River delta. North of this lake, however, many of the rivers which flow into Hudson Bay or the Arctic Ocean have spruce growth along their courses and thus carry the line of trees farther north. Much additional information is needed upon this point, and hardly anything general can be said about it except that

the trees are scarcer and more stunted the nearer one comes to the river mouths or as one goes higher up their slopes, and (to a less degree), according to latitude. The character of each river is important, whether it runs through an open valley or lies deeper down with steep sides—the amount of protection from the sweeping winds being the deciding factor.

In the region in question (south of Coronation Gulf) the observations embodied here were made by the Southern Party of the Canadian Arctic Expedition; but it should naturally not be forgotten that several other expeditions and explorers investigated the country earlier and have given us our main information about it. I refer to the accounts of Samuel Hearne, Sir John

Franklin and Dr. Richardson's expeditions, besides the various explorers and travellers who more recently (20th century) have used the Coppermine River as a kind of highway to or from the Arctic Ocean. Nowhere, however, is the northern limit of the white spruce treated from an ecological point of view, or in any detail at each place visited.

Grow Only With Protection.

With the exception of the Coppermine River and a small river (Naparktokuak) about ten miles east of it, no white spruce is found on the other river valleys further east or first when one reaches their upper courses. According to Dr. R. M. Anderson the spruce growth in the small, more unprotected Naparktokuak River (its name is Eskimo for spruce), is very stunted (below six feet) and scattered, only a little grove of trees being found here and there; but the trees reach to within a dozen miles of the Arctic coast. No observations were made in this river as to whether the trees were attacked by forest insects (no larger dead trees were observed) or not; but it is not likely to have been the case to any extent, the trees being too small and without connection with more extensive spruce growths; barren grounds intervening.

It is about $67-1/2^{\circ}$ Lat. n. that the most northern spruce trees along the river are found. The outposts are represented by about a dozen dwarfed trees which grow in scattered formation up the steep side of the west bank. I only saw them at a distance, but they seemed not to exceed four feet in height.

From here on, as one travels up the river, the trees increase in number and height and are found here and there on the banks; they are especially numerous and well developed in the mouths of small creeks—valleys joining the river, where they have some protection. We camped in a fair grove of trees on the east side of the river (near Escape Rapids) at a small creek-tributary. The best developed trees (up to about a dozen feet high) were found on a small flat at the mouth of the creek. As one went away from the creek or higher up the slope the growth became more scattered as also the trees smaller, and finally none at all were found. But old stumps and dead trunks of these trees showed that the spruce growth formerly attained a considerable size and had a more extended range up the slopes of this creek. As we continued further up the river on the east side the growths of trees became more numerous, and a larger creek near Sandstone

Rapids, where I stayed four or five days, afforded good opportunities for observations on the spruce trees here.

The west bank of the Coppermine River at the mouth of this creek is quite barren. On the east bank of the river the spruce growth is best developed (as a real small forest of high trees) in a depression south of and on top of a higher rounded cliff at the narrow place of the river a little north of the creek. The spruce vegetation is also well developed on a similar cliff-exposure on the east bank of the river a little south of the creek while the trees at the mouth of the creek are represented by a few scattered clusters and rather dwarfed. Following up this creek on the east bank of the river a grove of fair-sized trees are found in a protected pocket on the north side of the creek, but otherwise the growth gets more and more scattered and the trees dwarfed, until they quite disappear on top of the slopes. The biggest spruce tree I saw in this creek measured 59 inches in circumference about three feet from the ground, and it was 20 to 30 feet high. All the large trees had many dead branches among the living ones; and most of them were to a lesser or larger degree attacked by forest insects. Scattered over the region occupied by the living trees, and for a considerable distance outside of these were many dead trees and stumps standing, mostly deprived of their bark and of a still larger size than most of the living ones. They practically all showed signs of having been killed by forest insects.

From what I saw of the growth of white spruce on the lower Coppermine River it is evident that the occurrence of the trees depends principally upon the amount of protection available from the sweeping winter winds. As the winds mostly come from the north the spruce trees are found almost exclusively and attain their greatest development in localities protected from that direction, where also they benefit most from the warm rays of the sun. The kind of soil present at the various places of growth is much less important. I have seen real forests growing on almost the bare cliffs, while no trees at all were found on the exposed tundra.

Young Trees no Longer Thrive.

Another striking characteristic is the scarcity of very young spruce trees in this northern limit of their growth. Perhaps the intense cold and the sweeping wind in the winter time kills off most of the small seedlings which may have succeeded in taking root during the summer. This explanation is also indicated by an ex-

amination of the age of the various trees here; by counting the rings even the small and stunted trees were found to be under half a century old, while the largest trees would reach an age of almost 500 years.

I did not myself travel any further up the Coppermine River than around Sandstone Rapids, but from observations made by other members of the expedition it is clear, that even if the spruce growth gradually gets more extensive and the trees better developed, the characteristics (stunted growth on exposed places, many dead trees, etc.) remain the same.

Curiously enough seems the fact, that forest insects are principally responsible for the killing of the trees or tree parts on the lower Coppermine River, and have passed unnoticed by the various explorers and travellers who have visited the region from time to time; though they all comment upon the other characteristics of the spruce vegetation. A deterioration of the climate, coupled with destructive fires now and then, and the exposed position of the trees at a high latitude, have been given as reasons for their peculiar appearance in shape and growth. Now we have definite observations upon the spruce trees here; and remembering that the destructive forest insects in question do not attack dead trees, we may safely assume that casual wounds inflicted by the traveller's axe or a forest fire upon the living trees give the

forest insects an opportunity to increase the damage, and finally kill off the individual trees; and thus accomplish in a few years the same result which it will take a century or more to affect by the present slow deterioration of the climate only. It should also be remembered, that a forest fire is less destructive on places where the growth of trees is so scattered and the underbrush so little developed as is the case on the lower Coppermine River. The very isolation and exposure of the individual trees here make them ideal objects for attack by forest insects, which by living under the bark are less influenced by the shortness of the summer season.

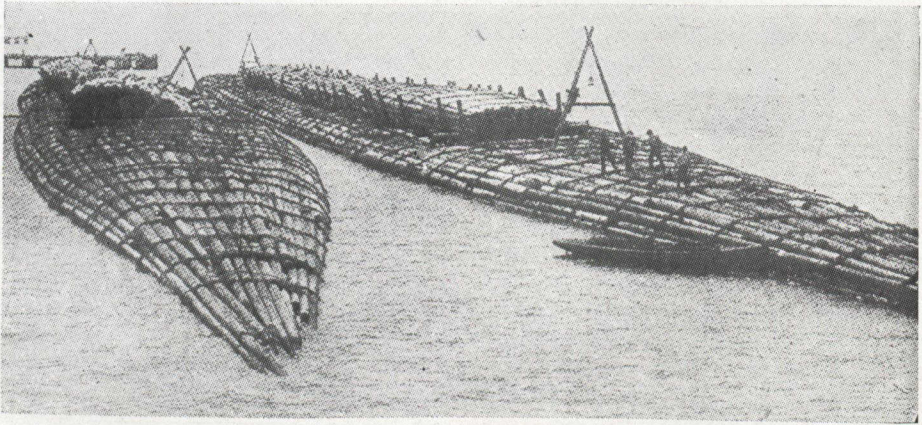
REMOVED BY SPECIAL TRAIN.

After fighting for 24 hours forest fires which threatened to sweep the town, the inhabitants of Natal, B.C., were removed from the town in a special train, while a volunteer fire corps under Chief MacDougall extinguished blaze after blaze within the town itself until the fire in the immediate vicinity had spent itself. No serious casualties were reported. Forest fires were reported from many districts near, and some ranching property was threatened. A fire one mile east of Hosmer was confined to cut-over land, and the fire wardens have been successful so far in protecting valuable timber lands.



Photo by F. Johansen.

In the Last Northerly Zone of Tree Growth.
Camping among white spruce, near Sandstone Rapids, Coppermine River, N.W.T.



How Canada's timber may reach foreign markets in future, thereby ameliorating the shipping problem. Picture shows Benson log rafts moored in San Diego harbor after a journey of 1,200 miles by ocean from the Columbia River.

PASSING OF THE BALSAM BUDWORM IN N. B.

By John D. Tothill, in charge of Natural Control Investigations,
Dominion Entomological Laboratory, Fredericton, N.B.



Shall We Have Another Outbreak?—Damage May Be Prevented by Allowing No Solid Stands of Fir.



We are frequently asked what effect will the present outbreak of the Spruce Budworm have upon the status of the tree more particularly affected, namely the Balsam Fir. The outbreak in question is practically confined to part of the New Brunswick forest and it is to this area that the following remarks will apply.

First of all, however, what is the Spruce Budworm? Many readers who have visited the New Brunswick woods during the past few years will know that most of the fir boughs cut in June and early July have not been fit for making up a bough bed. They have been filled with caterpillars which are those of the Spruce Budworm. Again some have seen in July areas of our forest having the appearance of being scorched as if by a light fire; this appearance has been caused by the budworm caterpillars eating away the new needles, the remnants of which have turned brown. Some again will remember the clouds of little moths that accumulated around

the arc lights of Fredericton and other cities toward the latter part of July in 1913 and 1914. The caterpillars of the boughs had become full fed and had turned into chrysalids and from the chrysalids had emerged the winged moths. The winter stage is less conspicuous. After pairing the female moth lays batches of green colored eggs on the needles of fir and spruce; the eggs hatch in August and the resulting caterpillars seek out a sheltered crevice in the bark; here they spin a silken case and spend the winter. In the following May the tiny caterpillars come out of their shelter and climb to the opening buds where they feed upon the new foliage. These tiny insects soon grow into the caterpillars of the boughs that we have already referred to.

The Degrees of Injury.

So much then for the nature of the insect. As to what it does we have already noted that its caterpillars destroy the tender foliage of fir

trees. In a general way it can be said that the fir trees defoliated in 1914 seemed quite vigorous in 1915; those defoliated in both 1914 and 1915 showed growth checks and a slight amount of top injury in 1916; those defoliated successively in 1914, 1915 and 1916 showed severe growth checks and also severe top injury in 1917, and a few of them were killed; while those defoliated in 1917 in addition to the preceding three years were nearly all killed.

The insect has now been on the rampage for five years and is at last decreasing in numbers. It has killed a very large proportion of the fir trees that are over twenty years of age, but has not effected very much the younger trees whose tops are still in partial shade; for the moths dislike laying eggs on trees whose tops do not pass through the forest roof. Neither has it effected very much any of the three species of spruce occurring in the province. So that while the damage done has been exceedingly heavy it has fortunately been confined almost wholly to fir of merchantable size.

Centuries Before Champlain.

One is often asked is the insect a new one. No, it is not a new one to the continent, but is a native and it probably occurred in New Brunswick for centuries before Champlain discovered the Saint John River in 1604. We have actual records of these outbreaks of this insect that have occurred in the State of Maine, and probably also in New Brunswick, during the past 110 years.

If history repeats itself, we are due to have another outbreak in twenty or thirty years, and judging from the preponderance of fir in the present reproduction the next outbreak is likely to be far more serious than any of its predecessors. Moreover another outbreak seems inevitable unless active measures are taken to prevent it.

How to Prevent Recurrence.

A study of conditions in the New Brunswick forest during the present outbreak has brought out the fact that the Budworm has gained no foothold in areas where the Balsam Fir exists in the primeval condition of a mixed growth. Another outbreak would evidently be prevented by so arranging cutting operations as to prevent the formation of solid stands of fir. Just how feasible it will be to prevent the undue production of fir is not yet clear. The problem however, is one that merits the most earnest consideration of those actually controlling the cutting operations, and upon its successful solution depends in no small measure the future success of the lumber industry in this province.

AERIAL PATROL DOES GOOD WORK.

Flying from March Field, Alessandro, Calif., an army airplane engaged in fire patrol work discovered a fire in the Waterman Canyon, not far from San Bernardino. A message giving the alarm was dropped in San Bernardino at once. Within a few minutes fifty fire-fighters were on the way to the scene of the fire. They arrived in ample time to prevent a destructive blaze.

There follow some recent notes on fire patrol work by the Air Service from several California aviation fields:

Exceedingly dry weather over California has caused increased vigilance of the aerial fire patrol and the watch from the observation balloon (United States Army School Arcadia staff) was maintained throughout the night.

Mather Field staff, Sacramento, Calif., during the week ending June 21, 1919, made 21 flights over the national forests, discovering four fires which were reported to the Forestry Service at Placerville Calif. The total mileage of the patrol was 3,000 and the patrol pilots were fifty-three hours in the air.

March Field staff, Alessandro, Calif.—Twenty-four trips were made, occupying thirty-eight hours, covering 2,500 miles.

Rockwell Field staff, San Diego, Calif.—Eight flights were made in twenty-six hours and twenty-six minutes, covering a distance of 2,115 miles.

E. T. Allen, secretary of the Western Forestry and Conservation Association, has long advocated the use of aircraft to spot fires on the north Pacific coast and in the Inland Empire. He recently urged that the aerial fire patrol work inaugurated in California be extended up the coast. The California flyers are patrolling regularly over a forested area covering about 6,000,000 acres. Estimated by Forest Service experts are that the work could be extended over 90,000,000 acres.

Aircraft are especially valuable for locating fires in deep canyons and valleys. Frequently the smoke from such fires does not reach the line of vision of the experts in lookout towers on high points until the blaze has had a chance to get a good start. While this form of fire protection always will be expensive, it fits in so well as one of the civil uses for the airplane and lighter-than-air craft and furnishes such excellent training for pilots and observers that it may be adopted as a permanent part of the work of the Air Service.

A QUESTION FOR NEW BRUNSWICK!

By Angus McLean, President, Bathurst Lumber Company,
Bathurst, N.B.

Development of Pulp and Paper Industries is a Stimulant to New Employment and Closer Utilization.

MR. McLEAN'S CONTENTIONS:

Stamp out forest fires.
Encourage establishment of pulp and paper industries to utilize maximum values from the forest.

Reclaim waste lands for timber.
Discourage extravagant practices of sawmills.

Bathurst, N.B., July 1, 1919.

Editor Canadian Forestry Journal,—I have a request from the Editor for a short letter touching on the forestry conditions in New Brunswick. I am, of course, more familiar with conditions prevailing on the north shore of the province, but conditions vary but very little in the whole of this province and they are also very similar to conditions prevailing in Nova Scotia.

In this country we are not subject to any serious forest fire hazard and with any kind of ordinary care we should completely abolish this hazard. This condition is due to the fact that we have a heavy precipitation here during the periods that are usually dangerous for fires. Then we invariably get early snows and they cover the ground in the woods usually up to the 1st of May and in the thick forests very often up to the early part of June. By that time the green undergrowth in the woods is up and covers the ground so that fires do not run. Our experience of ten years here has been so uniformly satisfactory in this respect that we are quite satisfied we are practically at the point where we will absolutely eliminate this hazard. We have had a few minor fires in our woodlands, but they have always been extinguished before much if any damage was done, so that our loss from bush fires covering this ten year period has been practically nil. What fires have taken place were invariably started by some settler burning up his slash without proper supervision. Our Minister of Crown Lands, Dr. Smith has taken the necessary and proper steps

to stop this hazard and regulate the burning of all slash in the future, and we are convinced he will succeed.

Bog Lands.

Most of our woodlands have a thriving growth of young timber on them, but we have some areas of bog and burned-over territory which should be receiving attention and prepared to produce timber, as most of our lands are not fit for farming and are only suitable for growing trees. The bog lands ought to be drained and the old burned-over lands, of many years standing, put into shape that young trees could grow on them. This requires some attention from a practiced forester. Apart from these above-named lands our timber reproduces itself without any artificial effort whatever. Please remember that these burned-over areas are of long standing and they were largely caused by hunters who claimed they needed open areas in the forest in order to get game as the moose and deer could not be successfully hunted in the dense growth.

More Careful Cutting.

Next and one of the most important matters is the cutting of timber. This, of course, is done under government regulations when cutting on Crown lands. There has, however, been very great loss caused in cutting timber in our forests here in the past, owing to the small trees cut in yarding and making roads being allowed to remain in the woods to rot and also when trees are felled too much timber is left at the stump in way of butting and large tops. Am quite sure fully one-quarter of the trees has been wasted in this way in the past. Of course in the ordinary course of lumbering for sawn lumber only, it is not feasible to take out the defective butts and small tops profitably, but these can all be used profitably in the pulp and paper industry and this is in the line our Provincial Government should devote some time to, and encourage these establishments in every possible way.

"Appalling Waste."

Next, the waste at the saw mills in New Brunswick and also in Nova Scotia is really appalling. Every mill in the land has either a steel incinerator or an open burner, into which thousands of cords of good material are being dumped and burned up annually, causing a serious loss of good raw material which should be utilized, and depriving many men of work to fit this material for the market. This is a great economic loss which should be very speedily corrected. In New Brunswick alone, hundreds of thousands of dollars are lost in this operation annually.

Another matter that is worthy of serious consideration is the manufacturing of our lumber and other products from wood into as near as possible the finished products at home. Too much unfinished raw material is being shipped out of the country on which needless cost is

entailed in the way of freight charges and our country is deprived of the expenditure of labor to convert.

Now to sum up, we must be satisfied with nothing less than absolute safety from fire in our forests.

Our waste and unproductive forest lands should be reclaimed and set to growing timber.

Our cutting should be so regulated that there would be no usable material whatever left in the woods when cutting is done.

Our waste in the saw milling eliminated until not even a grain of saw dust will be burned for naught. All material at the saw mills that is not usable in some form may be used as fuel to create power.

There are many other points I could touch upon, but this letter is already too lengthy.

Yours truly,

ANGUS McLEAN.

TREE PLANTING WORK IN QUEBEC



Berthierville Now Has Four Million Seedlings—Laurentide Company Has Developed Successful Plantations.



One of the most valuable organizations in the Dominion for the promotion of actual conservation of forests is the Woodlands Section of the Canadian Pulp and Paper Association. How close to its problems the Woodlands Section keeps was well illustrated by the holding of a summer meeting at Berthierville, and Grand Mere, Quebec, on Wednesday and Thursday, June 25th and 26th. About seventy-five men identified with the wood-using industries of Ontario, Quebec and New Brunswick, together with Government Ministers and foresters spent a full day in constructive discussion of urgent problems and in estimating the possibilities of forest re-planting. Mr. Piche's nursery work at Berthierville is always interesting, but especially was it so when every point in its development was carefully drawn to the attention of the large visiting party. Mr. Piche, with the enthusiastic backing of his Minister, Hon. Jules Allard, has built up a stock of 4,000,000 seedlings and it is expected that shipments from two to three million plants annually will soon be possible. The product of the Berthierville nurseries may be

seen in all parts of Quebec, and the Government itself has done quite extensive work in planting up denuded lands. Not the least important section of the nursery area is the 25 acres laid out for experimental work. This is made up of well-wooded land, and from the investigations in conditions of growth, the department is securing valuable data.

Following the tour of the nurseries, the guests assembled in the dining room of the pavillion where Hon. Mr. Allard delivered an address of welcome. Mr. Piche followed with a paper on reforestation problems, which the Forestry Journal will shortly publish. Mr. Ellwood Wilson, forester of the Laurentide Company, and Mr. F. W. Reed, of the United States Forest Service, lead the discussion. This centered upon the inadequacy of present timber cutting regulations which, as frequently pointed out by the Canadian Forestry Association, must bear a serious share of responsibility for deteriorating tendencies in eastern Canadian forests. It was pointed out at the meeting that the theory underlying the regulations was incorrectly based

and did not accomplish what was intended. Trees left after the first cutting did not commonly provide a second crop, but were subject to windfall and rot with usually very little increment in growth. As Mr. Wilson remarked: "We cannot afford after fifty years to establish camps to cut only 2½ cords per acre". By cutting clean under proper regulation, two major results would be accomplished: good natural reforestation would ensue, and slash disposal could be carried on under ideal conditions. The riddance of debris was a pre-requisite of thorough fire prevention. Mr. W. Gerard Power strongly supported the claims for clean cutting and mentioned the fact that he had been conducting some experiments on reproduction on burned-over areas.

Mr. Reed brought forward some interesting experience from United States practice and approved of clean cutting in spruce forests.

At Grand Mere, the delegates were taken to the Laurentide company's nurseries and the

reforested area at Proulx. This will be made the subject of a special article in an early issue of the Forestry Journal. The Laurentide company planted 912,000 seedlings in 1919, and expect to put out more than a million annually from their own seed beds. The Laurentide company and Mr. Wilson were thanked heartily for the courtesies afforded during the Grand Mere visit. A similar expression was conveyed to Hon. Mr. Allard and Mr. Piche.

A very interesting incident of the visit was the demonstration of the hydro-aeroplanes recently obtained from the Dominion Government for forest patrol experiments by the St. Maurice Forest Protective Association. Mr. Stuart Graham, the aviator, took one of the machines into the air from the surface of Lac Tortue and flew over the heads of the party at an elevation of a few hundred feet. The management of the machine was perfectly ordered and greatly impressed the onlookers.

ONTARIO'S FOREST POSSESSIONS

By James White, Assistant to Chairman, Commission of Conservation.

Regarding the survey of the forest resources of Ontario, the Commission of Conservation has been assured of the fullest co-operation of the Ontario Government in this undertaking and proposes to start at once on the completion of the data.

It took practically four years to complete the report on the "Forests of British Columbia" which has lately been issued and it is expected to take nearly as long to prepare a similar report for Ontario. Much will depend on the various departments of the government and from the timber owners. It is, of course, impossible for the Commission to attempt to cruise the whole province and since such a large proportion of the merchantable timber is in private holdings, for which the owners have detailed cruises, it would be extremely wasteful both of time and money, to duplicate this work. The Commission is therefore depending on the lumbermen, as it did in British Columbia, to supply the information they possess. It may be pointed out that, in British Columbia, detailed cruises were secured on 70 per cent of the alienated lands and in only two or three unimportant instances was the information withheld when available.

Ontario's Co-Operation.

Through the courtesy of the Minister of Lands, Forests and Mines of Ontario, the Commission will have access to all the cruises and reports in his department. Other sources of information will be cruisers, rangers, surveyors, explorers, etc., who have knowledge of local conditions, and, in addition, a considerable amount of field work will be conducted to check and connect up the data received from other sources.

The individual reports will be treated as confidential and used only as a basis for arriving at totals for large drainage areas embracing many holdings. It is hoped that sufficient data will be collected to permit of a general classification of the land as to whether it is wasteland or is suitable for agriculture or for forestry. Maps will be prepared, showing in a broad way the various forest types as regards composition and yield.

The report on the "Forests of British Columbia" has been received with the marked appreciation of the timber owners, lumbermen and others interested in the development of the forest resources of that province and it is felt that

information of a similar nature should be available for the rest of the Dominion.

Saskatchewan Report Soon.

The Commission of Conservation has completed a survey of the forest resources of Saskatchewan but, owing to the illness of the for-ester who conducted the investigation, the completion of the report has been much delayed. It is hoped, however, that it will be in the hands of the printer at an early date. In 1909-10, a similar survey of the forests of Nova Scotia was made by the government of the province. When completed, the report was published by the Commission of Conservation.

Much data respecting the forests of Alberta and Manitoba have been obtained by the Forestry Branch, Department of the Interior, and when supplemented by some further investigations, will be available for publication. The forests of New Brunswick are now being surveyed by the government of that province. Ontario and Quebec, therefore, are the only provinces in which a very large amount of investigatory work is required and, if the survey of Quebec's forests is undertaken by the Quebec Government, we may look forward with confidence to the completion, at a comparatively early date, of the survey of the forest resources of Canada. Then and then only, will we be able to formulate with confidence specific measures for the areas of Canada that contain forests and for the areas that are suitable only for the growth of forests. Unfortunately, when com-

pleted, this survey will demonstrate that the optimistic statements respecting our "illimitable" and "inexhaustible" forest resources have no foundation in fact.

Canada Needs Production.

Forests are primarily valuable for the production of wood. At the present time, Canada needs increased production as never before, but the fact must not be overlooked that we shall require sustained production for several generations in order to meet the obligations which the war has imposed on us. That our forests may be used to the best advantage, it is necessary that we first know what stock we have on hand; second, what future crops can be looked for; and third, what means can best be adapted to sustain and increase production. This knowledge is perhaps more valuable to those engaged in the forest industries than to the governments since a knowledge of the available supplies will enable them to so plan their operations that their plants may be kept running. The increasing shortage of supplies is becoming a serious matter, especially for the pulp industry and the problem of reproduction either naturally or by planting, has become a live issue. The Commission of Conservation is conducting an extensive investigation of this subject and with a knowledge of the virgin supplies, basic information will be available as to the practical possibility or advisability of adopting means of maintaining the productivity of their timberlands.

WOMEN MAKE GOOD AS LUMBERJACKS

(*Mr. Geo. Leven, at Meeting of Royal Scottish Arboricultural Society*)

"At the present moment I could specify one estate in the south-east of Scotland where women have undertaken very important work during this past season. They have not only been useful in planting operations and in felling and cleaning pit-wood, but they have tackled trees of a cubic capacity of 230 feet and felled them to the satisfaction of merchants and others. That is a very big undertaking and there are many people who would scarcely believe it, but it is absolutely the case, and I believe if we could devote more attention than we have done

in the past to better tools, better equipment, and perhaps a little better accommodation than some of them have had, that we would be able to make use of a very great number of women. I do not think it is altogether fair that we should treat them as beasts of burden. We should make some provision for training them, because I am absolutely convinced they can do a great amount of the work that falls to men in forestry. The women I have referred to have been able to do almost all the work with the exception of "laying in" these very large trees."

CAN TIMBER LIMITS BE MAPPED BY AIRPLANE?

By *Rolph Thelen.*

The development of aerial photography as a highly important and indispensable phase of modern warfare has been one of the many wonders of the great war. Photographic reconnaissance was practically unthought of during the early stages of the conflict, and may be said to have been an outcome of trench warfare. At the time the United States entered the war this art had become of tremendous importance, and in the final stages a complete detailed photographic map of each sector had to be made daily. General Squier states that the British army made 17,000 photographs before the operations at St. Quentin in order that a relief map of the whole sector might be prepared before undertaking the drive.

Military maps of this character are commonly called mosaics, and are made as follows: An airplane (other forms of aircraft could be used under certain conditions) equipped with a magazine camera flies over the area to be mapped, maintaining as uniform an altitude as possible, and exposures are taken at the proper intervals to insure a sufficient overlapping of the resulting negatives. If the area is too wide to be mapped in one flight, a number of parallel flights must be made, and the negatives of each succeeding flight must overlap those of the previous flight. After the negatives have been developed, prints are all made to the same scale; this is done by making them in an enlarging camera instead of by contact. Distortion, caused by obliquity of the plate at the instant of exposure, can also be corrected in the enlarging camera if proper base points are available. The cameras are usually rigidly attached to the planes, and since it is impossible to fly continuously on an absolutely even keel, a certain amount of distortion is bound to occur. After the prints are made, they are matched up, trimmed and assembled into the finished mosaic. It is obvious that in the case of flat terrain it is possible by this means to product an accurate scale map. However, in the case of mountainous country, this is not possible, since the scale will vary unevenly throughout the negative with variations in elevation. Thus a peak will be abnormally large in scale compared with a valley appearing in the same photograph, since it will be nearer the camera in elevation at the instant of exposure. The summit will be large scale, the valley small scale, and the slopes on

various intervening scales. In spite of this undesirable feature this type of map answers military requirements admirably, especially when accurate scale maps of the region are available, as was the case in France, and the main need for the photographic maps is to show the activities of the enemy. Points on the photographs can be tied in with the corresponding points on the scale maps, and the desired amount of detail filled in with almost any degree of accuracy. The speed with which aerial mosaics can be made is remarkable. The Division of Military Aeronautics recently made a mosaic of the City of Washington and surrounding country in a total flying time of only 2¼ hours. The area covered was 27 square miles.

The possibility of producing accurate topographic maps from photographs has been appreciated for many years, and the camera has been used for topographic surveys to a limited extent in India, France, and Italy, and almost exclusively in the Dominion of Canada. Cameras used for this purpose are known as photodolites, and are equipped with suitable cross-hairs leveling devices, horizontal scale, and magnetic compass, as well as with a small telescope for the reading of vertical angles.

ARSENIC TO KILL USELESS TREES.

"Of late years, the action of arsenic has been introduced with marked success in hastening the killing by the ring-barking process, and trees that ordinarily would take months to kill by the old method, are now killed in a few weeks, and frequently in a few days, by the application of arsenic."—*Australian Forestry Journal.*

St. Johns, Nfld., July 4.—Reports say that a big forest fire is raging on the Exploits River, and that dwellings near Exploits were in danger. Minister of Mines and Agriculture Walsh received the following message from Badger last evening: "Fire has encircled Badger, but so far only one house has been destroyed. Another has been badly damaged. The fire has crossed to the south side of the Exploits River, and the place is still in danger. Forest fires are now raging within a radius of ten to twelve miles north-east and spreading to south side of river."



Entrance to Yellowhead Pass, Jasper Park, B.C.

MAKING FORESTRY PAY ITS WAY



How a Stave Mill, Erected to Consume
Useless Hardwoods Turned in 42
per cent.



The necessity of compromise between the ideal forest of the technical expert and the forest that can be developed within the restricting lines of profit-making, always provides a halo of interest for any experiment in technical woodland management. At a recent meeting of the Pennsylvania Forestry Association, attended by the Editor of the Canadian Forestry Journal, Mr. Alfred E. Rupp, Forester of the Buchanan Forest of Pennsylvania, recounted the story of an experiment in the manufacture of staves which netted 42 per cent profit. The operation was not intended to help out the stave supply but primarily to remove from a tract all trees without future value so that young valuable species might develop and form the predominating stand; secondly, to market the products at a fair profit; thirdly, to train sawyers and operators for future stave mill operations.

This has a special point of contact with one of the gravest problems of operating the great spruce forests of Eastern Canada on a basis of sustained yield. In Central Quebec, for example, the removal of white spruce brings along a second crop of hardwoods and balsam fir in which a new growth of spruce is an uncertain factor. To remove the hardwoods, obviously, will encourage the spruce, but how to make a profitable logging proposition out of what undoubtedly is good forestry practice brings up one of the knottiest questions of the hour.

A Better Forest.

It is not suggested by the Canadian Forestry Journal that a profit of 42 per cent can be promised on such an enterprise as Mr. Rupp's under Canadian conditions for it must be remembered that the bulk of the machinery was bought at scrap iron prices and some of the labor performed by state employees was not charged up to the final reckoning. The transportation situation was strikingly better than would be encountered in Northern Ontario.

The chief problem before the eyes of Forester Rupp was to improve reforestation conditions on the areas in his charge. He found the land cumbered by a growth of fire-scarred,

blighted, crooked and timberless trees, making reproduction of valuable species exceedingly difficult. The entire area had been lumbered between 1900 and 1910, and all timber trees were cut at that time. To cut for cordwood was out of the question, owing to costs of transportation, etc. Mr. Rupp therefore set about to remove the useless trees and give a growing chance to the seedlings of more valuable species. Every care was taken, and additional expense incurred to save the young growth from damage.

On 33 acres of the tract planting had been done from 1911 to 1915 as follows: 30,000 white pine, 27,000 Norway spruce, 4,000 white oak and numerous other species. The young trees demanded more light and the canopy had to be thinned.

Liberal Profits.

Said Mr. Rupp: "We did not begin sawing staves to see how much money could be made. We are working for future benefits. If this operation assures this, we need make expenses only to justify the operation. We have made more than expenses as the following statement shows: We have sawed 501,944 staves, which were sold f.o.b. our shipping point for \$5,019.44. The cost of manufacture to date is \$3,528.44. The profit therefore is \$1,491.00, with a large amount of unsold material on hand. The operating expenses are proportioned as follows: Logging 23 per cent, sawing 62 per cent, marketing 15 per cent.

"The Department of Forestry paid \$2.00 an acre for this land. At an expense of \$13.25 per acre, 33.8 acres of the area were planted in trees. The shelter trees in the plantations have all been removed, and about 25 acres additional have been cleared of all large growth. The chestnut has been removed from 80 acres by selective cutting. The removal of this timber and its manufacture into staves has paid the Department more than \$10.00 an acre. This is \$8.00 more than was paid for the land. We expect the cleared area will reforest itself in tulip poplar, and the selective cutting area in hickory and chestnut oak. Great care, at extra

expense, was exercised in the logging operations to save the young growth. We have reason to believe that the treated areas will become as valuable as the planted areas.

"The total amount of the department investment is \$1,730.00, which includes team, wagon, engine, mill machinery, and buildings. The profit of the operation to the present time is \$239.00 less than the cost of the equipment; but the drying yard contains 70,000 staves unsold, and 150,000 staves are still to be manufactured from this area. The large chestnut and poplar logs have not been used for staves, but are reserved for lumber. These logs, with oak, maple, ash, and cherry, will cut 75,000 board feet of lumber. We have 50 cords of locust for insulator pins and 60 cords of wood for fuel to be removed from the area. The brush has been piled and will be burned when weather conditions permit.

Making Mill Managers.

"Permit me again to mention the purposes we had in mind before the operation was started:

1st. The removal of all trees necessary to the well-being of the future stand. This has been done with one exception. No trees harboring insects have been cut. No matter how

unsightly they were, no exception was made to this rule.

2nd. Profit. A profit of \$2.97 a thousand on the staves, \$5.34 stumpage in terms of cordwood, and \$10.68 a thousand in terms of board feet, was made on the operation. More than \$10.00 an acre has already been cleared on land purchased by the department for \$2.00 an acre, with other profits to follow and to be accounted for.

3rd. Training for future service. That "experience is the best teacher" is exemplified in this operation. Our blue print was a memory print of a mill worked on 20 years ago. Many of the mill parts were missing and it was necessary to replace them. The hard work done by the rangers assured the success of the enterprise. Thirty-one per cent of all the labor expended on the operation was furnished by the rangers and the forester. The salaried men of the department are skilled in operating all the machines and can superintend their erection and operation. We can now offer to the department of forestry three employees who can superintend stave mill operations. They are worth more to the department than a 42 per cent profit on the manufacture of keg staves."

BUILDING A NATION ON A TREE FARM

By Robson Black.

(Continued from June issue.)



Canada's Forest Possessions Have Been the Backbone of Continuous Prosperity.—
What the Future Promises.



Our Debt to the Lumberman.

Though we may have paid the price in a diminution of the rich supplies of standing timber, the unhampered exploitation of the forest resources has undoubtedly had many and mighty compensations. Lumbering, our most widely distributed industry, has opened up countless productive agricultural and grazing areas, and has supplied winter employment for tens of thousands of farmers through their first attempt at field crops. Lumbering has always been the country's greatest employer; it is a greater wage distributor, and, with pulp and paper making, holds more capital than any other Canadian industry. Faith in Canadian potentialities has in this matter been correctly founded. The development of her natural resources is Canada's obvious path to prosperity. True, we have diverted much time and capital to not a few industrial exotics, but that has a fashion of correcting itself periodically. The manifest starting point of a young nation such as Canada is to

seek to specialize in the least crowded field, to carry to market those wares that are subject to minimum competition. For instance, eighteen years ago, Canada's paper sales to the United States were just \$122. The pulp and paper exports in 1918 exceeded \$60,000,000, and the main reason for this phenomenal growth is that Eastern United States forests have "pinched out", or water powers have failed or risen to excessive cost, whereas in Canada, there remained that happy trinity for paper industries: wood, water powers, and transportation.

The industrial position of the pulp and newsprint paper mills in particular is not surpassed by any achievement of the United States. The point of apprehension, therefore, is not that the Canadian manufacturers of wood products need fear the ordinary tides of competition but that the supplies of accessible forest materials may prove unequal to the demand. This is no longer a mere sour speculation. Lumber companies have been forced in many instances to face total depletion of timber supplies, particularly white pine, while even some more recently developed pulp companies are not a little handicapped by a failing source of accessible spruce wood. Corroboration is found in the constantly ascending price of timber limits, particularly in Eastern Canada, the advancing of Government dues as fast as old agreements expire, the reduction of "estimated" timber stands on much of the public and private lands as accurate cruises are applied. This not only presages a dilemma for many industries which cannot survive a greatly increased cost for long hauls on their wood, but it materially restricts development of new industries and curtails the country's advantages in foreign export. The latter is of exceeding importance, for our exports of forest products have overtopped every other manufacture except the temporary output of munitions. To maintain and improve the nation's export business is the most pressing concern of our financial statesmanship. Is it too much to ask, therefore, that the examination of the various factors in export trade of pulp and paper and lumber should show some penetration, and that our national government taxing its brains over creating post-bellum exports might with profit give some attention to the living forest that lays the largest of our export eggs?

Canada's Great Tree Wealth.

The vital importance of forests to Canada cannot well be overstated. This seems so obvious that one would expect to find forest management a highly organized and advanced function of all governments these many years. Two-thirds of the Dominion is incapable of producing other than timber crops. Of the 163 million acres of Alberta, for example, not more than thirty per cent are capable of cereal production, and in 1915 only 6,000,000 acres were actually tilled. Quebec had a hundred years start in agriculture, and yet but nine out of 200 millions of her acres are under farm; nor can that ratio ever be seriously reduced by agricultural expansion. Nearly seventy per cent of New Brunswick is fitted by natural conditions for timber-growing, and for that alone. But forests, however vital to national existence, are backward political advertisers, and public policies in Canada have in a marked degree been formulated not primarily from scientific considerations but from respect for political consequences. Neglect of the forest breeds no consequences of such a sort; dead timber lands tell no tales.

Public Control of Forests.

Notwithstanding all the unmatched lethargy in the rudiments of public forestry, it is fortunate that no Canadian Government made the supreme blunder chargeable to the people of the United States of parting with the control by outright alienation of four-fifths of the republic's timber lands. Not more than five or ten per cent of the ground title in the whole forested area of Canada has passed from the Crown. It is true that more or less self-perpetuating leases of the most accessible timber growing on the Crown lands have been granted to hundreds of private corporations, but the state still retains the whip hand of a leasing system. This most fortunate restriction, from which no government since the days of the French seigneurs has deviated except for railway grants, reserves to the Canadian people ample power to impose whatever conservation requirements immediate or future public needs may dictate. The United States lacks this weapon, except upon about one-quarter of the national forest domain, although on that

quarter of the Forest Service has applied the nucleus of silviculture management. As to the power of a Canadian Government to revoke a timber cutting license, this is not exercised except for flagrant breach of regulations; and over much of the licensed area official supervision of operators is yet so slight as to make the operator's conscience the main crutch for statutory observances.

Although in all civilized lands forest materials enter into the processes of production to an amazing extent some nations, as the United Kingdom, manage to maintain commerce even with the handicap of importing seven-eighths of all wood materials used. Canada, however, maintains foreign trade in normal times on the strength of primary products, and the products of the forests occupy a place in the export trade of Canada second only to those of agriculture. In the fifty-one years since Confederation, the values of various classes of exports have been as follows: Agricultural products, \$2,010,298,011; animal products, \$1,743,974,236; the forest, \$1,418,568,514; the mine, \$849,845,443; the fisheries, \$485,298,526; manufacturers, \$898,623,720; miscellaneous, \$20,857,806; total exports, \$7,427,466,256. Our agriculturists, producing cereals and live-stock, are prolific wood consumers, employing about six times as much building wood per capita as the European farmer. Our fishermen rely upon cheap wood supplies for their fishing nets, their boxes, barrels, and buildings. The coal mines of Nova Scotia and Alberta stand helpless without pit props. To meet the thousands of producers in the irrigated sections of Alberta is to recognize one of the foremost services performed by the forests of the eastern slopes of the Rockies, that of maintenance of stream flow. Not only, then, is the forest in Canada to be identified as the supplier of the lumbering and paper-making industries, but in its contributory relations to all other natural resources and forms of development it is an absolutely essential balance wheel.

The total area of forested lands in the Dominion is approximately four hundred million acres. As to timber contents, British Columbia tops all the provinces with about three hundred billion board feet, one-half the amount of timber growing in the whole country. Quebec, Ontario, New Brunswick, Alberta, Nova Scotia, Saskatchewan and Manitoba rank in the order given. Canadian forest conditions to-day, however, represent a strong modification of those existing even a century ago. At the time of the Napoleonic wars, Canadian soil under plow crops formed a trifling contrast to the vast regions of untouched timber. Always we have had the barrens of Ungava and the far-reaching profitless tracts sweeping north-westerly to the mouth of the Mackenzie River, where only petty vegetation thrives. The treeless prairie, then as now, almost devoid of trees, covers a triangular shaped wedge extending from eastern Manitoba to the Rocky Mountains, the apex penetrating 260 miles north of the international boundary, on the North Saskatchewan River.

(To be continued in August issue.)

\$14,000,000 FOR FOREST ROADS

A safer insurance against devastating forest fires, a realization of the recreational advantages in endless miles of wooded scenery, and a fuller comprehension of commercial benefits accruing through the linking up of national forests with bordering highways are the impelling motives in the programme for the coming year for building 1,643.3 miles of forest roads under the supervision of the United States Forest Service.

The first federal effort towards road building

in the national forests came in 1912 when the so-called 10 per cent fund was formed. It provided that 10 per cent of all receipts from the national forest funds be used in the construction and maintenance of forest roads. It was not necessary that the state or states in which the roads to be constructed should co-operate financially in the venture. The only stipulation was that the money should be spent in the same district as that from which it was derived.

PUBLIC MUST PILOT FORESTRY POLICIES

Col. Henry S. Graves, head of the United States Forest Service, speaking at Boston on "The Need of Private Forestry," said:

"If the war emergency had come fifteen years later we would have had great embarrassment in obtaining the lumber needed for general construction. Four-fifths of the timber of the United States is in private hands and 97 per cent of our wood comes from that source. According to leaders of the southern pine industry the original supplies of southern pine in the south will be exhausted in ten years, and in five years not less than 3,000 mills will go out of existence. Pacific coast timber is already enter-

ing the eastern markets, and this means that the price of home grown timber has risen to a point making it possible to ship lumber 3,000 miles in competition with it."

Col. Graves said that in order to obtain good timber the state must direct the work of fire protection and enforce drastic fire laws. He believed that the public should provide a sane system of taxation and should co-operate in such economic problems as over-production of timber, problems of labor, technical questions relating to forestry and a variety of other industrial and technical matters that are encountered in carrying out in practice a systematic programme of forestry.

FORESTRY PROPAGANDA IN CANADA

At the invitation of the Pennsylvania Forestry Association Mr. Robson Black, Secretary of the Canadian Forestry Association, addressed a gathering of Americans on Canadian forestry problems and the methods of operation of the Canadian association. Great interest was displayed in the rapid progress of forest fire preventive work throughout the Dominion, and particularly in the success of educational work.

Mr. Black explained to his audience that unlike ordinary propaganda, the spokesman for forestry could not promise quick, tangible profit. People accustomed to political and commercial appeals, based upon immediate likelihood of gain were slow to take up cudgels for a cause that spoke of a social and national profit fifty or a hundred years hence. Yet, in a country where 90 per cent of the forest lands were owned and governed by the people and where timber operators were annual tenants, any advancement of state control of forest policies depended absolutely upon arousing the masses of citizens to their public privileges and responsibilities. The Canadian problem was, therefore, not quite the same as that of the average American state, where only a small fraction of the forest wealth had not been alienated and placed beyond public control.

The methods employed by the Canadian Forestry Association were explained in detail by the speaker, who claimed that one of the basic

reasons for success in forestry propaganda is to keep the organization free from any governmental or commercial affiliation. This allowed perfect liberty to carry on constructive agitation, which, at times, must run counter to governmental tradition, and perhaps displease certain commercial interests. Mr. Black described reforms in province after province of Canada due largely to educational campaigns.

The Forestry Association, he said, devoted the greater part of its attention to improvement of public policies and administration. At the same time, it initiated and carried out scores of educational enterprises aimed at securing the good-will and co-operation of the individuals responsible for setting forest fires. Scores of thousands of school children and teachers, settlers, railroad men, and other classes were reached year by year with attractive literature, and by motion pictures and special public speakers. This was a branch of work, said Mr. Black, which plays directly into the hands of practical rangers and their scheme of patrol, for it went far deeper than mere fear of the law and gained voluntarily what under no circumstances can be compelled by magistrates and fines.

Leaving out of consideration the overcutting caused by the war, the forests of Denmark yielded a net return varying from 3.9 per cent to 13.9 per cent, and averaging 7.7 per cent.



Looking along Kicking Horse Canyon, B.C.

ONTARIO'S FOREST FIRES DURING JULY

The Ontario Forest Service, which was placed on a modern basis in 1917, has been passing through more fire trouble in the northern districts than was encountered in the two previous years. It is impossible to give a summary of the fire losses as this issue of the Journal goes to press, as a number of the fires outside the Claybelt region have been reported only in a general way. After the bad fire period is over, detailed estimates are sent to headquarters at Toronto. As far as present information goes, the bulk of the Ontario fires have occurred on cut-over lands where slash has accumulated.

The fires in the Claybelt country while covering comparatively large areas have burned off what is to be agricultural land and to a large extent over areas that have been cleaned out of pulpwood and tie material. No lives have been lost, but by July 10th between forty and fifty settlers had been burned out.

It is an unfortunate element in Ontario's forest protection situation that the settlers of the north country are preponderatingly in favor of indiscriminate burning, and this despite the terrible experiences of 1916 and 1911. The Ontario law requires every settler to first obtain a permit from a ranger before starting to clear his land by fire, and imposes such regulations as the piling of brush, obedience to the ranger's orders regarding time of burning, etc. Without vigorous local support of such requirements, however, enforcement is very difficult. A large proportion of the fires sweeping parts of Northern Ontario during the first weeks of July were directly and solely attributable to the settlers' defiance of Ontario law. Several prosecutions are now under way, and a few stiff fines would help correct conditions. A change in the Ontario law to permit imprisonment of settlers is not improbable.

FOREST FIRES IN NEW BRUNSWICK

By G. H. Prince, Provincial Forester.

Fredericton, N.B., July 11, 1919.

The fire season in New Brunswick may be said to be more severe than 1918 owing to extended period of dry, hot weather. The organization of the Forest Service is proceeding favorably, but is not complete, owing to a considerable number of ranger appointments not being confirmed after the six months' probationary period. An examination will be held on July 30th when it is expected that all vacancies will be filled by returned soldiers.

A summary of the fires compiled to date is submitted, but does not include, of course, all fires that have occurred to date:

Total number of fires reported.....	220
General causes	76
Railway causes	144

Thirty-seven of railway fires occurred on right of way, and 107 were reported as tie fires.

The total estimated damage is in the vicinity of \$120,000.

April fires, 2 railway, 2 others.....	4 fires
Total	4 fires

May fires, 19 railway, 39 others.....	58 fires
June fires, 125 railway, 33 others.....	158 fires
	<hr/>
	220 fires

Causes.

(a) Settlers neglecting slash fires or carelessness, which resulted in \$50,000 damage	30 fires
(b) Fishermen, campers, picnic parties	23 "
(c) Railways	144 "
(d) Accidental	3 "
(e) Careless use of fire, industrial... ..	12 "
(f) Incendiary	5 "
(g) Unknown	3 "
	<hr/>
	220 "

Twenty-four prosecutions for non-observance of the fire law are in course of action, nearly all of which are in connection with the Kedgwick fire which destroyed so much property. These cases will be heard in Kedgwick on July 16th before Judge Matheson. Complete figures regarding this fire have not been tabulated, but it appears that a large number of settlers during

very hot, dry weather of June set fire to their slashings without permits, and these fires got beyond control with disastrous results.

The area of ground covered by all the fires in the province to date is approximately 10,000 acres.

The fire protection staff at present consists of:

Rangers and inspectors	40
Temporary fire wardens.....	32
Co-operative fire wardens	60
Voluntary fire wardens	154
Road commissioners	490
Total	776

Splendid results have been secured by the co-operation of the Public Works Department of the Provincial Government, whereby the

Minister of Public Works has authorized 490 road commissioners to act as fire wardens in case of fire in their vicinity. Also great assistance has been rendered by the lumbermen of New Brunswick, who have given the services of 60 of their woods superintendents and foremen as co-operative fire wardens.

1,500 school teachers have been circularized regarding fire protection; 14,000 camp fire books have been distributed.

15,000 fire posters have been placed in the field.

One look-out has been connected with telephone and watchman employed.

Preparations are being made for three others, and considerable amount of woods telephone lines.

NOVA SCOTIA ESCAPES HEAVY LOSS

By T. A. Harrison, Deputy Commissioner of Crown Lands.

Halifax, July 9, 1919.

The total number of fires reported to date, twenty-three, with an estimated damage of \$1,000.00. Of the twenty-three fires reported, ten were caused by railways, six by fishermen, two by farmers, and five unknown.

Judging from past experience, and particularly from the past four years, during which time a record has been kept, it is not probable that the damage will be much greater, as the records show that practically all the fires occurred in the month of May and the first two weeks of June.

MAKING SLASH BURNING A SAFE JOB

By Henry Sorgius, Manager, St. Maurice Forest Protective Association.

From an illustrated bulletin, published and distributed free by the Canadian Forestry Association, 206 Booth Building, Ottawa.

The settler must always bear in mind that the fire ranger is his friend, and is always willing to help him out by giving good advice in the burning of his slash to clear his land. Having burnt many slashes he is more or less of an expert in this work and can help the settler materially by having the slash piled and fired with the maximum results and minimum danger and trouble. The fire ranger is just as anxious as the settler that his slash should be burnt without causing any damage or trouble.

Proper Piling Comes First.

The first duty of a settler who wants to burn his slash is to see if it is properly piled and at least 50 feet from any standing timber or building and it would be advisable when possible to have it at 100 feet in which case it would reduce the danger. Once this is done he should then obtain a written permit from a duly appointed ranger who will visit his slash and gladly issue a permit if he finds that the slash

is piled to avoid any possible danger to the standing timber or buildings and if weather conditions are favorable.

Never at Midday!

A settler should never set fire to his slash at midday or when there is a heavy wind blowing. He should always set fire in the evening. Then if anything should go wrong he will have more facilities in extinguishing it. He should never set fire to too many piles at a time; he should burn one or two at a time, as otherwise he would never be able to control them. He should have the necessary help on hand according to the size of slash that he has to burn and always have pails and shovels with him so he can extinguish fire if it should happen to spread. If the fire is still burning in the morning it should be extinguished, except during wet periods, as the heavy winds during the day may cause it to spread. A good time to set fire to a slash is just before it is going to rain, then he will be assured that his fire will never run and cause any damage.

Have Help at Hand!

The very best time to burn slash is in the early spring when there is still snow in the woods.

There is no reason why a settler burning a slash should cause any damage if he takes the necessary precautions. He should always remember the following:

1. To pile his slash in heaps.
2. To have the heaps at least 50 feet from any standing timber or building.
3. To obtain a written burning permit from the fire ranger.
4. To never set fire at midday but in the evening.
5. To never set fire when a heavy wind is blowing.
6. To have the necessary help at hand to extinguish fire if it should spread.
7. To have pails and shovels with him.
8. To never leave a fire before it is completely out.
9. To try to burn during a wet period.
10. To always remember that the fire ranger is his friend.

It is easier to burn slash by taking the necessary precautions beforehand than to try to extinguish a large forest fire.

UP AND DOING! A CALL TO PLANT TREES

By "Ahmik", Agricultural Editor of "The Globe", Toronto.

In the plans being formulated for reconstruction forestry should have a leading place. More particularly does this hold true of Ontario and the Western Provinces. The southern part of the prairies are practically a treeless waste. A large portion of the best part of Ontario is being rapidly reduced to the same condition.

In Huron, which in the memory of men still living was known as "The Queen's Bush", with 800,000 acres of assessed land, only 48,000 are in the bush; in Grey, despite the fact that much of the land is fit only for the growing of timber, there are but 113,000 acres of bush out of more than a million acres assessed.

In unbroken counties, nearer the front, the showing is much worse. Brant, with 216,000 acres assessed, has only a little over 9,000 in bush, and Peel, with 297,000 acres assessed, has a trifle over 8,000 in woodland. There are at least twenty counties which have 80 per cent or more of their area cleared, and even at this "waste", "marsh" and "slash" are included in what is classed as the "uncleared" percentage.

If the northern districts, such as Parry Sound and Nipissing, are left out it will be found that Ontario, which was all bush a little over a century ago, has a smaller percentage of forest to-day than has Germany, which country has been settled since before the dawn of civilization.

A Chilling Prospect.

In western Ontario, that is, in the portion of Western Ontario south of the Great Lakes, and in eastern Ontario, excluding Renfrew and the unorganized districts, there is not sufficient timber left to provide proper climatic conditions and ensure the conservation of the water supply. If what we speak of as older Ontario were cut off from all outside sources of fuel supply, the population would freeze to death in a few years—that is, unless a wholesale exodus took place.

And the time may not be far distant when we shall be forced to depend mainly on ourselves for the fuel needed. The coal famine of last year, due to the way, may, before long, become

a chronic condition owing to the depletion of American supplies on which we have heretofore depended. Once a coal mine is worked out it is done for. Coal does not grow like trees. True, there is wood in the north country, but wood is such a bulky article that the distance over which it can be transported, save at ruinous cost, is limited. Furthermore, the hardwood area does not extend so very far north, and softwood is a most unsatisfactory material for the supply of heat in winter.

Should be Self-Supporting in Fuel.

Old Ontario should be self-supporting in the matter of fuel, and could be made so in a comparatively few years if land practically valueless for agricultural purposes were devoted to its proper use—the growing of trees. There is not a county in old Ontario in which there is not some land that is useful for no other purpose. Even in some of what we call “good counties” there are considerable areas that are worse than useless with the timber off them—that threaten to become sand wastes, and as such a menace to good agricultural land in the neighborhood. This is true of Huron, of Simcoe, of Durham, and of other counties that might be named.

Other Advantages to be Gained.

With these waste areas reforested the force of the wind would be moderated, water would be more abundant in streams and springs, rainfall would be more dependable, good land would be more productive. Incidentally, by a proper system of conservation applied to the timber growth, an abundant supply of excellent fuel would be assured for all time at moderate cost.

Nor would it be necessary to wait so very long before returns would begin to come in from planting. Beech and hard maple are slow growers, but Manitoba maples grow quickly into useful wood. Willows, planted in marshy places make rapid growth, and when a willow tree is cut down fresh growth will start from the stump. And willow makes good summer fuel at least. Even beech and maple do not take so very long to make their growth. Men in the prime of life can point to maples nearly two feet in diameter that they planted as saplings.

Community Effort Called For.

How is the work of reforesting waste areas in this province to be carried out? It is useless to depend on individual effort for what should be done. Not many men will plant where they cannot expect to reap. Besides, a man may set out a plantation to-day that his successor of tomorrow may look upon as an encumbrance, or at least treat with neglect. Community effort,

either through the province or municipalities, or both combined, is called for.

Here is a work wherein soldiers in large numbers could be given profitable and congenial employment. After their experience in war, where men have been assembled in large numbers, the comparative isolation of farm life will be irksome to most of the returned men. After life in the open the confinement of factory or office will be equally irksome in many cases. Forestry work is done in the open, and considerable numbers can be associated together in that work. The life of the forester is one that should make special appeal to thousands of our men now overseas.

Protection Alone Necessary.

An extensive undertaking in planting is not necessarily called for, at least at the start. There are thousands of acres, with scattered timber, that need only to have cattle fenced out and fire guarded against to become dense forests of valuable timber in a short time. Even where planting is necessary it is not such very slow work. Two men, working at moderate speed, can plant an acres in a day with trees five feet apart each way.

But individual effort can be made to count as well. There are thousands upon thousands of farms with from two to ten acres of land that should be in bush. These for the planting of such farm wood lots can be had, free of cost, from the provincial forestry nurseries. If a thousand farmers could be induced to start such planting next spring they would do a good thing for themselves, a good thing for their neighbors, and their action might stimulate the provincial authorities to undertake forestry work on a province-wide basis.

AIR PATROL IN B. C.

Victoria, B.C.—An average year of fire protection and control costs the province something like \$250,000 and in round figures one-fifth of that amount is absorbed by No. 1 Forest District, which embraces Vancouver localities and Vancouver Island. It was Hon. Mr. Pattullo's proposal to experiment in No. 1 District this year; but in view of the dangerous hazards he sees the necessity of maintaining the full regular service until the practicability of patrol from the air shall have been established. An approximate estimated cost of the first year's experiment—including the major portion of the initial outlays—in No. 1 District is placed at \$40,000, and the suggestion is that the province should contribute half and the Dominion the other half of the expense.

WESTERN CANADA!—THIS IS YOUR BUSINESS!

If Your Timber Resources Are Valued as Public Essentials, an Immediate Change in Dominion Methods is Due You.

Through the Canadian Forestry Journal, which regularly enlists the interest of more than two thousand public men in the three prairie provinces, and by various other channels, the long overdue change in public management of the choicest timber areas in the Middle West has been developed to such a point where postponement of the obvious remedy cannot prevail much longer.

By permission of the Parliamentary Committee on reorganization of the Civil Service, the Canadian Forestry Association will present a statement of its case at the Fall session of Parliament. It is noteworthy that the points contained in the Association's memorandum have never been discounted nor even seriously disputed from official or unofficial sources. Excerpts from the memorandum are as follows:

"The proposal we wish to bring before your committee in this instance is that the timber cutting operations on the licensed timber berths, which comprise the finest timber lands of the prairie provinces and the railway belt of British Columbia, should be brought into line with almost universal modern practice and placed henceforth under direction of the Dominion Forestry Branch. The latter represents the Dominion Government's forest conservation enterprise but at the present time has no actual authority over the really valuable timber of the Canadian West. Our reasons for this are of a specific and substantial nature. The public interest in maintaining a permanent timber supply transcends the interests of any commercial operator and is supposed to represent the motive of all Government administrators. The public interest requires that forest lands of no agricultural value shall be utilized for immediate requirements but with full provision for the maintenance of the capital values represented in maturing timber. In other words, the forest is to be regarded as a reproductive crop rather than a non-reproductive mine. This is the guiding star of all efficient European Governments and of the Government of the United States on the national forest domain.

What of the Future?

We are convinced that at the present time, the timber stock on Dominion lands, administered

by the Timber and Grazing Branch, is in a state of progressive depletion and that provision for future timber growth receives little, if any, consideration. While it is true a diameter limit is theoretically imposed upon all operators, this measure, even if enforced, is not in itself adequate to bring on a new forest. Each set of conditions within a forest area requires distinct forestry treatment, if conservation is to be more than a hollow term, and forestry is the business of technically trained foresters.

Get the Money—Lose the Forest.

We submit further that the present primary concern of the Timber and Grazing Branch is the collection of revenue, not the management of the country's timber supply on a basis of permanent production. For the latter responsibility, which takes precedence to the gathering of immediate revenues, the Timber and Grazing Branch has no administrative provision. It does not employ any forester, nor is there any means by which the staff of technical foresters of the Dominion Forestry Branch are given control of the work for which they are especially trained, and upon which they are already engaged as to lands in the Dominion forest reserves aside from the licensed timber berths.

The Example of Others.

The Dominion Forestry Branch was instituted as a conservation body to administer the timber resources of the West, not as a selling bureau, but to protect from fire and to build up the Western forests in the immediate and future interests of the Western people. Yet, the Dominion Forestry Branch and its constructive operations are restricted mostly to the poorest timber areas, while the main timber resources of the prairie provinces are thrown open to practically unrestricted exploitation.

The Provinces of British Columbia, Quebec and New Brunswick have taken action similar to that advocated for Dominion lands. In those provinces, the local forestry organization completely controls the administration of cutting on all Crown timber lands, whether licensed or unlicensed.

Undisputed Facts.

The Canadian Forestry Association has made these representations to your committee from a

sense of public duty and with regard only to facts which have been demonstrated to exist. We look upon the present situation as a departmental inheritance of the present Government which only awaits open discussion to be solved satisfactorily.*

The Commission of Conservation has repeatedly urged upon the Dominion Government the necessity of applying the authority of the Dominion Forestry Branch to the technical operations on licensed timber lands. This would not necessarily dislocate the present organization of the Timber and Grazing Branch, but would, rather, initiate a line of work—technical forestry—which does not now exist, so far as licensed timber lands are concerned. It forms, in our view, a very simple method of fulfilling the obligation of the Dominion to handle the western forests in the best interests of the western people. The reading of Section 58 of the Dominion Lands Act would lead to the conclusion that action along this line was originally intended by Parliament.

Unequal Supervision.

As your committee is concerned also in the question of duplication within the Civil Service, it will, no doubt, give due attention to our argument that once the principle of expert forestry supervision on Dominion timber berths is endorsed, the Dominion Forestry Branch is obviously the instrument for the application of such a principle.

At present, the Timber and Grazing Branch maintains six timber agencies. The field inspection as to the carrying out of the timber regulations is done by Crown timber inspectors numbering about thirty-five. In many cases the work is combined with that of land inspection, and in any case such a staff cannot closely supervise lumbering operations scattered over more than six thousand square miles of country.

Foresters Available.

The Dominion Forestry Branch, on the other hand, has divided its field work into four inspection districts, corresponding with provincial boundaries. These are in charge of district inspectors, who with one exception are technically-trained men. The inspector is the business manager of the reserves in his district. Each district is subdivided into administrative units, each in charge of a forest supervisor, the latter also being with rare exceptions a technically qualified forester. Assisting the supervisor are one or more forest assistants, graduates of for-

estry colleges. The 1918-1919 field staff of the Dominion Forestry Branch consists of 4 inspectors, 15 supervisors, 5 forest assistants and 165 rangers, making a total of 189 men, under the supervision of a head office staff of technically trained foresters.

In tree-cutting in the crown forest Gullberg, in the province of Ostergotland, of south Sweden, there was cut down a 56 years old pine that bore a fresh living branch of spruce of 51 years at 5 feet from the ground. A nearer investigation showed that the spruce branch was really grafted on the pine in a natural way and has lived so without communication with the mother spruce at least 14 years.

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During 1919, according to conservative estimates, says the American Lumberman, contracts for the construction of \$600,000,000 worth of good roads will be let. The total value of contracts may exceed \$1,000,000,000. The good roads campaign this year is more than a State campaign; it is a national campaign, and it marks the beginning of the construction of good roads upon a most comprehensive scale. There was a time when the construction of steam railroads was the great construction effort of the day; now, however, the construction of good country roads promises to be the order of the day and exceed in magnitude and importance the building of steam railroads.

A properly laid road of properly treated wood blocks makes the finest and most durable road

possible. The interest of lumbermen, therefore, in the road construction programme is much keener than it would be viewed simply from a national development standpoint. The action of the West Coast Lumbermen's Association in agreeing to pay the difference between the cost of concrete and wood block paving on a stretch of road five miles in length on the Pacific Highway in Lane County, Oregon, is a well planned boost for wood blocks. The lead of this association can well be followed by other associations and by individual lumbermen or manufacturers of wood paving blocks. The construction of lengths of wood blocks in specific places throughout the country will certainly demonstrate their superiority over any other class of road construction, and will prove to the public that wood block roads should have a very important place in the national good roads construction.

WESTERN AUSTRALIAN PUBLIC SERVICE PERMANENT POSITIONS UNDER THE PUBLIC SERVICE ACT.

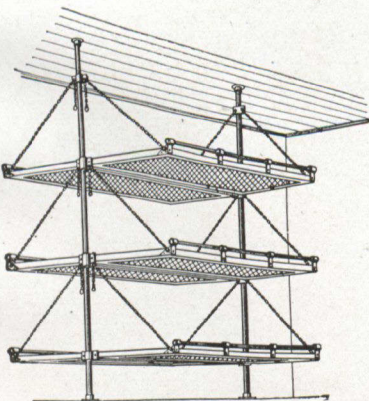
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G. W. SIMPSON,
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CLEARING THE FOREST OF DEBRIS

By Ellwood Wilson, Laurentide Company.

Can Fire Rangers be Used in Winter to Follow Crews and Eliminate the Slash?

The one thing that every fire ranger fears is a large fire in cut-over lands, which, fanned by a high wind, will attain such proportions before help can be obtained that many square miles will be burned over before it can be stopped. Single fires in the past have gone over tracts of 1,000 square miles and with weather and wind conditions favoring, the same thing could possibly happen again. How can we prevent this?

The records of fires for six years past, show that the majority of fires occur in cut-over territory and on old burns. That means that cut-over territory is responsible for the greater majority of the fires, for this burns over and the land so burned catches fire very easily for at least two successive seasons after the first burn. Of the area burned over each year about forty per cent is cut-over territory and forty-two per cent old burn, making a total of eighty-two per cent chargeable to the lumber operations. Practically all of the fires which require labor other than that of the rangers to extinguish start in cut-over or burnt-over lands.

Logging Areas.

The way to eliminate these fires is to burn the debris from logging at the time the logging is done, or shortly after. This will cost some money, but will materially cut down the cost of fire protection, and in time, cut down the cost of patrol so that it is probable the increase in expense would not be large. Then to, the value of the forest lands would continually increase, as now timber left after logging is destroyed by fire, and once burned over, the lands are very liable to burn over again, destroying the seed stored in the soil and postponing the reproduction of valuable kinds of trees for many years. This burning of the brush might logically be left to the logging crews, but it has been shown that anything that adds to the cost of making logs is violently opposed by woods managers and their staffs, as their efficiency is judged by the price

at which they are able to deliver logs and they do not consider that it is their business to do more than cut and haul the logs.

Fire Rangers Available.

If this cleaning up were made part of the fire protection work, it could be done by the rangers in winter, by men who understand how to handle fire in the woods, and who understand the danger of it. These men could follow the loggers and pile and burn the brush, so that when spring came, the danger from the cut-over debris, would be entirely eliminated. Of course it would be necessary to apportion the cost to the different operators on the basis of acreage, but this would not be difficult and the measurement of the amount of land cut-over each year would be of an immense value to the holders. Lands so handled would immediately begin to reforest themselves to the great benefit of the holders and of the country in general. By preventing the burning of these lands they would reproduce the valuable species instead of coming up in poplar and jack pine, as they now do after fires. Many years in the regeneration of these lands would also be saved.

Insect and fungus enemies of forest trees are spreading at an alarming rate and are now probably as serious a menace as forest fires. It has also been shown that burning the logging debris is one of the best possible ways to eradicate these pests so that from every point of view it seems that slash burning should without delay be made a part of our protective work.

It may well be asked if burning is the only way of disposing of logging debris. Taking out logs down to three inches top diameter would help the situation and would reduce the waste. Top-logging has been tried and found to cost about 40 to 50 cents per thousand feet board measure of logs cut, but the fire hazard is very little reduced. The advantage is that the brush rots quicker and so the land is not in a dangerous condition for as long a time as with unlopped tops. This does not do away with

the feeding ground which the decaying brush forms for borers and other insects and fungi.

Piling and Burning.

Piling and burning seems the only solution of the problem. In cleaning up lands for planting operations, this has been used for the past four years, but the amount of debris both hardwood and softwood is far larger than in ordinary logging operations, and the cleaning up much more thorough than in logging is necessary. The usual method employed in winter operations is to have a boy with every four choppers who takes the branches and tops as they are cut and starting a fire throws them on it. The brush both hard or softwood burns without any difficulty regardless of the amount of snow. In logging when there is no snow on the ground the helper piles the brush and these piles are burnt on rainy days or after the first snow. A flame-thrower burning kerosene has been developed and will be used in this work. It can be carried by one man and has two hoses which allow two streams of fire to be thrown at once. It may prove to be possible with this machine to burn brush just as it is cut without throwing it into large piles, the result of this burning as far as the condition of the wood is concerned afterwards is eminently satisfactory. The fire hazard is reduced by at least 75 per cent, the ground is clean and reproduction of young growth starts immediately, and the young trees left by the operation commence to make rapid growth owing to letting in of more light.

The Question of Cost.

This is the most important step which we can possibly take in forest protection, and it has been recognized as such in the cutting regula-

tions of the United States Forest Service and has also been imposed by the State of New York in a modified form on timber operators. It is better to undertake this in advance of pressure from public opinion, and hold our position as leaders of thought and promoters of the general public welfare.

The cost of slash burning in the St. Maurice Valley runs sometimes as high as 20 to 25 complete clearing on private lands in preparation for planting. Naturally there is not much commercial timber on such lands and the situation is quite different from a timber limit where the hardwoods are not logged.

There is one situation that I think is improving, i.e., the closer cutting than we had in the past. We do not cut our timber any deeper now than we did years ago. The quantity left in the woods to-day is very small compared with that left a few years ago. Over fifty per cent less. I agree with the idea that is a good thing that a committee is appointed to look into this matter of slash burning. If we could get a number of practical lumbermen that would agree next year and who would set aside one camp who will burn their slash and let other operations go on in the same way. Then we would be able to get exact facts as to the destruction caused by the burning of slash. I will agree to do this with one of my camps for one.

Mr. McLean: Practical lumbermen are interested in the disposal of slash. Lumbermen have the greatest interest in protecting the forest. It is their livelihood. I have not yet had any experiment made by my men as to the best way to get rid of slash, so have no definite plan.



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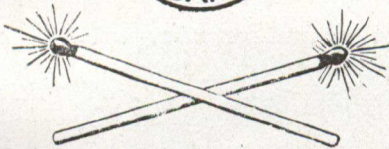
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