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Convention at Fredericton, Feb. 23rd and 24th.

At the meeting of the directors of the Association, noted in another part of this issue, it was decided to accept the invitation of the government of the Province of New Brunswick to hold a convention in Fredericton during the

present season. It has since been decided to hold the convention on Thursday and Friday, Feb. 23rd and 24th.

The regular annual meeting of the Association will be held in Ottawa March 10th and 11th, 1910.

The Nova Scotia Forest Survey.

The forest survey, or, rather, "reconnaissance," of the province of Nova Scotia (the inauguration of which was noted in the June issue of the FORESTRY JOURNAL) was proceeded with during the past summer, and satisfactory progress was made, those counties west of Hants being covered. Dr. Fernow and his four assistants succeeded in covering a total of about 8,500 square miles in this first season of the work, which will take another season to complete.

COST, OBJECT AND METHODS.

The low cost of the survey is a point especially noteworthy, the expenditure per square mile averaging less than twenty cents.

A high degree of accuracy was not aimed at, the object of the survey being rather to furnish approximately correct information regarding the character, extent and condition of the province's forest reserves. Such information, it must be observed, even though but approximately correct, is vastly more reliable than the haphazard guesses that have up till now been the expression of our knowledge of the extent and value of Canadian woodlands.

Five men were engaged in the survey and each was left largely to himself, a certain territory being assigned him

to cover by whatever means should seem best to him. In making investigation as to the timber, etc., personal inspection of the woodlands was supplemented by interviews with persons in each locality who knew the condition of certain parcels of timber. Much valuable information was obtained in this way, the lumbermen especially being very generous in giving information.

The survey plats of the Crown Lands Department, on the scale of two miles to the inch, were used as the basis of recording the forest survey. These were found only fairly satisfactory. Owing to the fact that no system of triangulation has been established, difficulty was found in tying new surveys to definitely located points. Moreover, the surveyors in the field frequently made "mistakes," such as locating the boundaries of a 100-acre grant of land to enclose an area of eight hundred acres. It was indeed, often found difficult to locate Crown lands at all, and much land shown on the maps as the property of the province did not exist.

POINTS NOTED.

The information gathered was, as far as possible, plotted on the maps in the field, colored pencils being used; numbers and letters were used to denote

different conditions. From these the information will be compiled and maps made on a smaller scale for publication.

Points usually ascertained were:—(1) the composition or "type" of forest; (2) the degree of culling; (3) the extent of burned areas; (4) the condition of reproduction; (5) the character of the barrens, the meadow lands and the farm areas within the timber country.

The forest land was divided into three classes:—(1) "severely culled;" (2) "partially culled," (where only from one-third to one-half of the timber had been removed), and (3) "virgin." Reproduction of conifers was noted as "good," "medium" and "poor."

As regards the composition of the forest, three "types" were recognized, namely (1) pure hardwoods, (2) pure conifers, and (3) mixed hardwoods and conifers. A mixture of 25 per cent. of either hardwoods or conifers was necessary to constitute the last-named type. Provision was made for a further subdivision of the areas into "sub-types" by recording the other species met with on any tract in the order of the frequency of their occurrence.

The original idea of securing information regarding soil conditions proved too troublesome to be carried out. In the timber country (generally speaking) not ten per cent. of the area is fit for farming; in some districts, however, meadow lands can undoubtedly be extended by the reclamation of marshes, bogs and swamps.

THE FUTURE OF THE FOREST.

To the forester the future of the forest is of paramount importance, and so it is gratifying to note Dr. Fernow's opinion on this point in a letter to the Western Nova Scotia Lumbermen's Association. "Although the data on reproduction and rate of growth are not yet collated," he writes, "it is safe to say that if the fires are kept out (and apparently with the present organization, further perfected, this may be done reasonably well) there is no difficulty in restocking by natural means the cut-over areas if not too severely culled. . . . In the pure hemlock-spruce stands all that is necessary is to remove the old hemlock thoroughly and cleanly to have the young growth of spruce, already established on the ground, take its place."

Reproduction of conifers is prolific, where not prevented by repeated fires, especially on abandoned pastures. Unfortunately two inferior species, namely, white spruce and balsam fir, take the lead. In the open white spruce beats red spruce, a slower-growing tree. In old timber the red spruce forms over ninety per cent. of the growth and reproduces well, especially under hemlock.

The white pine is rare. In Shelburne county there is a large area, burned over about ninety years ago, which is grown up almost entirely with white pine, and has for some time been logged. The timber, while merchantable, is not very desirable.

"As to the rate at which young growth attains merchantable size," Dr. Fernow further observes, "erroneous notions seem to be abroad. While the white spruce on abandoned pastures grows at an astonishing rate into a knotty rampike and occasionally makes a saw-log in sixty years, the forest spruce grows at a much slower rate, and may not average a twelve-inch tree in less than a hundred years."

The three important conifers, viz., pine, spruce and hemlock, were found to be to a large extent confined to particular localities. Annapolis County, for instance, may be called the "hemlock" region, as this species forms 60 to 70 per cent. of the stands. Shelburne County and part of Queen's are largely pine country, while Digby is a spruce county, seventy-five per cent. of this species often occurring in the stand of timber.

MAILING LIST CORRECTIONS.

The mailing list of the Canadian Forestry Association publications has been rearranged and brought down to date. In a list of this size a number of errors necessarily creeps in and some of these were rather annoying to members whose Journals or other publications were delayed or went astray. It is hoped the new list will obviate this, and every effort has been made to have it correct. Any member who finds that his name or address is not correctly given on the revised list will confer a favor by dropping a line to the Secretary giving the proper address. The matter can now be attended to without further delay.

The Spruce Budworm.

BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST,
EXPERIMENTAL FARM, OTTAWA.

In the annual report of the Division of Entomology of the Dominion Experimental Farms, covering the injurious insects of the year 1909, it is purposed to give a rather lengthy account of the injury done in Canada to spruce and balsam trees by the Spruce Bud-worm, *Tortrix fumiferana*, Clemens, during the past summer. As this report will not be published until the end of the present fiscal year, it has been thought advisable here to make a short statement of the work of this insect, dealing particularly with the ravages wrought in the Upper Gatineau country of the Province of Quebec.

In July last, the Deputy Minister of the Department of Agriculture was informed by the Hon. Senator Edwards that an insect of some kind was doing much damage to spruce and balsam trees in the above district, and as a consequence I was instructed to proceed at once to the infested locality to investigate the outbreak.

Early on the morning of July 29th, therefore, I left Maniwaki, Que., in company with Mr. M. Boyle of the W. C. Edwards Company, and drove to Baskatong about 40 miles due north. Around Baskatong the injury to spruce and balsam was very apparent, owing to the conspicuous reddening of the tops of the trees. Early the following morning we left Baskatong and spent the whole day examining trees at different points.

As soon as the first tree was cut down we saw at once that a lepidopterous insect had been at work. Thousands of the empty pupal cases of the moths were present on the trees, and these, with the partly eaten and discoloured dead foliage, together with the excrement from the caterpillars, gave the conspicuous reddish appearance to the tops of the trees.

The injury for this year, of course, had stopped before the time of our visit. The caterpillars had evidently become full-grown during the first and second week of July. Moths which had issued some days before the end of July were present in large numbers on the

trees, and from fairly good examples collected, I saw that the species was *Tortrix fumiferana*, Clemens, which is known popularly as the Spruce Bud-worm.

The caterpillars had fed chiefly at the tops of the trees, although some injury was done towards the ends of many of the lower branches. The foliage for about four or five feet from the tops of the infested trees was almost wholly destroyed, being either partly or completely eaten by the caterpillars. This, with the exposed pupal cases above referred to, gave the trees the conspicuous reddish appearance, and caused the rather widespread report among lumbermen that the trees were dying. In looking over a valley on the opposite hillside, the trees appeared as if fire had swept through the region. Other than loss of foliage and the consequent setback thus caused, the trees did not seem to be seriously injured. The tops were perfectly green under the bark.

The outbreak of the Spruce Bud-worm this year has been most remarkable and very widespread. Not only has this insect done much damage all through the Upper Gatineau country and other adjacent districts, where there are large tracts of spruce and balsam trees, but even in British Columbia reports have been received of much injury by the *Tortrix*. Dr. C. Gordon Hewitt, Dominion Entomologist, when in British Columbia in October last, saw the conspicuous work of the insect and received reports from local entomologists concerning its ravages.

The Spruce Bud-worm, when mature, is nearly an inch in length, tapering slightly from the middle to the end. In colour it is dark brown and bears conspicuous whitish-yellow piliferous tubercles, and along the sides of the body there is a yellowish stripe. The eggs of the insect are scale-like and are deposited in clusters overlapping each other. The partly-grown caterpillars pass the winter among the terminal shoots of the trees, completing their growth the following year.

The moth expands about seven-eighths of an inch in width when the wings are spread. In colour it is dull gray, the fore wings overlaid with bands, streaks and spots of brown. In the middle of the upper margin of the front wings there is a rather large conspicuous whitish spot. In British Columbia, this year, the moths were of a distinct reddish colour, but all the eastern specimens noticed were of the gray form.

When an insect attacks forest trees, as the Spruce Bud-worm has done during the past summer, it is, of course, impossible to do anything in the way of applying remedial treatment, such as

is done for leaf-eating insects when attacking orchard or ornamental trees. Fortunately an outbreak of such a nature, however, is generally attended by natural parasites, which sooner or later restore the balance of nature. From observations made, and from parasites reared in the Division of Entomology from material collected in the Baskatong district, we have reason to hope that the Spruce Bud-worm will not next year continue to any serious extent its work of destruction. Undoubtedly, too, birds will help materially to reduce the numbers of the hibernating caterpillars.

The British Columbia Timber Situation : Two Remedies.

(The JOURNAL presents herewith two views of the British Columbia timber situation, both from foresters of high reputation and recognized ability. Both these experts agree in recommending the modification of the royalty or stumpage dues. Prof. Roth suggests that, instead of an arbitrary tax on all timber alike, a proportion of the real stumpage value of the logs be levied; Dr. Clark would base the tax on the f. o. b. value of the mill product. In both cases what is plainly aimed at is to make the dues proportionate to the actual value of the wood.

As regards the licenses Prof. Roth emphatically advocates not only the non-extension of the present licenses but the complete abolition of the license in its present form, the transfer feature of the licenses being especially objectionable. Dr. Clark aims only at the modification of the terms of existing licenses, and, from the standpoint of the bona-fide investor and holder of timberlands, seems to have a good case.

Both are agreed that the reduction of taxation on licensed land is imperative, if forestry methods are to be introduced. It is interesting to note Dr. Clark's suggestion that the high ground rent is a method of paying for the timber on the instalment plan. Both agree that no general cutting regulations should be laid down, as, on account of widely varying conditions, a set of regulations which would suit one tract

of forest land would be altogether unsuited to another.

Prof. Roth's views are taken from an article in the "Vancouver World," while the expression of opinion credited to Dr. Clark is taken from his testimony before the provincial Forestry Commission).

PROF. ROTH'S VIEWS.

Prof. Roth, who is the head of the department of forestry at the University of Michigan, gives a short summary of conditions in British Columbia as below, and then goes on to give his suggestions for a remedy of existing evils. He writes in part as follows:—

BRITISH COLUMBIA CONDITIONS.

- (1) The bulk (probably 80 per cent.) of all good forests of the province are held under license.
- (2) The greater part of these licenses are new, less than ten years old.
- (3) The men who now hold the timber limits paid but a small sum for them; they have not bought the merchantable timber, let alone the property.
- (4) It is fair to assume that they can easily log off enough timber to well repay them for what they paid, even within the 21-year limit and with present rental and royalty.
- (5) Most of the limits are held not to saw timber to supply an eager market, or help develop the country; they are held on speculation. Nearly every

cent that the speculator makes the people of British Columbia lose. These limits were picked up as real nuggets. The search for them was a "stampede," many of the men who located them never planned to develop them; the very spirit and object of the policy and law is lost.

(6) The province gets a high rental, over 20 cents an acre, and gets a stumpede if timber is cut. Thus this stampede has led to a large revenue for the province, and one which looks very tempting to a district which has waited a long, long time for "development."

(7) The holders of limits are rapidly "bonding," mortgaging, selling and

THE REMEDY.

Any modification of present legislation should consider both the people and the holders of licenses. Legislation and the practice under the law should be fair and just to the holder of a license; it should fully consider his rights and equities; it should carefully determine his real investment and what should constitute a fair return on this. But it should also consider the real owner of the forest, the people; it should consider the people's rights and equities and it should not be misled into fallacies by certain vicious practices which have established themselves in the timber license business.



Cedar Forest along the Columbia River, B.C.

(Photo by E. Stewart)

trading. They are selling and pawning the property of the people. Their investment is a trifle; the people's property enormous. They are selling the merchantable timber of the forest on a rapidly rising market. They have changed a mere permit into a deed; the custom and practice of the Government sanctions this. They are selling timber they never bought. A man looks a section of land with twenty million feet of timber, he puts down a stake, pays a few clerical fees and then turns around and sells this twenty million feet of timber, which he does not own at all, at \$20,000 to some corporation. And this practice the province sanctions in its present law.

(1) How far are the people—the province—to-day the owner of the forest? and

(2) What can and should the people do to safeguard their interest, both in the marketable material and in the growing forest and in the forest land?

These two questions should form the first criterion of any measure suggested.

On the whole, it would seem clear that the ownership question is already beginning to be a mooted one; the law claims the title of everything to rest in the people; the limit holder speaks of the limit as his property and his investment.

As to the development of the forest as a property, the rental and royalty,

there can, of course, be but one honest position.

The people have a right to demand that the timber be honestly paid for; that the forests be used decently and not be devastated and destroyed; that the growing material be given a chance and that the land continue to produce. In fact it is a moral duty that the present generation make these demands in the interest of the country and the children to come.

Keeping these conditions in mind a few changes may well be suggested:

(1) Refuse any extension of time or life of license for the present.

(2) Modify the rental, make it a variable one, and suit the rental to actual conditions of the limit. The rental was originally intended to be a preventive and a spur. It should prevent "dog in the manger" business and stimulate active development. Retain this form of rental. But in remote districts, where it is practically impossible and undesirable to do anything with the timber under present conditions, make the rental an easy one. On the other hand, for other limits, where an income is had or can and should be had by fishing, hunting, resort business, or where the logging should be started and development stimulated, raise the rental. Once logging development is well started the object for this rental falls away and it may well be reduced to a minimum. Ten dollars per section for remote limits and up to \$300 for those well in position and in need of development. Such a plan is just as feasible as ordinary assessment of property. Probably 95 per cent. of all property is assessed on very superficial knowledge and investigation. Let the same suffice in this case and give the holder a chance for an honest hearing before competent men. In all cases hold the rental low and never allow it to become a club which drives the axeman on to work and to cut timber prematurely.

(3) Modify the stumpage dues or royalty. Mr. A. has a lot of timber. He gets \$12.00 per thousand feet, board measure, for his logs, and it costs him \$6.00 to log and deliver them. The real stumpage value of this particular tract at present is \$6 00 per thousand feet.

Mr. B. has a limit. He gets \$10.00 per thousand feet for his logs, and it costs him \$7.00 to log. His timber has a stumpage value of only \$3.00 per thousand feet.

Is it reasonable and good business that A. should pay only 50 cents when B. has to pay the same fee? Make the royalty, a certain part, say, 25 per cent., of the real stumpage value of the logs, as indicated by the above examples. Then Mr. B. pays 75 cents and Mr. A. pays \$1.50 per thousand feet. Moreover, if Mr. A. has a market for the poorer quality of logs and can only make 50 cents per thousand feet, he would still log this stuff and save it. for his fees would only be 12½ cents on such stuff.

This system might still be safeguarded by a certain minimum price on a certain quality of logs as criterion. Thus it might be specified that the fee cannot be less than 50 cents on logs of a certain kind and size and quality. In any case the province would retain the right to say what is market price and would not be dependent entirely on a recital of the interested man.

(4) Put into every license the requirement that the forest property be used in a reasonable way and one which shall insure to the real owners—the people—the safe continuance of the growing forest. But do not try and prescribe and give detail rules how this should be done. The so-called "selection" system, the use of a "diameter limit," etc., are all very well, but it would be the sheerest nonsense if one would try to prescribe the same treatment for a body of yellow pine or lodgepole in the Kootenay country as is prescribed for a body of Douglas fir (red fir), cedar, spruce and hemlock on the Coast. In fact, the forest is complex, and, even on the same limit, one would want to vary the methods. On the other hand, good sense and good will are quite sufficient (if properly backed up by supervision) to prevent devastation and destruction and to guide any good timberman (and they are all experienced and knowing men) in so removing his timber and in so cleaning up that the young trees are allowed to live and grow. This may be a bit crude at first, but if a proper penalty is prescribed and, what is better still, if it is applied, the forest will soon

show the good effects and timber-butchery will become a past tradition. Of course, there will be the "practical" man who opposes any measure which does not cheapen logging, but the government has, for its chief reason of existence, the wielding of the power of the people for the good of all the people, and should be able to wield it in this case. A reasonable use of the forest, no clearing without reproduction of young trees in a reasonable time, no wasteful logging, no great slashes as menace, reasonable care in cutting and removal of logs, to prevent undue destruction

the price of British Columbia timber and its forests.

(5) But most important of all: Abolish the transferable license. Make it impossible for any man to sell or buy a license; cancel the license whenever a man joins another, enters any combination, corporation or deal, unless he is willing to handle his limits as a separate and distinct business. And never issue any more licenses at all; but replace them by a simple form of contract for variable periods, each case resting on its own peculiar conditions. Such a law may seem harsh at first,



(Photo by J. R. Dickson, May, 1909.)

High Stumps left in some British Columbia Logging, an Example of Wasteful Lumbering.

of the forest, employment of a few good men to act as inspectors to see that these requirements are lived up to—these are some of the measures that must be enforced if the forest is to be perpetuated. Give the officer power, moreover, to call the holder into court and show cause, whenever his work is too bad.

"But this will interfere in our logging and disable us in our competition with the men in the States."

The men in the States hold their timber in fee simple. If they want to destroy it, let them. It will only help

but in fact is not so at all. It is well known that the bulk of licenses in British Columbia are young; that they have cost the present owners but little, and that even within the 21 years the holder can easily remove enough timber to repay himself well. To the bona fide limit-holder, who intended, in any case, to develop the limit in keeping with the spirit of the license law, to him this change would mean practically nothing. If he should die, his heirs would be allowed to continue. To the locator, and usually the purchaser No. 1 or No. 2, it would mean little; their invest-

ment is nil as yet, and but little development would return them their few dollars. The man whom it would hit most is the speculator in limits, the man who is allowed by the present system to gamble with millions of the people's property without paying for it. He would have to settle down to business in keeping with the spirit and intent of the license law and make his money (and it would be good money, too) in a way slower than gambling.

That this change would lead to an immediate "slaughter" of the forest is not necessarily true at all. The people, in their government, have ample power to prevent this by raising the stumpage or by direct prohibition of wasteful and destructive cutting.

The claims that the lumber industry would receive a serious backset, that "development" is stopped, that roads, towns, etc., etc., would not be built, may be true in part. But it will be a very small part only. These "nugget hunters" did not come until prices warranted their coming. The men who will build mills and do business will come whenever there is money in the lumber business. This will depend on prices of the large markets, which in turn are in no wise affected by the license and its character.

Give the real lumberman his timber, all he wants of it, and at a price where he can make money, but prohibit all future gambling through the transferable license.

The transferable license is class legislation and has worked in favor of few and against the many. The small logger is crowded out, monopoly has taken his place. The transferable license has led to "stampede," "nugget hunting" location, to a premature boom-claim business with all its gamble and mischief. The transferable license has given to aliens as well as citizens the property of the people by the millions of dollars.

The transferable license has perverted the license system, and has worked in the direction of complete alienation of forest property. The license is a permit and the transfer power has made the permit into a deed.

The transferable license, like the unwise and premature selling of timber lands in the United States, has been

largely responsible for much of the forest destruction, the robbing of our children and the devastation of our land. It will do the same for British Columbia that it has done for Ontario.

The transferable license has complicated the license to a point where not only the ownership of the forest but even the proper regulation of the business of the forest is largely prevented.

It has tied the hands of the people and prevents them from asserting their moral duty.

The transferable license is at the root of all evil in the disposition and the management of the Canadian forest. It should go.

DR. CLARK'S OPINIONS.

Dr. J. F. Clark, formerly Provincial Forester for Ontario, has, since entering the lumber industry in British Columbia, taken a position of prominence and his opinion, coming from one who is a trained forester and is likewise familiar with business conditions in the province, carries considerable weight. Part of his evidence before the Forestry Commission is as follows:—

THE TENURE OF LICENSES.

The limited tenure feature of timber licenses is, in view of the large amount of timber to be sold, a direct and most powerful incentive to wasteful logging and also utterly prohibitive of any forestry practices on the part of loggers. Twenty-one years is too short a time for a logger who is looking to the future to plan for future crops of trees, and hence that term prohibits forestry measures so far as he is concerned. So far as the logger who cares nothing for the future of the forest is concerned, he could have no objections to a limited tenure, provided there was a harmonious relation between the timber to be cut, the markets available and the time allowed in which to cut it. When the tenure was fixed at twenty-one years there were but a few hundred sections under license and future development in this line were not and could not have been foreseen.

A failure to bring the time limit on licensed timber into harmony with the amount of timber so licensed would inevitably result in the embarrassment of all logging and lumber manufacturing enterprises by forcing a chronic state of

over-production; but more serious and more permanent would be the loss sustained by the province as a whole by the irreparable damage it would bring to the forests themselves and to the provincial forest revenues.

My suggestion for remedy I quote from the "News-Advertiser's" report of my address before the Canadian Club last autumn.

"Let the license-holder be given the option for a period of, say, ten years of renewing his license as per the present law, or of converting it into a license renewable from year to year without time-limit, as now obtains on Dominion lands, with the provision that the logging, whenever undertaken, be conducted in conformity with plans approved by the Provincial Forest Department. Special and reasonable provision must, of course, be made for the clearing of timber from lands suitable for and actually needed for agricultural settlement."

THE LICENSE FEE.

Foresters are everywhere agreed that next to the fire the greatest enemy of forest conservation is high annual taxation. High taxation places a premium on hasty and uneconomical logging, with a view to the abandonment of the land after it has been stripped of whatever has any market value at the time.

The British Columbian case is complicated by the fact that the high license fee is essentially a method of paying for the timber on the instalment plan, and cannot now be changed without unfairly discriminating in favor of the licensee, desirable as such a course might be from the standpoint of forest conservation. It is a matter in regard to which we, as a province, have started on the wrong tack, and we will have to pay the price.

Provision should, however, be made for the reduction of the annual license fee to a nominal rate on all cut-over lands, whether under lease or license, which are logged according to plans approved by the Forest Department, in order that operators may find it good business to log carefully and otherwise care for their cut-over lands with a view to returning later to cut a second and succeeding crops of logs.

How impossible it would be for lumbermen to hold cut-over lands for

second crops of logs with any hope of profit under the present taxation will be appreciated when it is recalled that an annual tax of \$140 per year for thirty years amounts (at 8 per cent. compound interest) to \$16,600 in thirty years; \$40,180 in forty years; \$86,600 in fifty years; \$191,940 in sixty years; and it takes fully fifty years to grow a lumber tree even in British Columbia!

THE ROYALTY.

The royalty is capable of being adapted as an ideal method of forest taxation. The royalty as at present collected has two defects, viz.: (1) It bears relatively more heavily during seasons of low prices than when prices are higher, and (2) assesses as high a rate on the comparatively worthless top-log as on the log which gives a large proportion of flooring or finish. A royalty assessed as a per cent. of the f. o. b. value of the mill product is not subject to either objection. For example, if the royalty rate be 3 per cent., the royalty payable on all low-grade material averaging \$10 per thousand at the mill will be but thirty cents per thousand, while the royalty on flooring and finish will average between \$1.00 and \$1.50 per thousand. This would tend to encourage the utilisation of low-grade logs. Thus, too, a falling of prices will bring with it automatically a slight lessening of the cost of production, while an improvement in prices will bring automatically an increased revenue.

As the values of forest products increase in price from time to time, it is right that the provincial treasury should reap increased revenues. A per cental royalty on the value of the product gives this earned increase automatically in large measures, though the provinces should ever reserve the right to increase the per cental rate should increased stumpage values call for such a course.

CUTTING REGULATIONS.

The adoption of general cutting regulations, having in view a reproduction of the forest, applicable to all licenses or even all licenses in any given district, is not desirable. Forest conditions vary indefinitely even within small areas and efficient cutting regulations can only be prescribed for particular tracts after

examination by competent persons on the ground. Minor regulations having in view the utilisation of all merchantable material felled, can, of course, be applied to all lands.

A FOREST SERVICE.

As regards a provincial forest policy, permit me to suggest the desirability of having at Victoria a thoroughly efficient Forest Service. Let the men in charge be thoroughly trained and practical men and be free to carry out a consistent and farsighted forest policy, unhampered by the vicissitudes and exigencies of party politics.

PROTECTION OF THE FORESTS FROM FIRE

is not only the corner-stone of all forest policy, but is the whole foundation of practical forestry. Forest fire patrol—for the prevention rather than the extinguishing of fires—is the forester's insurance. The present patrolling system should be greatly extended. All fire rangers wearing badges should have the power of a constable to arrest without warrant, and head rangers in all out-of-the-way places should have the powers of a justice of the peace for the enforcement of penalties under the Fire Act. The cost of the fire service might very properly be divided between the license-holder and the province.

The problem of disposing of the



Effects of Forest Fire in British Columbia.

debris incident to logging operations is essentially a problem of fire protection and is as yet an unsolved problem on the Pacific Coast on both sides of the International line. The United States Forest Service is conducting extensive experiments along this line, but has reached no definite conclusion. I suggest that the provincial government make a modest appropriation for the purpose of determining the practicality and cost of burning the brush under local conditions. Such investigations are properly within the province of the government, and the information gained might be of the greatest value to the lumber industry and to the public. Certainly no intelligent legislation can be formulated along this line until we have definite knowledge gained by experiment both as regards its practicability and cost.

Forestry in New Brunswick.

By LT.-COL. T. G. LOGGIE.

¶ The receipts from the territorial revenue for the past year have been the largest in the history of the Province. Improved methods in the collection of the stumpage is principally accountable for this increase. No change was made by the Government in the tariff rate of \$1.25 per thousand superficial (board) feet for spruce and pine. New regulations were adopted, having for their object a more economical mode of cutting and a lessening of the fire danger, as was also a more systematic manner in the collection of the stumpage dues.

The regulations now call for the use of the saw instead of the axe in the felling of lumber and sawing the tops up into lengths. It has been estimated that a gain of at least six per cent. will be added to the quantity of the timber so cut in comparison with the old system. The regulations also provide for the under branches to be lopped off so that the tops may rot by lying flat on the ground.

Portable mills are only allowed to be set up and used on crown lands with permission of the Surveyor-General

under regulations providing for fire danger.

Forest fires, caused by excessive drought, raged through the province during the first week in June and much valuable timber, both crown and private, was destroyed. The number of fires reported to the department by the fire wardens totalled sixty-six and the damage was estimated at \$40,000; 161 square miles of ground were burned over. One hundred and twenty-three fire rangers were on duty during the year and each ranger had instructions to call out a sufficient force to fight these fires. In addition to this force 68 fire wardens were specially commissioned to patrol the lines of the Transcontinental and Intercolonial Railways now building and 70 fishery wardens were appointed to protect the angling waters.

It is proposed to introduce legislation to make the fire laws more stringent by enacting that no fires can be set during the dry months for clearing lands without permission in writing from the forest warden.

The forest lands of this province are fast falling into the hands of United

States citizens and a large portion of these lands are being exploited for pulp. The government regulations require that no permit be granted where it is shown that spruce will attain a diameter measurement of 14 inches breast-high in 75 years. A large area has been examined to enable the Department of Crown Lands to pass upon the applications made. It is proposed to introduce legislation during the coming session looking to the prohibition of the export of pulp wood, thus compelling this lumber to be manufactured in the province into paper on the same lines as adopted by the provinces of Ontario and Quebec.

A step in advance has been made with regard to applications made under the Labor Act for actual settlement. Lands are now first examined, and if 50 per cent. is not found suitable for agriculture the application is not accepted.

These reforms are in a large measure due to the representations made by the Canadian Forestry Association.

Fire Protection on Forest Reserves.

BY ABRAHAM KNECHTEL, Inspector of Dominion Forest Reserves.

This article is written to indicate very briefly some of the measures being taken by the Forestry Branch of the Department of the Interior to guard the Dominion Forest Reserves against fire. The idea is too prevalent among forest officials that their duty to the woods in this respect ends with the establishment of a fire patrol. Forest patrol is necessary to instruct and caution the public in regard to the use of fire, but when a fire occurs the patrol is unfortunately usually somewhere else; or he finds himself unable to do anything to put the fire under control. As will be seen, the department is using some other means, and is constantly seeking new means to reduce the destruction of the woods by fire.

GENERAL DESCRIPTION.

The Dominion Forest Reserves number twenty-six. Manitoba has six, with

an area of 2,288,160 acres; Saskatchewan, four with 473,600 acres; Alberta, six with 6,209,280 acres, and British Columbia ten, with 1,467,800 acres. The total area is 10,800,840 acres.

These reserves have been set aside by parliament with a view to conserving the timber thereon, and have been placed under the management of the Forestry Branch of the Department of the Interior. It is the intention of the Department that upon these areas shall be worked out improved methods of forest management which may afterwards be applied to the great forest domain of Canada. The work has several main lines, fire protection being the chief.

FOREST PATROL.

The reserves are constantly patrolled by forest rangers. These are permanent officials. In summer it is their chief

duty to prevent and extinguish fires. They prevent fires by posting along roads and streams and around lakes and ponds cloth notices which state the law in regard to fires. They also call upon the farmers and caution them in regard to the use of fire, and warn hunters and fishermen to be careful with camp fires, wadding from the guns and lighted matches.

Then these forest rangers extinguish fires that start in the woods. Sometimes they can extinguish the fire without any assistance, but in case they cannot do so they warn out the farmers or villagers, who are obliged by law to obey the summons, and the rangers direct them in fighting the fire.

During the danger periods, which occur usually in spring and fall, the forest rangers are assisted by temporary fire rangers. These are appointed by the Forestry Branch upon the recommendation of the forest rangers. Each forest ranger and fire ranger provides himself with a horse.

BURNED GUARDS.

To prevent prairie fires from coming into the reserves, the forest rangers burn the grass along the boundaries wherever such a measure is practicable. This is done after the snow is off the grass-land, but before it is out of the woods. Railways burn the grass and other debris along the right of way, under the immediate supervision of the forest rangers. Such burning needs to be done at the right time. Otherwise there is danger of setting fire to the woods.

PLOWED GUARDS.

In arable ground along the boundaries, and through the reserves wherever it is considered advisable, plowed fire guards are made. In making these guards a strip is plowed eight furrows wide; and four rods distant from this on the danger side another strip, four furrows wide, parallel with the first is ploughed. These strips are disc-harrowed in the spring and fall just before the danger periods. The grass strip between the guards is burned when it can be done with safety. This double guard is used as a line from which to back-fire when the forest ranger sees it necessary.

FIRE ROADS.

Roads are made around the boundaries and through the reserves. These are located so that, when a fire occurs on the reserve, men can be promptly transported to it. Moreover, these roads make it possible for the rangers to patrol the reserves more thoroughly, and also allow the settlers an easy means of getting out the timber. When it is deemed advisable, such roads can be used as lines from which to back-fire. Where these are made through poplar woods they need attention every year, as the poplars sprout readily from the root, and, if not kept down, will soon make the road impassable.

SETTLER'S SLASHINGS.

The forest rangers supervise timber cutting so as to lessen as much as possible the danger of fire. Settlers are instructed by them to cut the trees low so as not to leave stumps more than a foot high; to take out of the woods all parts over four inches in diameter of every tree cut; and to cut the branches so that they will lie flat on the ground.

SPARK ARRESTERS.

It is the duty of forest rangers to see that railway engines passing through or near forest reserves are properly equipped with spark arresters. These are not placed in or over the smoke stack, as many suppose, but are bolted to a framework in the forward extension of the boiler. To examine the screen it is necessary for the engineer to remove the front plate of the boiler. This can be done conveniently only at divisional points.

CLEANING THE FOREST FLOOR.

As opportunity affords, forest rangers are required to clean up the forest floor. Dead tree trunks and branches lying around on the ground greatly endanger the forest. Without this material the forest would hardly burn. Grass and leaves will carry fire through the woods, but unless the trees are small they will not be killed. Fire in rotting logs and brush will give heat enough to kill the largest trees. On the Turtle Mountain and Spruce Woods Reserves in Manitoba, on the Moose Mountain Reserve in Saskatchewan and on the Cypress Hills Reserve in Alberta, the removal

of wood by the settlers is restricted to this dead material, the taking of green timber being prohibited, until the forest is clean of dry logs and brush.

GRAZING.

The Department encourages grazing on the forest reserves and the removal of hay therefrom as a means of reducing the danger of fire. On every reserve

there are grazing areas and hay lands among the timber. In some places there is a dense growth of long grass and peavine. This, when dry, offers fuel for fire, and, when the fire gets into it, it is almost impossible to check the flames. Moreover, cattle going to water from the pasture lands make paths, which, though small, offer some resistance to fire and give lines from which to back-fire.

Some Manitoba Tree Claims.

In the course of the proceedings of the forestry convention held at Regina in September last a resolution was offered suggesting that the homestead laws be amended so as to provide for the granting of a homestead in return for the planting and successful cultivation in forest trees of a certain proportion of the quarter section.

The idea called forth some discussion, and among other points attention was drawn to the fact that action similar to that suggested had already been taken by the Dominion Government, but without much success.

It was in 1876—considerably over thirty years ago—that certain clauses were inserted in the Dominion Lands Act having reference to "forest tree culture" claims. These clauses provided that any person, male or female, of eighteen years of age or over could make entry for a quarter section, or other area of land, after paying the usual fee of ten dollars. Six years were required to elapse after the date of entry before a patent could be issued. One-fifth of the land applied for was to be planted with trees, that area amounting, in the case of an ordinary quarter-section, to thirty-two acres.

In the case of an entry for a quarter-section (160 acres) eight acres had to be broken and prepared for planting during the first year, the same amount during the second year and the remaining sixteen acres within the third year. Eight acres must be planted to trees during the second year, an additional eight

acres during the third year and the remaining sixteen acres within four years from the date of entry. Trees were to be planted not less than twelve feet apart each way. Cultivation of the trees up to the end of the six years from date of entry had also to be shown.

If less or more land than 160 acres were applied for, the areas specified above were changed to correspond.

These clauses remained in the act with some slight amendments until 1883, when they were dropped.

Only seven patents were ever taken out under these provisions. One of these was near Cartwright, Man., the remainder are within a few miles of Morden, Man.

During the past season Mr. A. P. Stevenson, of Dunston, Man., acting under instructions from Mr. R. H. Campbell, made an inspection of a number of these plantations.

The best of these was found to be that on the north-east quarter of Section 28, Township 3, Range 5; this is now owned by Dr. McConnell, of Morden. The plantation consists of aspen and Balm of Gilead trees, and is six acres in extent. The trees average about forty feet in height and $4\frac{1}{2}$ inches in diameter at two feet above the ground. Originally the trees were spaced eight feet apart each way, but as the young shoots and suckers were never cut out, the number of trees has increased until they now stand at an average distance of five feet apart each way. The soil is a moist sandy loam.



Photo by A. Mitchell, 1908

General View of old Tree Claim Plantation near Morden, Man.

Two of the other plantations situated in the vicinity of Morden are also reported as doing well. In one of these aspen alone was planted; in the other aspen and Balm of Gilead in about equal numbers. Where poplar alone was used (in a plantation of four acres) the average height attained, on moist sandy loam, was 39 feet, average diameter at two feet above the ground $5\frac{1}{2}$ inches. The trees here were set four by twelve feet apart, and all the young shoots and suckers kept out.

In the other one of the plantations referred to the trees had, on the average, reached a height of 35 feet, and an average diameter of four inches. The trees were originally planted ten feet apart each way. The number has since increased and they now number about

2,700 to the acre. No suckers were ever cut out. The Balm of Gilead appeared to have made the better growth. This plantation consisted of eight acres of sandy loam soil.

A fourth plantation, eight acres in size, on high sandy land, contained aspen trees only, originally set four feet apart each way. Here the average height was only 28 feet, and the average diameter at two feet above the ground $3\frac{1}{2}$ inches. This lot has been for years used as a sheep pasture, and to this fact is attributed the comparatively poor showing it makes.

On the fifth claim all trees had been ploughed up and the ground planted to wheat.

Electrification of B. C. Railways.

(A LETTER BY MR. CECIL B. SMITH, C.E., TORONTO.)

One of the members of the Canadian Forestry Association residing in British Columbia wrote, asking if in view of the great destruction of timber by fires started by locomotives it would not be advisable to electrify the railways in that province, considering the large amount of waterpower now running to waste. The question was submitted to Mr. Cecil B. Smith, C.E., the well-known engineer and authority on hydro-electricity, who some years ago prepared a report on the electrification of the Timiskaming and Northern Ontario Railway for the Ontario Government. Mr. Smith's reply is as follows:—

"The electrification of any steam railway system now operating over a wide area, with its attendant standardizing of equipment and operation, is a serious step for a management to consider.

"The difficulties of handling mixed traffic, including freight, by electric locomotives have been largely surmounted, and we may consider that this will be so perfected in the near future that a railway company may select direct current, three phase alternating, or single phase alternating as the method of propulsion with equal assurance of satisfaction, it being assumed that, acting on the advice of its engineers, the company has selected the type best suited for its special conditions.

"It may be in general assumed that there must be strong inducements to cause a change to be made in the equipment of a well-established system. This inducement may be of the nature of an expected growth of business with which electric operation can best cope. The question of smoke ordinances or smoke in long tunnels may be a governing feature; or again, a dense suburban traffic may demand a remedy. On the other hand, a moderate traffic under standard conditions will not justify electrification unless coal is quite expensive, grades excessive, and water-power electric energy available at a low rate and from assured sources.

"The success of electrification in Europe has induced great activity there in this direction. In Italy, Switzerland, Bavaria, and Sweden the governments

are expending large sums on the electrification of old lines, construction of water-power generating stations, and construction of new electric lines which handle all kinds of traffic with great satisfaction. Three phase and single phase alternating currents are both used.

"In America the interurban electric is extending its sphere and its competitive influence, and in addition we have the examples of the great systems expending millions on the electrification of the New York district; and in the West the Cascade Tunnel (three-phase) and the Spokane and Inland Railway (single phase) show the tendency of the times. In Canada very little has been done beyond the use of direct current operation of city and suburban lines—which are only developed to a modest degree. The Sarnia tunnel (single phase) is a partial exception, and was forced on the Grand Trunk by a serious accident and the order of the Railway Commission. The Ontario Government considered electrifying the Timiskaming and Northern Ontario Railway from North Bay to Englehart at a time when conditions were formative and the time opportune. The traffic now handled would have fully justified the step, and the only reason apparent for abandonment was timidity. The added steam equipment now owned, and the turning over of its best adjacent water power to private parties make the question now more difficult, but not impracticable. It is to be hoped the Government will still act in this matter and cease hauling coal from Pennsylvania at a cost of \$6 per ton delivered at Englehart.

"In British Columbia, it is true, there is apparently a large amount of water power available, but aside from some of the few large rivers, such as the Kootenay and the Columbia, the water-powers of the interior of British Columbia are not attractive as they are chiefly glacier-fed and run very low in the midwinter season. On the Kootenay, even with its enormous storage areas, the low water flow is quite moderate. On the other hand coal is

moderate in cost and widely distributed, and traffic is light except in the mining district at Grand Forks.

"The special applications most evident are that the C.P.R. should electrify its heavy grades and tunnels on the main line at Field and in the Selkirks and also electrify its mining branches in the boundary district. By using the

three-phase system and having these districts tied together, securing recuperation on the down grades, a well-balanced consumption of power might be obtained. Outside of this there does not appear any evident application of electrification of railways in British Columbia at the present time—aside from suburbans at Vancouver and an interurban in the Okanagan Valley."

Quelque Notes sur le "Douglas."

PAR D. CANNON.

J'ai planté un Douglas, un seul malheureusement, en 1875.

Acheté en pépinière, déjà petite pyramide formée, il devait avoir alors au moins six ans, ce qui lui ferait maintenant 40 ans d'existence. Placé, isolé, dans un coin de ma terre très aride et stérile, ou il m'est impossible de faire pousser la moindre herbe, il a subi, indemne : d'abord une terrible sécheresse persistante en 1876, qui a tué une grande partie de mes plantations de pin sylvestre; ensuite, et encore à l'état de jeune sujet à bois tendre, les froids destructeurs de 1879-80; et plus récemment, les atroces sécheresses de 1893, 1900 et 1906. Aujourd'hui il a environ 16 mètres de haut et 2 mètres de circonférence à 1 mètre 30 du sol, et il n'accuse encore aucun symptôme de perte de vigueur ni de ralentissement de croissance. On ne peut pas dire: "Ex uno disce omnes," mais cet exemple de rusticité me semble frappant.

Depuis 1883, j'élève en pépinière des plants de cette variété, et toujours au grand air, sans abri après la première année; quelquefois une gelée intempéste pince les pousses encore tendres des jeunes plants, mais ils refont bientôt leurs têtes. A ce propos, par parenthèse, je pense que l'opinion du besoin d'ombrage pour les jeunes plants de certaines essences est souvent exagérée; comme exemple, nous cultivons en Solonge, sous un climat plutôt dur que tempéré, l'épicéa et même le sapin en plein soleil depuis la deuxième année; nous en perdons quelques plants, mais pas en proportion excessive, et les survivants doivent gagner en rusticité à être exposés à toutes les intempéries.

Pour revenir à mes Douglas, j'en ai planté çà et là en nombre considérable. En sable frais ils poussent superbement; en massif avec d'autres résineux qu'ils ont vite dépassés ils ont déjà de 16 à 18 mètres de haut et de 0 m. 80 à 1 m. 10 de circonférence. Leur plantation date de 1889; élevés de semis, ils avaient probablement alors 5 ou 6 ans, ce qui leur donnerait 25 ou 26 ans d'existence.

D'autres, plantés dans des vides ou des pins maritimes et sylvestres avaient succombé à la maladie ronde, accusent quelques pertes que je ne m'explique pas très bien, mais que j'attribuerais plutôt à une sorte d'empoisonnement du terrain qu'à la sécheresse du climat; ce serait probablement l'effet d'un champignon inconnu. Je ne puis pas m'en plaindre, car c'était vraiment tenter la Providence que de planter des exotiques sur des sols où crèvent les résineux indigènes.

D'autres Douglas, plantés aux expositions du midi et du couchant, en bordure de massifs composés pour la plupart de pins sylvestres existant antérieurement et dont les racines traçantes affament le terrain pauvre et sec, se comportent vaillamment; je n'en ai pas perdu un seul, et leur croissance, quoique inférieure à la normale chez cette variété, dépasse bien celle de toute autre espèce dans les mêmes conditions. Tous ou presque tous les sujets décrits ci-dessus ont subi les grandes sécheresses et chaleurs de 1893, 1900 et 1906.

Il serait téméraire de conclure, d'après ces exemples, que dans de mauvais sols les Douglas conserveraient la même vigueur jusqu'à un âge avancé, surtout

en massif pur, serré, ou chaque pied dispute à son voisin sa pitance d'eau et de nourriture; mais il me semble très probable qu'en sol de fertilité moyenne, même en tout sol non calcaire, capable de fournir un taillis passable, cette variété, en mélange avec d'autres espèces peu exigeantes, surtout feuillues, présente de grandes chances de succès même sous un climat peu humide. Sans médire de la variété glauque, sur laquelle les expériences de M. Jolyet sont très intéressantes, je préférerais la verte dans la plupart des cas, sa croissance, beaucoup plus rapide, promettant une production à brève échéance, le rendant digne d'essais sérieux. Je dis: essais, car il ne faut pas oublier que le Douglas, variété verte ou glauque, n'a pas encore pu faire ses preuves de longévité en France, comme l'ont déjà fait d'autres exotiques, par exemple le Cèdre du Liban, le Cyprès de Louisiane, le Pin Weymouth, qui nous montrent çà et là des sujets séculaires de toute beauté. Mais il y a tout lieu d'espérer que le Douglas vert rendra toujours, en sol convenable, un produit rémunérateur; car, même jeune, son bois a souvent été trouvé de bonne qualité.

J'oubliais d'observer que dans les clairières de taillis dont traite M. Jolyet, sa croissance très élançée lui permettrait, plus tôt qu'à une autre espèce, d'affranchir sa tête et d'échapper à la concurrence des rejets, qui en s'allongeant, surtout par les années pluvieuses et grande croissance, pourraient menacer de le dominer et d'exiger des frais de dégagement.

Arrivons maintenant à la question de la résistance du Douglas au froid.

M. Pardé, d'après ses observations au Domaine des Barres, constate que le Douglas (le commun évidemment, car il traite ensuite de la glauque comme de sa variété) "est excessivement rustique." Il existait aux Barres avant 1879-80 : *Ancien Catalogue*, 1878, p. 43. Je présume donc qu'il y a résisté aux plus grandes froids, qui furent, aux Barres, de -32° ? (L. Pardé, *Arboretum des Barres*, p. 5).

Le livre de Baltet (*Action des Froids sur les Végétaux en 1879-80*), qui constate que dans l'Est cet arbre a gelé à -28 ; en quelques localités, est en effet un ouvrage remarquable et précieux, mais il aurait été un guide plus sûr s'il

avait pu constater l'âge des sujets observés en chaque cas; car un jeune arbre à bois encore tendre pouvait succomber tandis qu'un plus âgé résisterait. Comme exemple de ce fait, je puis observer que, pendant le terrible hiver, j'ai perdu la plupart de mes pins laricios de Corse, âgés de 7 ou 8 ans, tandis qu'aux Barres ceux qui dataient de 1823, et qui vivent encore, résistaient au froid polaire constaté plus haut. Le retour, dans un espace de 200 ans, d'une calamité due à tant de circonstances réunies; intensité exceptionnelle du froid; sa durée exceptionnelle; clarté exceptionnelle de l'atmosphère, est extrêmement peu probable, et dût-il arriver, je crois que le Douglas ne le craindrait qu'à l'état de tout jeune pied, dans lequel cas il ne perdrait que quelques années de son existence.

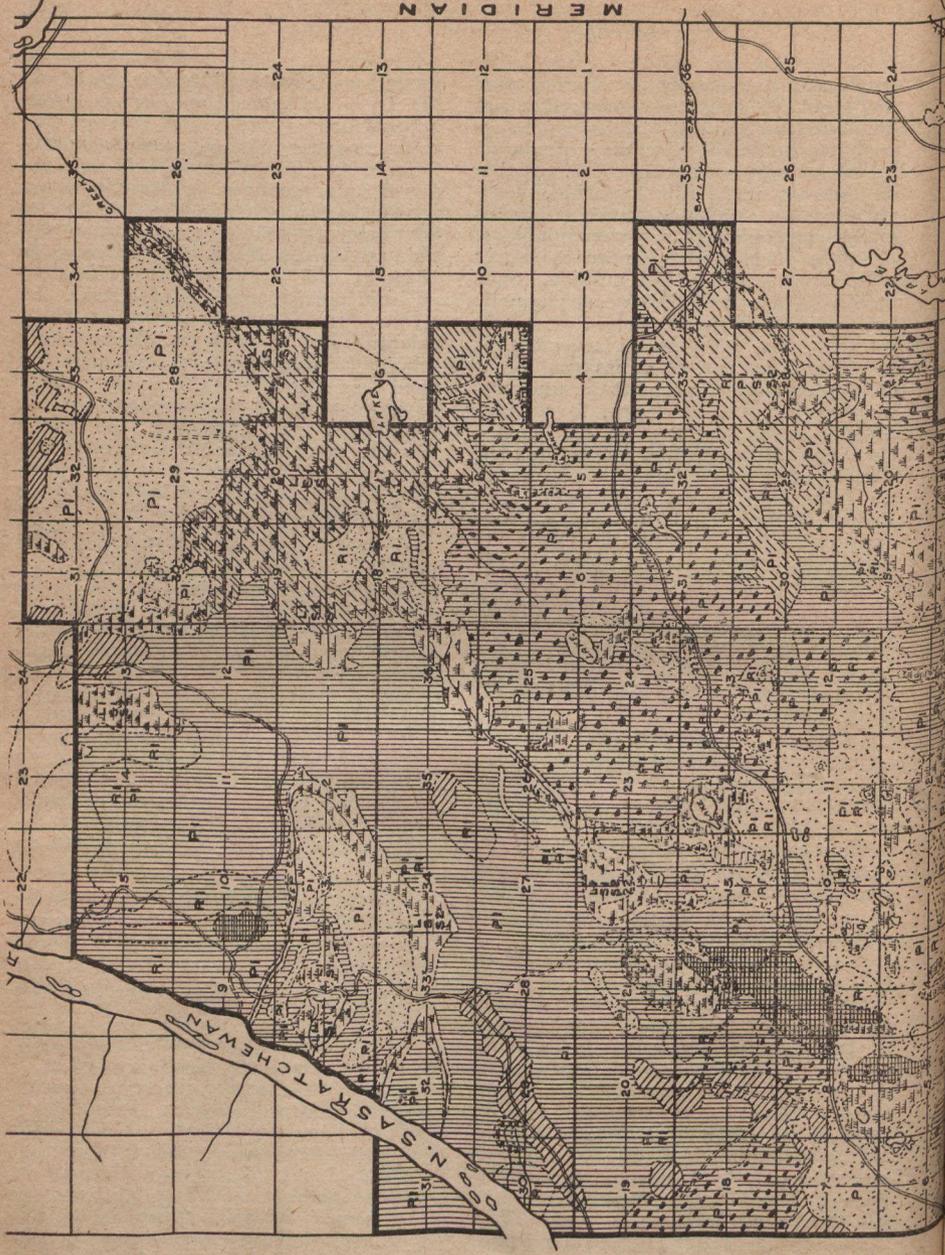
Et encore cela n'arriverait que dans certaines localités exceptionnelles.

En même temps que l'article de M. Jolyet, paraissait dans le Bulletin de juin de la Société forestière de Franche-Comté une étude importante, très documentée, sur le Douglas, de M. Barbey, expert forestier suisse. Elle fait surtout l'éloge de la variété type seule, dont le développement aurait été observé avec suite en Allemagne, en Belgique et en Suisse; partout, même en sol médiocre et sous les climats rigoureux, sa croissance aurait donné des résultats remarquables. Je cite, de la page 119 du Bulletin:

"En 1878, John Booth livra des brins "de Douglas âgés d'un an qui furent repiqués dans une bâtardière du Sach-ernwald; puis plantés en 1881 sur "terrain graveleux plus ou moins silico-argileux."

Suit un tableau de comparaison entre le produit de cette plantation et celui d'une même étendue de terre plantée en même temps d'épicéas. Résultat, en 1906, à l'âge de 25 ans, sur o. h. 235: Douglas, 95 m³, 65, estimés 1000 marks; Epicéa 45 m³, 65, estimés 360 marks; supériorité du Douglas en qualité comme en volume. En effet, même jeune, son bois aurait de la valeur. D'après Booth, "le bois du Douglas le plus mauvais "équivalait à celui de l'épicéa et du sapin, "tandis que celui de première qualité "est presque aussi bon que celui du "mélèze."

TP. 48

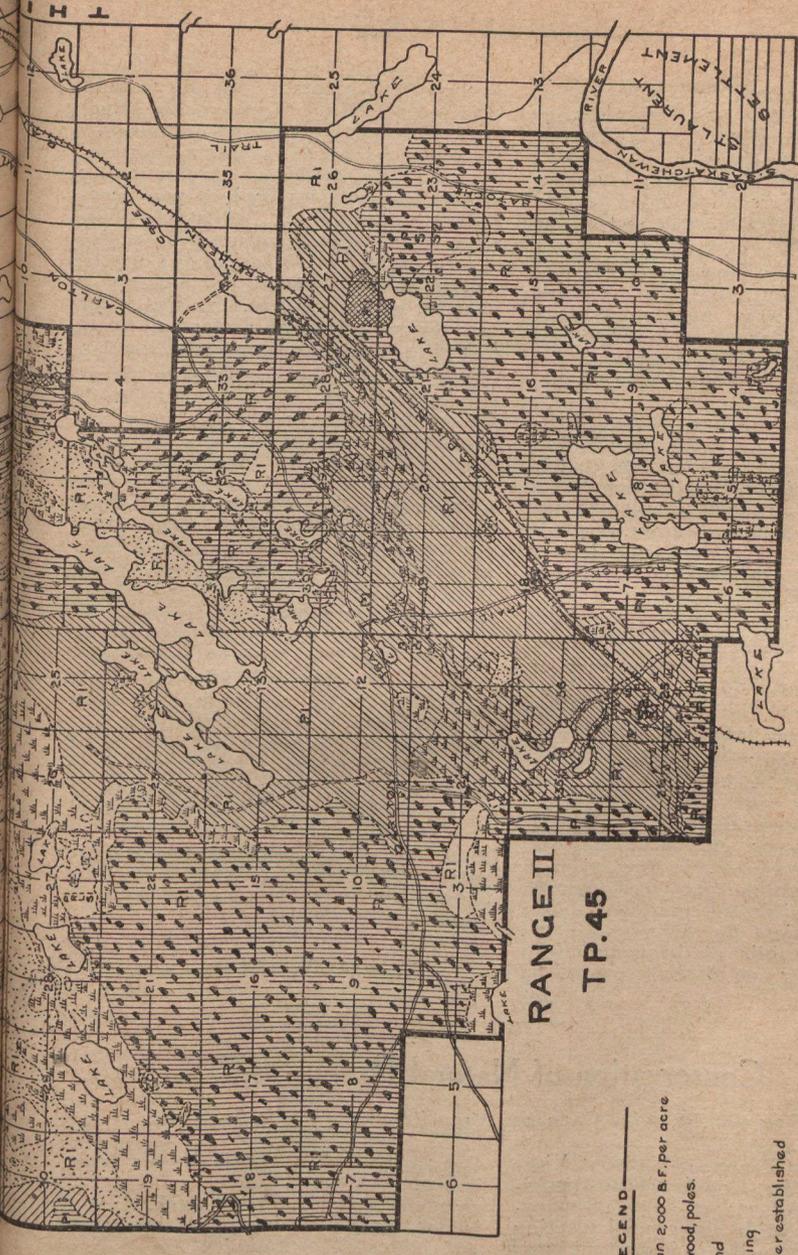


TP. 47

M E R I D I A N

TP. 47

TP. 46



RANGE II

TP. 45

RANGE I

- LEGEND**
- Timber less than 2,000 B. F. per acre
 - Woodland, cordwood poles.
 - Prairie grassland
 - Burnt, not restocking
 - Burnt, forest cover established
 - Old cutting 1/3 to 1/2 merchantable timber removed
 - Old cutting 1/2 to all of merchantable timber removed
 - Boundary line for classifications
 - Burnt scattered trees

SYMBOLS FOR TREE SPECIES

- PI - Pinus divaricata - Jack Pine
- RI - Populus tremuloides - Aspen
- S1 - Picea alba - White Spruce
- S2 - Picea nigra - Black Spruce
- LI - Larix americana - American Larch

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Les plants formant ce massif avaient supporté, âgés de 2 ans, les gelées de 1879-80, sous le climat de la Prusse, plus rigoureux que le nôtre. M. Barbey, d'ailleurs, qui a étudié un grand nombre d'auteurs forestiers allemands, ne cite aucun cas de pertes de cette espèce par les froids, et page 121 il observe :

"Notons que les Douglas de Freising (près Munich) ont supporté, comme ceux des Ardennes, une température de 30° centigrades. Sous le rapport de la résistance à la gelée, il nous semble que nous pouvons nous déclarer satisfaits."

Viola qui est concluant à l'égard des gelées d'hiver; et l'arbre répare très facilement tout dommage que peuvent lui faire celles d'automne et de printemps, auxquelles nous sommes exposés ici depuis septembre jusqu'en juin; atteintes, d'ailleurs, que je n'ai amais constatées que sur les sujets âgés de moins de 10 ans.

Le Douglas, il est certain, ne doit pas être planté dans des sols très calcaires; je l'ai vu languir sur le coteau crayeux de la Loire, près Tours, où prospèrent merveilleusement les cèdres, le sapin pinsapo, et le pin laricio d'Autriche.

M. Jolyet observe très judicieusement que notre arbre ne doit pas être cultivé en massif pur, serré. Outre qu'il n'a pas fait ses preuves de durée en cet état, outre les raisons culturales qui demandent le mélange, la rareté et la cherté de sa graine, par conséquent la production limitée et le prix élevé de ses plants, rendraient de tels peuplements difficiles à établir et beaucoup trop coûteux. Pour une plantation nouvelle

je conseille toujours à ceux qui veulent bien me consulter d'espacer très largement le Douglas, à 4 mètres en tous sens par exemple, soit 625 plants à l'hectare, dépense très modeste, garnissant les intervalles avec les espèces peu accaparantes, communes. Ces espèces pourraient être, selon la nature des terrains et des climats: le pin laricio de Corse, le mélèze, le pin Weymouth; le chêne, le charme, le bouleau, etc.: voisins qu'on pourrait supprimer ou recéper au fur et à mesure du développement du Douglas.

Ici, comme l'a constaté aussi un sylviculteur du Luxembourg, M. le Comte de Villers, cet arbre, jeune, est continuellement attaqué par le chevreuil, qui l'écorce en s'y frottant pour faire ses bois. Cet animal sent une attraction malheureuse pour tout jeune résineux poussant dans un espace clair, par conséquent autour duquel il peut tourner, et qui en même temps étant flexible donne un contact assez doux à la peau couvrant ses bois, très sensible. C'est donc un ennemi redoutable du repeuplement des clairières, et il montre pour le Douglas une affection toute spéciale. Un de mes amis s'est avisé de suspendre une petite clochette aux rameaux de chaque sujet qu'il avait planté, et leur bruit a fait fuir le chevreuil; mais ce moyen n'est pas d'application générale. A défaut du Douglas, le chevreuil se rejette avec le plus de goût sur *Abies balsamera*. Serait-il attiré par l'odeur des rameaux de cette espèce, très agréable comme ce le de la frondaion du Douglas?

D. CANNON.

Les Vaux, La Ferté-Imbault (L.-et-C.)

Conservation of Natural Resources.

BY WILLIAM PEARCE, CALGARY, VICE-PRESIDENT FOR ALBERTA.

Mr. William Pearce, of Calgary, Vice-President of the Canadian Forestry Association for Alberta, made all preparations for attending the special meeting at Regina, but owing to important business unexpectedly arising at the last moment he was unable to go. He had prepared a paper, however, and sent it forward to the Secretary, by whom it was included amongst the papers of the

Convention. A synopsis of this paper is given below.

In opening Mr. Pearce notes that it is not very flattering to an intelligent and educated community like that of North America when, after all the warnings of foresters and experts as to the waste of natural resources, it required a call from ex-President Roosevelt to fix public attention thereon. Fortunately

the first call to the people of the United States was followed by another, which embraced the whole of the continent, and is shortly to be followed by one embracing the greater part of the civilized world. It is anticipated that from these gatherings and from the information they disseminate much good will flow. Canada is to be congratulated that the Federal Government has taken action in this matter. The Canadian Forestry Association should bestir itself to lay before the new Conservation Commission everything affecting these resources, which it is the aim of the Association to protect.

Our water supply, whether for irrigation, industrial or domestic uses, or for navigation, depends for its proper regulation on our forests; the conservation of the moisture in the soil of our fields is aided by the preservation of the forests; our mineral wealth cannot be developed without timber, so much of which is used in our mines. Our forests in retarding the flow of water derived from the spring thaws or from storms prevent flood and erosion.

The principles of the Irrigation Act could with advantage be extended all over Canada and all matters relating to one subject covered in one Act. For instance, it has been held that the Act does not apply to waterpowers.

Mr. Pearce refers with approval to the address of Mr. George Otis Smith, Director of the United States Geological Survey, at the Irrigation Convention at Spokane. The people of Canada should know what the United States is doing to protect the public rights in the public domain, and Canada should be urged to take similar action. By an Order-in-Council of October 31st, 1887, the Government reserved to itself, in all the lands not alienated from the Crown, the right to the minerals throughout those portions of the Northwest Territories west of the Third Meridian. It would be well to extend that reservation to all lands controlled by the Dominion, and the provinces urged to adopt the same principle. Some of the provinces (Nova Scotia, at least) have, it is understood, always acted on it, so far as coal-beds are concerned. Mr. Smith at Spokane urged that the price of all lands disposed

of should be based upon the quantity and quality of the article sold, and Mr. Pearce holds that this should be applied to all natural resources. The proceeds of the sales of United States public lands are made available for the reclamation service. Canada will soon be in the position of the United States, namely, that the lands that can be reclaimed by private enterprise will be exhausted. Canada could therefore with advantage adopt the policy of the United States with respect to the area to be reclaimed by irrigation. There is in Alberta and Saskatchewan, south of the North Saskatchewan River, in addition to what will probably be benefitted by private irrigation enterprise, a large area of land which would be greatly benefitted by irrigation, and which when irrigated would at least quadruple the value of the non-irrigable portions.

The close relation of irrigation and forestry is noted by Mr. Pearce, and in this connection he states that he has burned several cords of wood cut out of a windbreak planted by himself less than twenty years ago.

Mr. Pearce has asserted for years that the people of Canada have been living in a fool's paradise, regarding their timber resources. This assertion he finds borne out by the evidence of Mr. R. E. Young, of the Department of the Interior, before the select Standing Committee on Forests, Waterways and Waterpowers, on April 6th, 1909. In his evidence Mr. Young stated that there was an astonishing lack of information about forests. Estimates of forest area run from 800,000,000 acres down to 100,000,000. His Excellency Earl Grey, addressing the Canadian Forestry Convention at Toronto in February, 1909, put the area at 354,000,000 acres which was perhaps the best estimate. But there was no doubt that Canada's area of merchantable timber was much smaller than that of the United States.

Mr. Young's evidence regarding the timber of the Northwest and Northern British Columbia is quoted by Mr. Pearce at considerable length, and Mr. Pearce states that Mr. Young's conclusions are more optimistic than his own, after having given attention to the sub-

ject for many years. Mr. Pearce in conclusion holds that the matter of creating public interest in forest conservation is the great one before the Canadian Forestry Association and the one to

which it should energetically address itself. He commends in particular the arousing of attention by sending frequent bulletins on forestry subjects to the newspapers of the country.

Patriotism in Forestry.

Dr. B. E. Fernow, Dean of the Faculty of Forestry of the University of Toronto, lectured before the Canadian Club of the town of Berlin, Ont., on October 22nd last on the subject of Forestry in Canada. There was a large and interested audience, presided over by the President of the Club, Dr. Honsberger. The speaker of the evening was introduced by an old friend, Mr. W. H. Breithaupt, C.E., who spoke of the need of reforestation to check the devastation wrought by floods on the Grand River. On the conclusion of the lecture a hearty vote of thanks was tendered to the speaker on motion of Mr. George Pattinson, M.P.P., for South Waterloo.

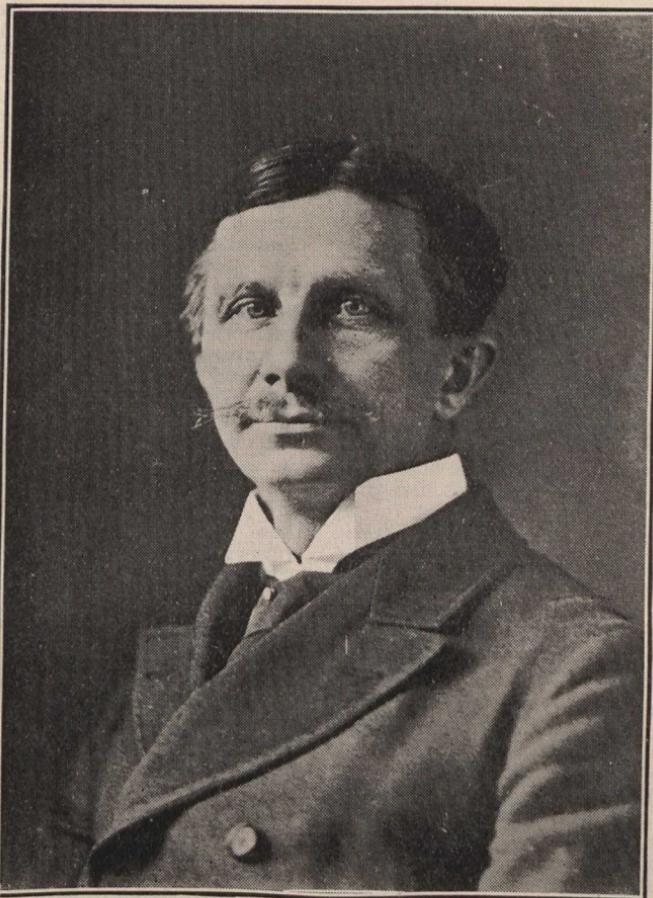
Dr. Fernow, speaking from a patriotic standpoint, showed that the three factors in the progress of a nation were men, natural resources and accumulated wealth or capital. Of these the most important was the first. Nations with great resources had sunk to decay because of lack of character, while others in lands poorly endowed by nature had become great by energy and foresight. Forestry was essentially a patriotic subject as it meant the leaving of natural resources in the best condition for future generations. The forest, because it produced an absolute necessity, wood, and because of its power of re-production and its effect on climatic and water conditions, was the greatest single resource of any country.

Two-thirds of the area of the eastern provinces was fit only to grow timber, and half of this would become unredeemable desert if allowed to be burned over and exposed to the sun, rain and wind. Of Ontario not more than one-third would ever be used for agriculture and the remaining two-thirds was in the rocky thin soil of the Laurentian plateau where the danger of its becoming a desert was imminent. Even of south-western Ontario two-fifths was unfit

for agriculture and should grow the fuel and some of the timber required, besides maintaining the stream flow and preserving favorable climatic conditions. Yet, important and vital as the maintenance of these conditions were, the Governments were doing almost nothing to guard the future.

What, asked the speaker, was wrong in the administration of Canadian woodlands? This question must be answered even if it suggested criticism of the present administration. But in fact it did not involve such criticism, only an apology; for the present administration had merely inherited the system of management under which it worked, and it was only natural that it should follow the line of least resistance and prefer, as long as it could be avoided, not to make radical changes, which in the end would be absolutely necessary.

It must be recognized that in matters of administration what was wrong to-day might have been right before; the system which was quite right at one time, answering the surrounding conditions, became wrong gradually as the conditions gradually changed; and before a change in the system would be attempted it must have become quite convincingly wrong. The timber license system of Ontario, under which the Crown retained ownership of the land and growing timber and sold only the mature timber fit for harvest, was a most ingenious device, which in the early pioneering stages could hardly have been improved upon, except for the abuses which had grown up around it but were not a necessary part of the system. Apparently inexhaustible forest areas needed to be made useful and a revenue derived therefrom, and to do so, capital needed to be attracted. Yet the land itself, at least as far as it was available for farming purposes, needed to be reserved for settlement. As long as mere exploitation of the surplus of virgin



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

timber and the opening up of the country was the object, this system worked well enough, although an unnecessary and undesirable liberality allowed the timber limits to be retained in the hands of licensees and their claims to be extended not only to the grown, but to the growing timber. Now, however, when it was recognized, first that the virgin timber supply was not only not inexhaustible, but near exhaustion, when there was no more need to force settlement, when there was no more difficulty to induce capital to embark in timber exploitation, when the revenue question was not any more

urgent, and the need of considering the future ought to be most prominent, the antiquated license system had become an evil, which should be excised or thoroughly reformed to permit a rational use of the remaining forest resource.

According to the reading of the licenses the Government had the right to change the conditions of the contract and impose new ones. While this would theoretically enable the Government to impose such conditions as would protect the future of its properties, prevent conflagrations and secure a satisfactory young growth, prac-

tically, and in equity, it would appear to be debarred from imposing conditions which would involve additional cost to the licensee who might not be the original contractor. It must, therefore, be realized that such changes could practically only be made by the government adjusting in an equitable manner any financial loss caused by changes of contract. Moreover, he was convinced that mere tinkering with the existing conditions would not satisfy the situation; a radical change of attitude and a radical cure was needed. This he believed could be brought about by the appointment of a Royal Commission which should ascertain the conditions and devise new plans in detail.

After expressing the belief that each province would soon have a bureau of forestry and expressing the hope that Canada would make progress like that of Germany, Dr. Fernow went on to refer to the work the Ontario Government was doing in the reforestation of

waste lands in Norfolk. There were at least 125,000 acres of such lands in Lambton, Norfolk, Simcoe, Durham and Northumberland, and while the beginning was a small one it was in the right direction and should be encouraged, and continued on a definite basis like the Prussian policy.

At the same time he made a comparison. Five thousand acres of replanted lands in sixty years when the timber was fit to cut would have cost \$187 per acre. On the other hand, if the Government would take five thousand acres of cut-over lands reforested by nature and place two men in charge it would cost in sixty years \$80 per acre. Thus the Government was spending twice as much to reforest waste lands as it would cost to take care of the natural timberland which is allowed to become waste. He hoped in conclusion that his words would stimulate them to help in devising means for the conservation of Canada's resources

New Diseases of the White Pine.

For some years past alarm has been felt in sections of the United States where white pine was growing as to a "blight" which has appeared on many trees of this species. Readers of the JOURNAL will remember the publication in the March, 1908, issue of a circular from Dr. Haven Metcalf, of the United States Bureau of Plant Industry asking for information regarding instances of the blight.

The present knowledge of the blight— or, rather, "blights," for several of these have been found—is outlined by Dr. Perley Spalding, of the United States Bureau of Plant Industry, in a circular on "The Present Status of the White Pine Blights."

In a short foot-note Dr. B. T. Gallo-way, Chief of the Bureau, writes some re-assuring words. "Comparatively few trees have been killed," he notes, "and timber owners should not become unduly alarmed, as the trees have in many cases already partially recovered from the blight. At present there is absolutely no reason known for cutting or disposing of thrifty young white pine

forests in which are scattering trees affected with the blight in any of its forms nor should work upon proposed plantations of this species be relinquished or postponed from fear of this trouble."

LEAF-BLIGHT.

Two forms of the injury, viz.: "leaf-blight" and "twig-blight," have been more or less widespread. In the former the leaves, or needles, died down for one-third or one-quarter of their length, measured from the free end (sometimes even to the base, with the result that the leaves fell off). The dead parts first become reddish and in two or three months fade to a dull brownish gray. The leaf-blight affects trees of all ages, from four years up, and occurs indifferently in thin or thick stands. The pine bears leaves of two different ages, as the leaves stay on for two years; either the younger or the older set of leaves may be affected. This form of blight was particularly prevalent in 1907.

After discussing various probable causes of the disease, the author con-

cludes:—"It is impossible to state definitely what is the primary cause of the leaf-blight, but it is probably closely connected with extreme climatic conditions which have prevailed during the past few winters."

The outbreaks usually begin about July 1st and vary in intensity from year to year. The leaf-blight may cause the death of affected trees occasionally in a single season, more often in two or more seasons, but even in the worst affected districts the number of trees killed outright bears a small proportion to the total number. No new trees became affected in 1908 and half of those that were affected in 1907 did not have their 1908 leaves touched by the blight.

TWIG-BLIGHT.

In 1908 the most common form of disease was a twig-blight. Of this there were three forms found. One form of this injury affected only small trees (usually less than ten to fifteen feet in height) and was common in Maine. In this form the injury was usually confined to the northern and western sides of the tree, the opposite sides being uninjured. This was apparently a real winter-injury: during the winter months a great deal of water was evaporated from the leaves, while the roots were frozen solid in the earth, and so were not able to absorb from the soil moisture to replace that taken from the leaves; hence the trees suffered. A small number of trees died through this winter-killing and others experienced a set-back, amounting to one, or, perhaps, two years' growth.

Another blight, found in New Hampshire and northern Maine, was apparently due to insects. Only lateral branches were affected, the leaders almost always escaping injury.

At Brunswick, Me., and sparingly in a number of other places, a twig-blight, due to a fungus (*Lophodermium brachysporum*) did some damage.

THE WHITE PINE BLISTER RUST.

A more serious disease and one that demands much attention and vigilance for its suppression, is the one just named.

The White Pine Blister Rust (*Peridermium strobis*) is one of the rust fungi (*Uredineae*). As is the case with other rusts, part of its development is made on one plant, after which spores are carried to plants of another kind, where the fungus completes its course. The first part of the life of the above rust is passed on the White Pine, after which it passes over to black and red currant plants, sometimes to gooseberries.

The period of growth on the currant is much shorter than that on the pine. The spores which are produced here appear in summer and autumn as an orange-colored powder. If these are carried by the wind to a white pine tree they may germinate and the plant body (mycelium) of the fungus establishes itself in the soft inner bark of the trees. No sign of the disease is noticeable the following spring, but during the summer after stem and branches often begin to thicken and swell. In the following spring the fungus breaks through the bark, and light orange-colored fruiting bodies (about one-eighth of an inch thick) appear. From these spores are emitted which, on reaching a currant bush, germinate and begin the round again.

The disease was discovered on stock imported by the New York State Forest, Fish and Game Commission from the nursery of J. Heins Sons, Halstenbeck, Germany, and was identified by Dr. Perley Spalding, of the Bureau of Plant Industry, United States Department of Agriculture and, later on, by others.

It was located in Vermont, Massachusetts and Connecticut.

A meeting of foresters (state and private) and others interested in the matter was held in New York and the problem discussed. It was decided that further importations of German white pine stock were undesirable.

The New York State authorities have adopted the following plan for fighting the disease:—

All places where it can be ascertained that Heins' white pine stock has gone during the past two years are to be inspected, and all currant and gooseberry

(Ribes) plants, wild and cultivated, within a distance of one hundred yards from any of these trees are to be destroyed by pulling up or cutting out, as necessary. These and all other infected or suspected plants are to be destroyed by burning. Cultivated cur-

rants and gooseberries are to be closely inspected, especially after July 15th, while suspected plantings of white pine are to be carefully inspected between May 10th and June 10th. These measures have already been put into force, and some effective work done.

A Year's Work in Federal Forests.

"The work of the Forest Service of the United States is spoken of in the highest terms of praise and with good reason, but it may be pointed out that, although the extent of Canada is not less than that of the United States, the forest service of the latter has an appropriation of \$4,640,000 and a permanent staff of over 2,000, while the Canadian forest service has an appropriation of \$100,000 and a permanent staff of about forty. If the Canadian people wish a service equally efficient with that of the United States, they must be prepared to deal much more generously with it than they do now."

The foregoing words form part of the introduction to the report of the Dominion Superintendent of Forestry (Mr. R. H. Campbell), which forms part of the 1909 report of the Department of the Interior, lately laid before Parliament. In addition to the forestry work proper the Forestry Branch has charge of the irrigation work and the national parks.

PROTECTION OF THE FORESTS FROM FIRE.

The main divisions of the forestry work carried on are the protection of the forests from fire, work on the forest reserves and work in tree planting on the prairies. At present the protection of the forests from fire is accomplished by means of rangers, who patrol their respective districts, discover and extinguish fires and warn travellers and residents of the danger of setting fires. While the season of 1908 was exceptionally dry and the risk from fire correspondingly great, few serious fires occurred on Dominion lands. The most serious fires were at Salmon Arm, Manson Creek and White Lake, in British Columbia, and in the valley of the Spray River in Alberta. For the British Co-

lumbia fire, squatters on timber berths were chiefly responsible and in one case carelessness on the part of a lumber company was a partial cause. For the Spray valley fire the carelessness of tourists was responsible. By the British Columbia fires 200,000 feet, board measure, of timber was destroyed and 10,000,000 feet damaged. The Spray valley fire burned about 3,000,000 feet of timber.

The total number of rangers employed during the season of 1908 was 82, as compared with 47 during the season of 1907. A special patrol was maintained along the line of the G.T.P. and no serious fire occurred there. Additional rangers were employed north of The Pas, in the country north of Prince Albert and on the Peace and the Great Slave Rivers. Despite this extension, however, there is the most pressing need of protecting the forests of the great Northern Forest Belt, a district reaching from Hudson Bay to the Rocky Mountains (a distance of 1,900 miles), and from 300 to 600 miles wide; there is also great need of the same along the many lines of railway projected into the northern country.

FOREST SURVEYS.

The need of a survey of this Northern Forest Belt is also dwelt upon. All this area is more or less forested and the forest is of great value for local consumption. While along certain lines of travel the country has been explored, large areas are entirely unknown and more definite knowledge of these is imperative in order to secure its proper administration and management. Mr. Campbell calculates that an exploration of this forest belt, similar to the one made in 1900 by the Ontario Government of the northern part of that province, could be made for \$200,0

an annual expenditure for ten years of \$20,000.

Timber surveys on the reserves were continued during 1908 and the survey of about 1,250,000 acres out of the 10,000,000 acres on the reserves completed. The results are rather discouraging, inasmuch as the reserves are found to be in poor condition as a result of fire and careless cutting. Plans of administration for the reserves, based on the results of these surveys, are now being prepared.

THE FOREST RESERVES.

A full list of the forest reserves, with their areas, dates of setting aside and other particulars is given in the report of the Inspector of Forest Reserves, Mr. A. Knechtel. The survey of the Riding Mountain reserve has been completed, and the results have been published as a separate bulletin (Bulletin No. 6, "The Riding Mountain Forest Reserve"). A reconnaissance survey of "The Pines" forest reserve near Prince Albert, Sask., was also made in the summer of 1908, the result of which is published in an appendix to the report (Appendix No. 2, Report of H. R. MacMillan, Assistant Inspector of Forest Reserves). Maps of the above reserves have also been published. Inspection was also made of a tract of some 200 square miles lying to the north of the Saskatchewan River, near Prince Albert, with a view to setting it aside as a forest reserve. A considerable extension has also been recommended to the Cypress Hills reserve, the value of which as a source of hay for the ranchers in the vicinity has been abundantly shown. An investigation was made of the forests of the Crow's Nest district in Southern Alberta, the result of which has been published as Bulletin No. 5 ("Forest Conditions in the Crow's Nest Valley, Alberta," by H. R. MacMillan, Assistant Inspector of Forest Reserves). Regulations for the manage-

ment of camping sites in the forest reserves and also for mining claims within the reserves have been prepared and are printed at the conclusion of the report.

TREE PLANTING DIVISION.

In the spring of 1909 over 2,500,000 trees were distributed from the Forest Nursery Station at Indian Head, Sask., to 2,010 applicants. The new applicants for trees to be delivered in the spring of 1910 number 2,235.

A new feature will shortly be introduced into the tree distribution by the distribution of coniferous trees, such as pine and spruce; this it is hoped to begin in 1911. The species distributed will be white spruce, jack pine, lodgepole pine and Scotch pine. It is hoped before long to add to these the tamarack or native larch. All applications for trees are now handled directly from Indian Head instead of from Ottawa as formerly.

DOMINION NATIONAL PARKS.

A list of the Dominion national parks is given, with a short description of each park, and the revision of the park regulations noted. The fence around Buffalo Park has been satisfactorily completed; it is seventy-four miles long, nine feet in height and composed of fourteen strands of wire. The St. Lawrence Park reservation, consisting of eleven islands and a small peninsula on the St. Lawrence between Brockville and Gananoque (formerly the property of the Mississauga Indians) is also administered by this department.

Fire notices have been printed in Cree and Chipewyan and a facsimile of that in Cree is appended to the report, together with a translation.

Copies of the report, as well as those of the bulletins referred to above, may be obtained free by addressing R. H. Campbell, Superintendent of Forestry, Ottawa.

Maps of Western Forests.

The Forestry Branch of the Department of the Interior has inaugurated and made some progress with the compilation of a forest atlas, which will be continued as the work of surveying the reserves and other forested districts ad-

ministered by the Forestry Branch progresses, thus furnishing adequate data for the maps. There have been already published a "legend" sheet and maps (in colors) of "The Pines" forest reserve in Saskatchewan and the Riding

Mountain forest reserve in Manitoba, both on the scale of one mile to one inch. The map of "The Pines" reserve was published some time ago, and that of the Riding Mountain reserve (in four sheets) is published as a supplement to the report of the Superintendent of Forestry for 1909. On pages 158 and 159 is shown a map of "The Pines" reserve, in black and white, on a much reduced scale, which will, however, give some idea of the general plan of the maps. Symbols are here used to denote burns, degrees of cutting, etc., instead of colors, as in the original maps. Tree species are

designated by a letter in conjunction with a figure. The annual report of the Superintendent of Forestry for 1909 is also accompanied by a map of the irrigated districts of Alberta and Saskatchewan, in eight sheets, on a scale of three miles to the inch, and a sketch map of the present and proposed routes of patrol in the Northern Forest Belt on the scale of 50 miles to the inch. The originals of all these maps were prepared in the draughting office of the Forestry Branch, under the supervision of the chief draughtsman, Mr. Geo. S. Proctor.

Hydrographic Survey of the Milk River.

BY L. GLEESON.

Closely related to the work of the forester in conserving and regulating the flow of streams is the work of measuring and distributing the available water so obtained, with a view to ensure its being put to the best and most economical use, whether for irrigation or domestic purposes or as the source of industrial power.

Such a work has been taken hold of by the Forestry Branch of the Depart-

ment of the Interior, and several parties were in the field during the past summer inaugurating the work of a systematic hydrographic survey. In this connection a short outline of the work of one of these parties will be of interest.

The actual work in the field began when the party, after two days on the trail from Lethbridge, pitched camp on the north bank of the Milk River at Milk River Station. The party consisted



Photo by P. M. Sauder, 190
Cable Car and Gauge Height, Elbow River, Alta.



Cable Car and Frame Complete.

Photo by L. Gleeson, 1909.

of four men, namely, Mr. Peters, the engineer, an assistant, a teamster and a cook, and the outfit consisted of two teams of horses, two wagons, two tents and a small but complete cook and camp outfit.

The work accomplished during the summer may conveniently be divided into two parts, each occupying about two months. The first consisted of a preliminary survey of the river, the second, the construction of the cable stations. The object of the preliminary survey was to discover the best possible and most convenient "sections" for

cable stations that the river afforded, to erect low-water gauging stations and to engage competent men to take daily observations on the gauge rod. When a satisfactory "section" has been found, a "bench-mark" was placed near the bank of the river, high enough to be out of danger of destruction by spring floods. Using this bench-mark as a starting point a line of accurate levels was run across the river, extending as far back as high water and flood indications could be found.

A gauge rod was then set up in the river close to the bank. This was made

firm by braces which were nailed to it at one end, the other ends being spiked to posts driven into the ground. A wire was stretched from post to post across the river and marked at intervals of five feet with tin hangers, upon which were marked the distances from a zero point. This point was generally taken on the face of the bench-mark.

Low water gauging stations of this sort were placed at eight places on the river; the first of these is situated close to the place where the river enters Canada, the last is about two hundred yards north of the International boundary near the spot where the river re-enters the state of Montana. A low-water gauging station was also placed at Sage Creek and elevations for cable stations were run at Lodge and Battle Creeks.

Cable stations were erected on the river only; these were seven in number. A bridge station was also established at Milk River Station. The length of the spans differed considerably, varying from 140 feet to 350 feet. The heights of the frames varied in a corresponding manner, from fourteen feet to twenty

three feet. A picture of one of the frames is shown. The timber for these was assembled right on the line of the section. A "deadman" was placed six feet in the ground and between twenty and thirty feet back from the frame. Around this the main cable was looped and then stretched over the top of the frames, across the river and around another "deadman" on the other side of the river. A turnbuckle was placed in the main cable at one end for the purpose of adjusting the proper sag. A smaller wire was simultaneously stretched to serve as a measuring wire and tin hangers denoting the distance from the zero point were fastened to it. Thirty feet upstream another smaller wire stretched across the river. The purpose of this wire was, by means of a cord, to hold the meter stationary and pointing up-stream, when the current is swift.

The erection of these stations was completed by the end of October after which the assistant and the teamster made a trip of inspection to see that all was in proper running order and leave everything in readiness for the district hydrographer next season.

The Forest Schools.

THE FACULTY OF FORESTRY AT THE UNIVERSITY OF TORONTO now has an enrolment of forty-three students, of whom twenty-four are new men. A number of these are graduates, some have spent a year or two in other faculties, others have been from two to six years in business; the average age of the student in the faculty of forestry is thus distinctly ahead of that of the ordinary undergrad. The six-year combined Arts and Forestry course is now in full operation, two men being in the third year of it and one man in the first. The library now numbers over 2,000 volumes and is free to all students.

At the beginning of the past term the three men of the senior class were, in response to a request for assistance, allowed to go to Maine where they were employed in forest survey work in connection with the estimation of damage

to forests alleged to have been done by locomotives of the Canadian Pacific Railway. Two of the junior class also assisted Mr. E. J. Zavitz in marking timber in Rondeau Park. One of the seniors has also been employed in doing survey work for the same lumber company which has employed several of the advanced men during the past two summers.

THE UNIVERSITY OF NEW BRUNSWICK has ten men enrolled in the Department of Forestry; four of these are in the senior class. Under Prof. R. B. Miller, the professor in charge, special attention is being given this year to the practical work of cruising and mapping timber. A couple of representatives of this school also took part in the work of estimating fire damage in Maine along with University of Toronto men and others. Fire patrol, timber cruising and similar practical work also occupied the

men of the department during the summer. Uncertainty of future employment for the graduates seems to be the chief hindrance to the enlargement of the department.

THE YALE FOREST SCHOOL has decided to make a distinct advance in its requirements for entrance. Certain courses now given at the school in botany and drawing will, for all students entering in 1911 and thereafter, be re-

quired for entrance, and the time now taken for them will be devoted to the extension of the technical work and advanced work in various subjects. After the above date graduates of the Sheffield Scientific School of Yale University will be required to take two years of graduate work in order to qualify for the degree of Master of Forestry, instead of being able, under certain conditions, to obtain the degree in one year, as at present.

Directors' Meeting.

A meeting of the Directors of the Canadian Forestry Association was held at 10 a.m. on Tuesday, December 14th, in the office of Mr. R. H. Campbell, Superintendent of Forestry, Ottawa. Mr. Southworth, of Toronto, President of the Association, occupied the chair and there were also present: Hon. Sydney Fisher, Messrs. E. G. Joly de Lotbiniere, and H. M. Price, of Québec. Que.; J. B. Miller, of Toronto; Gordon C. Edwards and R. H. Campbell, of Ottawa; Jas. Lawler, secretary, and F. W. H. Jacombe, assistant secretary.

Mr. R. H. Campbell reported for the committee appointed to engage a permanent secretary, reporting the engagement of Mr. Jas. Lawler for that office.

The Secretary presented his report for the period since his appointment in April; the report noted an increase in membership of about two hundred and seventy five, the membership of the Association being now somewhat over 2,250. The report also noted the work of preparing for and carrying through the Regina convention, and the work of lecturing at Port Arthur, Fort William and Kenora, and also the later tours as noted elsewhere in this issue; the total number of lectures and addresses so far delivered by the Secretary was twenty-one. A condensed report of the Toronto convention in French had been published and distributed; acknowledgement of assistance received in this work were made to Mgr. J. C. K. Laflamme, Senator Edwards, and Messrs. G. C. Piche, H. M. Price and E. G. Joly de Lotbiniere.

Much consideration had been given to the matter of making the FORESTRY

JOURNAL a monthly, but up to that time no decision had been arrived at. Grateful acknowledgement of aid rendered by President Southworth, Mr. R. H. Campbell and Dr. Fernow were made, and in this connection special mention and acknowledgement was made of assistance given by Mr. A. H. D. Ross, the former secretary of the Association, who had not only given great help to the present secretary in becoming familiar with the business of the Association, but had carried on all the secretarial work up to May 1st, 1909, and had supervised the publication of the annual report for 1909.

The assistant secretary also reported in regard to the newspaper bulletin service; four bulletins and other literature had been sent out, and the number of newspapers and other periodicals on the list now numbered over a thousand.

It was decided to hold the next annual business meeting in Ottawa, the dates, as provided in the constitution, being March 10th and 11th, 1910. The invitation of the Government of New Brunswick to hold a meeting in Fredericton was accepted, and a special convention will be held at that place on a date to be shortly determined. Notice of motion was also given to change the constitution (Clause VII) so as to provide that the annual meeting be held in Ottawa during February.

The President and Mr. Miller were appointed a committee to confer with the executive of the Canadian Lumbermen's Association with regard to a change in the time of the annual meeting. The latter body holds its annual meeting in the beginning of February;

many of the members of that association are members of, and deeply interested in the work of, the Canadian Forestry Association, and would like to attend the meeting of the latter, but find themselves prevented from doing so by the time at which the Forestry Association's meeting is held.

The matter of the Association's adopting a crest was brought up, and Mr. Joly de Lotbiniere was requested to interview an artist and have a design

for a crest prepared and submitted to the executive.

A resolution was passed expressing, on behalf of the Association, its regret at the death of Hon. W. T. Pipes, Attorney-General and Commissioner of Crown Lands of Nova Scotia, and vice-president of the Association for that province. As successor to Mr. Pipes, the lately-appointed Attorney-General and Commissioner of Crown Lands of the province, Hon. A. K. Maclean, was appointed.

The "Odd Lengths" Campaign.

A new movement in the direction of the conservation of the supply of timber has been started among Pacific Coast lumbermen in the United States. A very large proportion—practically all of these—have entered into an agreement to manufacture flooring, finish and other similar planing mill products in "odd" lengths, i.e., lengths measuring odd numbers of feet in length. Heretofore these have been manufactured only in even lengths, such as twelve feet, fourteen feet, etc. Under the customary way of using even lengths quite a proportion of the timber which came from the shaper was wasted, huge piles of such waste being a feature of the yards of many large mills.

The movement was launched at a meeting of the National Lumber Manufacturers' Association at Seattle, Wash., in July last. It is endorsed by the United States Forest Service as a move in the direction of the conservation of timber resources.

The Portland, Ore., office of the Forest Service recently made an investigation of the actual amount of timber wasted unnecessarily in restricting the manufacture of such material to "even" lengths and found it amounted to two per cent. of the planing mill product manufactured in Oregon and Washington from Douglas fir and other valuable species. It is estimated that fifteen million feet of high-priced timber can be saved annually in Washington and Oregon by adopting the proposal of using odd lengths. This amount of lumber would require the yearly growth on about thirty thousand acres of average timber.

The majority of British Columbia

lumbermen, it is said, also favor the movement.

Considerable opposition to this innovation has arisen among retailers and consumers. The retailer says that it is impossible for him to dispose of odd length material because of the common practice in the construction of wooden buildings, claiming that the initial saving of the manufacturer is transferred to the consumer. This is denied, however, because of the proportionally small amount of odd length material which will occur under the new system, and because of the latter-day practice of laying sub-floors of rough lumber and sheathing on the sides of the house before putting the finishing material in place.

NOTES.

No date for the proposed forestry convention has yet been fixed, but it is expected that this matter will be taken up when the Commission of Conservation meets, as per statute, in January.

The electrification of the lines of the National Transcontinental Railway in parts of Quebec and New Brunswick is coming to the front and a conference of officials from these provinces with officials of the road was held in Ottawa during December.

The Canadian Forestry Association has pleasure in welcoming to its ranks M. Chas. Guyot, Director of the Ecole Nationale des Eaux et Forêts, Nancy, France, who through the good offices of Mr. G. C. Piche, M.F., forester to the Department of Lands and Forests of Quebec, has become a life member of the Association.

Notes.

TIMBER
RESOURCES
OF THE
WINNIPEG
BASIN.

In a report by W. Thibaudeau, C.E., to the Surveyor General of the Dominion of Canada, reference is made to the pulp wood re-

sources in the drainage basin of the Winnipeg River in Manitoba. Mr. Thibaudeau reports as follows:—

"The drainage basin of Winnipeg River in Manitoba, exclusive of 10 miles on both sides of the Canadian Pacific Railway right-of-way, and exclusive of the farming lands, has an area of about 1,840 square miles, which added to the drainage basin of English River, in Keewatin, which joins Winnipeg River east of the boundary and covers an area of 9,500 square miles, forms a total of 11,340 square miles. Assuming about half this area to be covered by rivers, lakes and swamps, the balance, 5,670 square miles, or 3,628,000 acres, is forest, averaging 20 cords to the acre; this equals 72,576,000 cords of pulp wood, which is a conservative estimate. Assuming this to be equal to a supply for twenty years, it would allow a consumption of 3,628,800 cords per year, or about 3,000,000 tons of pulp, or 9,615 tons per day, which would require about 500,000 horse power to convert it into pulp.

"Within the area alluded to the proportion of pulp wood from my own observations and information gathered from many sources is about as follows: Poplar, 55 per cent.; spruce, balsam and tamarack, 25 per cent.; jackpine and a few white birch, 20 per cent. Poplar is found mostly along the rivers and lakes on the flats. As one goes inland spruce, balsam and tamarack take the place of poplar. Jackpine is found on rocky ridges. The present size of the timber is a growth of about twenty years. Outside the pulp area already described, but tributary to Winnipeg and English Rivers in Ontario, there are 12,000 to 15,000 square miles of the same kind of wood, existing under the same conditions, and which would average about the same per acre.

"To preserve the pulp wood industry it is imperative that stringent regulations should be adopted and enforced prohibiting the cutting of trees under

a certain size, say 3 inches in diameter. The owner of the timber berth should not be allowed to cut over the same area twice in twenty years, except in special cases. I saw only two places where the timber had been destroyed by fire. Although the country is rough, it would be easy to construct a railway logging road at a reasonable cost. Logging with teams would have to be done in winter owing to the swampy character of a portion of the ground."

A USEFUL
BOOKLET.

The Department of Lands and Forests of the Province of Quebec has lately issued a pamphlet entitled "A Treatise on the Protection of Forests from Fire," of which the authors are Messrs. W. C. J. Hall and B. L. O'Hara, Superintendent and Assistant Superintendent, respectively, of the Bureau of Forestry of that Province. The book is intended for distribution to forest rangers, the clergy, municipalities and others. After a short introduction treating of the necessity of the forests to a country and the uses of woodlands, the causes of forest fires, especially those along railways, are discussed. The prevention and fighting of fires are taken up, prominent topics being fire-breaks and back-firing. The use of telephones is noted with approval and short description given of the "Look-out Station" system as used in Maine. Full instructions are given to fire rangers. The progress of a fire is graphically described from an actual instance. A number of half-tone cuts make the booklet more interesting and attractive.

PROPOSED
LEGISLATION.

At the approaching session of the Quebec Legislature it is proposed to seek legislation (1) to require settlers to stop making flat slashings and instead to pile the timber to be burnt in rows or heaps, at least fifty feet from the forest; (2) to make it compulsory for all able-bodied men from eighteen to sixty years of age to assist in putting out a forest fire, when called on by a forest ranger; (3) to have the windows of all smoking cars on trains screened

so as to prevent live ashes, matches, etc., from being thrown out; (4) to require all industrial plants in the immediate vicinity of forests to have the smoke-stacks screened with efficient wire-screen bonnets; (5) to make it obligatory on limit holders to put on a sufficient number of fire-rangers, the department to be authorized to do so at the limit-holder's expense in case of his refusal or neglect.

CONTINUING THEIR EFFORTS. The project of planting waste land in the counties of Durham and Northumberland continues to make headway. The agricultural committee of the council of the counties is pushing the matter, and the Ontario provincial government has undertaken to have a survey made of the lands in question. A series of meetings is being held in the counties to further agitate the question. A large meeting was held at Cobourg on December 9th. during the session of the council of the counties, which was addressed by Dr. B. E. Fernow.

BACK NUMBERS WANTED. The Association would like to secure a few copies of the issues of the FORESTRY JOURNAL for June and October, 1908, for which the sum of 25c. each will be paid. Such copies should be forwarded to F. W. H. Jacombe, Assist.-Secretary, Forestry Branch, Department of the Interior, Ottawa.

RECENT ONTARIO CHANGES. Restriction of cutting by the imposition of a diameter limit is a recent innovation in Ontario timber sales; in the sale of October 15th last, it was provided by the terms and conditions of sale that no trees of a less diameter than nine inches on the stump should be cut, and, further, that all timber should be taken down to this limit. Ground rent was charged at the rate of \$5.00 per mile, and \$2.00 per thousand feet was charged as stumpage dues, in some cases on the pine only, in other cases on all timber. The fire ranging system has been strengthened, not only by the increase in the number of rangers appointed, but also by the

appointment of Chief and Supervising Rangers, with the object of attaining greater efficiency.

FORESTRY ABROAD. The Department of Trade and Commerce has given instructions

to the Trade Commissioners to send in reports on forestry in the countries to which each is accredited. The list of questions to be answered is as follows:—

(1) What is the forestry organization of each country? (2) What is the forest fire protection? (3) What are the principal forest laws and how are they applied? (4) What are the principal commercial trees of each country? (5) What are the principal uses made of the forest products and by-products? (6) How is the forest force recruited? What are the forest schools, etc.? (7) What are the principal publications published by the forest department of each country? Are they available to Canadians? (8) Is reforestation thought of or carried on to any large extent? What are the species planted? Is convict labour used for the purpose?

A number of the reports have already been received, and when all are in they will be published together and should make interesting reading for all interested in forestry.

B. C. FOREST FIRES OF 1909. The official summary of forest fires in British Columbia during the season of 1909 states

that the total number of fires reported was 489. During the season thirty-five fire wardens have been patrolling the wooded districts. Of these fires 118 were reported as being started by railway locomotives, 99 from clearing land and 56 from campers. Many other minor causes are assigned, such as slashing, pic-nic parties, ranchers, Indians and cigar stubs; of 124 fires the causes are unknown. The area of timber and slashing burned over is put at 18,619 acres. The quantities of timber destroyed are put as follows: 1,420,000 board feet of poor quality timber; 5,710,000 feet of medium quality; 300 to 400 piles; 4,000 fence posts; \$220 worth of cordwood; 30 bolts and 50 ties. "Improvements" to the value of some \$7,500 were also destroyed. Eight

hundred and fifty men were engaged in fighting fire, and, in addition to regular salaries, the sum of \$11,997.18 is reported as expended in wages and labor, besides a considerable amount authorized direct to government agents. A total of \$627.00 is reported as having been expended by private parties. The total number of miles covered by the patrol was 68,130. The clearing permits issued totalled 2,530; 57 informations were laid for violations of the Bush Fires Act, 26 convictions obtained and the sum of \$800.00 levied in fines.

It is gratifying to note that the problem of forest fire prevention is receiving much more attention from the provincial authorities, and the matter of forest fire protection is regarded as a very important one. During the last session a provision was introduced into the "Bush Fires Act," requiring all persons wishing to clear land in the restricted months, in addition to the usual precautions required, to first obtain a permit for the clearing from the district fire warden or other government officer. Application has also been made to the Railway Commission to have the regulations governing the operation of railway locomotives amended so as to lessen the danger arising from this source.

A PIONEER WESTERN TREE-PLANTER. The Nor'-West Farmer, in its issue of November 6th, shows a number of half-tone cuts of trees in the orchard of Mr. A. P.

Stevenson, of Dunston, Man. Mr. Stevenson's orchard this year produced over 100 barrels of apples and between forty and fifty bushels of plums. His sales of apples alone amounted to over \$450.00. One Hibernal apple tree, twenty years old produced five barrels, and a Transcendent crab tree, twenty-nine years old, gave over six barrels. Mr. Stevenson is a pioneer in the growing of both fruit and forest trees in Manitoba and his knowledge of all sides of the problem gave him the best kind of qualification as supervisor of tree planting in Manitoba under the free distribution scheme of the Forestry Branch, with which he has served since the inauguration of that scheme in 1900. For nine years he has carried the gospel of tree planting throughout the provin-

ince, doing much by example and instruction to spread a knowledge of the principles of tree growing on the prairies. Long may he be spared to carry on the good work!

THE FOREST WILL ENDURE. In extolling (quite rightly) the importance of agriculture to Ontario, as compared with "the more alluring products of the mine and the forest" the Toronto "Globe" of December 8th remarks: "While mineral wealth must be exhausted and the forests are in danger of depletion, the productive land promises a return to labor down all succeeding years." Surely the forestry specialist of the editorial staff was on leave of absence; otherwise he was surely nodding. Present forests may be pretty badly depleted and that process may go on, but all the forest needs in order to give "a return to labor down all succeeding years" is proper treatment and the return will be as sure as, or surer than, that given by farm land, though it may not be as great per acre.

INDIANS INTERESTED IN FOREST PROTECTION.

Mr. William McInnes of the Geological Survey, who spent the summer of 1909 in the Lac la Ronge district, in Saskatchewan, brings back gratifying information regarding the greatly increased interest among the Indians of that district in the prevention of forest fires. The fire notices in Cree which have been sent out by the Dominion Forestry Branch are faithfully read by the Indians, nearly all of whom can read the syllabic characters and who are proud of that knowledge. At Lac la Ronge a particularly noticeable mark of this interest was given. On one of the points that jut out into the lake a fire had occurred which burned over a large portion of it. One of the Indians had been noticed leaving the neighborhood shortly before, and his carelessness was blamed for the setting of the fire. The case was taken up by the Indian council, and the proposal was made that the offender should be taken into custody and handed over to the authorities for punishment. After discussion, however, it was finally decided to let the man go with a warning.

SECRETARY LAWLER'S LECTURES.

On the last day of November the Secretary left on a trip between Toronto and Ottawa to speak at a number of places on the way. These were Peterborough, Belleville, Trenton, Kingston, Brockville, Ottawa and Carleton Place. The organizations under whose auspices he appeared were Boards of Trade, Canadian Clubs and Boards of Education.

In Peterborough he first delivered a lecture before the Board of Trade. Then upon invitation this was repeated before the Peterborough County Council then in session. The councillors took hold of the subject and it was stated that there were 128,000 acres in the northern part of the county fit only to grow trees. This area has been nearly all cut off and the few settlers remaining are now moving out since their market, the lumbermen and the chance of working during the winter in the shanties have been removed. Evidently it will not be long before Peterborough county will be wrestling with its deforested lands problem.

At Belleville the lecture was held in the city hall under the auspices of the Canadian Club. On the second evening of his stay he was invited to address the students of Albert College. In Kingston it was the Board of Trade which arranged for the meeting. Several of the professors of Queen's University attended and upon invitation the Secretary addressed the members of the Engineering Society of the University on the following afternoon.

In Brockville the lecture was delivered in Victoria Hall, the Board of Trade

being the sponsors, while at Ottawa, Trenton and Carleton Place the Boards of Education arranged for the meetings. In Ottawa the meeting was held in the fine new Assembly Hall of the Collegiate Institute and Mr. Peter Whelen, the President of the Board of Trade, was in the chair. In every case the lectures were illustrated by stereopticon views and no small interest was aroused in all these places. This form of work is to be continued during the winter and spring.

TIMBER ALONG THE FRASER RIVER.

Mr. G. S. Mallock of the Geological Survey, during the past summer travelled down the Fraser River from Tete Jaune Cache to Fort George. After Tete Jaune Cache is left twenty miles in the rear the banks of the river are very heavily timbered till one gets to a point some sixty miles from Fort George. At the latter place a sawmill is being built. Spruce predominates, with some fir. Practically no fires have occurred of late. The province keeps a fire ranger along the river. For a stretch of fully two hundred miles, viz., from Gisborne Portage to within seventy miles of the Cache there has been practically no fire. Some fine cedar was met with, usually some little distance from the river, on the first slopes of the mountains; it runs up to 12 feet in diameter. Other species met with were white birch, fir and cottonwood, some specimens of the last-named species running up to eight to ten feet in diameter. Near Fort George, for a stretch of some seventy miles, there have been fires and jack pine and aspen poplar predominate.

FORESTRY ENGINEER

FRENCH SWISS, 26 years of age, having the diploma of the Federal Polytechnic School in Zurich, late pupil of the School of Forestry in Munich, 2 years practice, knowing French, German and English, seeks good and permanent situation either as manager of a wooded estate or as working manager or technical expert, in a timber business or other similar post. Copies of testimonials and diplomas if desired. Please address

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