

Canadian Forestry Journal

APRIL, 1916.



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Rebuilding Forests of France

A Graphic Article Telling of War's Havoc on Great Woodlands
—A Century of Labor Needed.

(Translated for the Canadian Forestry Journal.)

"From the woods of Ailly, there remain but a few mutilated trunks. It is a field of desolation, levelled by shells. There no longer exists an inch of ground that has not been overturned by explosives."

The January issue of "La Science et la Vie," a review published in Paris, contains a very interesting article on the damages wrought to the forests of France by the war and on the means and methods to be employed for their reconstruction. The author of the study is Mr. Louis Marin, député of Meurthe-et-Moselle, who is, as may be inferred by the reading of his essays, an expert in matters concerning the preservation of forests and reforestation. We offer to our readers a résumé of the article, as sufficient space cannot be spared for its entire reproduction.

After having alluded to the way with which the Germans are pillaging those parts of the forests of France where their armies are operating, imitating in this work of destruction, their ancestors, the savage invaders of 1870, who unjustifiably and mercilessly laid waste the woodlands they had frequented, Mr. Marin goes on to describe how the forests have to be necessarily treated by both sides in this tremendous conflict. He says:

"What have been, during the war, the causes of our forests' destruction? The building of trenches on the two adverse fronts; the ravaging effects of projectiles hurled by guns of all calibers, which, in a hailstorm of iron, mow down everything before them, breaking the trees and leaving, instead of a thickly-wooded area, a mere strip of land covered with dismantled trunks and dead snags; the construction by the engineering corps of works of defense; the consumption of firewood; the erection of log shelters, in short, of many works necessitating an extensive felling of trees, and, finally, the hewing down of an enormous number of trees of all sizes which obstructed the range of the artillery."

Woods in Warfare.

Mr. Marin then recalls the explanations he has given, in June, 1913, of a bill submitted to the French Parliament concerning the protection of the forests. He had then dealt with the importance of the wooded regions in warfare. When a forest stands in the

way of the invaders, what obstacles does it not constitute? Especially in the neighborhood of fortified places, wooded tracts serve as an obstruction to the advance of the foe. The latter finds it impossible to penetrate them with its convoys; he cannot build through them the railroads necessary and he is therefore unable to transport any farther his huge guns. Besides, the home forces can conceal themselves in those woods; posted in ambush among the trees and under the branches, they cannot be detected even by aerial reconnoitring, and they thus place themselves in a splendid strategical position." The writer draws the attention of his readers to the fact that this present war has amply demonstrated the usefulness of the forests in wartime:

"Everywhere, these (the forests) have been of a precious assistance to our soldiers; it is while concealed in them that we have lost the least men. From the offensive point of view, in this war of trenches which has been waged for long months, it is where our positions were protected by woods that we have gained more ground. From the defensive point of view, they have fully favored our troops. The woods of Argonne, however reduced from Dehouriez, have set up in the way of the same invaders the barriers of 1792, and thus the investment of Verdun was averted. The woods of Grand-Courronné have contributed to the halting of the sad retreat of Morhange and to the resistance in the defence of Nancy. These services are recorded in the orders of the days; the country thus learns the names of the woods of La Grenie, Bolante, La Cheminée-Saint-Hubert, Le Prêtre, of the forests of Apremont Grand-Courronné, etc.; our brave boys describe them in their letters."

In Times of Peace.

Mr. Marin now refers to the advantages derived from the existence of the forests in times of peace, from the utility and aesthetical points of

view. It is needless to mention the value of the forest as a supplier of the timber used for industrial purposes; it is recognized as the foremost asset of a nation. Having reminded his readers of the great number of masterpieces in arts inspired by the forest, he deprecates the fact that the people do not seem to appreciate all the beauty of our wooded domain and the benefits derived therefrom:

"The citizens seek in them a day's or an afternoon's rest, but they do not care cutting the barks, destroying young shrubs, pulling out frail branches, for no purpose whatsoever but simply yielding, as it were, to an instinct of destruction which we would not even forgive in a child. The country-folks themselves, however laboriously and assiduously bent on their toil, do not as sufficiently as they ought respect all the trees, and in several of our provinces, chiefly in Normandy, entire regions have simply been ruined as by mere vandalism." The writer states that in many villages and towns, there are scarcely any trees on public places; vast parks are to be found where there are no shady trees. The value of the forest cannot be overestimated, and in compliance with principles well-nigh eternal, we are bound to protect it.

"The salubrious influence of the forest is as vivifying as that of the sea; it has over the latter the advantage of what I might call 'the uniform effect upon the mind' from which the nervous and irritable people derive most healthy benefits. For whoever wishes to and can avail himself or herself of its influence, the forest is a free physician and a dispenser of balmy essences powerfully invigorating. It is there that can be sought and nearly always found the vital and mental equilibrium lacking in many people otherwise healthy, not afflicted with neither serious ailments nor apparent injuries, but who are overworked and exhausted by the conditions of modern living." The writer here names a



French first line trenches plowed by German shells. The forest in this section was battered to fragments.

few of the trees possessing the most soothing properties, such as those of the magnificent coniferous family: the maritime pine, the pine of Italy, the common fir, which are found in all the forests of Europe.

Blocking Floods.

After having explained how the presence of forests purifies the atmosphere, Mr. Marin tells his readers how they prevent or reduce the possibility of inundations. Because of its spongy sod composed mainly of leaves, the forest absorbs the rain-water and like "a vast sponge, retains the water to let it afterwards slowly escape." Moreover, where they exist in places formed by mountains and sand banks, they constitute a protection for these. As such, they must be carefully preserved, inasmuch as they guard the people settled in those localities from landslides and sand drifting. The forests' beneficial influence on the climatic conditions of a country is also described. They act as a 'mediator' between cold and warm temperatures; where they exist, the summer is not so hot and the winter much milder than in places where there are none. Experience further shows that they regulate rain-falls and provides by

means of their streams and brooks drinkable water to the neighboring inhabited places. Besides, the contamination of this water is impossible when supplied by the forests. Mr. Marin emphasizes as follows the important part which the forests play in delaying freshets, thereby preventing floods.

"This influence of the forest on the overflow of streams has been so carefully studied and appreciated, that reforestation is now considered, in mountainous regions, as the most effective means to suppress the floods. It is also acknowledged that the maintenance and the reconstitution of the forests prevent the sand and clay from sliding into the streams and rivers. In foreign countries, most rigorous regulations have been enforced with a view to adequately protect the forests."

Lessons of the War.

The writer then deals with efforts made by France in the 19th century in the reconstruction of its forests. There still remain about four millions hectares (about 9,880,000 acres) of untilled lands which could be turned into well-wooded sections, and about two millions hectares of mountainous areas

which could also be transformed into forests. There are laws in France in connection with this national improvement, but they have been loosely applied. The war has now brought out the strict and urgent necessity of rebuilding the forests. "It is impossible to neglect our mutilated forests; it would be a crime to not take up now steps in order to ensure, in a comparatively near future, their reconstruction."

Mr. Marin then enumerates the wooded regions that have been subjected to the military operations of this conflict. He finds that, in general, the forests at the front have been laid waste; the soil as well as the forests themselves has been destroyed. At those places where the struggle has been most acute, the land will have to be completely razed. With regard to the trees injured by bullets, it has been found that their wounds, unlike those of man, do not heal. After a few years the trees die, and can then only be used as firewood. As they are liable to rot, it is better to fell them soon so as to obtain the best possible use of them. Here, Mr. George is quoted in his scientific explanations of the causes whereby an injured tree is sure to wither away.

A Few Mutilated Trunks.

With reference to the damages done to the soil, Mr. Marin quotes the following *communiqué* of April, 1915: "From the woods of Ailly, there remain but a few mutilated trunks. It is a field of desolation, levelled by shells. There no longer exists an inch of ground that has not been overturned by explosives."

The writer then discusses a bill he has prepared with a view to obviate the disaster caused by this war, and in which he suggests a thorough reconstruction of the ruined forests of his country. We give here a brief summary of the chief parts of the bill referred to; it deals with "the gravity of the damages caused to our woods and forests; the calculation and the estimates of these damages, the

means and methods to be adopted in the reconstruction of the said forests; the necessity of special legislation in connection with these improvements; the difficulties of all kinds to be confronted in the application of the present law; the solution of the problem in the purchase by the State of all forests affected." He lays stress on a clause of the present law which to his mind should be amended, and which he would have substituted by a more acceptable proposition. According to the existing legislation, all sums paid to a proprietor, in the purchase of damaged and unused land by the State, must be employed by the proprietor in the improvement or reforestation of the said property. If, after the said improvements, he has money left, he must spend it in rebuilding adjacent properties. Instead of this, Mr. Marin suggests that, after the proprietor has spent sufficient to completely rebuild his destroyed property, he be permitted to keep the balance; in all cases, the State would pay for the said lands amounts corresponding with their full value, prior to the war. This measure would have the advantages of indemnifying the settler for his loss and of turning over to the State valuable tracts of wooded lands which would constitute a splendid addition to the national resources and which it would be bound to protect. — In explaining his bill, he admits that it will be difficult to ascertain the whole extent of the damages; a committee of experts would be entrusted with this task. Mr. de la Roussière, general secretary to the Forest Committee, is here quoted: "About 515,000 hectares of our forests are damaged. It is not completely devastated, but in estimating the loss at two-thirds, we should not be far from the truth. It will take at least a century before our forests are restored to their original conditions."

What of the Future?

The task will be enormous, but it will have to be attempted. The country will ever need wood for fuel and

timber for industrial purposes. In 1912, timber was scarce in France; lumber for the amount of 192 millions of francs has been imported in that year.

"The scarcity of timber for constructional purposes is not limited to France; it constitutes a real universal crisis. The forest reserves on the face of the earth are being rapidly exhausted, especially the timber from the caducous species. The manufacture of wood pulp has consumed entire forests in America, as well as in Europe."

Mr. Marin then considers the best methods to resort to in estimating the damages done to the forests and in their reforestation. "The proprietor will have to remove the fallen trunks, the injured trees, etc.; the soil will then be levelled, and local rangers' houses determined. This being done, he will proceed with the primordial work, i.e., the re-sowing of young trees in order to reconstitute the forest, without neglecting the natural disposition of trees, according to the number of years required by each species for their full growth, and the purpose for which they are intended. Timber from twenty to twenty-five years old can be used for fuel; from fifty to sixty years, for use in the interior of mines; from eighty to one hundred years, for the production of lumber, and about 150 years old for industrial purposes. In the latter-named, there are the oak, the ash, the beech and like species. This work accomplished by the proprietor will be but the preliminaries of the task entrusted to Time, and which years alone can perform. It is the work of several centuries."

Estimating Damages.

Referring once more to the damages to which this war has subjected the forests of France, the writer does not lose sight of the fact that the devastation is still going on as violently as ever, and that it is impossible to foresee all the efforts which will

be required of the nation. But France must be interested now in this great problem in order to be ready to proceed, when the time comes, with as least delay as possible to the reconstruction of her forestal resources. "All delay in the rebuilding of this heritage," he says, "would spell losses impossible to estimate to thousands of people living on the forests."

"In conclusion, I could not do better than to quote the following paragraph from one of Bernard Palissy's most interesting works:

"When I consider the value of the least branch and shrub, I am astonished at the great ignorance of men of to-day who seem to train themselves to pillaging, hewing and mutilating the magnificent forests which their predecessors have so carefully preserved. I would not mind their devastating them if they would afterwards rebuild them, but they do not worry in any way of the time to come and of the great loss they will have caused to the coming generations."

"These words were written in 1580," adds Mr. Marin; "they are worth consideration, because they have never ceased to be of the deepest actuality."

PUBLIC LECTURES.

Public illustrated lectures have been given by the Secretary during the past few weeks at McGill University, Montreal; Grand Mere, P. Q.; Cardinal; Sault Ste. Marie; Hamilton; with further dates arranged for Marmora, Ont.; Montreal, Ottawa, Toronto. The plan has been followed of giving a lecture at High Schools or Technical Schools in the afternoon preceding the evening lecture.

Burning Off the Claybelt

Peculiar Problems of Agricultural Areas of Northern Ontario
Investigated by the Association.

Forest conservation in Northern Ontario offers more than the normal complications. Several weeks ago the Canadian Forestry Association submitted to some of the Boards of Trade along the Temiskaming and Northern Ontario Railway a form of resolution the main points of which they were asked to endorse. The resolution called upon the Ontario Government to find some means to curb the number and destructiveness of settlers' fires in the forested districts of Ontario and suggested an investigation of the "permit system" in use in British Columbia and Quebec. Secondly it was asked that "the forest protection service should be so reorganized as to bring about adequate field supervision and inspection which would ensure efficient work by the rangers."

At a meeting of the Associated Boards of Trade, held at Haileybury, March 8th, the Secretary of the Forestry Association was given a courteous hearing and laid before the large number of delegates the main contentions. He stated that in advocating reasonable safeguards against indiscriminate burning, no one wished to hamper the settler in the necessary work of clearing the land, or in the liberal use of fire for that purpose. All that was asked was the supervision of clearing fires by a simple and convenient plan of permits from rangers, these officers assisting the settler to accomplish his results with the minimum of danger to standing growth and to neighbors' property.

An objection was taken by two

or three members present to any government supervision of clearing fires whatever. These delegates advocated unrestricted employment of fires, big and small, to clear the lands of the Claybelt free them from excessive moisture, the perils of frosts and lengthen the growing season.

Others, however, strongly opposed such a view and believed that clearing could be done with some regard for the future. Non-agricultural lands, bordering the Claybelt and within it should be protected from fire.

A live discussion followed, in which many phases of the question were given expression. Finally a committee was appointed to investigate the question more fully and this committee will report back to the Associated Boards of Trade.

A Special Situation.

Peculiar local conditions in some at least of the agricultural communities of Northern Ontario undoubtedly call for special treatment as concerns forest protection. At the present time the settler away from the lines of the T. and N. O. railway appears to have a free hand in the use of tree growth. Many conflicting statements are heard in regard to the profit and lack of profit from settlers' pulp wood. Certainly a very large amount of pulpwood is cut by settlers and marketed, for over 110,000 cords from homesteads came down the T. and N. O. Railway last year. On the other hand, one will meet with plenty of settlers, capable looking men, who will give

fact and figure to demonstrate their inability to make day wages out of cutting and marketing the pulpwood on their properties. That the Ontario Government should undertake to ross and market the pulpwood for the settlers is a piece of advice frequently heard but experiments in that paternal direction have not been notably successful. Again, the suggestion is made that the railway rates should be lowered so as to deliver the pulpwood at the United States border leaving a better margin for the settler. This in turn is countered by the statement that reduced railway rate on the T. and N. O. would be absorbed by the pulpwood buyers and the settlers would be no better off. The marketing of wood from clearings is complicated by many factors, not the least of which is the newcomer's inexperience in such forms of work as bush clearing, the scarcity of proper equipment, the relative rarity of good roads. In spite of these handicaps, however, the settlers shipped out last year, as mentioned above, the large total of 110,000 cords, and near such communities as New Liskeard one does not lack for examples of prosperous contented farmers who have braved the inconveniences of pioneer life and have come out at the happy end.

Unrestricted Burning.

These fortunate examples do not alter the fact that an influential percentage of 'local sentiment' throughout the Claybelt favors unrestricted burning off of the forest growth, not only what is immediately required for crop purposes but far in advance of settlement for many years to come. To make a living in the shortest possible time and by the most direct is the natural ambition of newcomers the majority of whom have almost no capital whatever. Whether the heavy clay soil would be the gainer by the avoidance of repeated fires is a secondary consideration.

The Leading Question.

The vital question in Northern Ontario resolves itself into the conservation of forest growth on lands not suited for agriculture and this automatically rules out, under present conditions, the Claybelt section. It is quite true that even in that enormous territory, some form of supervision of clearing fires would work in the interests of the settlers themselves and of every town and village, but until the absolute forest land of Northern Ontario, south of the Claybelt, and measuring roughly a thousand miles long and from one hundred to two hundred miles wide receives proper fire protection, the Claybelt itself can not be singled out for special treatment. Within this non-agricultural region are some Reserves and Parks; but the condition of much of the remainder shows how very urgently protection is required. From the appearance of much of the country south of Cobalt and for some distance back from the railway, with little or no settlement in sight, the combination of cutting and fire have left no very inviting prospect for the future. Ontario has over 2,000 wood-using industries and upon the supply of enormous quantities of materials from Northern Ontario their security depends.

All Favor Reforms.

As to the Association's suggestions for the better control of fires on non-agricultural lands, the Secretary found practically a unanimous opinion among settlers, merchants, miners and professional men of Northern Ontario. These men fully appreciated the value of standing forests as a source of supply for Ontario's industries and knew likewise the inadequacy of the present protective system. That forest rangers should be closely supervised was not disputed in any quarter.

The Editor of the Cochrane "Claybelt," an influential newspaper in

that district, made the following observations following the discussion by the Cochrane Board of Trade of the Canadian Forestry Association's proposals:

From Any Angle.

"Take it from any angle you will, forest fires are a tremendous waste and waste in any shape or form is always sinful. There is no intention to prevent the settler from clearing and burning every stick of timber on his homestead, if he feels thus inclined, but when that settler sets fire to his slash carelessly and consequently destroys and lays waste the country for miles and miles around him, wasting in our days what it took nature half a century to produce, destroying his neighbors' property and endangering their lives, that man is culpable and should be dealt with accordingly. What would become of our rivers, streams and lakes were we to denude the land here of all its timber growth.

That the burning of settlers' slash can be done judiciously we have ample proof in our neighboring province, where strict laws of forest protection are enforced and the clearing there is going ahead at a perhaps greater ratio than in our own province."

Paper Shirts for Soldiers

It is said the paper shirts made in Japan are now being served out to Russian soldiers for use in the cold and wet weather. A number of these paper shirts were used by the Russians last winter and they proved to be much warmer and cheaper than ordinary shirts. The paper is made from the bark of the paper mulberry tree. Shirts of this kind have been used by the Japanese army and people for many years, their only drawback being that they cannot be washed.

One Year's Pencils

The world's production of lead pencils probably amounts to nearly two million a year, half of which are made from American grown cedar. Owing to the growing scarcity of red cedar and to the fact that many other trees now little used appear to be more or less valuable substitutes for that wood in pencil making, the U. S. Forest Service has carried out a series of tests which show that next to the two species heretofore used for the purpose the best trees are in order of merit, Rocky Mountain Red cedar, Redwood, Port Orford cedar, and Alligator juniper.

Merchantable Timber

(From Mr. G. C. Piche's report in Quebec Statistical Year Book.):

Provinces.	Millions of acres
Nova Scotia	5
New Brunswick	9
Quebec	130
Ontario	70
British Columbia	100
Manitoba
Saskatchewan	100
Alberta
<hr/>	
Total	414

Bushmen's Battalion

A report states that permission has been granted to lumbermen now attached to overseas battalions of the 2nd Divisional Area to be transferred to the 224th Foresters' Battalion of Ottawa.

The Battalion will mobilize at Quebec early in April and will be ready for the transports within five weeks from the time the war office asked for it. The officers in command are Lt.-Col. Alex. McDougall, Major Gerald White, M.P., and Major B. R. Hepburn, M.P.

Success of Aeroplane Patrols

Wisconsin's Experiment Proves Practical Use of Flying Scouts —
Aviator Vilas Surveyed Sixty Miles at a Glance.

(Additional interest is given the following article by the knowledge that several Canadian forest protection officials have suggested the use of aeroplanes for patrol purposes. One would be unwise to deny the adaptability of flying machines to protective work in view of the good results obtained in Wisconsin.)

By F. B. Moody, of Wisconsin, U.S.A.

During the fire season of 1915 Wisconsin was fortunate in having the services of Mr. L. A. Vilas, who was operating a hydro-aeroplane in the vicinity of Trout Lake, where the central station of the Forestry Field Organization is located. Mr. Vilas volunteered his services, and was made a deputy forest ranger by the State Forester without remuneration.

The forest reserve region, although of high altitude, is a great plain containing many lakes and swamps, though no abrupt hills, and from the aeroplane some 200,000 acres of land can be surveyed. A fire 30 or 40 miles away can be easily detected.

The pilot should go over the country he is to patrol either on foot or horseback, thoroughly familiarizing himself with all lakes, rivers, railroads, strips of timber and cleared lands, and make it a point to find as many land marks as possible, at least one for each point of the compass such as a lone settler's farm, a brightly painted house, a railroad (the direction in which it runs, as the smoke of a moving train is oftentimes useful in keeping one located), a small town or range of hills. All the above objects mentioned are very noticeable 10 or 25 miles away at an altitude of 800 to 2,000 feet.

Seeing for Sixty Miles.

At an elevation of 1,500 feet on a clear day a fire 60 miles away in any

direction is visible to the naked eye. It isn't a case of finding a fire, but to locate it correctly is the job. Smoke will show up very plainly from the air. Mr. Vilas reports that during a flight across Lake Michigan from St. Joe, Mich., to Chicago, he was completely out of sight of land, or anything else for that matter, for over three-quarters of an hour, and at an altitude of 4,600 feet. The first thing he saw was the smoke from the South Chicago Rolling Mills. This was in sight over ten minutes before any shore line was visible at all.

People often ask what a country looks like from the air. It's difficult to describe it, except that it looks like a large painted map on a small scale, without section lines.

The efficiency of an aeroplane in spotting forest fires is without doubt as practicable as any use to which it could be put. I myself was very much surprised with what ease a fire could be spotted and located, and there is no question in my mind but what the aeroplane will practically do away with some observation towers. The use of the aeroplane in the European war in the way of spotting and locating gun fire, armies of men, supply trains, etc., is well known, all of which objects show up comparatively small in comparison with forest fires.

Three Counties a Day.

It would be an easy task for a pilot with a good land machine to patrol three or four counties in a state each day, at the same time carrying mail, supplies or passengers to any outlying ranger's cabin. A useful load of 1,000 pounds is nothing for the average machine, and as far as weather conditions are concerned, a pilot with a well-powered plane will fly in anything short of a gale.

The limitations are the lack of sufficient landing places in a thickly forested region, and highlands. For this reason a few lots of six or seven acres each should be cleared at different places, depending upon the necessity of landing places, where aeroplanes are used.

The machine used by Mr. Vilas is standard, four-passenger Curtiss Flying Boat, 110 H. P. Curtiss Motor; speed on water 45 miles per hour; speed in air 60 miles per hour averages; width of plane 38 feet; length of hull 26 feet over all; weight of machine, without passengers or fuel, 1,400 pounds; climbing capacity 1,000 feet in six minutes, and consumption of gasoline about eight gallons per hour.

Brave French Foresters

In the *Revue des Eaux et Forêts* is given a list of the loss to the French Forest Service after a year of war. This comprises 46 men, including one inspector, 7 assistant inspectors, 27 forest assistants and students, 5 students who were just admitted to the forest school at Nancy, and 6 officers who have disappeared (possibly captured), but concerning whom no official information has been received. Judging from the account of the work done by foresters each month, the French Forest Service is making an enviable record, since quite a number of them have been not only cited in the orders of their brigade, but for exceptional bravery in the army orders of the day.

HAVE YOU PAID YOUR 1916 FEES?

Members are respectfully reminded that the 1916 Membership Fees of the Canadian Forestry Association should be paid, if possible, this month.

The Association's extensive publicity work depends entirely upon voluntary contributions and members' fees form a very large part of the annual revenue.

Make all cheques payable at par to the Treasurer at Ottawa.

Prisoners Set to Work

The French Minister of War has facilitated the employment of prisoners for lumber operations in France, with the provision that not less than 50 men would be employed in one place. The employer guarantees food and lodging and pays the sum of 8 cents per prisoner per day; 4 cents going to the prisoner and 4 cents for his clothing. If the employer only furnishes lodging and beds without food, he must pay, in addition, 20 cents per day. If neither food nor lodging is supplied, the total cost to the employer of each prisoner is 30 cents per day, (1 fr. 57). In case of laziness, it is provided that the 4 cents will be withheld from the prisoner.

A Novel Fire Poster

Dauphin Herald: "Supervisor Chas. Wellman, of the Duck Mountain, is always practical. His latest stunt is to utilize some of the bulletin boards that were in commission during the late temperance campaign to educate the public as to importance of preventing fire getting started in the timber belts.

Torrent Control in France

When the French Programme is Completed, Total Cost Will Not Exceed One Year's Damage by Unruly Streams.

By H. R. MacMillan,

Timber Trade Commissioner for the Canadian Government; Director, Canadian Forestry Association.

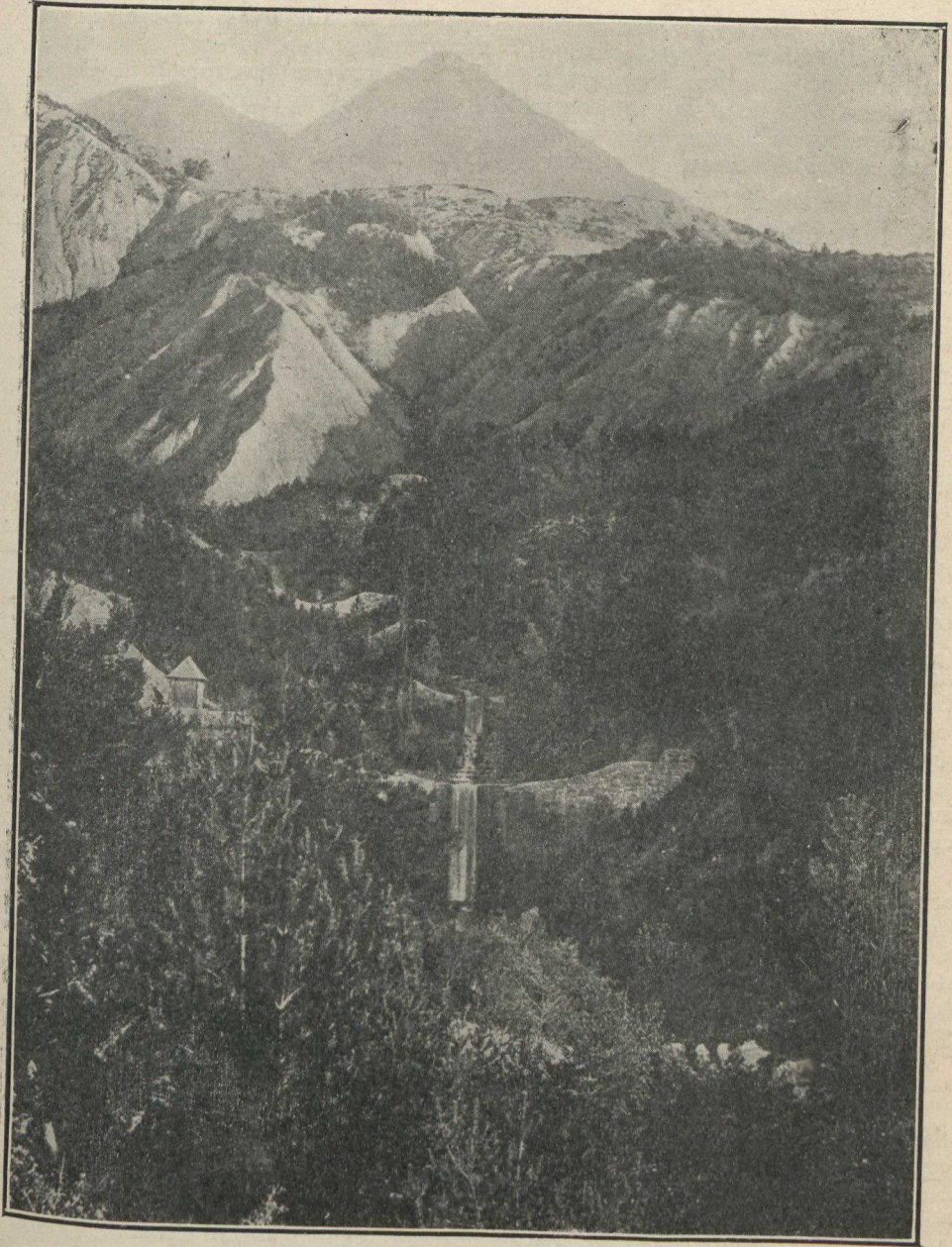
The damage due to floods and torrents from denuded water-sheds is probably the least serious of the effects of forest destruction in Canada. Nevertheless very large sums are being expended annually by railways in protecting road bed and bridges and by municipal, provincial, and Dominion authorities in protecting roads and public works against damage by torrents. The total amount so expended in Canada each year, while unknown, must be very great indeed. Canadians may therefore be assumed to be interested in the manner in which the control of torrents has been accomplished in France. It will be observed that whereas the expenditure in Canada is usually at the bottom of the stream in protective works, which will be a source of expense, the expenditure in France is chiefly at the seat of the difficulty, in reforesting the catchment area of the torrent, a work which will require outlay for a few years only, and which in some cases may actually become a source of revenue. Certainly the French system is more far-sighted than the Canadian.

Since the sixteenth century the problem of control of torrents has been periodically before the French public. Investigation of torrential action in 1797 gave rise to local laws for flood control. Very little action was taken, however, and discussion proceeded spasmodically until the

tremendous floods of 1856 in the valleys of the Seine, Rhine, Rhone, Loire and Garonne, involved the whole of France in a loss reaching hundreds of lives and \$40,000,000 in property. Always as elsewhere both with forest fires and floods, discussion of flood prevention in France had been most active after disasters which touched both the public imagination and the individual family or pocket. Sufficient had already been learned concerning the causes of the mountain floods, both from the investigations of engineers and the work already carried out by the Government to point out the proper method of regulating destructive torrents and, accordingly, in 1860 a law was passed providing for the reforestation of the catchment areas of destructive torrents, the work to be carried out by the Forest Department. The defects of this law were that the money provided was not sufficient for undertaking the work on the scale designed, the reforestation of the mountain catchment areas decreased the grazing areas, upon which depended the mountain population, and the right assumed by the state to appropriate communal lands for reforestation purposes upon terms which threw the expense of the work largely on the mountain communities. Protest, culminating in armed resistance, led to the amendment of the law, substituting sodding for reforestation in areas where grazing was of paramount importance. Sodding did not prove



The two engravings from which reproductions have been made on this and the adjoining pages were received from Mr. H. R. MacMillan, Special Trade Commissioner of the Dominion Government, and Chief Forester of British Columbia. At the time of writing, February 16, 1916, Mr. MacMillan was at Lahore, India. The pictures graphically illustrate the success of torrent control in France. The first shows a torrent in the Lower Alps, the bed of which has been built up by barrages behind which sediment collects. Picture taken in 1887.



A picture of the same torrent twenty years after. The barrages by preventing the cutting down of the bed of the river have also prevented the erosion of the banks which are now covered with forest.

a satisfactory means of stream control, and the other defects remained. Finally in 1882, after 18 years of agitation, the work of torrent control was placed upon a new basis by the law at present in force.

All Interests Considered.

The Forest Service still remains responsible for the work of stream control. Works are undertaken only where soil erosion has begun. The projects of the Forest Service are examined by a government commission on which local interests are represented and the boundaries of the area within which remedial works were large, and the formation of revenue bearing forests was an integral part of the scheme. Now an effort is made to restrict to a minimum the area upon which works are conducted, and on this restricted area to undertake intensive work, not only plantations to fix the soil and check the run-off, but also engineering works to break the descent of the water and support the banks and beds of the torrent. Large areas of forest are being established only in the lower Cevennes.

The works conducted by the State are carried on only on land belonging in fee simple to the State. Should there be within the area necessary for the control of a stream land owned by bodies and persons other than the State, one of two courses is adopted.

Taking Private Lands.

The State may buy or expropriate the necessary land. The right of expropriation is rarely exercised. The State acquires by friendly agreement the land on all streams where the public interest in the control of the stream is paramount.

The owner of the land, whether a private individual or a community, may retain the property upon condition that an agreement is made to conduct within a term of years fixed by the Forest Service under the supervision of the Forest Service the improvement works necessary. Com-

munities usually avail themselves of this privilege, and in such cases both the State and the departments in which the community is situated make money grants equal together on the average to one-half or two-thirds of the cost of the work. The State also assists with advice, and in the case of reforestation with seed and plants.

The law also names certain mountain communities in which, because of their important effects on stream flow, pasture lands must be treated according to conservative regulations in order to prevent destruction of the sod cover by over-grazing. Any ordered management of mountain pastures has been strenuously opposed by the mountain population, even though the object of all such regulation of use is the improvement of the pasture. Money grants have been made by the State, and assistance has been given freely in all cases where private individuals or communities have shown a disposition to protect mountain pastures. Nevertheless, the opposition still persists. A commission was appointed in 1910 to study better means of improving conditions and amendments to the law were under consideration at the outbreak of war.

Developing Specialists.

The French Forest Service in vigorously taking up the responsibility placed on it by the law of 1882 has led the world in works for torrent control. Foresters and engineers have co-operated in checking the destructive headlong plunge of waters from the Alps, Cevennes and Pyrenees. Half a century of experience, dating from the earlier laws, has led to the growth in the Forest Service of specialists in stream control, who have developed several well-defined methods of accomplishing their object.

The reforestation of the catchment areas of the torrential streams and their tributaries was in the early years the only means adapted for the control of water-flow. Even now, although in certain conditions it has been found necessary to rely on engineering works

reforestation remains the greatest weapon in the hands of the Forest Service. The catchment areas have been re-clothed extensively by planting and seeding, both with broad leaves and conifers. It has been found that except in the few situations where conditions are very favorable for forest growth, planting is much more satisfactory and even more economical when results are considered. Nurseries have been started near all the large projects, and coniferous species are used for an overwhelming proportion of the work, the most common of which are the pines, *P. sylvestris*, *P. cembra*, and *P. uncinata*. Other conifers planted extensively are larch (*Larix europaea*) in the Alps and Pyrenees and fir (*Abies pectinata*) in the Cevennes and Pyrenees. Broad leaf trees, chiefly various species of alder and willow, are planted in the beds of streams and on steep banks where it is important that a soil cover be rapidly established. Beech (*Fagus sylvatica*), chestnut (*castanea vulgaris*) are commonly used in the Cevennes and in the Pyrenees.

At the beginning of 1909, 629,488 acres had been reforested at a cost for establishing the forest cover of \$8,000,000, or \$12.70 per acre. Of the total, 363,151 acres have been reforested by the State, 134,005 by the communes, and 132,332 by private owners. The State has given valuable assistance to both the communes and the private owners, having paid 55 per cent. of the cost of the work accomplished by the communes and 37 per cent. of the cost of the reforestation carried on by private owners. The departments have also made small money grants for reforesting in the mountains amounting to 23.5 per cent. in the case of work done by communes and 5 per cent. in the case of plantation by private individuals. The total cost of the reforestation work to the State up to 1909 has been \$5,568,683 on State projects; \$812,807 subventions to communal projects; \$348,744, subventions to private works; total, \$6,730,234.

The remainder of the expense of establishing cover on the catchment areas of mountain torrents has been shared as follows: Private owners, \$546,488; departments, \$400,723; communes, \$320,921.

Costs of Land Purchase.

The programme of work is by no means completed. The land already purchased by the State, 325,265 acres, represents only about 55 per cent. of the area for the acquisition of which plans have been completed. There still remain 266,047 acres, the purchase of which will be necessary. The average cost of the land purchased in France for stream control is \$18.50 per acre. The expenditure in the purchase had reached in 1909 \$6,022,644, and it was estimated that a further \$3,500,000 would be required.

Over 92 per cent. of the land already purchased will be reforested. The remainder consists of rock outcrops and areas above timber line.

Reforestation alone is not always sufficient; where the catchment area of the stream is very small, where the immediate control of waterflow is an important consideration, where the slopes are very steep and the banks lack stability or where a very rapid fall of water must be broken, recourse must be had to the erection of barriers. The French Engineers in the Department of Waters and Forests are credited with leading the world in the construction of works for the artificial control of mountain streams. Over half a century of experience has developed several well-defined methods of correcting the flood tendencies of runaway streams.

The small tributaries, high in the mountains, which are dry during a portion of the year, but down which in the season of melting snow or rain the water sluices without obstruction, are first attacked. The most common method here is to cover the bed with a woven network of branches, held down by stakes or by poles criss-crossing the bed and driven into the banks. The bed of brush catches material

brought down by the water, prevents the carriage of gravel and rock to the stream below, and prevents erosion.

Bracing Up a Stream Bed.

At other times when branches are not available barriers of faggots, sods and stone are constructed at frequent intervals across the bed of the stream, the purpose of which is to hold up the water, catch sediment and prevent the cutting of the stream bed or banks. The barriers are rendered permanent by planting with shrubs or with cuttings of such species as willow and alder, which strengthen the banks, protect the bed of the stream, and form a living network of branches and roots to hold back flood waters and their burden of earth and rock.

Those portions of streams in which a large volume of water is flowing, where the bed and banks are rapidly cutting, and where torrential characteristics have already developed, require more serious treatment. In such cases masonry walls are built with the object of impounding the products of erosion, checking the headlong flow of water, preventing the cutting down of the bed of the stream, supporting unstable banks. The bed banks and flow of the stream are carefully studied before work is begun, and walls and barrages, as they are called, are designed to meet the requirements of each particular case, both so that the masonry itself may meet the stresses to which it will be subject, and further that the detritus accumulated by the masonry will prove an indirect support to shifting banks and a valuable means of decreasing the grade and checking the speed of the stream. According to the gravity of conditions, the barrages vary from simple dry stone sills set across the bed of the stream a few feet apart to mortar-set stone walls three feet or more thick, fifteen feet high, crossing the stream from bank to bank set so close together that the top of one wall is level with the base of the next barrage above it.

Sometimes it has proven easier to pave stream bottoms, canalize the waterflow, or create new stream beds than to correct the torrent by barrages; where necessary this is done. Occasionally also the constant sliding in of stream banks crushes the strongest barrages. Draining is then resorted to on a large scale in order that the banks may be fixed.

Preventing Snowslides.

The prevention of avalanches and snowslides is also undertaken. Snowslides usually follow definite courses. Stone walls five to six feet high, two and a half feet thick, are built across the upper courses of dangerous snowslides beginning at the point where the avalanche usually takes its start and continuing down the slope in ranks to the point below which snowslides are unlikely to start. When stone walls are impracticable, the desired results are secured by low banks of loose rock or earth disposed in the same manner. When conditions permit of it, plantations of trees or shrubs are made under shelter of the walls or banks.

There have been very few torrents upon which work has been done by the French National Government upon which some or all of the above corrective works constructed up to 1909 exceeded the cost of reforestation on the same streams, being over \$6,560,000, including maintenance to the same date. The question of maintenance is a serious one. All the works require constant upkeep, and some have had to be rebuilt several times.

The opposition of the mountain population has been overcome in various ways, by employing them on the works by money grants for pasture improvement, and by subvention to creameries and co-operative dairy associations. The total amount of such expenditure is about \$35,000 chargeable to the fund for the correction of torrents.

The work which the French have undertaken, re-clothing the drainage basins and remodelling the beds of

thousands of mountain streams, should, when finished, rank with the great constructive public works of the world. The task is now half completed. The cost up to 1909 was \$20,650,000. The estimated cost for the remainder of the work in sight was then \$12,000,000, exclusive of upkeep and exclusive of the expenditure necessary by departments, communes, and private individuals. *Such works however, should not be measured by cost, but by results. The obliteration of the torrents of France, impossible as it may have appeared in the*

beginning, will be practically accomplished with the completion of the programme now adopted. Torrential floods, which in one year wrought destruction equal to the total cost of stream improvement, will be no longer possible, and neither the vineyards and farms of the lower valleys, nor that important mountaineering element of the population which clings to upland slopes and valleys will hereafter be in danger by flood or snowslide. The price of one year's flood carefully expended will permanently add millions of acres to the productive area of France.

The Use of Pine Oils in Treating Ores

Much interest has been exhibited in the application of what is called the "pine oil flotation process" to the treatment of ores in the Cobalt mining district. At present the scope of the process in Canada is confined to experimental work, although flotation has been in use at many of the big United States silver and copper mines for years past.

The apparent economy and simplicity of the process, which may give high value to the enormous quantity of tailings of the Cobalt and other mines at present regarded as waste, depends upon an assured supply of pine oil. This is now imported from the United States and no guarantee of more than a few months' supply can be had. Whether or not the Canadian mines can be made independent of imported oils for the flotation process is at present engaging the attention of experts identified with the Ontario and Federal Governments and experiments will be made at the Forest Product Laboratories, Montreal, along such lines. If Red Pine or other Canadian woods could be made to produce the quality and

quantity of oils required, a new industry might be added to these now identified with the Canadian forest.

The system apparently is simplicity in itself yet there are things about it which cannot be explained even after exhaustive research work which is now being carried on. The principle is that air is forced under pressure through the canvas bottom of a tank-like cell, through which cell emulsified oil and water mixed with crushed ore held in suspension passes. The oil apparently forms a filament on the particles of mineral and brings them to the surface in the bubble. The froth is skimmed off and in it is contained the mineral.

The oils used may be broadly divided into "frothers" and "collectors." The pine oils are good frothers and coal tar and its various subdivisions are good collectors. It has been found that a mixture of coal tar, 50 to 60 per cent., coal tar creosote 30 to 40 per cent., and refined pine oil 5 to 10 per cent. give good results. Other pine oils work very well on Cobalt ores, however. The oil consumption per ton of ore approximates about one pound or from 2 to 3 cents per ton of ore.

Valuable Tests to Prove Forest's Effect on Streams

Experience has proved that the forest works efficaciously against many dangers resulting from the elements let loose, such as avalanches, falls of stones, erosion, earthslides, inundations. These are facts admitted and indisputable, but how and in what measure does the forest exercise this moderating action upon the destructive power of water? How can it lessen the destruction from inundations?

It is in order to attempt an answer to this leading question that the Swiss Federal Station of Forest Research in 1900 installed an observing station in the basin from which two streams of the Bernese Emmental are fed. These streams, tributaries of the Hornbach, are located in the territory of the commune of Sumiswald-Wasen, on the northwest slope of the Napf. The geological formation is fissured pudding-stone which decomposes readily. One of the basins, with an extent of 140 acres, is completely wooded. The other with an area of 175 acres has only a small average of wooded district, about 30%. The forest is composed of spruce and of alder bushes. The measurement of the precipitation, rain and snow, takes place regularly throughout the year. In each of the basins there have been installed three rain gauge stations at different altitudes. At the junction of the two streams with the Hornbach certain apparatus registers automatically every five minutes day and night the volume of the water flowing.

The Research Station is going to publish very soon the results thus obtained from these valuable observations. In the meantime if we refer to the provisional statements of the Research Station the two following points seem to have been definitely established:

1. In case of storms accompanied with heavy rains the maximum out-flow in the wooded valley is from 30 to 50% less than that from the other valley, and there is another beneficial circumstance from the action of the forest, that this maximum flow is produced later in the wooded basin than in the other.

2. In the long periods of drought (the summers of 1904, 1906, 1908 and 1911) the wooded district gave without interruption a flow of water while in the denuded valley the stream dried up and all the springs ceased although at a normal time they have an abundant flow.

These observations seem thus to have demonstrated irrefutably the moderative action of the forest upon the regulation of the stream flow which some have denied.

Warning on Licenses

The Department of Colonization, Mines and Fisheries of the Quebec Government has favorably considered the suggestion of the Canadian Forestry Association that warnings

against fire be printed on the fishing and hunting licenses in future. A letter to the Secretary from Mr. E. M. Dechene, Deputy Minister of Lands and Forests, states that such action has been decided on.



Experiments With Reindeer

The Story of Canada's Efforts to Introduce a Valuable Animal to
New Forms of Service.

The connection of reindeer and forest conservation is not so remote as first thoughts might indicate. As mentioned in a recent number of the Journal, Mr. Ellwood Wilson, Chief Forester of the Laurentide Company, Grand Mere, P.Q., has succeeded in domesticating a remnant of the herd brought to Canada through the efforts of Dr. Wilfrid Grenfell, and these have come through the past winter remarkably well and will probably show an increase. Last year the deer showed their practical value in browsing off the hardwood seedlings in plantations where the forester wanted evergreens only to grow. Many devices were tried in an effort to get rid of the hardwoods. The reindeer finally were turned in and devoured

the hardwoods refusing to touch the conifers. That these animals were to be used for logging, or for winter travel in various woods operations and forest protection, is a happy theory which has not had much opportunity for demonstration.

The following article by Aubrey Fullerton in April "Rod and Gun" gives most interesting information on the reindeer question:

Five years ago a novel experiment was made by the Dominion Government in the way of wilderness colonization in the far Northwest. It was animal colonization, rather than human, but its success was likely to mean a great deal to the people who might settle there at some future time. For these new animal colonists were reindeer.

Forty reindeer were brought by the Government from Dr. Grenfell's herds in Newfoundland, and were taken across Canada to Fort Smith, up in the Mackenzie River country. There they were placed in a reserved area and left to make themselves at home in new surroundings. It was hoped that they would take kindly to the change, and for a time they seemed to do so; but something over a year ago it was reported that of the forty animals all but three had died or escaped. The Mackenzie country did not suit the Newfoundland deer, and the attempted colonization proved a comparative failure.

There are still many deer in the North, however, and though the native deer of those wilderness parts are far less tractable for domesticating than the reindeer of Labrador or Alaska, they have in a few cases, at least, submitted to the taming process—in proof of which is the accompanying picture of a deer team that a persevering halfbreed in the Athabasca country has trained to harness.

Success in Alaska.

The reindeer has been a pronounced success in Alaska, where there are now some fifty thousand descendants of the fifteen or twenty animals originally imported from Siberia. As a beast of burden the reindeer is far more satisfactory than dogs, and it finds its own living, feeding the year round on the moss and lichens of the Alaskan plains. Its powers of endurance are remarkable. Two hundred pounds, besides the sled, is a normal load for one animal on a long journey. A few winters ago a Government official travelled four months with reindeer teams, covering two thousand miles of barren country, in which the deer lived entirely on moss that they dug from under the snow.

At another time a relief expedition was sent to the Arctic coast, where some whalers were ice-bound,

with three hundred reindeer, which were driven eight hundred miles with the temperature from twenty to fifty degrees below zero. The animals, which were intended for food for the imprisoned whalers, reached the end of the long journey in good condition, having foraged for their own food along the way.

The United States mails have also been carried along the Behring Sea coast, for several winters, by strong reindeer teams, and more satisfactorily than the Canadian mails in our own North-land have been carried by dog-teams.

Good for Meat Supply.

Another benefit that has followed the introduction of domesticated reindeer in Alaska has been the increase it has made in the meat-supply. Reindeer meat is not only the staple diet of the Alaskan natives but is already being shipped in small quantities to such markets as Seattle, and is finding its way to good American dinner tables. It is believed that, as the herds of reindeer increase, the mossy grazing grounds of Alaska will become a great meat-producing region for the Western States market.

The Canadian North has possibilities of exactly the same kind. It, too, can produce meat, and may some day be a valuable source of supply for our own market. The great sub-Arctic prairies are covered for hundreds of miles with rich grass, and in such abundant pasturage there is feeding for countless droves of cattle-kind. A suggestion has even been made that beef cattle should be taken into the North, as soon as the railroads make it possible, and turned out to feed upon the wide grass-covered plains of the Mackenzie and Athabasca territories; but at any rate those plains are the natural feeding-ground of meat-producers of almost equal value, the roving herds of deer and caribou. One of these days we shall perhaps be bringing down deer meat

from the North and making use of it to lower the cost of living in our towns and cities.

If the experiment in domesticating reindeer at Fort Smith had been successful it would have meant a great deal to northern Canada, and in time might have led to as bene-

ficial results as in Alaska. Something may come of it yet, or another trial of the same kind may be made. But the native deer are there, at any rate, and it remains for Canadian genius to find some way of utilizing them. That Athabasca halfbreed has shown a very good example, as a beginning.

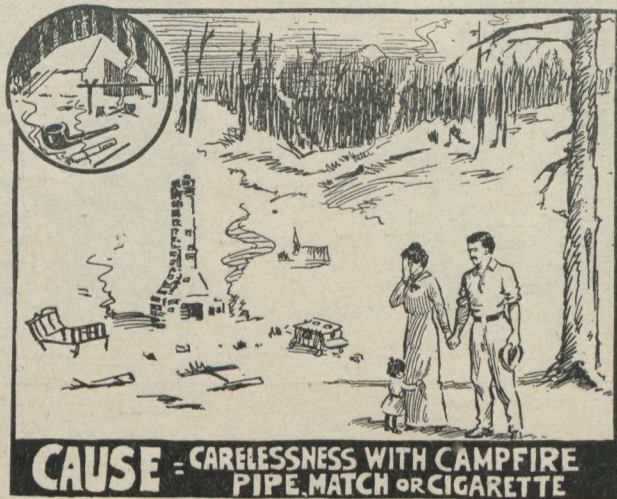
"A Matter of Opinion"

Under the above title the Canadian Forestry Association will issue this month fifteen thousand small books of about thirty pages each, with colored cover, for general distribution throughout the Dominion. A French edition of eight or ten thousand will be issued simultaneously.

"A Matter of Opinion" presents to the reader the main arguments for forest protection in the form of soliloquies by The Settler, The Railroad Man, The Camper, The Fire

Ranger, The Banker, The Power Engineer, The Taxpayer. Each speaks of the forest from his own point of view and testifies by his narrative to the forward movement in conservation during recent years.

These booklets will be sent to all members as soon as issued, and the bulk of the edition will be distributed direct to settlers, railroad men, etc., etc., through the Association's facilities provided by the banks, the railroads, forest departments, etc.



The above cartoon has been issued by the Association in the form of posters for the use of fire rangers, lumber camps, etc. The posters are on cardboard, 10 by 8½ inches, printed in green and red, and form a striking cartoon. Already several lumber companies and protective associations have made good use of them. They may be had on application to the Association office, Booth Building, at the price of \$1 for fifty.

FROM THE ASSOCIATION'S FREE CARTOON SERVICE USED BY
SEVERAL HUNDRED CANADIAN NEWSPAPERS.



The Canadian Soldier: "That's about the worst wreck of a forest I ever saw."

The Canadian Woodsman: "It is, eh? Then you ought to see what's left after a forest fire. I'll take you to a hundred townships right here in Canada that will make such a picture look tame. We think it is a pity for European forests to be smashed and yet we smash our own by nearly 10,000 timber fires per annum."

The Soldier: "H'm! That's a new way of looking at it."



Published in collaboration with the Canadian Society of Forest Engineers.

P. Z. Caverhill, Forester for the Province of New Brunswick, is preparing his plans for a forest survey of that Province, and has mapped out a most excellent scheme. He has been kind enough to ask the advice of many of the members and a very interesting symposium has been held and useful information collected and discussed. Mr. Caverhill will make a trip to Grand Mere in April.

R. R. Bradley, of the New Brunswick Railway Company, is preparing his final maps of the territory owned by that Company and expects in the spring to undertake planting operations on a large scale.

Henry Sorgius, Manager of the St. Maurice Forest Protective Association, made a trip to Michigan to attend the meeting of the Northern Forest Protective Association. Mr. Sorgius is very busy with his plans for the season's work, and is equipping a gasoline speeder and a Ford automobile with the new pump designed by Mr. Johnson, of the Railway Commission. Circulars are also being sent out to the settlers explaining to them the changes in the fire laws and asking their co-operation.

Ellwood Wilson went to Syracuse on April first to lecture to the students of the New York State College of Forestry.

A. C. Volkmar, Forester of the Riordon Paper Co., St. Jovite, Que., has been elected an associate member.

George Chahoon Jr., President of the Laurentide Co., Ltd., is spending the month of April, with F. A. Sabbaton, Vice-President of the Laurentide Power Co., at Hot Springs, Va. Mr. Chahoon is an enthusiastic golfer and Mr. Sabbaton is a tennis player of no mean order.

B. M. Winegar, of the C.P.R., reports that he will begin the planting of trees for snow sheds along the eastern lines of that road.

Arnold Hanssen, of the Laurentide Co., Ltd., has been busy all winter clearing off the flood basin of the River St. Maurice about to be flooded by the Company's new dam, hauling the wood and trying to dispose of it to the best advantage.

G. A. Gutches, Director of the New York State Ranger School, reports a very successful season.

Prof. R. B. Miller, of the University of New Brunswick, has been getting out some very creditable reconnaissance maps made by his students.

Mr. H. R. MacMillan is now in Calcutta, India, investigating conditions and markets and will proceed from there to China and Japan.

H. R. Christie, of B.C., is going to Ottawa, for the purpose of enlisting.

The activities of the Dominion Forestry Branch will continue along the same lines as last season.

A. H. Unwin, of England, is going to Nokling, via. Lagos Nigeria, Africa, for the next twelve months. Mr. Unwin is the only European member of the Canadian Society of Forest Engineers.

R. O. Sweezy writes from the Royal Military College at Kingston that he is carrying on a detailed survey for M. J. O'Brien in the Upper Ottawa, area 1,125 square miles, and that he gets away occasionally from his military duties to see how his parties are progressing. Recently he made a brief examination of the limits of the Mattagami Pulp & Paper Co., in Northern Ontario.

To a Pine Forest!

"A pine forest is one of the most beautiful features of nature. Of all quiet scenes it is surely the quietest. The harsh sounds of the busy human world, and even the dreamy murmurs of summer, are hushed there; no song of bird or hum of insect disturbs the solemn stillness; and only at rare intervals the mournful coo of a dove, making the solitude more profound, is heard in the deeper recesses. The weary, care worn spirit bathes in the serenity of the silence, and feels the charm and refreshment of its highest life. The trunks of the trees have caught the ripened red of many vanished summers, and are bearded with long streaming tufts of grey lichen, which impart to them a weird, savage appearance; but they are touched with grace by the wild flowers growing at their roots; childhood sporting in unconscious loveliness at the feet of old age. They form long drawn aisles and vistas, like the pillared halls of Karnak, or the Thousand Columns of Constantinople, which are indescribably attractive, for they appeal to that love of mystery which exists in every mind; they reveal only enough to stimulate the imagination, and lead it onward to lovelier scenes beyond. Life itself without these vistas of expectation would not be worth living.

Beautiful indeed is the pine forest in all seasons: in the freshness of spring, when the gnarled boughs are penetrated and mollified by the soft wind and the warm sun, and, thrilled with new life, burst out into fringes and tassels of the richest green, and cones of the tenderest purple; beautiful in the sultry summer, when among its cool, dim shadows the cheated hours all day sing vespers, while the open landscape is palpitating in the scorching heat; beautiful in the sadness of autumn, when its unfading verdure stands out in striking relief amid changing scenes, that have no sympathy with anything earthly save sorrow and decay, and directs the thoughts to the imperishableness of the heavenly Paradise; beautiful exceedingly in the depth of winter, when the tiers of branches are covered with pure, unsullied wreaths of snow, sculptured by the winds into curve of exquisite grace.

It is beautiful in calm, when the tree tops scarcely whisper to each other, and the twitter of the golden wren sounds loud in the expectant hush; it is more than beautiful in storm, when the wild fingers of the wind play the most mournful music on its great harp-strings, and its full diapason is sublime as the road of the ocean on a rock bound shore.— (From "Teachings in Nature," by Rev. Hugh MacMillan.)

Fire Protection in Pine Logging

The Value of Any Protection is the Money Worth of the Loss it Averts.

By Coert DuBois,

District Forester, U. S. Forest Service, San Francisco, Cal.

When one walks about any large city he sees at frequent intervals expensive buildings and, through their open doorways, costly-looking apparatus or fine horses that look like ready money. From four to six big husky four-dollar-a-day men in blue shirts are tilted back in chairs in front of each one of these houses. On every other corner one notices a red painted iron box on a post that must be connected up with an electric wiring system, for which real money was paid. This all means that the risk of fires starting in a city and the value and inflammability of the structures subjected to this risk are so great that a system adequate to protect it is maintained, practically regardless of the cost of that system. I have seen many newspaper criticisms of the adequacy or efficiency of city fire departments, but I have never seen printed or heard a citizen utter a complaint of the high cost of the system.

In a well ordered factory you will see an \$8,000 automatic sprinkler system, \$2,500 worth of 4-inch water piping, and a \$10 steel reel with \$15 worth of fire hose on it at the end of the hall on each floor—an investment of \$10,575. For what? To prevent \$10,576 worth of damage. The value of any fire protection, then, may be stated as the money worth of the loss it averts. It can cost anything less than the loss

which is reasonably sure to occur without it. Therefore, to arrive at a definite conclusion of what is a justifiable sum to spend on fire protection in any activity, it is necessary to inquire how likely fires are to start and the cash damage they may be expected to do, once started.

Problem of Fire Logging.

My talk will be confined to the fire question, because I don't know anything about any other kind of logging.

Contrary to popular opinion on the subject, the cause statistics collected by the Forest Service show lumbering activities to be the least prolific source of fires in the National Forests, only a trifle over 4 per cent. (literally 4.067 per cent.) of the total number occurring from this cause in the eight year period from 1908 to 1915. Nevertheless, because the total number is high—5507—the number caused by logging operations—224—is high when viewed independently.

I know of one outfit that had 16 fires on its works this summer. In any activity in the woods some measure of the number of fires which can reasonably be expected is gained from the extent of the legitimate use of fire which must necessarily accompany it. In the typical pine logging job there are perhaps 200 men in the woods, 80 per cent. of whom smoke cigarettes or a pipe while working; 6 steam logging

machines burning wood fuel; 2 steam locomotives burning oil, and a camp burning wood for cooking and heating. I should say the pine operator could expect to see start on his works an average of not less than five fires a year.

The elements of damage done by fires in the logging woods are, first and foremost, lost time; then, the cash loss by destruction or reduction in the value or efficiency of equipment such as donkeys, loaders, logging line, chutes, railroads, trestles, or camps; last, the value of the product is lowered when logs are damaged.

Sources of Loss.

Take the element of lost time. A fire is usually handled by the railroad section crew. It is not unusual for a five-man crew to work a day on an ordinary fire, leaving one man to watch it for 48 hours afterward. This means \$21 in lost time. A larger fire may require a donkey, a camp crew, or the whole woods crew. It is not at all unusual for a part of all of the mill crew to turn out in an emergency. A fire which requires the whole logging crew of an ordinary double band mill will cost the operator, in lost time, about \$400 per 10-hour shift. These figures refer to direct labor charges only and do not take into account lost operating time of expensive equipment or the supervisory and overhead charges which are going on while the plant is turning out no product.

If it is expensive to fight fires, why not let them burn? This would be good business if it were not for the fact that it would very probably be still more expensive in damage to equipment. A fire practically never ruins a donkey engine beyond repair, but \$500 or \$600 damage is a frequent occurrence. Burning the sled out from under a machine, for instance, would mean a loss of about \$400, and it will yard no logs for several days. Logging cable is

easily damaged, and the loss of the lines on one machine—say, 1,300 feet of yarding line and 3,000 feet of back line—costs \$375. Repairing a line burned in two may be put down at \$5 per splice.

Cost of Repairs.

The ordinary fire on a logging job does not destroy a chute—it about half destroys it. Repairs can be figured at \$750 per mile of chute burned over. The most serious single equipment loss is the burning of a main line railroad trestle. It means that the main artery of the woods work is cut and the product of all work must stand still until the damage is repaired, at a cost of \$3.50 per running foot of trestle burned.

I have seen, an hour and a half after a spark dropped out of the fire-box of a moving donkey, an entire camp wiped out as thoroughly as though packed off by a cyclone. All that was left was a large black cloud of smoke, which cost about \$2,200. Logs on the ground burn on the end, or, where they lie across others, pockets burn out of the sides. A fire seldom destroys them, but it reduces their value between 10 and 15 per cent.

Forest products rank second among the industries of Canada and are worth \$180,000,000 a year. The important uses for wood in Canada are for lumber, lathes, shingles, poles, railway ties, pulp wood, hard wood distillation, cord wood, hemlock bark for tanning, etc., etc. In the manufacture of lumber about 25 per cent. of the tree is left in the forest, in the form of stumps, tree tops, branches, leaves, etc., while at the saw mill about 35 per cent. more is discarded in the form of bark, sawdust, edgings, deal ends, shavings, etc. So that under the present conditions only 35 to 40 per cent. of the original tree is converted into finished lumber or other useful articles of products.



One corner of the Berthierville, P.Q., Forest Nursery.

Prussian Forests in War

War conditions have induced the Prussian forest administration to issue alleviating instructions to the managers of State properties. Moratoria for rents and wood purchases are permitted under circumstances. Brushwood may be given to the poor at one quarter its usual cost.

All the oak bark and spruce bark for tanning purposes is contracted to the War Leather Association (in which the government is partner) under easy conditions.

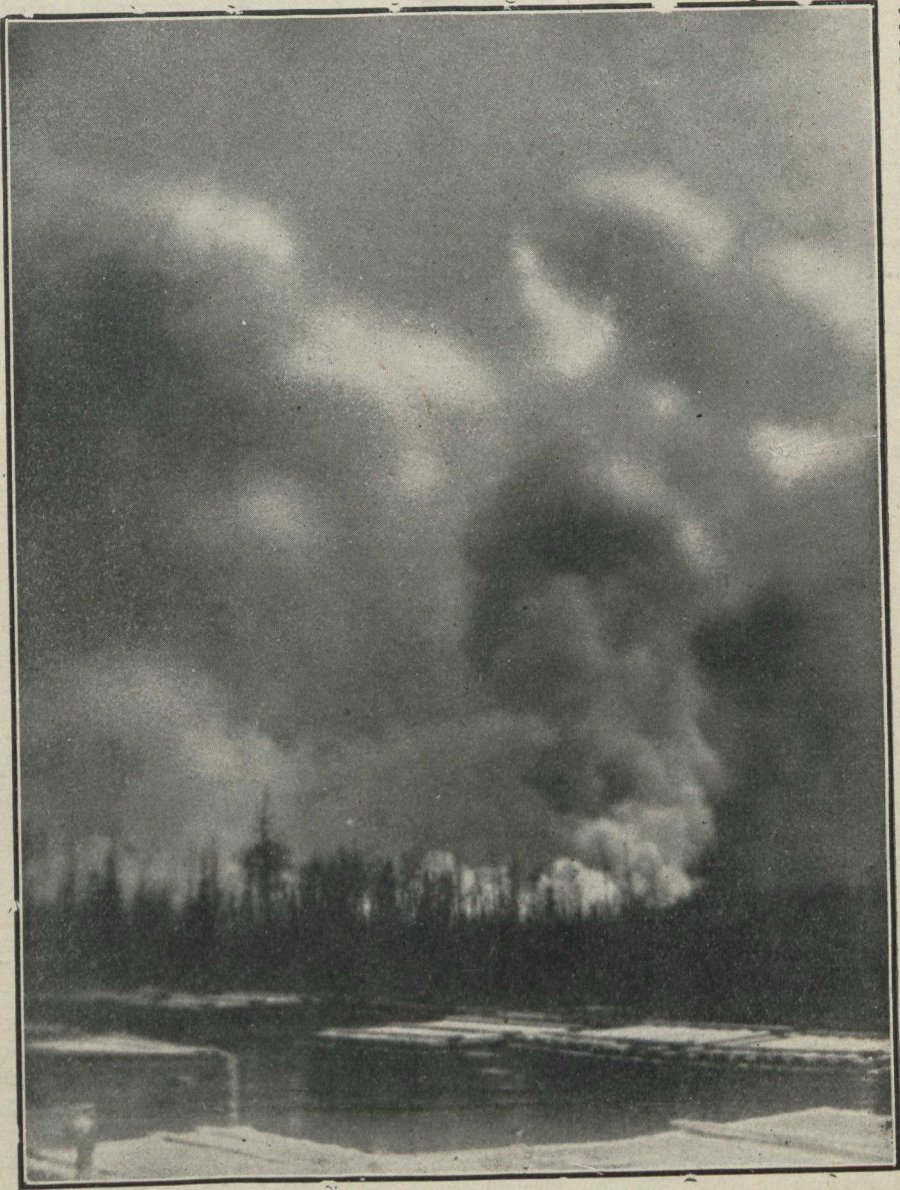
A serious deficiency exists in rosin, which has been mostly imported, and is especially used for manufacture of lubricants and of writing paper. There are three possibilities of securing rosin, namely by tapping spruce as used to be done long ago, by distilling any coniferous wood, by scraping the rosin exuded on spruce when damaged by game animals.

Curiously enough, the latter method is supposed to give at least most rapid results; while the second

method is being experimented with. Instructions are issued how to scrape the rosin, which is to be 70 per cent. pure and is taken over by the "rosin accounting office" at about \$2.50 per hundred weight f. o. b.

In experimental areas about 80 pounds per acre at a cost of \$1 to \$1.25 per 100 pounds could be secured.

In March, 1915, the administration pointed out that in order to assure sufficiency of bread grain and potatoes for human needs the number of pigs would have to be reduced. To prevent, however, later a meat famine, breeding stock and young stock should be carefully preserved, for which purpose the forest pasture should be opened up, herding the pigs wherever larger communities are involved, even to the extent of transporting the herds by train. The pasture is to be free of charge, to be continued till late fall or early winter.



From a photograph of a destructive forest fire in Northern Manitoba.

Silvicultural Problems of Forest Reserves

Learning the Character and Conditions of a Property in Detail—
Administrative, Economic and Technical Problems.

By Dr. B. E. Fernow,

Dean of the Faculty of Forestry, University of Toronto.

(Following is the second part of Dr. Fernow's paper which commenced in the March issue of the Journal.)

In order then to inaugurate a systematic management of any property, the character and condition of the property needs to be known in detail; next, its administrative, its economic, and its technical problems must be recognized and solved.

These requirements in a forest property involve first of all a detailed forest survey, including a close stocktaking, and mapping; next, a suitable subdivision into smaller units or compartments for convenient handling; a study of the materials that can be marketed, and a study not only, but a stimulation of the market for the minor materials; next a study of growth conditions and their effect and results in regard to regeneration and in regard to increment. Based on this information an admissible felling budget may then be calculated and the felling areas may be suitably located; finally, study and experiment is necessary to learn how the local silvicultural difficulties may be overcome.

These are the data which must be ascertained in order to formulate a working plan and to inaugurate a technical management. There is no need here, I hope, to insist on the necessity of employing men with

professional training to collect these data and to apply them; no need to insist that permanency of tenure of office and continuity of organization are essential to successful execution of the plans.

I propose now to point out a few illustrations of the kind of silvicultural problems that must eventually be solved by experimentation, those that arise in attempts to secure a new crop of desirable character.

Each reserve has its special problems, according to its character and composition.

The Aspen Problem.

In the Riding and Duck Mountains, we find conditions and problems very much alike. The most valuable species here at present in the white spruce, hence it is this species for which the management would have to be devised, especially as at least 60 per cent. of the soil is adapted to this species.

Unfortunately, numerically, another species, the aspen, is most prominent, as a result undoubtedly of fires which in past ages and also in modern times have reduced the spruce to only a limited amount; hence the spruce must be re-established in competition with the aspen.

There is no difficulty on this ac-

count, in the nature of the two species, for the spruce is a tolerant species and can stand the light shade which the aspen gives, almost without being retarded in its growth. The only problem is that of the profitable or at least costless removal of the surplus of aspen.

Aspen is by no means a useless weed tree. Not only is it valuable as a mere soil cover, recuperating the soil after fires, but it furnishes an acceptable fuelwood and pulpwood, and even an inferior grade of lumber, especially for flooring. Aspen also lends itself to use for small woodenware, boxes, crates, pails, excelsior. The establishment of industries near or in the reserves using this material is probably possible and should be brought about by investigating the possibilities of securing a sufficient supply of the raw material and other factors favoring such industries.

Unfortunately, it is liable at an early age to rot. Large areas of mature aspen, which look as if they would cut satisfactory saw material, are to the extent of 50 to 80 per cent. "punky," and so far as known useless. The silvicultural problem of re-establishing the spruce must wait upon the solution of the technological problem of finding a use for "punky" wood, or a use where at least a certain per cent. of rot is not objectionable.

Such large areas of pure aspen of all ages are found in these and other reserves that it will become an unavoidable necessity to work in part for aspen reproduction, and in that connection to solve the problem of reducing or stopping the progress of the disease, keeping it out of the younger growths that are not yet affected.

The aspen problem is, indeed, a general one throughout the whole Eastern Dominion; the development of its profitable utilizations should be made one of the studies of the Forest Products Laboratories.

Underbrush Problem.

There is little or no difficulty in establishing spruce under aspen of the shade endurance of the latter, but another, worse inimical agency comes in to make difficulty. The light shade of the aspen favors the establishment of a dense underbrush, especially of hazel, with an admixture of half a dozen other shrubs. This underbrush, keeps out the spruce, keeps it from establishing itself by natural seeding, and would choke it out if planted, and hence must be removed before a young crop of spruce, and even of aspen, could be established. Experiments are needed to determine the cheapest effective method of dealing with this trouble.

The inquiry would be as to whether cutting or burning produce the more favorable conditions and at what time of the year it is best to do the one or the other.

Planting Problems.

The desire of the forester is to secure his crop, if possible, by natural regeneration; that is, to so handle the mature crop that the seeds falling from it establish the new crop before the seed trees are all removed; this in order to avoid the outlay for planting. But there are large areas in these Reserves on which no old crop of desirable species is to be found, and it becomes necessary to establish such species by planting. The problem, then, is to find the most suitable species and the cheapest successful manner of propagation.

To gain an insight as to what species to introduce, trial plantations on a small scale are indicated.

It is my impression that not only in the aforementioned forestless reserves, and where desirable species are lacking, but also in the well wooded ones, planting will be found often preferable to reliance on natural regeneration.

While the apparent economy in relying on Nature's ability to estab-

lish a new crop is in favor of natural regeneration, avoiding the cash outlay necessary to start the crop by artificial means, sowing or planting by hand, in the end result the latter often proves the cheaper.

To use Nature as a planter requires knowledge, judgment and skill not only, but lucky weather conditions of the ground for germination and growth of the seedlings. This combination of favorable circumstances does not occur frequently. On the other hand, by growing seedlings in nurseries where they can be given the best care, and setting out plants, success can be forced, and especially time can be saved.

Hence, early attention should be given to finding out the best materials and methods of planting.

Jack Pine Problem.

Large areas of sandy soils are covered with a dense growth of pure Jack pine, standing so dense that each tree has little chance for development, hence the individual development is extremely slow. By reducing the number per acre, i.e., by thinning, as it is technically called, the remaining stand can be given opportunity for better development.

The problem is to find out at what time of the life of the stand to thin and how many trees to the acre promise the most satisfactory result.

The most valuable use of the Jack pine is for railroad ties, and it would, therefore, be desirable to grow tie trees. For this purpose, there is no need of freedom from knots, hence branchiness is no objection, and the increase in increment due to fully developed crowns that can develop in open stand may be secured without injuring quality. That means an early and severe opening up is indicated, only taking care not to expose the soil too much at a time.

The Jack pine is a rapid grower when young, but not persistent,

hence this tendency should be utilized by giving it a chance to develop its rapid rate early. This may, perhaps, be done by reducing the number in the stand early to say, 300 or 400 trees per acre or perhaps even less.

The narrow-minded manager will object that the operation would not pay because, perhaps, he could not dispose of the material coming from the thinnings profitably, but if it could be shown that instead of having to wait 80 to 90 years for a 5-tie tree to develop, a full crop of railroad ties, 1,500 to the acre, could be produced in 40 to 50 years, the profitability of the operation might justify its inauguration even without the possibility of disposal of the thinnings. Experiments, then, for determining the most satisfactory density of these stands should be undertaken at once.

The possibility of shortening the time of production of sizeable materials by a rational thinning practice has even in Germany been fully realized only during the last 30 years, and now, not only are from 25 to 50 and more per cent. of the final harvest crop secured by thinnings, without reducing the amount of the harvest crop, but the rotation as far as it is designed to produce sizes can be reduced at last 20 years.

It is desirable to institute thinning experiments in other than the Jack pine stands.

The Muskeg Problem.

Such experiments suggest themselves at once also for the Black spruce stands on the peaty muskeg areas which occupy such large extent in the reserves, and usually grow in overcrowded condition, retarding the development to size of the single individual. Whether by thinning, the rate of growth can be changed could be easily found out. The probability, however, is that lowering the water-table would show better results.

Altogether, the problem of the

proper use of these extensive peat bogs is one that should early occupy the attention both of the Forestry Branch and the Agricultural Department, for there is hidden in them a great resource that it has so far not been given to us to fully realize.

Fallen Timber Problem.

In the Rocky Mountain Reserves fires have killed large areas of mature growth, and as a result there are thousands of acres of windfalls covering the ground with a labyrinthian maze of down trees, which make the areas almost inaccessible and unmanageable for cropping. What can be done with this unfortunate condition? After some time this material rots, disintegrates and becomes a part of the soil, but in the alpine climate this process takes a long time.

Meanwhile, these areas form also dangerous fire traps.

Here again, the Forest Products Laboratories may be able to work out a solution, devising means of utilizing such material.

Altogether, the problem of finding use for minor wood materials is one that would often make it economically possible to solve the silvicultural problems.

There are, then, a host of problems which it takes time to solve. Their solution should be attempted at an early date. This is possible by experiment on a small scale before the necessity of solving them on a large scale arrives. But it should be realized that the answers to these inquiries by experiment come as slow almost as the crop itself for which they are made.

Therefore, the time to inaugurate them is now. Fortunately, the experiments outside of requiring careful and judicious planning can be made with very small expense, and considerations of economy, due to the exigencies of the war, need, perhaps, not delay them.

"HARM ME NOT!"

Following is an interesting placard which, says the British Journal of Forestry, is a copy of that affixed to the trees in Spanish forests most frequented by the people. The translation is as follows:

"To the Wayfarer,—

Ye who pass by and would raise your hands against me, hearken ere you harm me.

I am the heat of your hearth on cold winter nights, the friendly shade screening you from the mid-summer sun, and my fruits are refreshing draughts quenching your thirst as you journey on.

I am the beam that holds your house, the board of your table, the bed in which you lie, and the timber that builds your boat.

I am the handle of your hoe, the door of your homestead, the wood of your cradle, and the shell of your coffin.

I am the bread of kindness and the flower of beauty.

Ye who pass by, hear my prayer: harm me not."

Tree on Tree

A singular tree in Cuba is called the yaguey-tree. It begins to grow at the top of another tree. The seed is carried by a bird, or wafted by the wind, and, falling into some moist, branching part, takes root and speedily begins to grow. It sends a kind of thin, stringlike root down the body of the tree, which is soon followed by others. In course of time these rootings strike the ground, and growth immediately commences upwards. New rootings continue to be formed and get strength until the one tree grows as a net round the other. The outside one surrounds and presses the inner, strangling its life and augmenting its own power. At length the tree within is killed, and the parasite that has taken possession becomes itself the tree.

Planting Snowbreaks on Railways

What Canadian and American Experience Has Shown Thus Far
—Cutting Down Cost of the "Snow Crop."

The following article from "The North Woods" will interest readers of the Journal. The difficulties of "the snow crop" have been faced equally by our Canadian railroads and the planting of trees as a permanent solution for snow troubles has been recognized for some years. The Intercolonial Railway performed some windbreak work but, according to present information, did not maintain the plantations. The Canadian Pacific on their western lines have planted windbreaks extensively, and similar work on the eastern lines will be commenced this spring. It is understood also that the Canadian Northern have been investigating the matter. The practice on Canadian Pacific western lines has been to use willow and broad-leaved species which have the advantage of speedy growth. It may be that spruce or other conifers will be found useful for the purpose. This is a point which the experiments thus far have not successfully determined.

"Those most closely interested in harvesting the snow crop—aside from a few over-zealous men—are the railroads. There is always a certain amount of snow—or rather a very uncertain amount which shows a tendency to collect in the railroad cuts or on the prairies. The railroad men are interested in corralling that snow before it gets into the cut. They are all convinced that it must be corralled, but the best method of doing it is still in doubt.

It was to discuss this important question that the representative of eight railroads and of the College of Forestry met in the office of the

State Forester on the morning of March 20. The live snow fence was the object of discussion. For many years these railroads have been patiently building portable board fences at a cost about \$3.50 per rod, laboriously distributing along the cuts every fall and collecting them every spring at a further cost of at least fifteen cents per rod, and with the full understanding that a new set of panels would have to be constructed at least every five years. And even at that the results have not always been satisfactory.

The Work of Testing.

Many of the roads have tired of feeding this financial leak and are attempting to replace this temporary and expensive fence system with a permanent snowbreak of trees and shrubs planted along the right of way. It is pioneer work along this line, and subject to all the derision and doubts that such new ideas are heir to. Some are skeptical, some confident, but all of them who have taken up the work are spending considerable money on it. Naturally much of the work is of an experimental character because no one knows just what kind of a snowbreak will be most effective; what species to use, how to place them or how to plant them. Up to the present each one has been groping on alone with but little idea of what the others were doing. This meeting was called to effect an exchange of ideas, and see what could be learned from all the experience of the different roads viewed in the aggregate. The result was well worth while.

The Great Northern has been doing more of this work recently than any of the other roads and doing it in a very systematic way. Mr. Mouck's report of the methods they were using and the results were most interesting. He described their methods as follows:

Wherever the snowbreak was to be planted, the right of way was widened sufficiently to keep the inside of the planting one hundred feet from the centre. A strip fifty-six feet wide is broken about four inches deep and rolled or disked. This is then backset to about the same depth in the fall. The following spring this same land is deep plowed, from twelve to sixteen inches with a Spalding subsoil plow drawn by eight horses. The next spring, that is in the spring of the third year, it is ready for planting. This method was generally approved as the most efficient.

Nursery Stock.

The stock, raised in the company nursery at Minot, was planted in five rows eight feet apart and four feet apart in the rows. A row of shrubs on the outside, spaced closer, two rows of willows and two rows of some taller species. Eight feet of cultivated ground was left on each side of the plantation to serve as a firebreak. The planting was done by the section crews, and extra gangs were needed.

The shrubs found most satisfactory were the caragana and the artemisia, though the latter has not been used extensively. The golden, the laurel leaf and the white willow have all been tried. The laurel leaf was a little freer from insect attack than the others. The cottonwood had been used most for the taller species on the inside, but had proved of very little value as a snowbreak. All seemed agreed that the willow formed the most effective element in the break and Mr. Mouck strongly advocated a pure plantation of willow, discarding the other species.

He was anxious to get information on the suitability of evergreens, but very little experience with them was available. He did not doubt that a properly selected plantation, one with a row or two of low, bushy growth and a few rows of some higher species, would stop the drifts but had not experimented enough to be able to say definitely what species should be used. The others all agreed that there was no question of the satisfactory service of a live snow fence and that the only problem was the selection of the most suitable species and the determination of the best methods of planting and soil preparation. The only places where plantings have been markedly unsuccessful are the alkali spots and Mr. Mouck thought this difficulty could be overcome by the proper deep cultivation to break up the hardpan.

"Let the Trees Do It."

Mr. Welsh, of the Omaha, cited the best examples of a live snow fence that was really doing business. About 1880 the Omaha planted groves for the protection of the cuts on their main line in Minnesota. These were of mixed species planted on land bought outside of the right of way or on land where the perpetual right to maintain a grove was leased. The trees were cultivated for six or seven years, but no care has been taken of them since. For thirty years these groves have absolutely prevented snow trouble. While the other roads have been laboring with the snow fences, the Omaha has been sitting back and letting the trees do the work. At a very conservative figure, the cost of maintaining snow fences for these thirty years would have amounted to \$35 per rod, or \$11,200 per mile. In one place where a cut was lengthened, so as to extend beyond the protection of the grove, trouble is experienced every winter. This testimony leaves no doubt of the efficiency of the live snow fence.

And experience seems to show that there is also very little doubt that they can be successfully grown.

One Hundred Trees Per Man.

Mr. Hoverstad, of the Soo, cited much the same experience as Mr. Mouck. Hobo labor had proved too expensive. One hundred trees per man per day was above the average. For this reason, the Soo expects to experiment this coming season with a new tree planter and a power cultivator. They are fully convinced of the wisdom of the tree-planting policy. The planting has to be done at a time when farm labor is fully employed.

Some of the other roads had done some tree planting for this purpose, but were unable to give any very definite account of the work."

Windbreaks on C.P.R.

The Superintendent of the Forestry Branch of the Department of Natural Resources, C.P.R., has given the following information:

"The work was started in 1908 and it took two years to get the ground ready for planting. The prairie sod had to be broken the first year, then backset and summer fallowed in order to accumulate sufficient moisture for tree growth. The conditions affecting tree growth east and west of Moose Jaw were found to be absolutely dissimilar. East of Moose Jaw trees planted three years can be left without any further maintenance; west of Moose Jaw it is necessary to cultivate each year in order to keep the trees free from weeds, which would deprive them of needed moisture. The district west of Moose Jaw is in what is known as "The Dry Belt." In territory similar to this in the United States one of the railways tried watering the trees, but that is a mistake; cultivation is all that is needed.

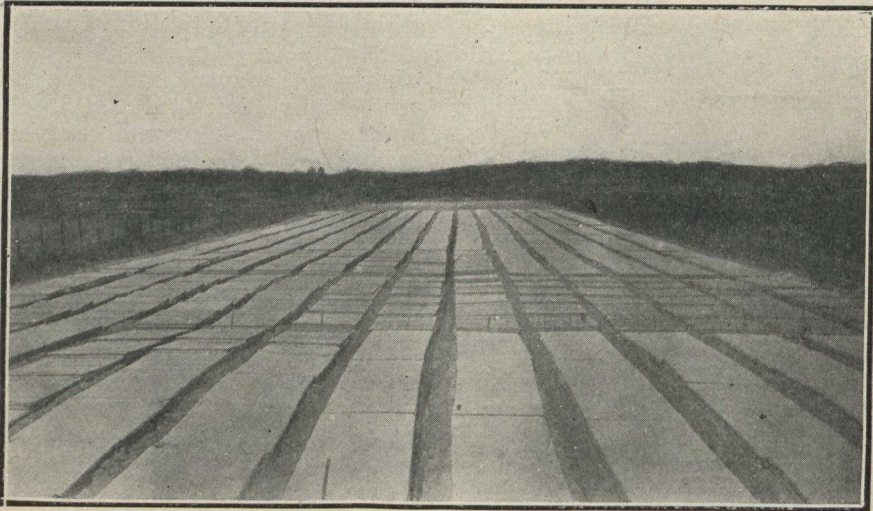
"The cost of the portable panel snow fence anywhere in Western Canada, Minnesota, Dakota, or

other western states is from \$2.39 to \$2.51 per 16 ft. panel. The depreciation and annual maintenance per 16 ft. panel is 47 cents. The cost of 16 feet of tree fence, including three years maintenance, is \$1.95. The three years cost of maintenance is necessary before the fence may be said to be established; west of Moose Jaw it may take five years.

"The tree snow fence has been remarked upon by hundreds of tourists, and has helped very considerably in demonstrating to intending settlers the possibilities of proper cultivation in the dry areas. The tree snow fence also is just as good, if not better, than the panel fencing."

May Tax N. B. Lands

The question of how to raise more revenue was discussed by many supporters of the Government in the New Brunswick Legislature recently, and the resolution of J. L. White, proposing to place a tax upon granted lands not included in the school districts was enlarged upon and an amendment offered by L. P. D. Tilley to have a committee of the House inquire into the advisability of taxing both crown and granted lands was adopted. There are 7,000,000 acres of crown lands and it is said about 4,000,000 acres of granted lands. Some propose a tax of two cents an acre upon crown lands, which would yield about \$140,000. An equal tax upon granted lands would bring \$80,000, but it is said some propose that granted lands shall pay four cents per acre, which would yield a revenue of \$160,000, or \$300,000 in all. The Speaker appointed Messrs. White, Carter, Mahoney, Jones, Culligan, Woods, Hachey, Tilley, Lockhart and Slipp as the committee for this purpose.



At the Berthierville P. Q. Forest Nursery:—White pine seed germinating under bag-cloth set on wood frame. This is a very good seed cover; it guards against the devastation of birds and also gives valuable protection to the soil.

Canada at War

By Dr. C. D. Howe,

of Toronto University Forest School, in "The Biltmorean."

One thought is uppermost in the minds of all Canadians, that is to do their "bit" in the service of their country at this time, and they have succeeded beyond their own expectations, not only in furnishing men but in performing the innumerable services contingent upon war. Evidences of the spirit of service and concentrated effort meet one at every turn. One sees women knitting socks for the soldiers at the church and theatre, in the street cars and even as they walk on the streets. There are no more bridge parties, dinners or other social functions for their own sake. Women now meet to work. A lady of my acquaintance has knitted over a hundred pairs of socks, besides spending nearly every afternoon and evening engaged in the various phases of war relief work. A former

society leader has spent six hours a day for a year in a dingy store-room, collecting and packing clothing for the Belgian relief—and she has also become worn and white-haired in the service. Every woman has found some way in which to help. There are certainly no "slackers" among them.

Children Do Their Bit.

The children in the schools make scrap books for the soldiers and contribute their pennies for war relief. The older boys have their cadet corps. Churches, Sunday schools, fraternal organizations, boards of trade and business houses are mobilized for service in some form.

The voluntary contributions of money during the past year have been enormous. Five million dollars were contributed to the Patriotic

Fund, which goes to the needy families of soldiers. The estimated cost of such work the coming year is \$8,000,000. Toronto's share in that will be \$2,000,000, and the plan is to raise this in a three-days' campaign. Several million dollars have been given to the British Red Cross. Toronto raised a half million dollars for that purpose in one day. The staff and students of the university shared in this to the extent of over \$4,000. The Canadian Red Cross has collected over a million dollars in connection with its work. Many towns, cities and business organizations have donated motor ambulances, hospital supplies and even machine guns. The university raised \$40,000 to establish a base hospital (now reported to be at Saloniki) and \$60,000 for running expenses. The university women have undertaken to furnish the necessary supplies for the hospital. The teaching staff of the university established a chair for a professor from the University of Louvain, and he is now giving courses here.

The Clash of Arms.

As I write this, a company of soldiers is marching past with a band playing a pulse-quickenning air. About 12,000 soldiers are now being quartered in Toronto, and men are enlisting in the city at the rate of about 200 per day. Up to Christmas, Canada had raised 207,000 soldiers and on New Year's day the call came from Ottawa for enough to bring the total number up to 500,000. The population of Canada is, or was before the war, close to 8,000,000. So when the enlistment reaches half-million, the proportion will be one to every sixteen of the entire population. If we estimate that one in eight of the total population is male of military age, then, when the latest call for men is supplied, one-half of the military strength of the country will have been recruited, or in other words, Canada in the pinch can raise one million men. How-

ever, those of military age but unfit should be deducted in this estimate. The men rejected are now running at about 25 per cent. of those offering their services.

The British war office has estimated that the wastage of men from all sources is 15 per cent. a month, or in other words, the armies at the front must be completely renewed by the end of each seven months period. From this statement, if he knows what numbers are now engaged and what numbers of recruits are available, one can figure out how much longer the war can last on the basis of the present activities.

Foresters to the Front.

The university has responded generously to the needs of the war. Six hundred undergraduates and 85 members of the teaching staff have already enlisted. Over 900 recent graduates have also offered themselves. This makes the university's contribution over 1,600 men. The Department of Forestry has probably contributed a larger percentage than any other department in the university, as there has been a decrease of 70 per cent. in the number of students since the beginning of the war, the registration at that time being fifty and now only fifteen. And moreover, only one-half of those who enrolled last October are now present. We have a few students not of the military standard and they are all we expect to have left at the end of the school year, for practically every able-bodied man will enlist, unless the atmosphere clears in the meantime. That is the spirit throughout the university. Nearly every man is drilling. The campus is covered with men in khaki from 4 to 6 o'clock in the afternoon. During these cold days the corridors of the university buildings, once sacred to mental and spiritual strivings, now resound to the clash of arms. The students are organized into an officers' training corps. The successful get a lieutenant's

commission, either in the Canadian forces or in the British army overseas. Thirty-one went over to take commissions during the Christmas vacation and another bunch will go next month.

The New Brunswick Forestry School, the Dominion Forestry Branch, and the various provincial

forest services are being restricted in their work through enlistment. Of the graduates of our school employed in forestry work, some fifty in number, 40 per cent. have enlisted up to date. The forest services have lost their non-technical men, such as rangers, guards, etc., in about the same proportion.

Canadian Timber for Government Works

Henceforth Canadian timber only is to be used in all public works undertaken by the Dominion Government. Such a policy can very easily be followed, so far as supply is concerned, for it is a fact that Canada is one of the greatest of tree-growing lands. Except in the prairie country, the forest is never far distant, and in it are to be found trees suitable for practically every work in which wood enters. With proper management, which is now being attempted on a considerable scale, supplies need never become exhausted. It is not a difficult matter to allow, and help, new forest crops to grow where trees are cut down for industrial purposes.

There are many varieties of big trees in Canada, a score of which are well-known and plentiful, and which are used for various purposes. The largest is the Douglas fir, named after David Douglas, who discovered its worth as long ago as 1825. This truly splendid timber tree ranges in height from 175 to 300 feet and has a long, clear trunk, from which large timbers of even diameter are secured. The wood is employed in heavy construction work and for masts and poles. The Douglas fir's habitat is British Columbia, and also the Rock Mountain part of Alberta. In the same territory, also, grows the western red cedar, very much in demand for shingles, interior woodwork and doors. Other cedar trees are to be

found from Manitoba to the Atlantic, rising to a height of from 50 to 60 feet. Their wood is valued for its rot-resisting qualities. Fence posts and telegraph poles are made from cedar.

The emblem of Canada is the maple leaf, and the beautiful tree on which it grows thrives wherever the land is good. There are several species and the hard or sugar maple is the most valued hardwood tree in the country. Its wood enters into furniture, flooring, shipbuilding, railway car construction, tool handles, etc. In the forest the maple rises 100 feet and more and has a diameter of from two to five feet. The Canadian oak is about the same height and is put to much the same uses. Hard birch is employed most extensively by manufacturers, especially in the making of cars, carriages and furniture. The elm furnishes strong, tough wood, and the ash tree is favored by the producers of baskets, barrel hoops, boats, coars, ball bats, and like articles. The spruce tree, which ranges from the Atlantic to the Pacific, gives a soft light wood, much used for lumber and pulp for paper-making. Other useful timber trees include the chestnut, cherry, hickory and the basswood. Indeed, the trees of the Dominion are of many varieties and in sufficient quantity to fill every need. They are a great source of national wealth.

Destroying Shade Trees

(Ottawa Citizen)

Complaints are being made to the civic authorities of the vandalism of local companies whose extensions of wires necessitate the removal, in whole or in part, of trees on civic property. It is alleged that trees on residential streets are being virtually destroyed in many cases by wire stringing crews and that when protests are made the answer usually given is that civic permission for the removal or mutilation of the trees has been secured. The city engineer's department, however, denies that such permission has been obtained unless the work is done under the supervision of a representative of the department.

Trees on civic property (on the street) are the property of the corporation. No private company or individual has the right to interfere with them unless by special permit from the engineer's department and under the supervision of an official from that department. It cannot be too strongly impressed upon householders and others that every mutilation of trees under other circumstances is a violation of the civic regulations, and the perpetrators thereof are liable to the penalties prescribed for such offences.

The matter is one that concerns the health, comfort and beauty of the community. The remedy for the present epidemic of tree mutilation is in the hands of the citizens and it is to be hoped that it will be promptly applied whenever necessary. The city is prepared to deal with all such cases and unless the regulations are promptly and permanently complied with by the companies responsible for recent infractions legal action would appear to be alike desirable and necessary.

Will Reach the Boys

(From "Industrial Canada," organ of the Canadian Manufacturers Association):

"The Canadian Forestry Association are to be complimented and praised for the admirable little "Boy Scout's Forest Book," just produced for presentation to the sixteen thousand members of the Boy Scout organization in Canada. The objective, of course, is to get the boy scout interested in the highly important task of preserving our forest resources from destruction, and this has been done in a skilful way. By means of numerous interesting illustrations and a letterpress by Robson Black, which is as good as a story, the boys of Canada will undoubtedly be attracted and inspired to do their share for the preservation of the forests. The booklet is distributed free by the Association."

Settlers' Fires

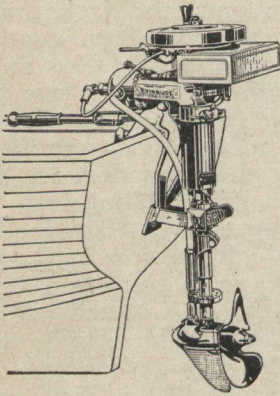
Discussing editorially a lecture given recently by the Secretary of the Association in Cobalt before the Canadian Clubs of Temiskaming, the Cobalt Nugget, which circulates largely in the Claybelt section of Ontario, wholly approves of better Government control of forest protection on non-agricultural lands. Says this paper:

"Although it is humiliating to acknowledge the offence, Canada is the greatest forest destroyer of the world. Statistics of no other country will show the enormous losses of standing timber due to forest fires than official figures of Canada reveal. And the majority of the fires which are responsible for a big monetary loss to this country every year are caused by lack of care by the settler in setting out fires to burn up his slack in the process of clearing the land.

The aims of the Association are commendable. The society does not desire to keep under forest the land that is specially suited to agriculture. The objective of the members of the body is to introduce Government inspection and supervision of the system of fire ranging in every

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province of the Dominion and educate the settlers to use the utmost care and judgment in setting out fires in order that destructive conflagrations may not spread and result in the loss of much valuable timber. The man who goes into any new country in order to clear and cultivate land should be accorded the maximum freedom and encouragement. The least hindrance possible should be put in the way of the settler, and every acre of real agricultural land should be placed under cultivation. As pointed out by Mr. Black, there is no desire to conserve the forest growth on land that will grow grain or vegetables, but one object the Forestry Association has in view is to save the people the forests which are growing on soil that is fit for nothing else.

There is really no excuse for a loss of several million dollars every year in Canadian timber. If proper steps are taken the steady depletion of the forests by fire and careless cutting may be averted."

To which the Kenora 'Examiner' adds:

"It happened during the last gold rush in this district that prospectors started bush fires to bare the rocks so as to make prospecting easier. This should entitle the starter to a job in the penitentiary."

Supervisors Meet

A very successful Supervisors' meeting was held at Calgary from February 28th to March 7th inclusive, by direction of Mr. E. H. Finlayson, District Inspector of Forest Reserves. It has been the practice to call the Supervisors in to Calgary once a year for the purpose of dis-



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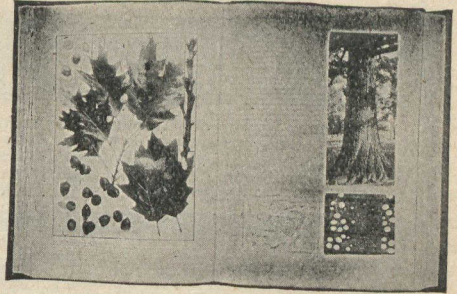
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Discussing all sorts of administrative problems but the last meeting was made more general and two Forest Assistants and two of the best rangers were added to the attendance. One of the most interesting features of the meeting was a telephone demonstration given by Mr. M. E. Deering, of Winnipeg, representing the Northern Electric Company, which was found of exceptional interest.

The following were in attendance: Mr. Finlayson; Mr. C. MacFayden, Supervisor Athabasca Forest; J. Y. Greenwood, Acting Supervisor Bow River Forest; S. H. Clark, Supervisor Brazeau Forest; A. E. Austin, Supervisor Clearwater Forest; R. M. Brown, Supervisor Crow's Nest Forest; W. W. Badgely, Supervisor Lesser Slave Forest; Forest Assistant Manning of Clearwater Forest; Forest Assistant Macdonald of Bow River Forest; Forest Ranger Blefgen, Crow's Nest Forest; Ranger Hutchison, Brazeau Forest.

Disappearing Forests

Of the dense tropical forests of mahogany, cedar and other valuable hard woods that once covered the islands of the Carribean, there are left among the Northern Islands, only Dominica in the Leewards and St. Lucia in the Windwards that have any portions of these forests still standing. In Barbados, Antigua, Montserrat, St. Vincent and Grenadad, the forests have disappeared. Trinidad, Jamaica and British Guiana, however, have escaped denudation, on account of the difficulty of reaching the interior since no rail nor waterways exist by which the lumber could be got out. In these colonies although the coast line has been cleared and lumbering operations pushed for a few miles into the back country, a large area of timberland still remains in each colony from which is annually drawn a considerable "cut."



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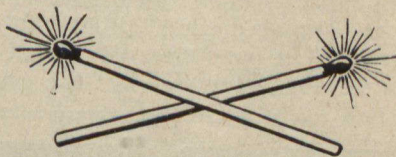
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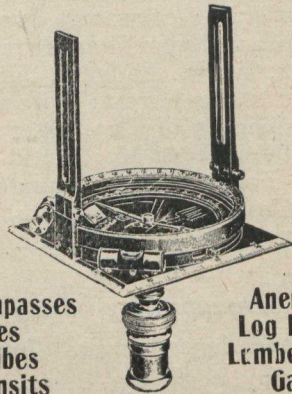
An interesting lecture was given recently on the subject of Canada's forest wealth by Dr. J. S. Bates, Superintendent of the Forest Products Laboratories, before the Natural History Society, Montreal.

The forests of Canada, he explained, extend from the Pacific to the Atlantic. British Columbia had half the timber in the Dominion. Coming east one finds large forests on the northern side of the prairie provinces, while there are good forest lands in northern Ontario, extensive areas through Quebec, fairly well covered lands in New Brunswick, and rather limited ones in Nova Scotia and Prince Edward Island.

It should be remembered, he said, that the amount of merchantable timber in Canada is only about one fifth to one fourth of what still remains in the United States and for this reason everything possible must be done to increase Canada's forest resources. Canada, however, still stands third among the nations of the world as regards her forest wealth. Russia comes first, the United States second and then Canada. It is estimated that about 60 per cent. of the land area of Canada is good for nothing else but the grow-

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ing of trees, therefore the forest must be considered as a crop which can be made perpetual and immensely valuable by proper methods of handling.



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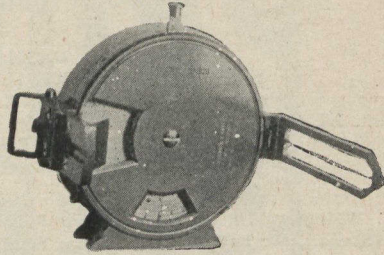
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