Canadian Forestry Journal

VOL. VIII. MAY--JUNE, 1912 No. 3

Single White Pine on Lachute (P.Q.) Sand Hill.

Height, 80 ft., diameter at breast-height, 33 in. (See page 63.)

OTTAWA, CANADA.

THE CANADIAN FORESTRY ASSOCIATION.

is the national organization for the informing of public opinion in the effort to secure a rational development of the Canadian Forests through the co-operation of national, provincial and municipal organizations and private enterprises. The objects of the Association are:

(1) The exploration of the public domain, so that lands unsuitable for agriculture may be reserved for timber production.
(2) The preservation of the forests for their influence on climate, soil and water supply.
(3) The promotion of judicious methods in dealing with forests and woodlands.
(4) Tree planting on the plains, and on streets and highways.
(5) Reforestation where advisable.
(6) The collection and dissemination of information bearing on the forestry problem in general.

To promote these ends the Association publishes the *Canadian Forestry Journal*, issues bulletins, arranges for the delivery of free illustrated public lectures, and holds conventions in different parts of Canada.

The Association desires as members all (both men and women) who are in sympathy with this work. The membership fee, which entitles the member to the *Journal*, the annual report and other literature issued, is one dollar per year, (life membership $10). Applications for membership or requests for information may be addressed to the

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Canadian Building, Ottawa, Canada.

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Canadian Forestry Journal

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Our Next Forestry Convention.

Victoria B.C., Sept. 4-6, 1912.

At a meeting of the Directors held on May 9 in the office of the Director of Forestry, Ottawa, a large amount of correspondence was considered in regard to the time and place of holding the next Annual Convention. Invitations were in hand from Winnipeg and Victoria, B.C., the latter an official invitation from the Government of that province. After full discussion, in which all the various aspects were considered, it was decided to hold the Convention in the City of Victoria, B.C., during the coming autumn. Owing to many causes, which need not here be gone into, the

question of the date was even more difficult to decide. It was finally resolved to leave the selection of the date to the President, Mr. John Hendry, and the Premier of British Columbia, Hon. Richard McBride. These gentlemen at the time of the meeting were in London, England, and they cabled the Directors strongly urging that this year the Convention be held in British Columbia. It was suggested by the Directors, however, that Sept. 4 and 5, other things being equal, would be a suitable date. The results of this meeting were cabled to London, and the dates were accepted by the gentleman above named. On Mr. Hendry's return from England he met a number of the Directors of the Forestry Association at an informal meeting called when he was passing through Ottawa on May 27. At this meeting the subject of the date was again gone into and the suggested date was confirmed with a rider that Sept. 6 be added if found necessary to accommodate all the features on the program. It was also decided at this latter meeting to direct the Secretary to proceed as soon as possible to British Columbia to consult, in company with the President, with the Hon. Richard McBride and the Hon. W. R. Ross, Minister of Lands, in regard to the program and its different features. Both the Premier and Mr. Ross are taking a very enthusiastic interest in the subject.

British Columbia has just enacted a new timber and forestry law and is adopting a very progressive attitude in regard to the conservation and proper disposal of its immense forest wealth. Great interest prevails on the Pacific coast in regard to the new law, and to modern methods of lumbering, but the interest of the Convention will not be confined to these but will embrace projects and topics relating to all the provinces and to the work of the Dominion Government. At the season of the year when the Convention will be held here there are in force special rates from eastern points on the different railways, and it is hoped to announce in the next issue what the best rates available from Montreal, Ottawa, Toronto, Winnipeg, Regina, and other points will be. This will be the first Convention held on the Pacific coast since 1906, and in addition to the enthusiastic attitude of the government as above noted, Mr. Hendry and the leading members of the Forestry Association on the Pacific coast are determined to make the Convention worthy of the great timber resources of that province. Our members are urged to make a note of these dates and to hold them open so that if possible they may be able to attend and take part. It is hoped that by the next issue of the *Journal* to have a full statement of the program and other details for the members. Those who expect to be present will greatly facilitate the work of preparing for the Convention if they will notify the Secretary, Canadian Building, Ottawa, of their intention.

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OIL-BURNING LOCOMOTIVES.

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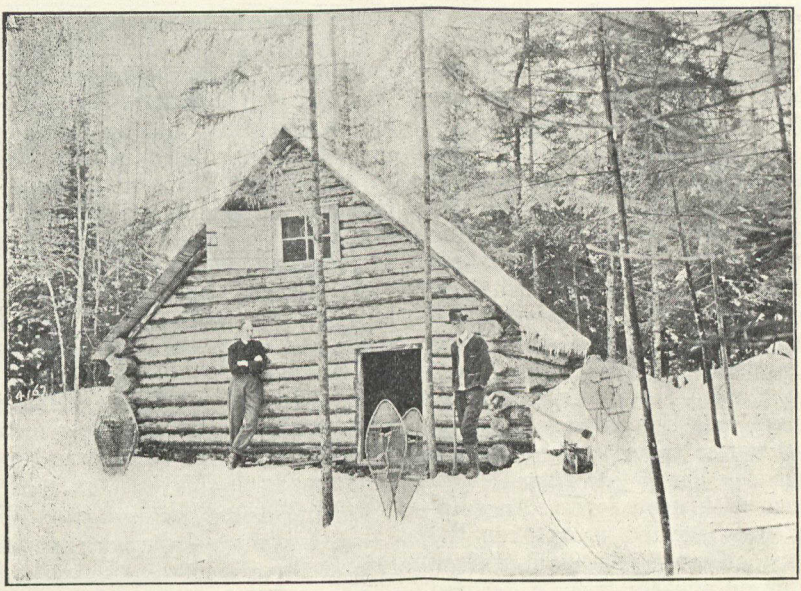
At the meeting of the Directors of the Canadian Forestry Association on May 9 the following resolution was adopted:—

That the Board of Directors of the Canadian Forestry Association place on record their hearty approval of the proposal that at the earliest practicable date a regulation be brought into force compelling the use by railways of oil-burning locomotives in dangerous districts and during dangerous seasons, and that a copy of this resolution be sent to the Board of Railway Commissioners for Canada.

—

A conference on farm forestry will be a feature of the Seventh International Dry Farming Congress, which is to be held at Lethbridge, Alta., Oct. 21 to 26, 1912.

The plantation of 40,000 white pine, set out last spring by Dr. A. R. Myers, of Moncton, N. B., is thriving. The owner is planting 50,000 trees this spring and expects to put out 100,000 more next spring.



[Photo A. Knechtel, 1912.

University of New Brunswick Foresters' Log Camp.

A Forestry Students' Camp.

By R. B. Miller, M.F., Professor of Forestry, University of New Brunswick

There has been a growing feeling on the part of the Forestry Department of the University of New Brunswick that they should have a permanent building on their own lands, within walking distance of the college, so that students might have, from the first, the right setting for their profession.

The Engineering Department last fall decided that instead of paying someone along the Keswick for the privileges of a camp site and for clearing out lines for imaginary railroads that the camp might be very profitably transferred to the college lands. Such cleared lines could then serve admirably, at little extra expense, for roads, trails, and fire lines, while the whole tract would offer almost inexhaustible opportunities for carrying on all lines of surveying. And in the picture of this closer cooperation between the foresters and engineers loomed large a roomy log camp with great open fire-place, instead of musty, smelly tents, with no chance for office work to deaden the dull monotony of the inevitable rainy days—often a total loss to the student and a sore trial to the instructor.

The result of a combination of these two desires has now embodied itself in a log camp, on a good trail running to Corbett's Brook, less than three miles in a direct line from the college buildings. Being situated in between two brooks an abundant supply of good water is assured.

A party of fifteen men, about the middle of October, chose and began to clear off a place for the camp on a slight ridge well up from the brook. On this first day a few began felling trees on the flat across the brook and

around the camp. As it was desired to have the inside dimensions sixteen by twenty feet this meant that the logs must be nineteen and twenty three feet in length, allowing a foot and a half projection at the corners. Straight, sound fir logs were for the most part chosen, varying in size from ten to fourteen inches in diameter at breast-height. A few straight and over-mature popple were cut and all trees were marked before cutting so that too heavy a thinning might not be made in any one place. About fifty trees were required in all, and every man was found eager to fell trees but not so eager to clean up the tops and pile brush afterwards. In pursuance with good forestry regulations it was insisted upon that the crews cut off and pile all branches before taking another tree—a decided innovation to those used to the ordinary lumbering methods in New Brunswick. This lesson will no doubt be a valuable one for all classes of students and will give them an idea of how the woods should look after lumbering in a conservative manner, with proper slash disposal.

Most of the New Brunswick boys, engineers as well as foresters, have been raised near the woods and are excellent axemen, felling their trees to a nicety and 'sampsoning' them over with a short pole to the desired spot, when necessary, with the skill of veterans. Many haggled stumps betokened the work of the inexperienced but these men hung to the task, despite blistered hands, until their trees were either down or comfortably supported by four or five others.

After felling came the sawing up into proper lengths, and several were initiated into the mystery of crosscutting with the saw without causing the other man excruciating agony. Crews were then put to peeling the logs which, in knotty timber, is no easy task until the proper kink is learned.

The work of felling and peeling proceeded for a few Saturdays with a crew of men varying in number from fifteen to thirty, from all departments. Some logs were then carried on the shoulders of the men across the brook and up the slope — no easy task with green, balsam-covered logs. Three of the men, who had seen lumber camps erected, began notching the corners and putting the first logs in place. As the logs were quite large and had considerable taper, in order to keep the walls level, some had to be notched very deeply, and in many cases small drop logs had to be let in between. The work was carried on at intervals until, at Thanksgiving, the camp was three or four logs high.

During this short vacation it was decided to push the work more rapidly and three men went out and made a temporary camp across the brook, putting up the usual 'lean-to' tent used by the guides and lumbermen.

The camp outfit was taken out by pack-horse in true western fashion, with the famous 'diamond hitch' (learned from a New Brunswick guide) over all to advertise the fact that we were not 'tenderfeet,' even if we had never been west of the 100th meridian. The pack-saddle, by economizing with canvas girths and using straps of moose-hide, was constructed for us by the same guide at a cost of less than $10.00 and serves every purpose of the higher priced article for short trips. There are two ropes which accompany it, one about one-quarter of an inch in diameter and thirty feet long, and the other, used for the final hitch, a half-inch rope about 36 feet long (which seems of ample length the first time you use it).

With only three or four men working on the camp during this short vacation it was found impossible to carry big logs over the brook, although we found they grew perceptibly lighter after being peeled for a week or more. T he ingenuity of the boys overcame this difficulty in short order. The broad girth of the pack-

saddle outfit was passed around the breast of the horse (who knew more about the woods than we did, it proved) fastened in place by the smaller rope, and the long rope used as traces, being finally attached to a short spruce single-tree, with a long enough end left for a noose to take the place of logging tongs. By snubbing the ends of the logs and swamping out paths, enough logs were soon yarded for the rest of the construction work, and the walls soon brought up to a height of seven feet, which was considered ample. Rafters of round, peeled, spruce poles were then put up, about two and a half feet apart, and spiked to the side logs. The ones at each end of the building were made double, that is about six inches apart, so that the short logs forming the gable could be dropped down in between.

A tight sheathing of second-grade hemlock boards was then nailed on over the rafters and a layer of three-ply felt put on lengthwise, and the edges tarred, a roof warranted to last ten years or longer.

After levelling off the ground inside, sills of peeled logs were sunk about two feet apart and two layers of hemlock boards put down as a floor, the first layer of cheap material, the last surfaced on one side.

The chinking, or 'stogging' of such a camp is more of a task than appears at first thought. Moss was gathered from the high ground in the woods and carried in sacks to a place alongside the building, an immense quantity being required. This was pounded in with a tamp from the outside at first, but cold weather setting in, the rest of the camp was chinked from the inside.

The camp will become, in time, the center of a large field of future operations—the construction of roads, trails, and fire lines, telephone lines, of brush-burning, of thinnings and cleanings, of cutting of logs and cordwood, of surveying, mapping and estimating, and perhaps later of some experimental work in silviculture whose results may become an object lesson to owners of timber. The entire camp has cost not over $25.00 all told, and if Yale and the other graduate schools are hungering after demonstration forests of their own, which they can handle to get results and give their men training, we think we are fortunate, and the University of New Brunswick is fortunate, in finding such a tract lying at its back-door and knowing that this camp is going to mean getting right down to the humus from this time on.

Such is, in brief, the history of the building of this camp which means to the foresters of the University a comfortable retreat for work and recreation. Not only has it given them some valuable construction experience not down on the regular schedule, and hence more valuable, but has, as its walls rose, log upon log, from the brown earth, built up that spirit of brotherhood and loyalty to class and school which we believe to be one of the strongest assets in the future. More than that, it has brought a little nearer to all that invisible spirit of the woods which the forester feels but cannot explain to others, that spirit which makes him a fighter and transcends salary or worldly honor and leads its recipient to struggle through muskegs and over mountains, along the unblazed trail — 'a pioneer in a new profession.'

The total value, at the point of production, of the annual forest products of Canada is at least $166,000,000. This is $22.44 for every person in Canada, March 31, 1909. In 1909, there were cut from Canadian forests about 400 cubic feet of timber for every inhabitant of the country. This is a per capita timber usage unequalled by that of any of the other important countries in the world.

Two fifths of the lumber of Canada is produced in Ontario, one fifth in British Columbia and one fifth in Quebec; New Brunswick and Nova Scotia together make up the greater part of the remaining fifth, and but proportionately small quantities are manufactured in Saskatchewan, Manitoba, Alberta and Prince Edward Island.

Les usages du Bouleau à Papier.

(Extrait du rapport annuel du Ministre des Terres et Forêts de la Province de Québec pour 1910-11.)

Il serait intéressant de détailler les divers usages auxquels le bouleau à papier convient et de montrer les ressources que l'on en pourrait retirer. Tout d'abord on en fait des bobines pour filatures, aussi des sabots (industrie inconnue ici), des chevilles et des enforts pour chaussures, des cure-dents, des épingles à linge, des jouets d'enfant (cette industrie est très florissante dans le Maine), des barreaux de chaises, des goujons, des navettes, et autres bois tournés. On ne fait encore des règles et des équerres. Les jeunes tiges servent à faire des cercles et aussi à la confection de balais.

L'écorce servait à nos indiens pour la construction d'excellents canots.

Nous ne pouvons résister à la tentation de reproduire ice une page de M. Mathieu, dans sa Flore forestière, au sujet des emplois accessoires du bouleau verruqueux, qui a beaucoup d'analogie avec notre bouleau à papier:—

'L'écorce de bouleau, particulièrement le liber qui en est la partie la plus active, contient du tanin, 1.6 p.c. d'après Davy; elle est très recherchée par les habitants du Nord de l'Europe, pour la préparation du cuir, auquel elle communique une couleur particulière et une odeur caractéristique. On en extrait par voie de distillation sèche, une huile essentielle avec laquelle on enduit les cuirs de Russie. Elle s'enflamme facilement et fournit un bon combustible.

'L'écorce blanche renferme, presqu'en moitié de son poids, une résine particulière, la bétuline, que l'on peut extraire par l'alcool, puis faire cristalliser. C'est sans doute l'abondance de cette substance qui assure à son écorce une inaltérabilité et une imperméabilité si remarquables... La première de ces qualités est telle, que dans des tourbes et des lignites, on trouve des portions d'écorce de bouleau parfaitement intactes, tandis que le bois est totalement détruit. On le met à profit dans les régions du Nord en revêtant d'écorce les portions des pieux qu'on enfonce en terre. On sait que l'imperméabilité de cette écorce la fait rechercher pour en fabriquer des tabatières; on peut aussi en faire des semelles aussi bonnes que celles de liège, pour garantir contre l'humidité; enfin, en la distillant dans des fours, elle produit un goudron. Ce goudron est fort recherché, il égale 86 p.c. du poids de l'écorce; en redistillant ce produit on obtient un huile dite huile du goudron de bouleau, qui sert à donner l'odeur du cuir de Russie aux imitations.

'L'utilité de l'écorce est telle, qu'en Russie elle est soumise à une exploitation périodique, tout comme le liège en France (et en Espagne). En ayant soin de ne pas entamer le liber (partie verte de l'écorce) la partie subéreuse et lamelleuse se régénère facilement, sans que l'arbre ait aucunement à en souffrir.

'Les verrues et les bourgeons contiennent aussi de la résine, mais celle-ci ne cristallise pas comme la précédente.

'On retire de la feuille une matière colorante employée en peinture sous le nom de styl de grain.

'La sève du bouleau renferme une notable quantité de sucre, 8.7 par 1,000 K. Concentrée, puis soumise à la fermentation avec addition de sucre et de différents aromates, on en fabrique une boisson spiritueuse très appréciée dans ces contrées.. (F. Forestière pp. 414-415).'

Nous ajouterons que l'écorce du bouleau à papier peut servir à des fins architecturales dans la décoration des villes. On en fait des paniers pour mettre les plantes. L'écorce de bouleau à papier est beaucoup employée pour postales.

Les déchets, comme les croutes, peuvent être utilisés pour la fabrication de l'alcool de bois et de l'acide acétique.

A St-Ignace du Nominingue, M. Lacaille, un industriel ingénieux, que manufacture des bois de placage (veneer), emploi le bois de cœur, pour faire des poteaux de cloture (en les créosotant, on prolonge leur durée). Il s'est servi de ces bois de cœur, au préalable débités en deux parties, de forme identique et de même volume, côté plat et face rebondie, pour décorer la résidence d'été qu'il s'est construite sur les bords du lac Nominingue.

Comme on voit, il y a un immense parti à tirer du bouleau à papier, tant de son bois, que de son écorce, et même de ses feuilles qui, d'après Girard, peuvent servir comme fourrage.

Il serait à souhaiter que nos industriels cherchent à utiliser ces propriétés. Nos fermiers surtout devraient, durant les longs mois d'inaction, à l'instar de leurs confrères d'Europe, rechercher à profiter des qualités qui rendent le bouleau propre à une foule d'usages et très variés, développer la petite industrie du bois, qui donne des revenus si considérables aux pauvres paysans des Flandres, du Jura, des Vosges. Le Service Forestier, lorsqu'il sera mieux organisé, s'efforcera de répandre ces idées dans la population en exhibitant, lors des expositions régionales, quelques-uns de ces produits, en donnant des conférences, en divulguant par la presse, des bulletins, etc., ces connaissances.

Quebec Province Starts Forest Planting.

The planting up of the waste sand lands at Lachute, P.Q., has been actively taken up this year by the provincial government, and during the first two weeks of May the students of the graduating class of the forestry school of Laval University were engaged in the work of planting a portion of the area known as the Argenteuil Sand Hill. The work was done under the direction of Mr. G. C. Piché, M.F., director of the forestry school and chief forestry engineer of the Department of Lands and Forests of the province.

On May 10 a representative of the *Forestry Journal* visited the scene of the planting, and was courteously shown around by the student planters.

Lachute is a town of some 2,000 inhabitants, situated on the north shore of the Ottawa, and on the North Shore line of the C.P.R. from Ottawa to Montreal. It is distant some 44 miles from Montreal and 76 from Ottawa. In the neighborhood of the town are three areas where drifting sand has covered the better soil and threatens, by its further drifting, to become a menace to agriculture in its vicinity.

The largest of these, on which the planting is being done, covers an area of some one thousand acres. It is about four miles in length, and varies in width. The particular site on which planting is being done is about four miles east of the town. Much, if not all, of the area covered by it was once cultivated. An old resident of the locality explained to the writer that about a generation ago the district was visited, for several years in succession, by a plague of grass-hoppers, which ate practically all the green vegetation, and it was soon after this that the

sand, by that time deprived of all the grass roots which had formerly held it in place, began to drift. Little was thought of it at the time, but the drifting became worse and worse until it got beyond the power of the people to stop it, and for many years the area has lain uncultivated. Looking over an expanse of a couple of hundred acres, which included the land just planted, the narrator continued, 'I have ploughed every field you see here.'

While the soil is pure sand, and becomes very dry on the surface, yet even in the driest times abundance of moisture is found four or five inches below the surface. Some trees of good size are found growing on it, among the species found being white pine, tamarack, balsam fir, white spruce, white cedar, balsam poplar, aspen poplar and white birch. Willows planted there have been very successful.

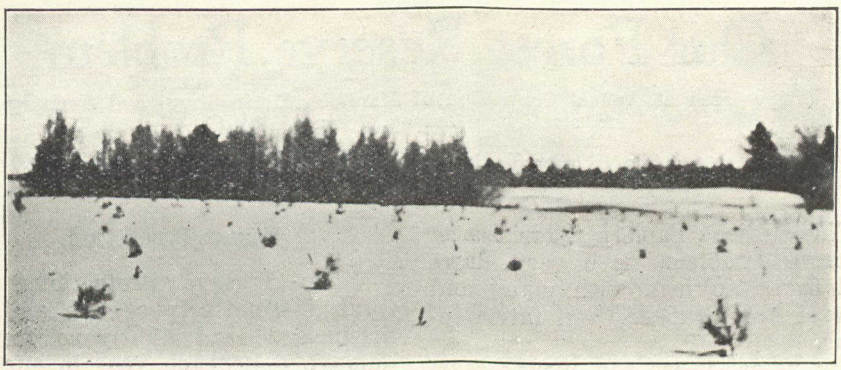
A certain amount of planting has been done in former years by the owners of the farms, evidence of which is to be seen along the way out to the planting area. As far back as 1898 the Central Experimental Farm assisted by sending out planting material to farmers in the vicinity. The chief trees sent out by them have been white pine, white spruce, Norway spruce, balsam fir and tamarack.

On this hill the provincial government has purchased some 375 arpents (about 320 acres) of land, with the intention of eventually planting it up to species of valuable trees. The original owners of the land are to be allowed to buy back the forested land, after a term of years, if they so desire, at a price that will recoup the government for its outlay. This spring a beginning of the work is being made on a small area of about thirty arpents purchased from Mr. Paul Nicholl. The area is triangular in shape, and is well suited for the purpose, being well protected by trees on two sides, especially to the north and west. When the planting

[Photo F. W. H. J., May, 1912.

Fields Covered by Drift Sand Near Lachute, P.Q.

(Note Buried Fence).



[Photo F. W. H. J., May, 1912.

Part of 1912 Plantation at Lachute, P.Q.

is completed, a wire fence will be erected around it, so as to keep out all stock.

Some thirty thousand trees will be required, which are supplied from the provincial forest nursery at Berthierville. The trees are three-year-old stock, divided almost equally between white pine and white spruce. A small number of ash and elm are used on the most favorable sites. The pine and spruce are planted in alternate rows, five feet apart each way, that is to say, the rows of trees are five feet apart, and the trees are placed five feet apart in the row.

The land on which the planting is being done has the North river to the north and the Canadian Northern Quebec railway to the south, though neither the river nor the railway touches the area.

The road out from the village leads through a prosperous farming country, but only a short distance out from the village indications of drifting sand are to be seen and all along the road are frequent instances of planting, chiefly of conifers (spruce, pine, etc.) and of willows.

The planting will be continued next year on an area immediately to the east of the area planted this year, and this fall a strip will be sown with beach grass so as to furnish protection for next year's planting.

The students who are planting the area are Messrs. F. Laliberté, C. J. D. Marquis, B. Guerin, J. R. Gareau, E. Menard, G. Boisvert and H. Roy.

A Good Average Specimen of the Spruce Seedlings Planted.

This tree, while but 8 inches tall, had root 11 in. long.

Our Forest Reserve Problem

(Paper read at Annual Convention of Manitoba Horticultural and Forestry Association, Winnipeg, February, 1912.)

By J. R. Dickson, M.S.F.

This subject, namely 'Our Forest Reserve Problem,' is a very large and broad subject, with many and diverse ramifications and interrelations.

Let us see if we can outline some of the more important factors in what I have termed our Forest Reserve Problem. In the first place it is a complex problem. The great ultimate object which the Forestry Branch has in view in every piece of work undertaken on the forest reserves is a 'Normal Forest.' And when one says 'Normal Forest' every simon-pure forester has at once a picture before his mind, a forest where every acre is fully stocked with tall, clean, straight, thrifty trees, of the most valuable species which that climate and soil will grow. A 'normal forest' is a piece of land producing the largese quantity of the most valuable timber possible, in the shortest possible time.

But that ideal must remain forever unsatisfied. No forester has ever yet been, or ever will be, able to say: 'There, that is the most which that acre can produce.' Even in that famous forest of the City of Zurich — the Sihlwald — which has been producing its crops for a thousand years, the quantity and quality is still improving. Its revenue return last year was some twelve dollars per acre.

A normal forest, then, on each reserve is what we are after, and to secure it we have only to surmount the twin difficulties of protection and reproduction, for that other terrible bogie of the private timber owner—the taxation question—does not concern us as yet on the forest reserves, and perhaps never will.

Forest Protection.

When I say 'Protection,' you think instinctively of fire and the fire-hazard; and rightly so, for the damage done each year in our forests by insects, fungi and wind is usually insignificant when compared with the fire loss. To secure real protection which protects is the very first essential and basis upon which all further forestry work must rest. For whether we consider mature timber, or reforestation work, it is very clear that to start forest management would be a mere absurdity so long as the investment were even liable to be burned up.

At every forestry convention in Canada up to the present this vexed initial problem of fire protection has received almost sole attention and discussion. No doubt much good resulted from these conventions, but the evil still flourishes and the great careless public looks on in good-natured tolerance.

Outside of more or less indirect assistance from legislation and education there are in America to-day two general direct schemes for combatting the fire danger; these are the warden system and the patrol system. The former, in use by many of the United States up till recently, was found too inelastic to answer the purpose, and is now rapidly being discarded or modified.

Fire Prevention.

The principal of prevention and its elastic adaptability are the two things which make the patrol system so efficient, for in fire-fighting the proverbial ounce of prevention is worth a ton of cure. I take issue

with all pessimists who say: 'Oh, you can never reduce the fire-danger sufficiently to make forestry worth while.' It is true that the dry interior climate here and high winds make the danger rather greater for us than it is in Europe; but not seriously so, and over there, except in Russia, the annual fire loss is now an entirely negligible quantity.

The Forestry Branch is this very winter adopting active measures to install, extend and buttress the patrol system on all the reserves, with special attention to the Riding Mountains. Some fifteen good look-out hills were located around that reserve, and as fast as possible towers will be erected on these and men installed in the danger season, with telephone connection to the Chief Ranger. Trail extension and improvement is being pushed. The 262 miles of boundary line round this reserve has practically all been cut out eight to sixteen feet wide and will be turned into a road or bridle-path, as the local topography will best permit. This boundary trail will also have some value as a fire line.

To safeguard this reserve still further against insweeping settler and prairie fires, a plowed guard is now being made along the south and west, twelve to sixteen feet wide. As a start 35 miles was done last summer, with two team of oxen on a breaking plow. If the public will but grant its sympathetic co-operation and a decent amount of money, the Forestry Branch will undertake to adequately protect the reserves.

Renewing the Forest.

Mr. Warren, a forester from the United States, who visited over 150 German coniferous forests in 1911 reports that on only three of them was natural reproduction being depended upon; that is to say, in ninety-eight per cent. of German forests natural regeneration has been discarded as being too uncertain. Planting gives them straight, uniform trees, which have a market value right from the first thinning to the final cut.

In our case, however, the fact that we have on these western reserves such large areas to re-clothe, as compared with Germany, coupled with the further fact that labor here costs three to five times as much as there, makes it obligatory for us in Canada to continue diligent experiments, looking first toward developing, if possible, satisfactory methods of natural reproduction of existing timber as it is cut away, or, failing that, the successful sowing of seed on a large scale. It looks at present as though the planting out of nursery-grown trees might be too costly an operation for general adoption on our reserves.

And yet, would it be? Every year, you, the owners of these reserves, are losing thousands and thousands of dollars on account of the vast areas of land now lying idle as the result of original denudation by fire or lumberman and repeated fires since.

I think we should all be appalled if we could once get a clear appreciation of the tremendous losses involved in the continued holding of all this land as unproductive capital. True, one might say in crossing the Riding Mountain reserve, that there was not much of the land but had trees of some sort on it. But Mother Nature knows naught of business or economics—in fact she decidedly favors the comparatively useless poplar or balsam fir instead of the really valuable spruce. Poplar is normally so defective from disease, frost-crack, wind-shake, etc., as to be hardly worth lumbering, and still you are permitting it to occupy land that will grow the finest of spruce—or, for all that is known to the contrary, even red or white pine.

One hundred years ago the public forests of Denmark were an almost pure stand of relatively valueless

hardwoods; to-day, as a result of patient labour and co-operation over sixty per cent. of the land is growing the highly profitable and rapid-growing Norway spruce. What is to hinder Canadians achieving a like success on their reserves if they just go after it in earnest and leave politics out?

The chaotic conditions found on Canada's reserves to-day are quite similar in general to those of Europe one hundred years ago. Like us, they were then spending about one cent per acre for protection and maintenance and getting in return an infinitesimal revenue. But year after year the Germans, for instance, have been spending more money and getting larger and larger net returns. In 1909 the average expenditure per acre over the entire government-managed forests of Germany was some three dollars and twenty five cents, while the financial net revenue per acre was two dollars and twenty five cents—a net money return of two dollars and twenty five cents per acre, quite outside of all those enormous auxiliary forest benefits which nourish the very life of the nation, quite outside, too, of the living made by the many thousands of workers which is represented in the expenditure of that other three dollars and twenty five cents. Do not forget, however, the long initial period of expenditure, of sacrifice and of patient experiments, of which this grand result is the fruits.

What Will It Pay?

Let us see now about what the Riding Mountain reserve could do as a wealth producer and consumer of labor were it covered, say, even with white spruce—a native species that flourishes there—and we had reached that stage of forestry where the annual cut can be based on the annual growth. The public forestland of France—much of it being thin Alpine soils and in no way comparable to our rich, though stony, Riding Mountain soils — is producing an average of 240 board feet per acre per year; the Austrian forests, 300; the German forests, 380. Accurate measurements taken on the Pacific Coast show that the climate and soil there will grow six to eight hundred board feet per acre per year. Surely then, the Riding Mountain would grow two hundred. The total for the reserve would thus reach, in round numbers, 200,000,000 board feet a year. That quantity would tax the combined sawing capacity of the great mills of Ottawa and Hull. It would annually supply to each one of fifty saw-mills as much timber as is now being cut each year for all purposes over the whole reserve. The net annual return derived, if we figure stumpage at only five dollars per thousand feet, board measure, would be, on the German 1909 ratio, at least 400,000 dollars. On the basis of the forest labor employed in Saxony, the production and crude manufacture of the above-mentioned crop would support a population of ten thousand workers.

The timbered area of Nova Scotia is only two and a half times the size of this reserve—yet no fewer than 240 saw-mills are now supported by its annual cut, and this cut promises to be maintained and increased by the progressive forest policy being adopted in that province. Again, in Great Britain public opinion is beginning to clamor for an active national forest policy. Take, for instance, the following statement issued in February, 1911, by the General Federation of Trade Unions in the United Kingdom:

'To absorb surplus labor an urgent appeal is made for afforestation. The employment furnished by the present uses—mostly grazing—to which our wild land is devoted, may be taken to average one man per 1,000 acres. This does not represent one tenth of the permanent employment afforded by the maintenance of a similar area under forest. The labor

connected with imported timber and timber products is performed abroad; the labor incidental to home-grown timber would be performed in our own country and would afford maintenance to many thousands of families."

Or take the following from a report issued only last fall by a cautious British Royal Commission on Forestry:

'The final and conclusive test of the value of afforestation must be its ability to improve the existing condition of a given district as to population, employment and economic returns. If, by means of afforestation on a financially sound basis, land which is too poor to cultivate can be made to give more employment and support a larger population than it is capable of doing under pastoral conditions, then the future of afforestation as a means of increasing prosperity is assured, and afforestation on the lines suggested would not only pay its way, but bring in a considerable return.'

Business Management Necessary.

If for no other reason than because of the 'long-time element' involved, forestry is essentially a business proposition — neither politics nor sentiment can be trusted to maintain over long periods a correct and uniform forest policy. Canadians are most fortunate in the help they may get from their good neighbor the United States in solving their national forest problem—both how to do it, as in their federal forest service, and just as truly how not to do it, as seen today in the great commonwealths of Michigan and New York. New York State's forestry policy is the greatest anomaly I know. The law decrees that not a stick of timber dead or alive shall be cut or used from the state reserves, and yet, while at the one end they are letting all this fine mature timber go to waste and ruin, at the other end they are frantically growing and importing and planting out millions of little pine and spruce seedlings. There, in the heart of that busy state, one finds fifteen hundred thousand acres of timberland producing no income— a monument to the power of sentiment—a miser's way of conserving resources—all due to bad policy.

No; business management is the sole policy which will stand the test of time, and slowly but surely improve each reserve until it is producing a maximum sustained yield. We hear a lot about 'Conservation' nowa-days. What is it, anyway? In a speech made one year ago Sir Wilfrid Laurier defined conservation in four words so succinct and comprehensive that they cover the whole ground. He called it 'Wise Use. Wisely Regulated.' Think it over. It applies almost equally well to the so-called non-renewable resources which are mined, as oils and minerals; and to the renewable resources which are cropped, such as fisheries and forests.

Test it on this set of logging rules now being applied to operations on the Riding Mountain reserve. Part of them, as that calling for low stumps, are to ensure wise use of the crop now ready. Others make provision for seed-trees and proper brush-disposal, to provide for a new crop and insure it against fire—that is, present use wisely regulated in order that the future of the forest may be safeguarded, and its producing power steadily increased in quantity and quality as crop after crop is removed. That is true conservation. That is the policy of the Forestry Branch—every acre a producing acre.

If we consider this problem of developing, under a business forest policy, the Riding Mountain reserve for instance, must we not approach it in the same reasonable way a business man would if the land and timber were his and he could count not merely on thirty to forty years of life, but on a thousand years—just

as the present owner, the Canadian people, can?

This business man would regard the reserve as a big tree-farm from which he must produce the largest quantity of the best possible timber in the shortest possible time. To do this he makes use of those two ultimate natural factors of production, sunlight and soil fertility. By patiently fostering the best conditions for these two factors to work together for the production of timber, the Germans and the Japs have built up their magnificent forests: and we in Canada can do the same. The opportunity and possibilities for forestry on the Riding Mountain reserve are splendid, and in this it is only a type of all the reserves in these prairie provinces.

Experiments Needed.

Now, outside of economic efficiency, the ultimate success of such a forest policy must depend, as you well know, upon a close knowledge of the natural laws underlying and controlling all tree life and growth, and our skill in applying this knowledge under given local conditions—in a word, upon the science and art of silviculture.

Forestry practice cannot be adopted wholesale from another country, because our conditions are different; often on two parts of the same reserve they differ greatly. What Canadian foresters need to-day to guide their fieldwork aright is the compiled result from many definite local experiments. We need a number of forest experiment stations.

Isn't it rather odd that the Canadian people maintain some fifteen experimental farms, where experts search out the laws underlying the best local farming practice and how best to apply them, and yet make no study whatever of their forest crop? If all this research is needed in the case of soil products which grow in sixty to one hundred days, how much more for one requiring sixty to one hundred years? Lumbering is the third greatest industry in Canada, yet as a nation what are we doing to guarantee its future prosperity and permanence? And this seems all the more remarkable when one reflects that fully two thirds of our cropable land in Canada is suited not to the growth of food crops but wood crops.

The explanation, of course, is that up till now the lumberman has not had to grow his crop like the farmer does. He has cared nothing about the cost of production. He has merely harvested an unearned increment. But from now on that condition will change and definite knowledge of the life-history of our trees become more and more necessary. More and more must our lumberman—whether on Crown lands or not—make provisions for future need by planting, rather than by purchase.

The People's Interest.

As the result of a wise land policy our Canadian timberland has not been alienated, so that forestry in Canada will ever be primarily government work, and this is well. As more and more of this cut-over licensed land reverts to the Crown, it—along with the rest of our wild lands—should undergo an expert soil survey and classification, and all that is absolute forest land be made part of our National Forests. (The term 'Reserve' is an unhappy one, because their usable products are not locked up but under due safeguards are for full and immediate use). But whatever the name, let its status as forest land be fixed beyond doubt. Permanence is the very first essential for a forest reserve.

Just let me emphasize in one further word that the people of any forest-supported community have a vastly greater interest at stake in perpetuating that forest wealth than has the lumberman who is exploiting it. For every dollar of profit that lumberman clears, he pays out four for labor, supplies, machinery, transportation and taxes, so that from a

financial standpoint merely and outside of all auxiliary benefits, the general local public have four times as great an interest in making and keeping a given piece of forest permanently productive as has the lumberman who may chance to own or control it.

Look, for example, at the case of the Lake States, Michigan, Wisconsin, and Minnesota. In 1890 their total output of white pine was over nine billion board feet, but in 1910 it had sunk to less than two billion, and as a result more than 500 sawmills, employing many thousands of workmen, have been forced to cease operations—not to speak of many of the dependent wood-working industries—simply because no steps were taken to make the lumbering industry permanent. The science of forestry was completely overlooked.

The people of those states are now suffering because they thus foolishly allowed—considering the part ruinous taxation played, one might say compelled—the lumberman to mine, instead of assisting him to crop, their magnificent pine forests. Mark you, the lumberman suffered little, for unlike the community he could move away, and he is now repeating his mining operations in the Southern States or on the Pacific Coast. And, speaking of Michigan especially, remember that these timber sharks did not for the most part denude agricultural land, but sandy plains and rocky barrens fit only to grow timber, land which is now an unproductive waste of scrub-oak and brambles, land which for years the state has been vainly trying to sell at ten to fifty cents an acre.

'Oh,' you say, 'that misuse could not happen in Canada where the lumberman does not hold in fee simple but is merely a licensee whom we can easily control and force to do right.' In that saying you voice the all-too-generally accepted fallacy that the lumberman is a sort of felon whom the people must coerce even to the point of making him lose money, for the sake of the future. That idea is surely a wrong one. A lumberman is a useful wealth producer. He is instrumental in transmitting a natural resource into national prosperity and happiness, only he needs to be 'wisely regulated.' The people must form a partnership with him and frankly and fully cooperate according to benefits derived. There is in Canada to-day a great field of opportunity awaiting the genius who will evolve, on equitable principles, a triangular basis of co-operation among the following trinity of interests:

(1) All the people—whether nation or province—sovereign owner of the land, the first factor in production;

(2) The Community—providers of the labor, the second factor in production;

(3) The Lumberman — source of enterprise, capital, organization, the third factor in production.

Such a workable partnership, ensuring conservation by conferring on each interest its proper responsibilities and rewards, is first of all badly needed to-day on our licensed timber lands. Afterwards, its methods would naturally be modified and adapted to the management of unlicensed lands, and to the encouragement of private forestry. Every Canadian should take an intelligent interest in seeing to it that the future is duly considered in the present use and management of all our Crown and licensed timberlands, whether provincial or federal. The deplorable results in the Lake States and in many of our own forests also, should warn us that it is foolish, and most unfair as well, to depend on the licensees—for if those Michigan lumbermen who actually owned their cut-over land did nothing, how much more can licensees be expected to do?

Use of Telephone Lines in Fighting Fire

(From American Forestry.)

In fire-fighting a minute may mean millions. To realize the truth of this statement one has only to inspect a trained fire department, used to guard the lives and property, in any city. Most of us are more or less familiar with their time-saving devices; we have admired the splendid horses taught by months of patient labor to spring to their places at the sound of the gong, have seen them harnessed to the truck in the time it takes to press a button, and have observed men drop to their places from the floor above. All this training and expense to save a minute's time in the battle against the fire-demon, in a city where man has used his utmost ingenuity to build so as to thwart the ravages of this element.

Compared with such a well organized system the (U. S.) Forest Service methods seem crude indeed. One man with an axe and shovel guards from 100,000 to 200,000 acres of timberland, worth from $500,000 to $5,000,000. In the greater part of these forests nature seems to have invited their destruction by strewing the ground with a carpet of dry leaves and resinous needles, and covering the branches and trunks with moss that, when dry, burns almost as quickly as gunpowder. For one man to attempt, single-handed, to check a conflagration under such circumstances seems worse than foolhardy; and yet, let it be told to the credit of the tribe who wear the Forest Service badge, that when necessity demands they pit their strength and cunning against the flames, and sometimes, aided by night dews and bulldog endurance, win out. The Forest Service records could reveal many such cases of which the public has never heard. It is only when the battle has been lost and the fire becomes a public menace that the matter gets into print.

It is obvious that chances are all against conquering a fire of any magnitude under these conditions; consequently, every human endeavor is used to prevent the starting of such conflagrations. During the dry summer months a ranger's waking hours are spent in patrolling the routes frequented by travelers, to extinguish neglected camp-fires, and in searching his district with a field glass from some lookout point, to detect the first faint column of smoke that means the beginning of a forest fire.

With so much territory to cover, it is a physical impossibility to have all parts of the district under his supervision at all hours of the day. There will come a time when several fires will start at once. The causes are various; sometimes they are set by lightning from the electrical storms that are common in a mountainous country; more often they are due to carelessness of campers or tourists; occasionally they are started wantonly by some person who objects to the arm of the law, as represented by the forest ranger, reaching back into the wild places; again, it may be that an unextinguished match, or a spark from a pipe or cigarette is dropped in the dry humus, as the hunter or prospector wanders in places remote from the generally traveled trails. The spark ignites the slow-burning duff, which smoulders perhaps for days unseen, the thin smoke being lost in the blue of the spruce tops above it; slowly it burns its way to the resinous roots or mossy trunk of some conifer; the mountain breeze fans it to a flame;

it leaps up and seizes upon the dry twigs and the pitch-laden foliage; the tree bursts into a pillar of flame, and the destruction of the growth of centuries begins. Any of these events may happen any day during the long drought of summer. When they do occur the ranger needs help, and needs it quickly, to save the heritage he has been set to guard.

If he has a telephone the call for help will be in at head-quarters within an hour, and in another the ranger will be at the fire planning his battle and doing all he can to check the flames. At head-quarters the organization that has been perfected for just such emergencies is set to work; by telephone the nearest rangers are sent to his aid; from the lists that have been prepared and kept on file of the available men and horses that can be hired at the nearest settlement, crews and supply trains are organized within a few hours and sent in, if additional help is needed.

With no telephone in his district the ranger must ride to the nearest settlement, where he gathers such help and supplies as possible, with the least loss of time, and returns to the fire after sending a messenger on to head-quarters with the news. But in the meantime hours have been lost that may mean thousands to the nation. I have seen 7,000,000 feet of timber burn in one afternoon because a privately owned telephone line on the national forest was out of repair in just such an emergency as has been described. Several hours were lost in getting a messenger out to the nearest ranger and the news to head-quarters; a crew was organized and sent in without loss of time. but arrived four hours after the fire had broken out of control of the ranger and the few men he had gathered. In this short time it swept the whole mountainside clean. The supervisor bought that telephone line before another season opened.

(*Concluded on Page* 82).

COMMISSION APPOINTS FORESTER.

The Commission of Conservation has recently added to its staff an experienced forest engineer in the person of Mr. Clyde Leavitt, B.A., M.S. F. Mr. Leavitt has had much experience with the United States Forest Service, with which he was connected from July, 1904, until he resigned to take up his duties with the Commission of Conservation on April 15 last. Mr. Leavitt commenced his forestry studies at Cornell University, under Dr. Fernow, but completed his work at the University of Michigan, from which he graduated with the degree of M.S.F. in 1904, having previously, in 1901, obtained the degree of B.A. from the same university. In 1904 he received the appointment of forest assistant in the Forest Service, in 1907 was appointed Assistant Chief of the Office of Organization (and later Chief), in December was appointed District Forester in charge of the second district, with headquarters at Ogden, Utah, in March, 1910, became Assistant Forester in the Branch of Operations, with headquarters at Washington, D.C., and in April, 1911, was appointed Forest Inspector and assigned to work under Mr. W. L. Hall in connection with the purchase of land under the Weeks Law, which position he held until his recent change.

Mr. J. M. Swaine, recently appointed Assistant Entomologist for Forest Insects in connection with the Central Experimental Farm, Ottawa, is spending several weeks in the Riding Mountains (with headquarters at Dauphin, Man.) engaged in study of the insect life of the reserve, especially the bark-borers (Dendroctoni), of which he has made a specialty.

In the treatment of 'damping off,' applications of wood ashes have given good results in the nurseries of the Forestry Branch.

Measures for the Prevention of Forest Fires.

From the German of Dr. M. Kienitz, Royal Forester and Professor of Forestry at the Forestry Academy of Eberswalde; translated by Ellwood Wilson.

Fire is one of the greatest dangers of the forest, not only for a virgin stand with its litter of dead trees and fallen dry limbs, but also for a cultivated forest with its thick even-aged stand which in its youth is so easily destroyed by fire.

A forest fire is absolutely dependent on the inflammability of the ground cover, and if this consists of green herbs or if it is entirely removed so that the mineral soil is exposed a fire is impossible.

Every fire has a small beginning, burning at first in dry moss, grass, fallen leaves or needles, without harm to the trees, until, according to the amount of combustible material and the character of the stand, it sooner or later strikes into the crowns and the whole forest sinks in a sea of flame. Arrived at this stage, a conflagration knows no boundaries, the crown fire rushes ahead of the ground fire, leaps over great obstacles, showers burning sparks across watercourses or meadow-land, kindling new fires on the farther side. A crown fire can only continue to burn if the ground fire follows it and if the flames can continually rush up the trees. If the ground fire loses combustible material over a wide strip, the top fire goes out. On these facts are based our methods of fire-fighting.

Extinguishing Forest Fires.

It is easy to put out a fire just started, a green branch covered with leaves or needles swept over the ground in the opposite direction to that in which the fire is travelling, not beaten up and down on the flames, soon drives back and extinguishes it. Once the flames are out, all glowing coals must be smothered by stepping on them, beating them out, or covering them with earth, or the fire can be confined by a furrow made with a grub-hoe, spade or plow, throwing the earth toward the fire.

The same principles apply to large fires as long as they are ground fires; but it may happen that the heat is so great that near approach is impossible or the number of men available too small to cover the front of the fire. In that case it must be gradually reduced by fighting from the sides until it is conquered. (See Figure 1.) The newly extinguished places behind the fire must naturally be watched to prevent it springing up anew behind the fighters. If the fire has already reached the crowns, these means will be of no avail and a back-fire must be started.

A back-fire can be used where the front of an oncoming fire gives an opportunity to light a row of small fires which can burn towards the main one without spreading backwards. Good places are roads, trails, railway lines, brooks, moist hollows where the grass is green, etc. Naturally the back-fires burn into a closed line against the wind, slowly along the ground, and without catching into the tops and except in very young stands will do no material damage. As soon as the back-fire reaches the wind-driven main fire it will be seized by the rising air current, and will be carried into the tops against the latter, with which it will unite. This meeting kills both fires because there is nothing in the path of the fire on the ground to burn, and the crown fire, having no nourishment, dies out.

Preventive Measures.

In cultivated forests places to start possibly necessary back-fires should be provided at the time of planting. In favourable situations strips fifteen feet wide must be left bare and in seasons of especial danger they must be kept bare by plowing or digging. These strips answer the purpose excellently. The loss of ground is trifling, as fifteen feet is soon practically covered by the meeting of the crowns in middle age. Besides they serve as roads for removing thinnings, or they can be sown with fodder crops,—saradella, for instance, which furnishes food for game and prevents deer from feeding on young trees.

In well regulated forests, it is not sufficient to make rules for extinguishing fires, but means must be taken to see that no fires start. Police and legal regulations practically prevent fires started by human agency. In countries like Germany, where the knowledge that it is necessary to protect and care for the forests has penetrated to practically every class of the population, it has become possible steadily to decrease the number of fires set through malice and carelessness. Regulations requiring every dweller near a forest to help fight fires without pay are willingly obeyed by the majority, and in countries where conditions are as favorable as they are in Germany, the number of fires would yearly diminish were it not that one circumstance increases them.

The Railway Danger.

This is the growing number of new railways through the forests and the steadily growing traffic on those already built. Every

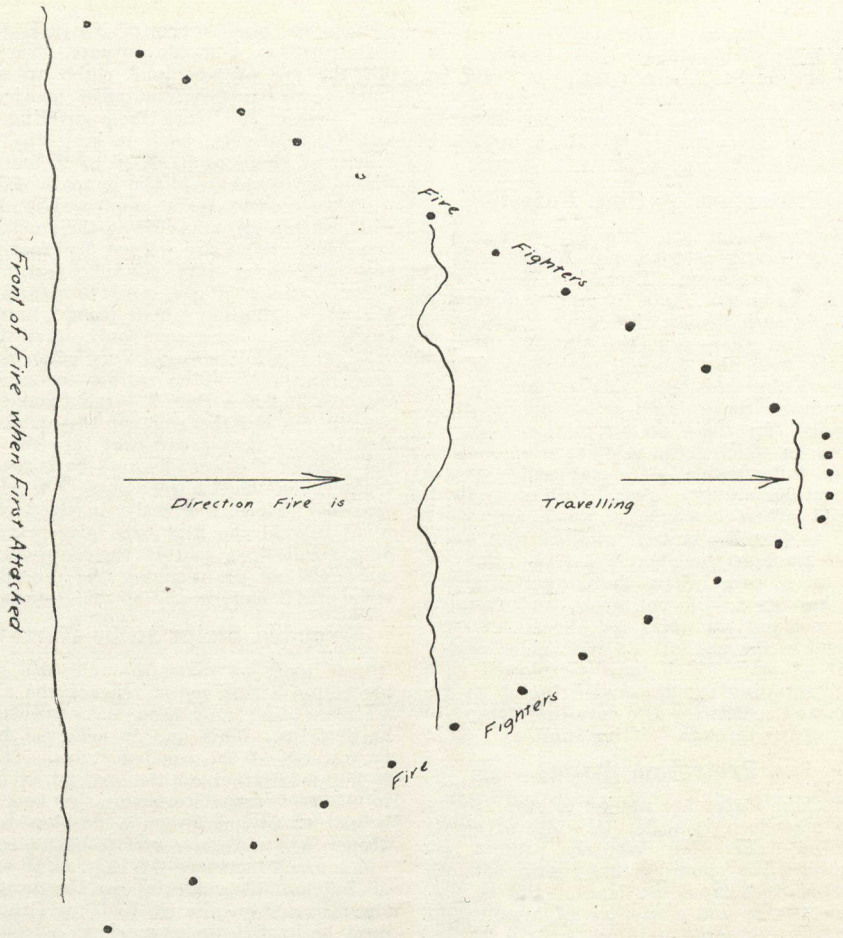


Fig. 1 – Method of Checking a Forest Fire.

engine using a fuel which throws off sparks (coal, peat, wood, etc.,) is dangerous. In the pamphlet published by the Royal Prussian State Railway Commission in 1901 treating of the Prevention of Forest Fires, it is especially stated that, in spite of all efforts to the contrary, engine-builders have been unable to devise any practical means to prevent sparks being thrown off by locomotives. They have succeeded in making fire-boxes tight, which prevents the dropping of coals, but these latter are not very dangerous, falling, as they do, on the track. It is the glowing sparks which fly from the smoke-stacks which are especially dangerous and cannot be held back without interfering with the draft; this is especially the case with fast trains. Patrolling the right of way is also no longer possible, as the number of trains has so increased, and one locomotive on a trip can set numerous fires in rapid succession in widely separated places.

It is therefore necessary to protect the track on both sides by some arrangement which will automatically prevent sparks, thrown out by an engine, from setting fires. For this purpose fine wire netting of sufficient height and hedges or shields such as are used against drifting snow, could, of course, be employed, but their first cost and upkeep would be entirely too expensive. It has been proved by experience that keeping the soil broken up and bare is a certain means of preventing the spread of fire. The danger from sparks is in proportion to the size of the redhot particles, the amount and direction of the wind and the inflammability of the ground-cover.

The larger the sparks, the more likely they are to start a fire, but the shorter the distance they are carried, the distance depending on the velocity of the wind; but the danger is always greatest near the

track. If the forest-floor cover is only slightly or with difficulty inflammable, it is sufficient to keep bare a strip between the right of way and the woods, so that a fire starting cannot pass it; even this is sometimes not necessary as the light far-flying sparks are not dangerous.

Protection of Pine Forests.

The conditions are quite different if the railway crosses a wood with highly inflammable ground-cover. There is especial danger for extended stands of pine on poor dry soil. In such stands, the danger lasts nearly all the year, and the flames, running swiftly over the ground, easily reach the crowns; they are safe only as long as the snow is on the ground, or as long as it is raining. In these stands, as well as all others, in which there is a large amount of easily inflammable, dry material, special precautions must be taken. Ordinarily these consist of treeless spaces, which are either used as farming land or planted with hardwood managed on short rotation. But on dry forest soils, where the danger is greatest, hardwood will not grow, and farming does not pay, in which case broad, entirely unused strips are left on both sides of the right of way, which must be plowed each year, entailing expense and bringing no return, and sometimes also entailing danger to the railway through drifting sand.

Protection Strips.

If these strips are needed to stop sparks, they must be very wide. A width of ninety feet on either side does not protect, for Burkhard has observed that sparks have set fire 240 feet from the track. But a strip 33 feet wide and a quarter of a mile long contains one acre, therefore a strip 33 feet wide on each side of the track would mean eight acres per mile, not only lying useless, but in some cases increasing the danger of fire, as it has been proved that where a railway runs through a forest which lies close to the track, there the danger is, on the average, less than when the woods are farther away. If the trees are close the wind is compelled to follow along the narrow lane of the track, while if the trees are farther away, the wind can blow from the side and drive the sparks among the trees.

To overcome these disadvantages, and to protect the forest from the danger of fire from locomotive sparks, it is necessary to manage the wood near the track, and to prepare a strip on which all fire will die out before it can set fire to the crowns, or kill the trees, and at the same time catch all sparks. The glowing sparks are rather large and fall immediately to the ground as soon as they strike the still air stratum inside the protection stand, just as snow-flakes fall behind a hedge or sand-clouds behind fences and grass tufts. The protection strips, which the author of this pamphlet has recommended for pine forests of North European plains, answer a double purpose. They permit the use of woodland right up to the track, even in districts most subject to fires, protect the track from drifting sand, and are relatively cheap to keep up. They consist of strips of trees, 36 to 45 feet wide, which have a bare ditch or path 4.5 feet wide toward the forest, and a strip, 3 feet wide, of bare ground next to the track. The two bare strips are joined by foot-paths, kept bare, every sixty or ninety feet.

As mentioned above, every fire starts from a small beginning, which cannot harm the trees, and is dangerous only when it has succeeded in spreading. Very often the dry grass or moss on the railway embankment catches, and has quite a large front by the time it reaches the edge of the woods, and that it may not spread over into the wood, the edge of the wood is kept bare for three feet. Then the fire goes out. The glowing sparks which fall directly on the strips of wood beyond the first bare place can start only small fires, and if these spread, they must die out on reaching the second bare strip of 4.5 feet, or one of the cross lanes.

Wooded Strips to be Narrow.

Care must be taken that the fire on the protection strips never reaches the size of a crown fire, and thus spreads over the bare strips. This end is achieved by the narrowness of the wooded strips. If there is not much fuel on the ground, a fire 36 to 45 feet from its origin is not high; height comes only when a fire has reached deeper into a forest, over a larger surface, which much increases the heat. The amount of inflammable material on the protection stand, both on the ground and above it, must be kept down as much as possible; all dry branches, weeds, juniper and other inflammable objects must be removed; suppressed and dry branches of the trees up to breast-height must also be pruned off. Only the green branches on the edges of the stand must be kept as near the ground as possible. The closer the green branches are on the side toward the track, the better the protection strip fills its second important purpose, ie., to stop the lighter far-flying sparks.

To attain this end, the stand on the protection strips must be closed and without large gaps; a stand which is too thick is not favorable, for between the close standing trunks, the flames easily rise higher than where the trees are not so close, and crowded trees do not develop good crowns.

Since very old stands become too thin and the high trees are likely to be thrown on the tracks by storms, or at least may damage the telegraph lines, it is necessary to choose a short rotation for protection strips. In determining this rotation, the first consideration is the purpose of the protection stands; the second is the yield. The rotation

Fig 2

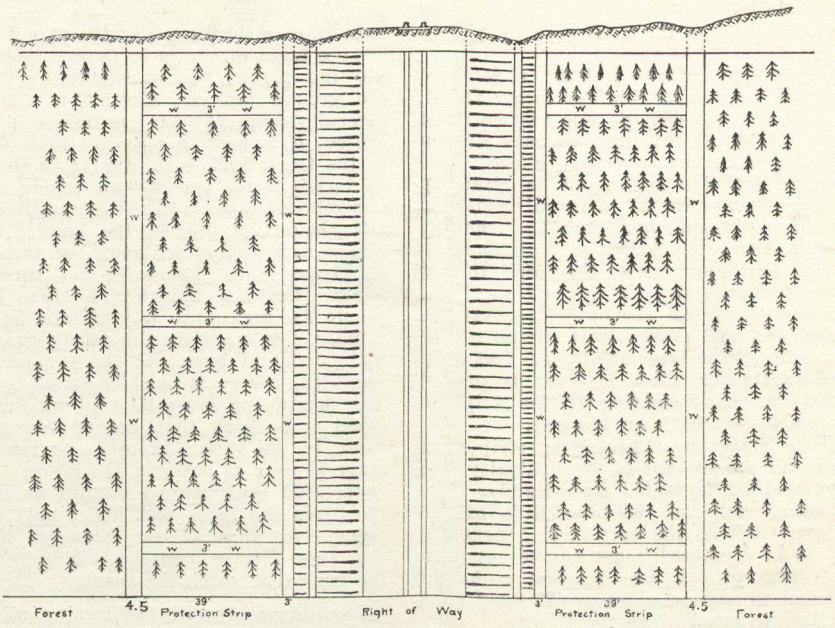


Fig 2.—Right of Way With Protection Strips on Both Sides.

W — Strips of Bare Earth.

of strips in pine on sand must be between sixty and eighty years. A too short rotation is to be avoided, for a strip only becomes of use when it reaches a height equal to that of the funnel of the locomotive.

Since the danger of sparks flying far is especially great if the wind finds nothing to check it on either side of the track, therefore both sides of the right of way must never be cut at the same time; at least one side must be left. The stands behind the protection strip, too, must not be cut and replanted as long as the protecting trees are so low that they do not fully prevent sparks from flying over them.

If reforestation must take place behind an insufficient protection system, then a second protection strip must be laid out exactly like the first, and be kept up until the first strip is a sufficient protection.

Cuts, Curves and Fills.

The danger is least if the road runs through a cut that is so deep that the top of the smokestack does not reach above its edge. In this case, a strip three feet wide between the edge of the cut and the wood is enough. Since, however, these deep cuts are generally short and the air currents are difficult to judge, it seems in most cases necessary to carry the 36-foot protection strip past these also.

The danger is especially great on the convex side of curves. Often here the direction of the railway is the same as that of the prevailing wind, while in the curve they do not coincide, with the result that the sparks are thrown in large numbers against the protection stands. It is at such places that the stand must be close, and the trees of ample height, for the number of sparks makes no difference, as even a rapidly passing train cannot send out enough to set fire directly to the crowns.

The danger is also great when the line passes along a high fill, where the full force of the wind strikes the funnel. It cannot be denied that in such places the sparks can fly farther than in a level section because they take longer to reach the ground; but the danger is not so great as might appear from a superficial consideration. The wind can throw the sparks into the wood only if it strikes the railway at an angle; and when it reaches the lee side of the embankment it falls, carrying the sparks down with it, and these fall faster and reaching the still air rapidly settle to the ground. Since in railway fills flat slopes are usual, three feet rise to six feet horizontal, so the protecting strips begin at a considerable distance from the track, and run back with every three feet rise of fill six feet farther from the track. The trees on the protecting strips can stop the sparks just as well as those which in a level country stand close to the track, if they are only high enough. The dimensions just given are sufficient.

Only if the protecting strips are young, it is safer to have a second strip, 36 feet wide and arranged like the first, kept up behind it.

When a new railway is built, a menaced stand will be handled like any other forest, i.e., only a broad enough lane will be made for the right of way, and on both sides a protecting strip as described above. The forest is not changed except to clean up the ground, remove all material which in burning would generate much heat, as dry twigs, heather, etc. At the edge of the road-bed and on the outside of the forest toward the protection strip, the ground must be cleared entirely, 4.5 feet wide, so that the mineral soil will prevent any spread of the ground fire. The trees on this 4.5 feet strip may be left; they must, however, be pruned so that the yearly clearing of this strip can be done by horse-drawn harrows.

If the timber on a protecting strip must be cut off on account of overmaturity, the strip must be replanted immediately. The protecting strip on the other side of the track, as well as the forest lying next the strip to be lumbered, must not be cut until the young growth has reached a height sufficient to prevent a transverse wind from blowing the sparks into the forest.

Choice of Species.

The kind of trees to be chosen for planting must satisfy the following conditions:—

(1) The trees must be adapted to the soil, so that they start well and continue to thrive.

(2) They must form a thick bark early, so that they will not be killed by ground fires.

(3) Their crowns must be thick enough at all seasons to catch flying sparks and to shade the soil in order to prevent a thick growth of grass.

According to a current opinion, hardwoods are better than pines; this view is based on an incorrect observation. Where hardwood thrives, as a rule the ground is fresher and the fire risk less than where pine grows. The young pine, one inch in diameter, is safer from a running fire than the same-sized hardwood tree (beech, oak, birch) because it early forms a thicker, non-conducting bark than the other. Its crown is a better spark-arrester, because it is green in the danger season, spring, before the leaves of the hardwoods have appeared. It must, however, be pruned to a sufficient height to prevent a weak fire striking up into the crown. For the narrow protecting strips, pruning up to 3 to 4.5 feet is sufficient.

On the dry sand of the North European plains the common pine is the only indigenous tree which forms a safe protecting stand. In other forested areas, there are evergreens which have the same resistance to fires, and are suitable as Pinus silvestris.

Formation and Care of Strips.

Sowing is the best way to start a stand, for the main object is to have strong even-growing plants, and it allows us to keep the ground between the plants clean for several years. If the ordinary pine is chosen, it is best to plant in rows parallel to the track 3 ft. 6 in. apart; in the rows, 18 inches is the spacing for strong one- or two-year-old pines. If possible, a little good soil should be put in the holes. Strong plants with well-balled roots, or three-year-old transplants should be set three feet apart. Between the rows a horse harrow should be used once a year, so that if a running fire starts in the young growth, it will go out at once. If the ground is too rough for horses, it must be bared by hand. This harrowing must be kept up until the stand is so high that ground fires cannot catch in the tops. In order to reach this stage as soon as possible, the lower, dry and suppressed branches are cut off as soon as the pines are three feet high; only on the outside row are all the branches left, so that they form a mantel reaching nearly to the ground to catch the sparks.

Simultaneously with the pruning, all superfluous trees are cut, i.e., those which stand too close to another tree. In their early years, a spacing of 3 ft. to 3 ft. 6 in. is about right. Later all suppressed trees are cut, so that only thrifty trees with thick crowns remain. By means of the thick close crowns the undergrowth of grass, lichens, etc., is prevented, so as to furnish little nourishment to a ground fire, which then runs harmlessly through. It is desirable that these protecting strips should burn often, so that no accumulation of fuel can occur to be dangerous for a later fire. If there is no fire for a year from sparks, the advisability of setting a fire under favorable weather and wind conditions (toward the track) to burn the ground-cover, should be considered.

As soon as it becomes impossible to work the ground between the rows, precautions should be taken that a fire catching in the protecting strip does not run into the stand to be protected. For this purpose, before mentioned, the bare strips are laid out, whose surface must be made fireproof, each year, by raking off inflammable matter or by working the soil. On the woodward side, the strips are 4.5 feet wide, and those toward the embankment and the right-angled strips 3 feet.

This baring of the soil can be well accomplished by using a spring harrow. In this case the bare strips must be arranged so that the animals drawing the harrows can work uninterruptedly, and a uniform width of six feet should be chosen. A form as shown in the sketch is good. The

(*Concluded on Page* 81).

Canada's 1911 Pulpwood Consumption.

The Forestry Branch of the Department of the Interior has finished the compilation of the statistics of pulpwood consumption for 1911, and will shortly publish the results as their Bulletin No. 30.

The consumption of pulpwood showed an increase of 73,801 cords (or 12.3 per cent) namely, from 598,487 cords in 1910 to 672,288 cords in 1911. The average price per cord ($6.45) was the highest paid since these statistics began to be compiled in 1908. The increase in the production of pulp was 22,229 tons, viz., from 474,604 tons in 1910 to 496,833 tons in 1911 (an increase of 4.7 per cent). Fifty-four firms sent in reports, an increase of three.

Quebec mills, 28 in number, consumed 58 per cent of the total quantity of wood used; Ontario, with fourteen mills used almost one third; the four mills in New Brunswick took 6.8 per cent of the total and Nova Scotia's seven mills about half that quantity. The actual quantities of pulp consumed are as follows:—Quebec, 390,426 cords; Ontario, 213,667 cords; New Brunswick, 45,824 cords, and Nova Scotia, 22,221 cords. Pulp manufacture in British Columbia is still in the experimental stage.

The effect on the price of pulpwood of Quebec's prohibitory regulations as to export of wood cut on crown lands has been awaited with interest. The conclusion to be drawn from the figures of the bulletin is that an increase of almost one dollar per cord has resulted. The average price paid for pulpwood in Quebec in 1911 was 97 cents per cord greater than that paid in 1910. In Ontario the price fell twenty cents, while New Brunswick and Nova Scotia show increases of twenty to thirty cents per cord.

Spruce is still far in the lead as a pulpwood, over four-fifths of the wood used being of this species. Somewhat less than one fifth of the total consumption was balsam fir, and poplar and hemlock each furnished less than one per cent of the total. The proportion of balsam fir used for pulp is constantly increasing.

Only four species — namely, spruce, balsame fir, poplar and hemlock — were used for pulp in 1911. Quebec used all four, Ontario and Nova Scotia all but hemlock, and New Brunswick only spruce and balsam fir. The proportions of the two principal woods to the total consumption in the various provinces were as follows:—Quebec: spruce, 75 per cent, balsam fir, 23.8 per cent; Ontario: spruce, 90 per cent, balsam fir 9 per cent; Nova Scotia: spruce, 81 per cent, balsam fir, 18 per cent; New Brunswick: spruce, 96 per cent, balsam fir, 4 per cent.

Of the processes the mechanical leads; sixty per cent of the pulp manufactured was made by this process. Thirty two per cent of the pulp was produced by the sulphite process, and about eight per cent by the soda process.

Quebec leads in the production of mechanical and soda pulps, and Ontario in the manufacture of sulphite pulp.

The proportions of the different woods used in each province are as follows:—

	Mechanical.	Sulphite.	Soda.
Spruce	57.5%	33.8%	8.7%
Balsam Fir ..	76.2%	23.1%	0.7%
Hemlock.. ...	24.0%	9.0%	67.0%
Poplar	5.3%	51.0%	43.7%

In 1911, 72.9 per cent of the pulp made was produced by the mechanical process. Nova Scotia used this process exclusively, and over half of Ontario's pulp is produced by this method. New Brunswick, on the other hand, manufactures eighty per cent of its pulpwood by the sulphite process, with the remainder divided almost equally between the other two processes.

The annual consumption of pulpwood per mill in the Dominion was 12,450 cords, almost the same as that for 1909 (12,442 cords) and quite an increase over that for 1910 (11,735 cords). Ontario gives the highest average cut per mill, viz., 15,262 cords.

The aggregate export of wood-pulp was 259,514 tons, of which 221,167 was mechanical pulp and 38,347 chemical pulp. The total value of the pulp exported was $4,902,862, an average value of $18.89 per ton. In 1910, 328,977 tons of pulp, valued at $5,694,896, were exported. The mechanical pulp was worth $3,436,670, or $15.54 per ton, and the chemical pulp $1,466,192, or $38.23 per ton. The mechanical pulp thus formed 85.2 per cent of the export, and the chemical pulp 14.8 per cent. The United States received 99.1 per cent of the mechanical pulp exported, and 99.8 per cent of the export of chemical pulp; the United Kingdom, 0.9 and 0.2 per cent respectively. There was practically no export to any other country.

While exports of wood-pulp decreased by 69,463 tons, the quantity exported to the United States increased over that taken in 1910 by 3,103 tons, that country taking almost 52 per cent of Canada's total product. In transatlantic markets it seems that Scandinavian and German pulp are suc-

cessfully competing with Canadian pulp, probably owing to the lower cost of labor in these countries and perhaps, also, to the fact that smaller profits may be satisfactory to capital. The home market, also, has increased its production by some forty per cent since 1908, when it took 34 per cent, and in 1911 took almost 48 per cent.

Canada now supplies approximately half of the United States import of pulp. Less pulpwood in the unmanufactured state was exported in 1911 than in any year since 1907. The decrease is confined to Quebec, which sent to the United States over 140,000 cords less pulpwood than in 1910; Ontario and New Brunswick, on the other hand, have both increased their imports to the United States. Still, of the 1,520,227 cords of pulpwood produced in Canada in 1911, considerably over half (nearly 56 per cent) is exported unmanufactured, the quantity being 847,939 tons. The total value of the pulpwood produced was $9,678,616, that of the pulpwood manufactured in Canada $4,338,024, and that of the export being $5,340,592. Had Canada manufactured into pulp the pulpwood she exported, she would have received, instead of the $5,340,592 she actually got, approximately $15,000,000. The pulpwood thus exported would have supplied sixty eight mills of the average size of those operating in Canada, and the Dominion, instead of having fifty four pulp-mills, would thus have a hundred and twenty two; Quebec could supply, with her export, forty five mills of the average size operating in the province, and New Brunswick could double her number.

Imports of wood-pulp nearly doubled in value, namely, from $49,000 in 1910 to $94,000 in 1911.

U. S. FOREST RANGER QUALIFICATIONS.

The requirements and duties of forest rangers on National Forests in the United States are thus described in 'The Use Book,' which contains the regulations and instructions for the use of the National Forests:

'A ranger of any grade must be thoroughly sound and able-bodied, capable of enduring hardships and performing severe labour under trying conditions. He must be able to take care of himself and his horses in regions remote from settlement and supplies. He must be able to build trails and cabins, ride, pack and deal tactfully with all classes of people. He must know something of land surveying, estimating and scaling timber, logging, land laws, mining, and the live-stock business.

'On some forests the ranger must be a specialist in one or more of these lines of work. Thorough familiarity with the region in which he seeks employment, including its geography and its forest and industrial conditions, is usually demanded, although lack of this may be supplied by experience in similar regions.

'The examination of applicants is along the practical lines indicated above, and actual demonstration, by performance, is required. Invalids seeking light out-of-door employment need not apply. Experience, not book education, is sought, although ability to make simple maps and write intelligent reports upon ordinary forest business is essential.

'Where saddle horses or pack horses are necessary in the performance of their duty, rangers are required to own and maintain them. The Forest Service furnishes no personal or horse equipment.

'Rangers execute the work of the National Forests under the direction of Supervisors. Their duties include patrol to prevent fire and trespass, estimating, surveying, and marking timber, the supervision of cuttings, and similar work. They issue minor permits, build cabins and trails, oversee grazing business, investigate claims, report on applications, and report upon, and arrest for, violation of forest laws and regulations.'

The examination consists of questions regarding the use of the forest, supplemented by a field test to show the applicant's fitness to do the actual work of a ranger. Education and experience are rated on the answers to the questions on these subjects in the application form and on the applicant's use of English in the written test. Horses for the tests in riding and packing are provided by the Forest Service.

The examination is under the control of the Civil Service Commission, and not of the Forest Service.

The law requires that, when practicable, forest rangers must be qualified citizens of the State or Territory in which the National Forest on which they are appointed is situated. Since the list of local eligibles must be exhausted before eligibles residing in other States can be appointed, the chance of citizens of outside States who go to the National Forest States and take the examination to secure an appointment is small.

The per capita lumber production in Canada in 1909 was about 684 board feet, probably the greatest in the world. The per capita production in the United States in 1909 was 470 board feet. It is probable that with an increased demand due to forest depletion in other countries, with the development of transportation system to northern forest regions, now inaccessible, the forest production of Canada will still further increase even though it has already reached proportions which under present systems of administration the forest of this country cannot permanently support.

Measures for the Prevention of Fire

(Concluded from page 78.)

place for the strips to be bared must be chosen when planting.

The laying out and keeping up of the protection strips naturally costs something, and the strips are only a sure protection if carefully kept up. But the cost of this system is far less than the sacrifice, which must be made to keep up the heretofore little-useful, bare protecting strips, used in North Germany, and a management used, as is the railway, to install all means for safety of passengers and to run its business with the most painstaking care, will easily carry out the relatively simple rules laid down here. The wood-owner must strive to protect his forests from devastating fires, and it will be to his own interest as well as that of the country in general to co-operate with the railway management.

PAY MORE FOR PULPWOOD.

The Montreal correspondent of the Paper Trade Journal, one of the leading journals of the paper trade in the United States, sent to that journal lately an interesting note on the effect of the prohibition of pulpwood export. After noting the fact that it is only recently, for the first time, that the United States mills are compelled to come to Canada for their supply, and the reasons for this, the despatch continues: 'They find that the price has advanced practically $1 per cord, and they are now forced to pay from $7.50 to $8 for peeled wood cut on free lands. This extra dollar charged for pulpwood will mean an extra dollar charged for their pulp. This gives the Canadian paper maker so much of an advantage. The indications are that the price of raw pulpwood will continue to increase from year to year owing to this scarcity, which will result in further advantages to the Canadian manufacturer, and eventually his absorption of the entire market. The real significance of the whole matter is found in the fact that this is the first real test of the working of the Gouin law, and it is proving itself to be an admirable and advantageous thing for the Canadian pulp and paper manufacturer.'

Forestry seeks not only to prevent the destruction of the forests but to secure their improvement so that they will be in a position to produce each year, without any lowering of their value, even greater crops than they have yet produced under methods of exploitation. To secure this result forestry must achieve fire protection, prevention of waste in the logging, manufacture and use of lumber, and the reforestation of barren and cut-over lands.

AN ONTARIO FOREST SURVEY.

During this coming summer the Commission of Conservation will conduct a survey of a portion of Haliburton county and the northern part of the county of Peterborough, Ontario. This survey is to furnish a detailed description of the economic and natural conditions and resources of the watershed in Peterborough and Haliburton counties feeding the Trent canal waters and to serve as a basis for a plan of management. The entire area is about 1,500 square miles in extent.

The survey is under the superintendence of Dr. B. E. Fernow, the field work being done by Dr. C. D. Howe and Mr. J. H. White, with three students. The survey was started during the fourth week of May, in the township of Marmora (Hastings county). This is at the southeast corner of the area to be surveyed, which includes all the townships north of Sturgeon and Stony lakes, as far west as Victoria county.

The information especially sought is the distribution of farm and forest lands and of forest types. The first object of the survey is to secure detailed information, not only of natural conditions, but also of ownership and economic conditions of the country surveyed.

The Dominion government has a distinct interest in the part of the country to be surveyed, owing to its having spent several million dollars, during the construction of the canal, on the building of dams and for means of conserving the waters of the region, without controlling the watersheds. Hence the reason for the Commission of Conservation undertaking the work.

With every couple of months bringing a report of several hundred square miles of forest swept out of existence, and with the activity of hundreds of sawmills all over the country, one wonders just how long it will be before North America will be treeless.—Ottawa Journal.

Use of Telephone Lines in Fighting Fire

(Concluded from page 73.)

While the principal reason for building these lines is for fire protection, they pay for themselves in other ways by facilitating the business and administration of the forest. Hardly a week passes but the ranger finds it necessary to communicate with his supervisor upon some matter of business. Mail routes are scarce in these remote districts. To get to head-quarters he may have to ride one hundred miles, or even more. This means several days of labor lost, to say nothing of the risk of leaving the district without any patrol. With a telephone the matter can be settled in fifteen minutes and the ranger does not leave his work.

During the summer months the forests are used to pasture thousands of head of sheep, cattle and horses, that are trailed for scores of miles to these summer pastures. The telephone is a boon to the owner in enabling him to keep in touch with his foremen and outfit.

This is why the Forest Service spends thousands of dollars of its appropriation each year in the construction of telephone lines. Besides those built and owned by the Service they have the free use of many miles of telephone built by settlers in cooperation with the Service. Free right of way and poles are granted to any company, corporation or private party to cross the forests with such lines; in exchange for these privileges the Forest Service asks the right to connect its lines, or to place an instrument where needed. Settlers and miners are glad to have an instrument placed in their cabins free of charge, the only fee required being that they notify the rangers of any smoke seen in their vicinity. Often an abandoned telephone line, that has been built into a once prosperous mining camp, is purchased or leased at small expense. Temporary lines are often strung to some lookout point, where the instrument is placed in a box and nailed to a tree; such lines are generally strung on trees or brush and taken down when the season is over.

A comprehensive plan for a telephone system has been worked out for each forest; few of these have been completed to date, but something is being added to them each year as appropriations are available. With their completion, and an increased force for patrol during the dry season, a serious forest fire on the national forest will be a rare occurrence.

The Forestry Division of the Laurentide Co., (Grand Mere, P.Q.), is this spring planting 15,000 seedlings, having in view the re-stocking of cut-over lands near their mill. A forest nursery will also be established. Mapping and valuation survey work will be continued.

The Timberman (Portland, Ore., U.S.A.,) reports a number of forest fires in the states of Washington and Oregon. The early part of May was very dry, and hence the season was favorable for forest fires. Five lives were lost in a fire which destroyed one logging camp. Nine camps and one mill, besides other property, are also reported destroyed.

The College of Forestry of the University of Washington is to have a demonstration forest; it will fill the double purpose of an experiment station and a field laboratory in which the students of the college may carry on work.

A press despatch, dated May 28, from Prince Albert, Sask., stated that bush fires had been sweeping the country north of the River Saskatchewan for two weeks before that date. One house belonging to a settler had been destroyed, and a survey camp of the Canadian Northern Hudson Bay railway burned.

With the Forest Engineers.

DOMINION FORESTRY BRANCH NOTES.

The Forestry Branch of the Department of the Interior will this summer have several parties in the field. Work is being taken up in a couple of regions in which no forestry work has so far been done. In one of these, viz., the Lac la Biche country, in the province of Alberta, Mr. S. H. Clark will be in charge of the work. Another new region is south-eastern Manitoba, where Mr. L. C. Tilt will be in charge of a survey party, with Mr. F. S. Newman as assistant. Mr. W. L. Scandrett will take up the work begun last summer by Mr. W. J. Vandusen in the Pasquia Hills district, where an addition to the Porcupine forest reserve is contemplated. Messrs. Geo. Tunstell and A. E. Parlow will also be members of this party. North of Prince Albert another exploring party will operate under Mr. C. H. Morse, with whom is associated Mr. W. J. Boyd. Mr. J. A. Doucet will survey the country southwest and west of Lesser Slave Lake, continuing Mr. Cameron's work of last season; with him will be Mr. V. C. Clark. They will enter the country by way of the Peace River trail from Edson.

Mr. D. Roy Cameron has been appointed Inspector of Dominion Forest Reserves in the Railway Belt of British Columbia, with Mr. S. H. Irwin as his assistant; Mr. Irwin will also make inspection of lands to be included in forest reserves in the upper country.

On the east slope of the Rockies Mr. J. R. Dickson, for some years forest assistant in the Riding Mountain Forest Reserve, in Manitoba, has been appointed supervisor of the Crowsnest Forest Reserve, with headquarters at Pincer Creek, and will have as his assistant Mr. C. McFayden.

On the Bow River forest reserve Mr. T. W. Dwight is at present acting supervisor in the absence of the supervisor, Mr. A. Helmer. Mr. T. G. Edgar has been assigned to the reserve as forest assistant.

Mr. G. H. Edgecombe is supervisor of the Brazeau reserve, and Mr. R. M. Brown is forest assistant for the reserve.

Mr. W. J. Vandusen is at present assisting Mr. W. N. Millar, Inspector for Alberta.

Mr. L. R. Andrews has been appointed forest assistant on the Riding Mountain reserve, in place of Mr. J. R. Dickson.

Mr. F. K. Herchmer has been appointed Inspector of Forest Reserves for the province of Manitoba.

The list of officers of the Canadian Society of Forest Engineers for 1912 shows no change from that of 1911, all the officers being re-elected. The list is as follows:—

President—Dr. B. E. Fernow.

Vice-president—R. H. Campbell.

Sec.-treas.—F. W. H. Jacombe.

Executive Committee—H. R. MacMillan and Ellwood Wilson.

Mr. H. R. MacMillan has accepted the position of Chief Forester of the Department of Lands of British Columbia.

Mr. R. D. Craig, formerly Inspector of Dominion Forest Reserves, is now in business in Vancouver, engaged in buying and selling timberlands and making forest surveys for private owners.

Mr. A. Knechtel, Inspector of Forest Reserves, visited Fredericton, N. B., in April, as representative of the Forestry Branch, spending the week from April 4 to April 10 in examining the timberland belonging to the University of New Brunswick, in company with Prof. R. B. Miller, and conferring as to the policy to be adopted in the treatment of the tract. As a result of the conference, a forest working plan will be prepared and a strip survey has already been started as a preliminary to this. Studies for volume and yield tables will be prepared next fall on tracts adjoining the property, and thus the cutting of the University's forest will be rendered unnecessary. A trail will be cut along the boundary at one side of the tract; certain necessary cleanings and thinnings have already been begun.

Kenneth R. Machum, of the junior class of the U. of N. B. forestry department, is working with the forestry branch of the Canadian Pacific Railway's new department of natural resources.

Prof. R. B. Miller, of the University of New Brunswick, in a recent newsy letter to the Editor, gives interesting notes of activities in the Maritime Provinces. An important part of his spring's programme has been the supervising of a plantation of 15,000 Norway spruce seedlings on land belonging to the Rhodes Curry Co., at Little River, N.S. The stock used was three-year-old transplants, strong and hardy stock, secured from Ostermann & Sons, Germany. A tract of some ten acres was laid off in a burned area and all debris removed. A fire guard will be plowed around the plantation and a fence erected to keep out the deer. He also supervised the planting of several hundred ornamental trees on the summer estate of Mr. N. Curry, of Montreal, president of the Canadian Manufacturers' Association, at Tidnish, N. S. Work in prospect at the time of writing included a summer camp on the college lands for a short time, followed by the oversight of a party of students making an estimate of 3,000 acres for private individuals in the province. After a short visit to Prof. Hawley and a party of Yale Juniors engaged in some timber-marking work near Woods Lake Siding, in the Adirondacks, New York State, for the International Paper Co., he will spend the summer at his home in Indiana. He considers the prospects of the forestry department decidedly encouraging.

Mr. R. R. Bradley, of the New Brunswick Railway and Land Co., will have a party of three U. of N. B. students with him this summer.

Mr. A. H. D. Ross will again spend the summer in the employ of the Canadian Pacific Railway Company as consulting forester.

Foresters now in British Columbia include Dr. Judson F. Clark, and Messrs. R. D. Craig, H. C. Wallin, A. S. Williams, L. Margolin, H. C. Kinghorn and P. L. Lyford.

Asa S. Williams, F.E., is British Columbia agent for the Allis-Chalmers-Bullock Co., manufacturers of logging machinery. Business seems to be pretty good, as he has just sold three more over-head skidders for Vancouver Island. Former ones have proved very successful in handling the heavy Coast timber.

Mr. Overton W. Price, former Assistant Forester for the United States, is now in British Columbia, acting as consulting forester for the B. C. government in the organization of their forestry department.

The United States took 63.8 per cent. of the mechanical wood pulp and 95.7 per cent. of the chemical wood pulp exported from Canada in 1909.

The fire at Porcupine is a repetition of the story that has become common wherever standing timber is still to be found. Some day there will be an official awakening to the need of real precautions.—Toronto Globe.