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No. 1.

How Canadian Northern Provides Against Forest Fires

Well-Organized System of Collecting Information—Causes and Losses Closely Ascertained—Velocipedes Preferred.

[Editor's note:—Mr. A. E. Warren, Assistant to the General Manager, Canadian Northern Railway, was asked to state for readers of the Canadian Forestry Journal a detailed description of the Company's forest fire protection work. His interesting and complete reply is given herewith. It may be noted that Mr. William Kilby is the officer immediately in charge of fire prevention for the C.N.R. system on its western lines.]

Forest fire protection on the Canadian Northern Western Lines is handled direct from the General Manager's office. All instructions are issued therefrom, and reports are made thereto.

The work on the lines running through forested sections is taken care of largely by special fire patrolmen, whose duty consists essentially in patrolling certain designated beats. Through the courtesy of the Dominion Forestry Branch these men are supplied with badges inscribed: "Dominion Railway Fire Patrol." These badges add dignity to the work, and authorize the men to summon help if necessary. The Company assumes payment for help so summoned, and after two seasons' experience the arrangements in ef-

fect have been most satisfactory. The subsidiary forces are comprised of train, section, and bridge crews, telegraph, fence, construction and extra gangs. In cases of extreme urgency all officials and employees of the road are required, as their duty, to assist in the work of fire protection.

Centralizing Information.

In order to cover this work it was first necessary to devise a system of fire reporting which would centralize necessary information. Enclosed herewith are copies of reports in use, together with a chart showing how this information is distributed. It will be noted that everyone employed by the Railway is required to, and means are provided whereby they can, make reports to officials concerned. This is made possible by the use of a special telegraph form so arranged that, with the use of telegraph symbols, essential information can be sent in the shortest worded message and to the proper officials. The action taken on receipt of this information depends, of course, on the nature of the fire. Arrangements are made whereby forest officials are notified when fires occur outside the jurisdiction of the railway company.

All roadmasters and officials above them have in their offices the names, addresses and telephone numbers of special Government Forest officers, and thus no time is lost in summoning their aid should occasion demand.

Every fire, no matter of what size, is followed up by a subsequent report which is submitted directly the fire is extinguished, by the section foreman on whose section the fire has occurred. By this method it is possible to have a complete history of every fire. This is of extreme importance, particularly where damage suits are concerned, and to an almost equal degree for the compilation of statistics. The final disposition of these reports takes the form of a summarized statement for the year showing losses, and other statistics which serve as a valuable record for future handling and guidance.

How Patrols Are Handled.

The fire patrolmen employed on the Canadian Northern Railway are mounted on hand velocipedes. These machines are used in preference to power cars. The reason for this is that up to the present no power car has been found that is really reliable, and, apart from this fact, it has been found that patrolmen when using power cars are more inclined to give their attention to the condition of their car than to fire protection. Using hand velocipedes, these men cover an average beat of 20 miles. It might be said that this is rather long, but it is the opinion that the men passing over their beats daily serve as an object lesson to other employees, and their duty is really more that of fire policemen than fire fighters. Only in the case of small fires are they expected to work and extinguish them.

The fire patrolmen record their activities in a special monthly diary and registration book. These books are placed in special boxes at the end of each patrol beat. Beats are

numbered consecutively across each province, starting at the east side of the provincial boundary and numbering westward. The object of this is to eliminate unnecessary correspondence in connection with patrol beats. By this system it is only necessary, if complaint or otherwise is to be made of, say, the first beat east of the Manitoba boundary, to refer to it as Manitoba No. 1. The patrol boxes mentioned are painted red, and there appears on them the following: "C. N. R. Fire Patrol Beat No. . . ." The diaries are received in the General Manager's office direct from each fire patrolman, who mails it in a ready addressed envelope, and each man's record is kept separately. At the end of the season a statement showing the time which the man has spent actually patrolling his beat watching for fires and the time spent on other work pertaining to fire protection, is made.

Duties of Patrolmen.

During the season of 1914 (a normal season) it was found that fifty percent. of the men's time was used on actual fire patrol, and the remaining fifty percent. on other fire protection work. The latter consisted of cleaning right of way, cutting brush, filling water barrels on bridges, etc., and cleaning around wooden buildings, culverts, platforms, and other structures liable to destruction by fire. Each man is provided with special equipment, consisting of shovels, water pails, and in some cases a portable telephone set, which he carries on his machine.

Prairie and building fire protection is also covered.

I might add that the work on the Canadian Northern Railway in this connection has been largely experimental, there being no precedent for handling forest fire protection by any railway along such lines as we now have in effect.

Forestry Talks for Young Folks

A School in the Woods

By James Lawler.

Once upon a time there was a boy. Not the bad boy nor yet the good boy, but just a boy. One morning when he was going to his school he decided he would run away. He thought he would run away from school, but that is where he made a mistake, as you will see.

He ran on and on. He came to the woods and then he ran harder than ever till he began to feel that he must be so far away from school that he would never see it or hear it again. After a while he began to feel hungry and because he could step on his head he knew it must be dinner time. (Not his real head, of course, but on the shadow of his head, as he walked. Did you ever try it to find out if it was near noon?)

He found that it was dinner time, but he did not find the dinner, at least not just then. After he had walked on farther he saw a Jinnee cleverly disguised as a man. He knew he must be one of the Jinn because he had read about them in the "Arabian Nights." This Jinnee asked him where he was going, and being a truthful boy and knowing that it would be useless to try to deceive the Jinnee, he said, "I have run away from school."

"You mean you have run away to school," replied the Jinnee.

"This is the forest," said the boy, "and there are no schools in the forest."

"Did you never hear of a Forest School?" asked the Jinnee. "Come along and you will soon see one."



"This is the forest," said the Boy, "and there are no schools in the forest."





"Here they saw the class of the Forest School. . . . They shared their lunches with the Boy."

"What is it like?"

"It is like a good many things, but out here it looks like a log with a scholar at one end and a teacher at the other." Then the Jinnee added genially, "Have you got your lunch in that bag?"

"I can't eat books," said the boy ruefully.

"Never mind. There is enough in mine."

Then the boy noticed that the Jinnee had a lunch box slung over his shoulder by a strap. They walked on a little and the Jinnee began to shout like all Canadian woodsmen, "Hoo-Hoooo," and after a little while they heard a faint reply, "Hoo-Hooo." They went in the direction of the sound and soon came to a little clear space by a brook. Here they saw the class of the Forest School. There were about two dozen young men in the class. Most of them sat on a log and at one end there was a somewhat older man whom they called Dr. Forester. In front of the log there was a small fire over which a black kettle was bubbling.

The Forest Students Have Lunch.

The Jinnee told the others that

he had brought a new scholar, whereat one said that he was starting young. However, just then one of the young men said the tea water was boiling and took the black pot off the fire and put in some tea. They then all opened their lunch boxes, for each had one, and brought out a tin cup.

They shared their lunches with the boy and let him drink out of their cups. They had sandwiches of bread and meat and of bread and cheese. Some had bread and butter and jam, and others pieces of pie or very filling cake. Altogether the boy got on famously even if the tea was strong and had no cream in it.

After lunch Dr. Forester drew out a map and laid it on the log, and assigned to the different members the work they should do for the afternoon. Some were to go a mile west and then turn south another mile and "pick up" a survey "blaze" made by the surveyors in 1874. They were then to follow the south boundary line of the township eastward until they reached the next mile stake or "blaze" and they were thus to lay out their work for next day.

Others were to continue "esti-

mating" the timber on the "south forty" which the Boy was told meant a certain square of forty acres. Others were to study Dendrology, which is the natural history of trees. Still others were to chop down such a number of trees of different sizes and measure them.

One thing that struck the Boy particularly was the care they took to extinguish their fire. It was only a little fire to begin with and it seemed all burned out but they soused it with pail after pail of water from the brook till the cinders were swimming in water. That was the way, they said, to keep out forest fires.

In a few minutes they were all at work. The tree-felling was to be done near at hand and the Boy first watched this. The scholars of the Forest School took up their sharp axes, and saws. One cut a nick in one side of a tree with an axe and then two others sawed into the tree from the other side. They soon had



the trees they selected crashing down through the other trees of the forest. Then they took their saws and sawed the trees into logs of different lengths and peeled the bark from these logs. After this they carefully measured the logs and the Boy found that this was done to make the "estimate" more exact, since trees of the same height and the same diameter growing in dif-



"They came up with a party under one of the teachers studying the natural history and characteristics of the trees."

ferent parts of the country contain different amounts of wood.

They Find an Old "Blaze."

When the Boy had watched this for some time, the Jinnee, who was really one of the scholars of the Forest School, said he would catch up with some of the other parties and the Boy stuck to his friend. From the glimpses which he got of the sun the Boy thought they were going north, but the scholar did not go in a straight line, but looked for different things here and there on his journey. He went forward so many paces and looked for a blaze. This showed the Boy that all these woodsmen know how far they step and by scouting their steps can tell how far they travel. In this case

stake rots in the course of years and is lost, and if he uses (as he generally does) a "blaze" on a tree the bark will cover over the wound or "blaze," and then the next surveyor in order to pick up the cornered must carefully take the bark from a part of two or three trees, that stand just about the point, in order to find the old mark.

On the way they came up with a party, under one of the teachers, studying dendrology, that is, the natural history and characteristics of the different trees so that at any time of the year they could distinguish one tree from another. In the case of the most common trees this is not difficult, but with those less frequently met with the work requires close attention and study.



"This was the Lumber Camp."

they found the "blaze" but it had been made so many years before that the bark had to be taken from a certain part of a big tree to find it. This is one of the difficulties of woods surveying. If the surveyor uses a stake to mark points, the

The Boy counted up how many trees he could surely name.

Telling the Distances.

Leaving this party they went on again into the forest. The sun went under a cloud and then all direc-

tions looked alike to the Boy. But the Scholar went on and on and a great fear grew up in the Boy's heart that they were lost. The afternoon was drawing on and the

latter called out in a sort of sing-song the size of the trees within a certain distance of his side of the tape as "pine fifteen; oak, ten; spruce twenty; maple twelve."

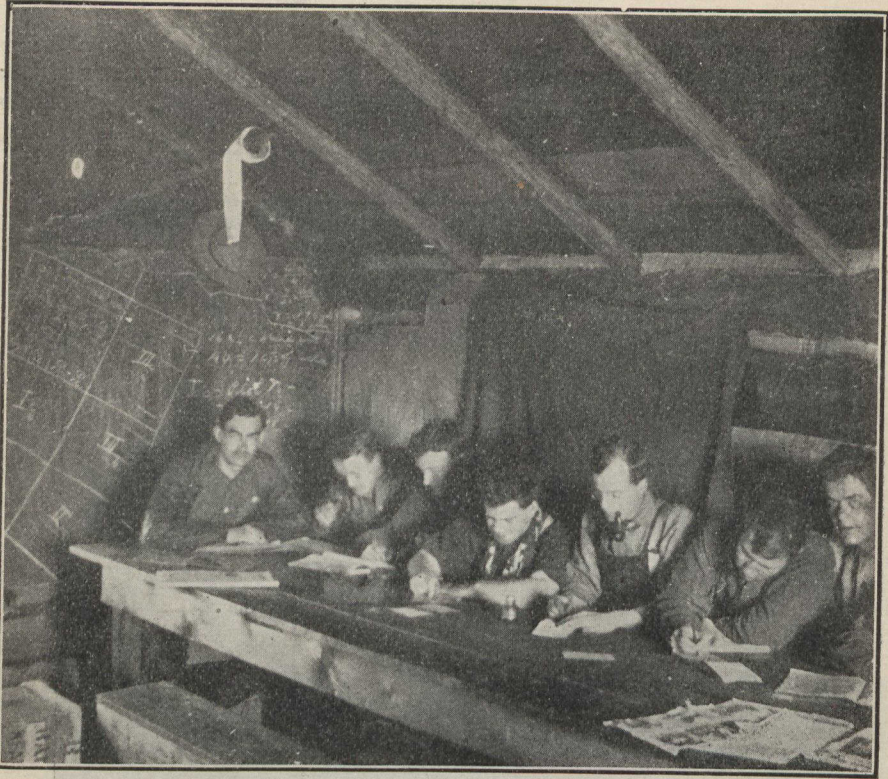


"They took their coats off and began to plant little trees about a foot high."

Boy thought with horror of spending the night in a tree with nothing to eat. Just as he was going to mention his fear and ask the Scholar if he thought he could find his way again, that person said, "I guess the boys will be over there by now," and began to shout "Hoo-Hoo-oo." Sure enough, back came the answering shout and after a few minutes brisk walking they came up with four of the men walking straight through the forest. The leader carried a compass and directed his steps by that. In his other hand he trailed a steel tape, the other end of which was in charge of the most rearward man in the party. In this way they knew exactly the direction and the distance they walked. On each side of the tape walked one other man. Each one of these

Tree Measuring.

Then the Boy noticed that the man who had the rearward end of the tape carried a pad of ruled paper on a sort of board and marked down the names and sizes of the trees as the two men called them out. How the tallier could mark down the names and sizes of trees so fast puzzled the Boy and he got out his scribbling book and tried to keep up. He quickly saw he could not write down the name of the tree each time; but even when he had written the names of the trees he could not write the figures to indicate their size fast enough. Then he found that the tallyman's pad had the names of the trees written down one side and opposite these were spaces marked in inches with all the sizes commonly met with in the trees they



"Lamps were lit and the scholars gathered themselves around the tables."

were measuring. When one of the measurers called out a number like "pine twenty-four," the tallyman simply made a dot in the twenty-four inch column opposite the word "pine." At the end of the day these dots are counted and the estimate worked out. The measurers carried wooden instruments called calipers with which they measured the size of the trees when in doubt, but for the most part they trusted to their eyes, as, after a time, they get very skilful in judging the size of trees.

The Boy also found out that in estimating how much timber there was on a certain area, the estimators did not count every tree. They ran straight strips about as wide as a city or town street or country roadway through the property and counted and measured every tree in those strips. Then if the strips alto-

gether amounted to one-twentieth of the whole area, they multiplied the result of their counting by twenty and thus got the timber on the whole area. Of course this must always be done with judgment to make allowance for lakes, swamps, mountains, burnt places or specially good or bad pieces of timber, and here is where the skill and experience of the estimator comes in.

Back at the Log "College."

In spite of his good lunch the Boy began to feel very hungry and he was glad to hear the chief of the party say that they had finished the work for the day and would go back to the College for supper. The Boy thought of the colleges he had seen in the city when his father had taken him there and he was quite surprised, when, after half an hour's walk, they came out on a cleared

space and found only half a dozen log buildings, just like any lumber camp. In fact this was a lumber camp, but the lumbermen, having finished for the season, had gone away.

As soon as they reached camp everybody made haste to wash in water from the lake, dipped up and panned in ten basins set on stumps and stones. This was no sooner over than the cook, in a white cap and a long, white apron, came out of the cook-house and beat with a bar on a steel triangle hanging on a frame outside the door.

At this welcome call to supper all went into the cook-house and seated themselves on benches around long tables.

At the other end of the room was the kitchen where from pots and pans on a big range the cook and his assistant quickly put soup, hot roast beef, potatoes, beans, pudding and pie and tea before the scholars. This was practically the fare on which the shantymen had lived who had left for the season. People who imagine that shantymen live nowadays entirely on salt pork, beans and black molasses have not kept in touch with modern lumbering.

After supper, as the night was somewhat chilly, all the men went into the bunk-house. There was a big stove in the middle of this house and near it a long table. Along the walls on each side were ranged two rows of bunks one above the other like the berths of a sleeping car. The shelves or bunks sloped slightly toward the floor in the centre and all the sleepers slept with their feet toward the stove and their heads to the walls.

Around the Study Lamps.

Lamps were lit and the scholars gathered themselves about the table with the teacher at one end to write up the work of the day. The Boy thought the bunks looked what he called "comfy" and, having found

were he was to sleep, he was soon in bed. The last he knew was that the men around the lamps were talking of "altitude" and "dip" and "yield tables," and "township lines" and "east forties."

It seemed that he had just closed his eyes when he was again wide awake because of the most terrifying noise. It must be a fire. The fire brigade must be coming and then he slowly realized that he was not at home but was in the School in the Forest. Then he thought it must be on fire for the noise went on more angrily than ever. It was not yet daylight. There was one lamp on the table and in its light he could see forms moving about drowsily. Men, yawning, hunting for boots, asking for caps, stretching themselves up lazily could be seen all over the row of bunks opposite to him. It did not seem as if they were in a hurry. "Is it a fire?" he asked his bed fellow.

"No, that is the cook ringing the rising bell, and if you want any breakfast you had better get up."

In spite of his hearty supper the Boy felt he could not afford to miss breakfast, so he hurried on his clothes and gave himself a lick-and-a-promise wash in the cold, cold water in the tin basin outside. They had breakfast by lamplight and a very good breakfast it was. There was porridge with syrup, fried bacon, hashed potatoes, good thick bread and butter (both thick), apple sauce, prunes and coffee.

When breakfast was over the men got out their lunch boxes and each man made up a lunch for himself from eatables he selected from another long table where they were all set out for that purpose. They made sandwiches of meat, cheese and jam, helped out sometimes with a boiled egg, a couple of cookies or a piece of pie. The cook thus gets two meals a day, while the scholars are the best judges of what and how much they require for lunch.

Off to the Nursery.

As they were going out the teacher they called Dr. Forester said to the scholar that was the Jinnee, "It's going to be a pretty long tramp to-day. Better bring Jack along with us to the Nursery."

The Boy was inclined to resent this, but still the tramp of the day before had been a long one and he was doubtful about repeating it. But what struck him as strange was that this Dr. Forester should know his name.

The doctor and the Boy and several of the scholars started on a brisk walk, and, after what seemed a good while, the lumbermen's track which the Boy had called the "tote road" ran into what seemed a regular wagon road. A little farther on a telephone line appeared which seemed from that point to strike right into the forest. The Boy who was walking near Dr. Forester called his attention to this.

"Yes," said Dr. Forester, "that line takes a short cut to the camp. It is very handy. I was talking with your father over it last night."

The Boy would have asked more, but just then they came to a little farm in the woods that seemed to be filled with hundreds and thousands and millions of little trees. Some were tiny trees scarcely as thick as a match and only four or five inches high. Then there were long beds as wide as a dining table and miles long, it seemed to the Boy, where the little trees were just peeping through the ground. Farther on there were larger trees and when they reached another field the

scholars took off their coats and began to plant little trees about a foot high. The little trees were taken from some of the beds they had passed and were carried about the field in pails of muddy water. What surprised the Boy was the speed with which they were planted. He found that if he walked along the rows slowly two planters working together could about keep pace with him.

The Boy Bids Good-bye.

In a little house in the nursery there was a machine, something like a squirrel cage, which the Boy was told was for separating the seeds from the cones of pines, spruces and other cone-bearing trees.

The Boy was examining this and some implements used for planting trees, called dibbles and mattocks, when he heard a familiar sound. It was the jangle of the bell on the light wagon which was used to bring children in from the country to the school which the Boy attended. There were no children at the nursery but the driver stopped at the gate and Dr. Forester said, "I guess this is the carriage to take you to your school." "When you are as tall as this tree," said he taking hold of one eighteen inches higher than Jack's head, "come back to our School in the Forest."

"Thank you," said the boy, "but I shall never be as tall as that tree. It grows faster than I do. But when I am as high as this gate post I will surely come back and learn to be a forester."

And this is how the Boy ran away to school.

Our Biggest Industry

Wall Street Journal: "Measured by number of persons employed, what is the country's biggest manufacturing industry? Lumbering, with its 48,000 saw-mills, its \$1,000,000,000 investment in these plants, and its employment of 605,000 men. This does not include, says The Na-

tion's Business, the standing timber, which brings the total investment to \$2,500,000,000. This industry furnishes railroads a traffic income of \$200,000,000 a year. Yet lumbering is one of the most depressed of industries, and seems to be the victim of its own helplessness because of uncontrolled competition.



(Published in Collaboration with Canadian Society of Forest Engineers.)

One-Third of B. C. Forest Staff Enlists

Ever since war broke out members of the Forest Service have been leaving on furlough for the bigger job overseas, and they are still doing so. Out of the regular or permanent staff, which in the summer of 1914 before the war numbered about 170 (including female clerks and stenographers), almost one-third have enlisted to date. In addition over 20 members of the temporary or summer staff of guards, patrolmen, etc., are known to have enlisted, and it is very probable that as many more have joined of whom no information is now available. The recent enlistments are as follows:—

A. H. Black, Cruiser, Victoria—Engineers, Vancouver.

Jack Thompson, Ranger, Tete Jaune—Pioneers, Victoria.

O. J. Sangar, Forest Assistant, Lillooet—Artillery, Victoria.

W. Ross Flumerfelt, Forest Assistant, Vancouver — Engineers, Vancouver.

E. F. Heath, Ranger, Fort George—67th Western Scots, Infantry, Victoria.

R. Jobson, Guard, Fort George—67th Western Scots, Infantry, Victoria.

J. J. Donnelly, Guard, Fort George—67th Western Scots, Infantry, Victoria.

N. F. Murray, Guard, Fort George—67th Western Scots, Infantry, Victoria.

R. L. Condy, Clerk, Fort George—67th Western Scots, Infantry, Victoria.

J. R. Chamberlin, Forest Assistant, Victoria—Royal Flying Corps, England.

Clarence Ferris, Messenger, Victoria—103rd Battalion, Victoria.

H. S. Laughlin, Forest Assistant, Victoria—Captain, 104th Battalion, New Brunswick.

G. R. A. Ball, Clerk, Victoria—88th Battalion, Victoria.

G. H. Llewellyn, Draughtsman, Victoria—Sergeant, 5th Regiment, Victoria.

C. I. McKenzie, Draughtsman, Victoria—Captain, 88th Battalion, Victoria.

Mr. P. Z. Caverhill, Deputy District Forester in the Vancouver Forest District, has accepted the position of Chief Forester for New Brunswick. Mr. Caverhill is a native of that Province, a graduate of the University of New Brunswick, and has had a wide experience and been a valued officer both in the Dominion and British Columbia Forest Services. His many friends will wish him every success in his new work.

FOREST FIRE STATION ON MOUNT HOOD

During the summer of 1915 an innovation in the work of fighting fires in the national forests was brought about by the installation of a fire observatory on the summit of Mt. Hood, one of the five highest mountains of the Pacific Northwest. Mt. Hood stands 11,225 ft. above sea level, and even in midsummer the weather conditions at the summit are at most times severe. The establishment of the station was largely an experiment on the part of the U. S. government, there having been a great deal of doubt before the experiment was tried as to whether an observer could stand, for an entire season, the lonely existence, the high altitude, and the storms. This point was conclusively settled by a mountain guide whom the government employed as an observer. This guide, who had already made 350 ascents of the mountain, succeeded in establishing a camp on the summit and spent the entire summer there in comparative comfort. So successful did the experiment prove that toward the end of the season the government built a wooden observatory building on the summit. This building will serve as permanent quarters for the Forest Service, and in addition to this, will be used as an observatory for the United States Weather Bureau. As a result of the satisfactory outcome of the experiment, plans have also been made for the installation during the year 1916 of a number of other snow-peak observatories.

When it came to establishing the fire observatory on the summit of Mt. Hood, the work of getting the necessary equipment and supplies to the top proved to be a big undertaking. Above the 6,000-ft. level the mountain is continually covered with snow, while the slopes are so steep and treacherous as to tax the resources of the most skillful moun-

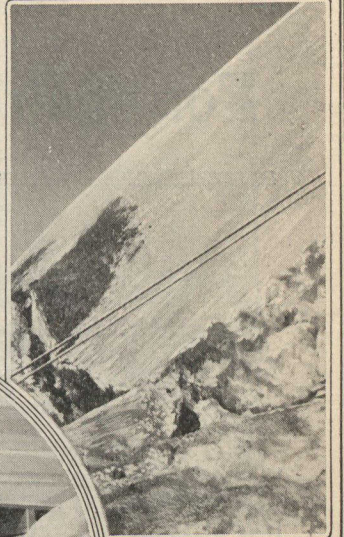
tain climber. There are two routes to the summit, one up the south side of the mountain and the other up the northeast side. Just below the summit, on each of the routes, where the slopes are particularly steep and perilous, a steel cable has been anchored to the mountain side, and it is only with this that the climb can be made with any degree of safety. The cable on the south route is 800 ft. long, and that on the northeast route, 1,800 ft. long. The 4,000 lb. of material required for the camp was taken up the south route. Pack mules were used for transporting it up the mountain side and across $2\frac{1}{2}$ miles of the snow zone to the 8,000-ft. level. From this point the climb was too steep and dangerous for this mode of transportation, and the material was carried the remainder of the way to the summit on the backs of the observer and an assistant. At the summit there is a scant two acres of fairly level snow-covered ground with little in the way of mounds or depressions to furnish shelter. Even in midsummer the temperature sometimes drops nearly to zero. To resist the high winds, the tent, 12 ft. square, was not only securely guyed but was heavily weighted around the sides. It was provided with a double floor. A comfortable bed of Hudson Bay blankets and a sleeping bag, a liberal stock of food, instruments for making observations, and a few books, constituted the living and working equipment of the observer. With the pioneer work done, the transporting of material for the permanent wooden building at the summit was carried out with less uncertainty and danger.

The Journal is indebted to "Popular Mechanics Magazine" for the cuts appearing on opposite page as for the text of the description.



Party of Mountain Climbers Working Their Way to Summit with Aid of Cable

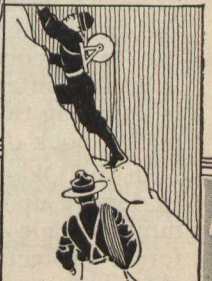
One of the two Observation Stations on the Summit of Mount Hood, from Which the Forests for Hundreds of Miles in Every Direction are Watched Constantly. When a Fire is Discovered a Sight is Taken with the Instrument Mounted on the Top of the Post and the Bearing is Telephoned Immediately to the Supervisor's Office.



Cable and Telephone Line Spanning a Large and Dangerous Crevasse



Extending Telephone Line to 9,000-Foot Level!



How the Telephone Line was Carried to Summit



This Tent, in Which the Fire Observer Lived during His Long Watch on the Summit, Is the First Habitation Ever Maintained on a Snow Peak in the United States.

Forest Problems in the Okanagan Valley of B.C.

By Geo. P. Melrose,

District Forester, Vernon, B.C., under Forest Branch of the
Government of British Columbia.

In a country where agriculture is the leading industry and where wood is plentiful and easy of access, it is difficult to interest the majority of the population in forest protection. This is even more the case when the lumber and other forest products used can be brought into the district about as cheaply as they can be procured on the ground. It is hard to interest the general public in anything that does not affect their pocket book or their comfort.

In the Okanagan Valley were we to depend upon the influence of the lumber trade to awaken interest in forest protection, we should probably have a great many years of hard sledding. Although there are some 10,000 M feet of lumber cut every year in the Okanagan, the amount is insignificant as compared with the tremendous quantities cut on the coast. The amount of money distributed through the lumber trade is small compared with that distributed through agriculture. The Valley is essentially a fruit and vegetable raising district.

Lying as it does in the "Dry Belt" the annual precipitation is not sufficient to water and nourish the large acreage of orchards and crops. Irrigation is resorted to to such an extent that already several millions of dollars have been invested in irrigation works, while only about 35% of the available agricultural land has been taken up.

The irrigation systems naturally

depend upon the stream flow. A reliable system of irrigation works must have a constant and steady flow of water from the supply streams. Even costly dams will not entirely make up for an irregular and non-dependable stream flow, and the regularity of the stream depends almost entirely upon the maintenance of a proper forest cover.

Through the irrigation systems the people of the Okanagan must be appealed to, in order to protect the forests, conserve the water supply, and the timber for the future, and thus insure the continuing prosperity of the district.

A Distinctive District.

This article will deal entirely with the Okanagan Valley, or that greater portion of it that lies within the Vernon Forest District. No attempt will be made to describe the forest cover or the forest protection of the remainder of the Vernon district, which has to a greater or less extent, an entirely different climate, forest cover or administrative problem.

What is commonly called the Okanagan Valley in Canada, extends from Armstrong, about twenty-five miles south of the main line of the C.P.R. to the international boundary. The main valley runs practically north and south with few side valleys of any great importance. Okanagan Lake occupies the floor of the valley for about 90 miles of its length, while a chain



Sawmill operation in Yellow Pine, Okanagan Valley, B.C.

of smaller lakes run south to the International Boundary, the probability being that the lake was once continuous from north of Vernon to somewhere on the U. S. side of the line.

From the level of the Okanagan Lake, which is 1,175 feet above sea level, the mountains surrounding the Okanagan watershed rise only about 7,000 feet at the most. By far the largest number are from 3,000 to 4,000 feet high, and lie far back from the main valley.

Low rolling hills surround the valley, broken by deep gulches, and a few valleys, which widen out some distance back. These hills gradually rise, as they recede from the valley, to the plateau and mountain country of the watershed summits.

Plateau country is the predominant feature of the Okanagan watershed. Plateaux with low smooth hills and shallow lakes, many swamps and streams. Their continuity is broken by regions of high mountains and deep gulches, with swift streams and craggy outcrops of country rock.

Fruit-growing Soil.

Though there is not a great deal of outcrop throughout the valley the

soil is not deep. It consists, except on the benches near the lake, of loose gravelly and sandy loam with a great deal of granite wash and loose rocks and boulders. The benches are composed of a light grey-colored gumbo clay, known locally as volcanic ash though it is not known whether there in any authority for the same. This material extends to great depths and is excellent for fruit raising.

In the Vernon and Armstrong districts the soil is a deep dark loam.

The climate in the Okanagan is remarkable for the latitude and the elevation above sea level. The summers are long and hot with little rain. The winters are short and mild. In the southern end of the valley there is never sufficient snow for sleighing, near the level of the lake, except in exceptional seasons. Higher up in the hills the winters are hard and long. By the first of March the sun's heat is felt, and the snow melts off at the lower levels. The middle and end of April often see a serious fire season commencing. Warm weather lasts till the end of October, although the nights, always cool, get cold and frosty. Snow usually appears on the high peaks about the middle of October.

Four Forest Types.

In describing the forest in this district, it is necessary to describe only four main types. These are determined by altitudinal and moisture conditions.

Yellow Pine Type.—On the lower slopes up to an elevation of approximately 3,000 feet, forming a very distinct belt around the centre valley is the yellow pine type. It is composed of Western Yellow Pine (*Pinus Ponderosa*) and Douglas Fir (*Pseudotsuga Toxitolia*) with Yellow Pine predominating. Both these species are intolerant of shade, the Yellow Pine being exceedingly so, and produce an open stand.

The annual precipitation in this belt is less than 20 inches, producing a condition of extreme drought in the summer months. This accounts for the presence of the Yellow Pine, and the poor character of the Fir in the type.

The average stand of merchantable timber in this type in the Okanagan is between 3 and 4 thousand board feet per acre, although in some specially favored localities it has been cruised as high as 10 thousand. A large percentage of the type however does not produce merchantable timber and is suitable for nothing but stock range and the production of cord wood.

An abundant growth of Pine grass covers the forest floor and affords grazing to cattle and horses. This, however, early ripens, and becoming dry and inflammable adds a large factor of danger to the general fire hazard. Fires in this type have not a very great disturbing effect, but as they occur time after time over the same area, large loss occurs through the enlarging of butt scars and the destruction of seedling and second growth.

There is probably from 25% to 50% of this type occupying land that will eventually be used for agriculture. This land produces the best stands of Yellow Pine, and therefore

the amount of this class of timber is likely to be reduced in the very near future, as agriculture develops.

The Fir Type.

Above, and bordering on the Yellow Pine type we have the Fir type. On the lower hills, that is up to 3,000 feet, it is often hard to distinguish between the Fir and the Yellow Pine types, but with a little increase in the elevation, the Yellow Pine quickly thins out, and Fir becomes predominant.

This type forms a belt above the Yellow Pine type, from the elevations of 2,500 feet to 4,000 feet. The precipitation at this altitude is somewhat higher than in the Yellow Pine type and this accounts for the frequent presence of Tamarack, Spruce, Cedar and Lodgepole Pine.

This is a permanent type. Reproduction in openings caused by either cutting or firing, is sure and abundant. The percentage of Fir is temporarily reduced after fire, Lodgepole Pine taking its place. As Fir is intolerant of shade, it cannot compete with the more tolerant Lodgepole Pine until openings occur. Tamarack and Spruce reproduction is not affected so greatly by the action of fire.

The Spruce type occupies the watersheds and plateau regions of the district between the elevations of 3,500 and 7,000 feet. High moisture content of the soil is necessary and abundant precipitation. The species found in mixture are Spruce, Lodgepole Pine, Alpine Fir, and Douglas Fir. The species, except Douglas Fir, are all tolerant of shade, and reproduce abundantly, when moisture conditions are not disturbed.

Fire Reduces Spruce and Fir.

As the Spruce and Alpine Fir are easily killed by fire and fire also has a disturbing effect on soil conditions, the type disappears after fire and is replaced by the Lodgepole Pine type. At one time probably 25% to

30% of the district was under this type, but, owing to fires the percentage has dropped to from 10% to 15%.

The amount of commercial timber in the Spruce type is small, the forest being almost entirely a production forest. It is permanent if not disturbed by fire.

Lodgepole Type.—This type occupies the areas of higher elevations, plateaux and mountain sides from 3,000 feet to 5,500 feet. It covers probably 20% of the area of the district, and is gradually widening, due to repeated fires, at the expense of the Spruce and Fir types.

The type is composed of Lodgepole Pine, Alpine Fir, and Aspen with a mixture on the lower levels of Fir and sometimes Yellow Pine. Better moisture conditions are required than in the Fir types, though less than in the Spruce.

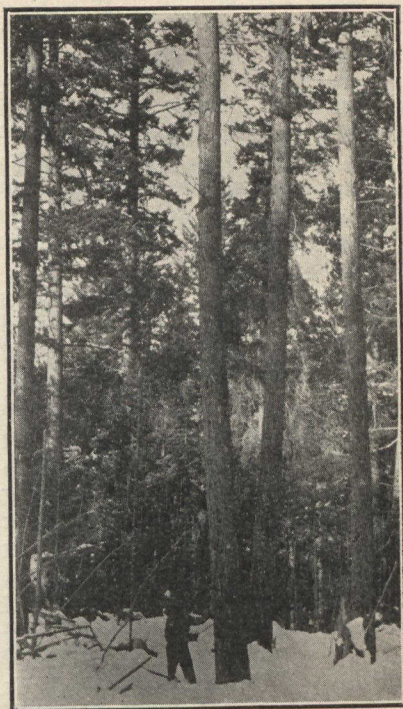
Reproduction after fire is abundant and sure, until about the fourth and fifth burn when a barren is created. The second growth is often so dense, that reproduction is poor though in the more open stands Spruce and Douglas Fir reproduction is well represented. As these latter species are longer lived than the Lodgepole Pine, and originally occupied the sites where Lodgepole Pine is now predominant, it is probable, that given time the Lodgepole Pine will be replaced to a large extent, by the original stands of Fir and Spruce.

The type is at present occupying entire watersheds. The stand averages somewhat less than 2,000 feet per acre, and therefore we must classify the type as mainly a protection forest.

There are, of course, several other types in the district, but these are of very little importance commercially or for protection of the watersheds.

Relative Importance.

In discussing the importance of these four types they naturally divide themselves into two groups of



Fir stand, Okanagan Valley.

two each, viz.: Under commercial forests, the Yellow Pine and Fir types and under Protection Forests, the Spruce and Lodgepole Pine types.

The former contain practically the entire stand of commercial timber in the District, amounting to some 1,584,187 M feet board measure, distributed over an area of 521,200 acres.

The non-commercial or Protection Forests in the Okanagan cover approximately 1,374,300 acres and have a total stand of nearly 2,078,000 M. feet board measure. Of this large area of non-commercial forest land, providing proper protection from fire we can expect that 25% to 50% will eventually turn into commercial forest through the return of the permanent Fir and Spruce types, and the present stand of Spruce through a longer lease of life will yield a large per cent. of commercial timber.

Users of the Forest.

(a) Lumber Trade.—The lumber industry is not the most important user of the forest in the Okanagan, or better perhaps, the income from the lumber trade is not so great as that from other activities dependent on the forests.

The annual cut of the district is probably about 10,000 M. feet board measure, which represents a total value of \$250,000 to \$300,000. A very large percentage of this cut is used in the manufacture of fruit and vegetable boxes, and is, therefore, through this branch of business dependent upon the forest from another aspect, rather than their capacity to produce timber.

In the Okanagan Valley there are now operating six saw mills with a total daily capacity of probably 225 M. per day. For several years, however, they have not been working full time and the annual cut has been low. At the time of writing, however, the outlook seems to be brighter, and several large orders have been headed towards the local mills.

A very important part of the industry, as has been mentioned is the manufacture of boxes and crates for fruit and vegetables. There are about 400,000 boxes and crates used in the Okanagan in 1915 calling for some 1,500 M. to 2,000 M. feet of lumber.

Other products besides lumber, are railway ties, construction timber, poles and mine props.

The local market takes most of the product, but owing, no doubt, to the splendid campaign being carried on in the prairies for the use of B. C. wood, a wider market seems to be opening out. Several orders have already been received from the prairies, and it is expected that there will be a profitable trade established in the near future.

Better Times in Sight.

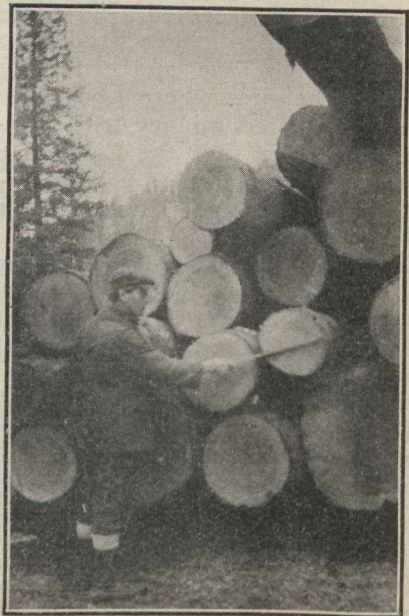
The lumber interests have been going through a very critical period,

but better times are in sight, and the future will probably see a fairly large lumber business carried on, up and down the Okanagan Valley. With increased acreage under agriculture, increased output of fruit and vegetables, and increase in population, there will be need for more flume stock, lumber for houses, barns, etc., and a tremendous quantity for boxes and crates. The outlook is bright, and the lumbermen are ready to grasp any opportunity that offers to further their business and incidentally the prosperity of the entire district.

The Water Supply.

The Okanagan district is famous for its fruit and vegetables. It is essentially an agricultural district and annually produces a crop of fruit and vegetables valued at over \$2,000,000.

Owing to the scarcity of rainfall the whole district is dependent upon irrigation for the success of its crops. There are approximately 900,000 acres of watershed tapped for irri-



Scaling Western Yellow Pine logs. Note contrast between heart and sapwood.

gation, power and domestic users. This represents an actual investment of capital of many millions of dollars. Irrigation flumes and ditches, power plants, city water systems, all represent a large investment and all are dependent upon the maintenance of a good forest cover on the watersheds to supply streams for their continued usefulness.

An idea of the amount involved can be had by capitalizing at 5% interest, the annual income from agriculture, which so dependent upon irrigation. The total annual value, we said, was \$2,000,000. At 5% the capital value of this would be \$40,000,000. This much money is not actually invested in irrigation projects but it is invested in farms, fruit trees, homes, etc., which are all dependent upon the continuance of the water supply and which all contribute to the earning of the annual income of \$2,000,000 or more. Therefore, I think it is fair to say that the forest cover on the watersheds of the Okanagan represent a total value of \$40,000,000 or more for irrigation alone.

If the value of the water supply to the cities and towns, power plants and private individuals is also figured the amount involved would reach a tremendous sum.

Forest Protection.

The immediate problems thus confronting the Forest Branch in the Okanagan are mainly protective. The highly inflammable state of the majority of the watersheds, and their importance, make it imperative that great care be taken to keep fire out. Fire hazard in other localities is not excessive and the danger resulting not so large; they need, therefore, less attention.

Happily we are blessed with an excellent system of roads and trails, thus facilitating communication and guaranteeing quick access to fires. So far, however, full advantage has not been taken of this system, in the matter of suitable conveyances, but

we are now coming to a stage in our development where we can advance no further till the best means of transportation on the roads, automobiles, are used.

(a) Prevention.—Since the Forest Act was passed in 1912, an active campaign has been carried on for care with fires, through the agency of posters, whetstones with suitable inscriptions, newspaper articles, slides for motion picture theatres, etc. Personal appeal by the Forest Officers has also played a large part in the propaganda.

The permit system as administered in B. C. is one of the best means of keeping down the fires, and results in the Okanagan have been entirely satisfactory. By this system we not only have all slash burnings examined by Forest Officers but the Officers come in contact with the largest proportion of the forest users, and have an excellent chance to put forward the cause of forest protection.

In the endeavor to enlist all parties in our work co-operation has been arranged with railway employees, stage drivers, logging and saw mill foremen, mine managers and superintendents, telephone companies, storekeepers, and many private individuals who have a chance to aid. Besides these an agreement has been drawn up between the Dominion Service in the Railway Belt and the Provincial Service, covering fires burning near the boundaries of their respective districts. On the south the officers of the U. S. Forest Service have signified their willingness to co-operate along the international line, and, next year, I believe, will see the beginning of a working agreement with them.

Lookout Stations.

(b) Detection.—So far the Okanagan has been fairly well supplied with detection facilities. The two most important watersheds, viz.: Vernon and Kelowna are provided with lookout stations with telephone

connections to the towns named. These stations have been in actual use only one full season; that of 1914. The 1915 season was not hazardous enough to warrant putting lookout men on duty. In 1914, however, they showed clearly the advantage of their positions. Although in the worst part of the season they were rendered useless by smoke in the valleys, yet during the preceding period many fires were located and quickly attacked, that would probably have cost several times the value of the lookout station, had they not been discovered so quickly.

It is planned to continue this system and add other stations from time to time. With three more lookout stations we shall have practically every acre of watershed and merchantable timber in the valley directly under the view of forest officers in the danger season.

(c) Control.—The control problem is one of the great moment, and we are still in the experimental stage as to the best method of attacking fires in certain types, best implements to be used and the best means of transportation, as well as many other problems.

Owing to the inflammability of the ground cover and the forest itself in most types, fires assume large proportions in a very short time. Quick arrival at the fires is therefore essential, and here it is we can take advantage of our excellent road system. Were it not for the roads I believe that practically the entire area of range would be burned over every year. As it is, guards arrive quickly at range fires, usually near towns, and get them under control without delay.

The somewhat slower rate of spread where the timber is thicker, allows of more time, which is necessary, as the roads are not so plentiful nor so conveniently located. As settlements advance more roads will be built, until practically the entire

hazardous area of the district will be within easy reach of a road. Then with automobiles, for the transportation of men, tools, and supplies, we shall have our communication problem solved.

State of Organization.

The control force at present in the valley consists of the District Forester, one Ranger, and six temporary, 4½ months, guards, with provision for an increase of short term patrolmen and special patrolmen hired by the day as the season advances. Day laborers are hired as they are needed for actual fire fighting.

This plan of organization allows of great flexibility. As the hazard increases or decreases, so men are put on or laid off. The only defect is the difficulty of procuring the same men each year for short terms of employment. If some way can be devised to keep these men always on hand a great step forward will be taken and the efficiency of the force advanced at least fifty per cent.

Since the Forest Branch has established in 1912 there have been only three fire seasons. It can hardly be said, therefore, that a permanent organization has been created. Permanent would seem to presume a long term of service as a stable unit. It will take a great many years' experience to determine just what permanent force is most suitable to cover all conditions and serve as a skeleton for the temporary increases made necessary by increased hazards.

Each year, however, we come a little nearer, each fall we are able to check up the past season's work and see a little progress, and each spring correct in our organizations the mistakes and shortcomings of the previous year.

The Lesson of Experience.

The summer of 1913 was wet, and the hazard was slight. The damage resulting from forest fires therefore

was negligible; 1914, however, proved one of the worst experienced in years. It was likened by many to the famous bad year of 1910. The force being new and in many cases inexperienced, though doing all that could be expected, was not sufficient to cope with the situation. No similar years had confronted the new organization and consequently provision had not been made to look after such a bad situation.

In 1914 there were 198 fires, burning a total area of 88,400 acres, and damaging property valued at \$28,000.00.

The past season, 1915, proved to be very favorable and the damage was slight. The number of fires was 72 with only 14 of them costing money to fight, against 97 in 1914, or 19 per cent. against 49 per cent.

These results would show an improvement over 1914. In both years there has not been a serious fire on or threatening any of the important watersheds. The experience of the two preceding years enabled us to place an organization, and so distribute it that the percentage of fires costing extra money to fight was reduced by 30 per cent. The percentage of fires of unknown origin was also reduced showing a better distribution of the force for detection. The lessons learned in 1914 were put to good purpose in 1915. Those of 1915 will be put to good purpose in 1916.

Ideal conditions will never be reached, as ideals never should, but each year will see a better and more efficient organization, and consequently decreased danger to the valuable watersheds and timber supplies of the Okanagan.

Double Reason for Care.

Lack of space has prevented the presentation of a great many facts and figures concerning the forests and the problems confronting the Forest Branch in the Okanagan Valley but enough has been said to show that the main problem is and

always will be one of protection. Protection, not so much for the intrinsic value of the timber involved but protection for the maintenance of a steady and reliable supply of water for irrigation, and through that, protection to the great agricultural interests that make for the prosperity and advancement of the entire district.

Douglas Fir Wins in Test

Victoria, B.C.: Two Douglas Fir and two Red Cedar railway ties were recently forwarded by the Forest Branch of the Department of Lands, to the Great Eastern Railway Company of England, who selected two sleepers from their stock which they obtained from the Baltic, and tested them all under similar conditions.

The results of these tests show beyond a doubt the superiority of British Columbia Douglas Fir for railroad ties.

It was found that under compression Douglas Fir will stand 5,695 pounds per square inch; while Red Cedar made a very creditable showing against the Baltic timber of 3,407 pounds per square inch.

Tests in tension were even more favorable for Douglas Fir. This is shown by the fact that it would take 11,450 pounds or over 5½ tons to pull apart a stick of Douglas Fir having a cross section of one square inch; whereas just half that weight would suffice to pull apart Baltic timber, and only 3,300 pounds were required to separate Cedar.

These tests were carried out by the Great Eastern Railway, and the results which they found will be of immense value to the reputation of Douglas Fir as a railway tie material amongst English engineers. The importance of this is increased by the fact that English engineers have the supervision of most of the railway lines in China, India and South Africa, all of which are valuable markets for Douglas Fir.

Recommendations for Quebec

"Summing up in brief the general situation of forest protection in the Province of Quebec, we would recommend, first, of all, furthering the formation of the limit holders into co-operative associations; secondly, increased appropriations from the Provincial Government and co-operative interests for permanent improvements. Lookout stations carefully located and coupled with telephone communication furnish probably the best assistance to prevent fires getting out of control; and thirdly, that the laws pertaining to forest protection be amended to more restrictive relation towards offenders. I am pleased to report that the Honourable the Minister of Lands and Forests is considering proposed amendments, and we feel that the necessary changes will be made and put in force for the coming season."—Arthur H. Graham, Chief Fire Inspector, Lower Ottawa Forest Protective Association.

At the request of the Editor of the Journal, Mr. Arthur H. Graham, Manager of the Lower Ottawa Forest Protective Association, prepared the following statement summarizing the results in his 1915 operations. The attention of readers is directed particularly to the comments upon the reduction in settlers' fires through prosecutions.

"We have this season increased our area by 944,640 acres and have now the patrolment of 8,504,320 acres. Within the above area there remains but one or two small limit holders who are not members of this Association. The figures as given do not include lots taken up by settlers or other holdings taken out of the limits.

Rangers and Equipment.

Organization.—The total area was divided into four divisions and 49 ranger districts. The patrolling was done with 58 rangers and 4 inspectors (or Chief Rangers). All rangers were equipped with canvas water buckets and fire fighting equipment was stored at convenient places in their districts. The patrolling was done partly on foot, canoe, or with horses. The nature of the district trails and roads being taken into consideration. 10,000 fire posters were used in placarding roads, trails,

camping grounds, watering places, etc., and a large quantity of warning pamphlets were distributed among settlers located in vicinities bordering the limits.

During wet periods rangers were kept busy trail cutting, building fire places, lookout towers and ranger camps and construction of telephone lines. Two hundred and twenty miles of trail were cut and cleared this season.

Causes of Fires.

Fires.—155 fires were extinguished this season and of that number 113 were extinguished without extra labor, or in other words, put out before spreading. They originated as follows:—

Settlers	79
Fishermen	15
Berry Pickers	8
Squatters	8
Lightning	6
Drivers	4
Hunters	4
Woodsmen	2
Indians	2
Railways	2
Surveyors	1
Unknown	24

Settlers' Fires.—The above figures show that 51% of all fires originated from settlers. This is a considerable decrease over the per-

centage of fires from that source last year. Our rangers supervised the burning of 322 slashes and permits given.

With the co-operation of the Provincial Government we continued to prosecute settlers in the same manner as in the season of 1914 and convictions were secured in 40 cases and it may be said that very few of the number were found in the vicinities where prosecutions took place last year.

Getting After Malefactors.

Mr. Henry Sorgius, Manager of the St. Maurice Forest Protective Association, with headquarters at Three Rivers, P.Q., gave the Journal the following condensation of prosecutions undertaken by him during 1915:

Charles Larouche, was prosecuted by the Association, for having set fire to the forest on May the 31st, 1915, near the town of La Tuque. He pleaded not guilty and was placed on trial at Three Rivers before Magistrate Marchildon. The judgment was pronounced against us.

Francis Morin, of St. Ignace du Lac, was prosecuted by the Association, for having set fire to his slash during the prohibited season without first obtaining a written permit from the ranger. He was placed on trial at Three Rivers before Magistrate Marchildon and pleaded guilty. He was condemned to pay a fine of \$10 and in default of payment of fine and costs one month imprisonment. He passed one month

in the common jail at Three Rivers. Fine, \$10.00; costs, \$44.50.

Albert Beaulieu, of St. Ignace du Lac, was prosecuted by the Association for the same offence. He pleaded guilty before Magistrate Marchildon at Three Rivers, and condemned to pay a fine of \$10.00, plus costs, and in default of payment he was to spent one month in jail. The high constable has twice gone up to get this man but was unsuccessful each time. He has not paid his fine and is still at large. We will get him in the spring. Fine, \$10.00; costs, \$44.50.

Joachim Savoie, of St. Charles de Mandeville, was prosecuted by the Association on identical grounds. He pleaded guilty before Magistrate Lacroix at Joliette and was condemned to pay a fine of \$1.00, plus costs, the costs amounting to \$3.70. He paid his fine.

Arsene Bellerose, of St. Michel des Saints, was prosecuted by the Association for burning without permit. He pleaded guilty before Magistrate Lacroix at Joliette and was condemned to pay a fine of \$1.00, plus costs, the costs amounting to \$2.00. He paid his fine.

Leonard Charrette, of Notre Dame de la Merci, was also prosecuted. He pleaded guilty before Magistrate Lacroix at Joliette and was condemned to pay a fine of \$1, plus costs, the costs amounted to \$27.35. He paid his fine.

Alvini Beauchamp, of St. Donat, was acquitted before Magistrate Lacroix at Joliette, as several witnesses seemed more inclined to favor the accused.

Charles Crepeau, of Notre de la Merci, was acquitted by Magistrate Lacroix at Joliette. Witnesses seemed more inclined to favor the accused.

Damien Desroches, of St. Damien, was prosecuted by the Association for having set fire in the forest to obtain work in fighting same. He was condemned before Magistrate

"For Valor"

"It is my belief, and I venture to assert it," declared the lecturer, raising his voice, "that there isn't a man in this audience who has ever done anything to prevent the destruction of our vast forests." A rather timid-looking man quietly arose in the rear of the hall and said: "I-er--I've shot woodpeckers."

Lacroix at Joliette to pay a fine of \$10.00, plus costs, and in default of payment to imprisonment in the county jail for one month. He spent his one month in jail. Fine \$10.00; costs, \$45.15.

Joseph Rivest, of St. Come, was prosecuted by the Association for having set fire to his slash during the prohibited season without first obtaining a written permit from the ranger. He was acquitted by Magistrate Lacroix at Joliette, as the witnesses favored the accused.

Ernest Bouchard, Louis Guerin, Doe Hervey, Philippe Claveau, Philippe Brassard, David Tremblay fils de Jimmy, Durgene Ellefson and Mederic Tremblay were prosecuted by the Association for having set fire to the forest while working on the improvements. Their attorney has since taken an injunction against the proceedings claiming that we had no rights to arrest them in the manner that we did. The injunction has not yet come before the judge.

Where Skilled Management Pays High Dividends

A Swiss Canton in 30 Years has Tripled the Annual Forest Cut
Without Decreasing Capital Stock.

It would be easy to show that several forest managers have reached the point of realizing a return which is greater than is the amount of the expense of administration solely by judicious management and intelligent sale of the products of their forest. As an example of this let us take the Commune of Couvet, Canton de Neuchatel, Switzerland. The forests of Couvet have a total area of 345 acres. They have been managed for thirty years by a technical forester. According to the plan of improvement and the control of operations we see by the table on the opposite page the development of the standing material and the production both in material and in money.

From 1883 to 1913 the annual cut

has increased from 42.36 cubic feet per acre to 128.49. It has thus tripled and that has been obtained without a diminution of the standing material. The latter has even slightly increased. It is necessary to note also that the proportion of larger timber, the most valuable, which in 1883 was only 18% is now 30%. The proportion of wood for manufacture in the annual cut also has increased from 56% to 69%. As to the return in money it has nearly doubled. The credit of such good result is due in the first place to the method of direct management which the Canton of Neuchatel has provided. Applied elsewhere in the same conditions there is reason to believe that it would not have less good results. Examples of it are abundant.

RESULTS OF THE OPERATIONS OF THE COMMUNAL FORESTS OF COUVERT
FOR THE PERIOD FROM 1883 TO 1913.
Forested Area, 345 Acres.

Year	STANDING TIMBER			Estimated Pro- duction per acre from the main stand. Big Tim- ber Cubic Feet.	Actual Cut per acre Big Timber Cubic Feet.	Proportion of building timber by percentage of principal cut.	Production in money per acre. Gross.
	Large Timber per acre. Cubic Feet.	By Sizes in Percentages.					
		Small 7.8-13.6 inches.	Medium. 15.6-21.4 inches.	Large. 23.4 inches, up- ward.			
1883	4236	32.8	49.3	17.9	35.3	42.36
1890	4264.24	30.5	49.3	20.2	73.42	105.9	\$ 9.36
1895	4306.6	27.7	50.3	22.0	86.13	103.07	12.24
1901	4306.6	24.8	49.1	26.1	101.66	114.37	13.68
1907	4405.44	21.5	48.4	30.1	105.9	128.49	16.88
1913					127.08		

Managing A Forest Reserve

A Description of the Varied Problems Confronted in Saskatchewan
—How the Reserves Help Their Neighborhoods.

By *Everett H. Roberts,*

Acting District Inspector of Forest Reserves, Prince Albert, Sask.

Saskatchewan is the keystone province of the West and to the casual observer this signifies a wheat producing country with vast expanses of treeless prairie and to any traveller who crosses her fertile lands on any of the three main lines of railway, his deductions would not be far wrong if he had only to depend on what he sees from the observation platform. But let his vision expand in this western atmosphere and enquire more fully into the matter and he will find that at present only about one-third of the total land area of this province is open country and treeless, except along the river banks perchance a few scrubs may be found. Roughly speaking, another one-third is forested area which fosters the next greatest industry of the province outside of wheat raising, namely, as you proceed northward mixed farming, cattle raising and the timber business. The remaining third is for the most part waste land at the north of the province which runs through miles of muskeg and lake country into the barren.

The central third or forested portion is that to which I wish to give most of my attention, as at the present time it is undergoing the most rapid development. This area, roughly speaking, lies north of the main line of the Canadian Northern Railway and south of the Churchill River and contains most of the

larger Forest Reserves in the Province. A very small percentage of this area is really adapted for agriculture and the government has withdrawn vast areas of this portion and put it into Forest Reserves with the object of preventing ignorant settlers from taking up worthless land which might give them a couple of crops after considerable expense in clearing it up, and further to protect what remaining bodies of merchantable timber have escaped the devastating fires that have swept this north country for centuries. Much of this land now contains thousands of acres of young vigorous forest growth which with protection will in time furnish the people of the province with lumber and fuel, when the present virgin stands have disappeared.

Fifteen Forest Reserves.

The government by a very wise policy has set aside for forest purposes fifteen Forest Reserves with a total area of approximately six million acres. These are divided into two classes, those in the north country which are essentially forest land, and those on the prairie which are usually sand hills or badly broken grazing country. It is the intention to eventually plant up these prairie reserves and thus aid in retaining moisture and affording shelter; and further, to provide some fuel and fence posts for the settlers. These areas are practically barren

at present with only a very scant covering of grass and in places the sand has commenced to drift very badly. The object of the larger reserves is to afford protection for the remaining merchantable timber that exists, also for the vast areas of young forest coming up. These big reserves are essentially forest land and not adapted under present conditions for agriculture, though there are numerous other uses to which they are being put under the administration of the Forestry Branch.

There will continue to be an increasing demand in the country for lumber which these reserves will eventually supply as well as fuel and fence posts which are in constant demand by the farmers.

During the past summer the Dominion Forestry Branch had about fifty fire rangers on duty patrolling this vast expanse of wooded country outside of the Forest Reserves. Travel was by foot, canoe, saddle horse and motor boat depending on the locality the ranger was in, it being his duty to be on the lookout for fires and put them out whenever found, to warn settlers and travellers about the danger of fire, and to keep trails and roads open so as to make the districts accessible.

Towers and Fireguards.

Besides these fire rangers who are employed only for the summer there are about forty forest rangers on the Forest Reserves who are employed the year around, their chief duties in summer being fire protection, supervision of the cutting of hay and grazing, also game protection. In winter the supervision of the wood cutting takes up most of their time not otherwise spent on improvement to the reserves.

These men on the reserves are supplied with houses to live in and stables for their horses; fuel and hay are allowed free, and there are as a rule, very attractive places where they have a small garden and

a pasture for their stock. Many of the Reserve houses have telephone connections, which are of material benefit in time of fire as are also the lookout towers which are built in locations where they give a very wide range of vision of the surrounding country. These towers have proved of very great aid in helping to locate fires and enabling the rangers to get to them in the shortest space of time. Fireguards are being cut and ploughed around the boundaries of the different reserves, thus furnishing a protection from fires that may originate outside of the reserve as most of them do, usually from settlers burning brush for clearing up their homesteads.

Along the boundaries of the reserves fireguards are cut from 12 to 25 feet wide and then three to five furrows are turned with the plow on each side of the clearing. All inflammable matter and brush is kept out and burned off the intervening space, and the plowed land is kept freshly disked whenever it grows up with long grass or bushes. In the early spring while the frost is still in the ground and the snow in the woods, the hay meadows and sloughs are burned off by the rangers with the aid of neighboring settlers, thus further insuring adequate protection from prairie fires.

Two-thirds is Waste.

The name "Reserve" when applied to these forest areas is rather a nuisance, for it gives the general public the wrong impression. They think that these areas are withdrawn from use, but this is not the case; for when these areas are set aside it is for the benefit of the public, all the people, and the small settler has just as much right as the big man. But when I say "use" I do not mean "abuse," which has been the case all through until the regulations were put into effect. The settler is almost as free on the reserve after it is created as before,

except that it is necessary for him to secure a permit from the officer in charge, thus enabling the Department to keep a record of his operations and not let him abuse the privilege he is granted to the detriment of his neighbors. He may secure a permit to cut wood, building logs, rails, fence posts and fuel at very reasonable rates, the Department merely requiring him to eliminate all unnecessary waste by cutting low stumps and utilizing the tops to their smallest diameter; also to burn his brush in order to clean up the woods and remove the fire danger that would exist if this material was left to dry and scattered all over the ground. Certain areas are set aside in each reserve where the settlers are allowed to cut and these places are chosen so as to be as convenient as possible for everyone. Enormous waste has taken place through all the wood operations in this country by both the lumber man, cordwood and tie operator and the settlers in getting out wood. It is a known fact that only about one third of the tree reaches the consumer after passing all through its many phases of manufacture. Is it not self-evident then that most of the remaining two-thirds is wasted and lost unnecessarily? Most of it is left in the woods to rot or burn when the fires get into the old slashings and are almost impossible to control doing great damage to all young growth that has sprung up since the original cutting off of the areas.

At the Nursery.

An experimental nursery has been in operation for several years on one of the reserves in order to determine the tree species most adaptable for planting up the barren areas. Plans have been drawn up for planting on a number of the smaller reserves and we expect to plant a portion of each of the prairie reserves during the coming year. Much care and forethought must be exercised in this work and through the co-operation

of the Indian Head Nursery plants are secured to carry on the work. The Forestry Branch through the Tree Planting Division at Indian Head has for years been supplying the farmers, free of cost, trees for planting around their farms and now it is time that it was planting up some of its own non-agricultural land in the same manner.

The Grazing Problem.

The provincial authorities have for the past few years been trying to encourage the live stock industry as much as possible; and I may say that the Forestry Branch is heartily with them in this as many of the reserves afford excellent pasture which may be utilized by the settlers or stockmen under a permit system which is very reasonable. In some localities the settlers have formed stock associations to jointly fence large portions of the reserve, in which they may run their cattle during the summer season while the crops are growing.

Many of the settlers avail themselves of the opportunity of securing wild hay or prairie wool from the reserves which they may get at a very small rate of ten cents per ton. In some instances where stockmen graze their cattle during the summer season on part of a reserve they are able to winter them over on another part where they have put up hay. These men are permitted to erect corrals and buildings for their stock and the accommodation of their herders.

Public Not Excluded.

The public use of the Reserves is encouraged. Summer resort lots are leased for a long period at a small fee of \$5.00 per year, the Department merely requiring the owner to erect a small house to the value of \$300.00 and keep same in a neat manner. Small portable saw-mills are allowed to operate, in order to turn out rough lumber for the settlers. The prices charged by these millmen are regulated and the settler secures the

logs from the Reserve at a very low figure. In many cases a homesteader is allowed a very liberal amount free for the erection of the buildings.

Most all the forest rangers have been appointed game guardians by the province and assist to enforce the game laws. Most of the Reserves have been declared game refuges and no shooting, trapping or injury of any wild animal is permitted. If this protection is continued for a number of years these refuges will become fine game reserves, from which all variety of game will overflow into the surrounding country and thus provide a perpetual supply of good shooting and sport for the people in the surrounding communities. Fishing is permitted with hook and line but not by nets, which in a very few years might deplete the quantity in any one locality. This provides for much recreation and sport when the public visit the numerous lakes in some of the Reserves and spend days in having a pleasant camping party and a little fishing on the side; and with the game protected are to be many times rewarded for a little patience in seeing a beaver build its house, or hear the call of a moose, or possibly get a photo of a deer.

The Forest Reserves are an ever increasing benefit to the community and do not permit of their resources becoming monopolized by private parties, but are for the benefit of each and every individual.

Mr. J. D. Gilmour, recently District Forester at Cranbrook, has been transferred to the head office, Victoria.

Mr. H. B. Murray, formerly District Forester, Kamloops, is now in charge of the Cranbrook District, and Mr. E. B. Prowd is Acting District Forester for the Kamloops District.

Foresters and Lumbermen Unite at Meetings.

The Foresters' Club of Ottawa, which has done good work for the past three years, has decided to enlarge the scope and in addition to having forest engineers and forest administrators come together for mutual counsel and benefit, will draw upon the fund of experience gathered by lumbermen, particularly in regard to forest protection. This new policy was put into force at a recent meeting. The chair was occupied by Mr. R. H. Campbell, Director of Forestry, president of the club, and there were present representatives of the forestry, entomological, horticultural and seed branches and Railway Commission, Commission of Conservation and geological survey and also of fire-protective associations and Ottawa lumber firms.

The speaker of the evening was Mr. Clyde Leavitt, chief forester of the Commission of Conservation and chief fire inspector of the Railway Commission. Mr. Leavitt spoke on the work of the convention of lumbermen and foresters held at San Francisco during the recent exposition. This was followed by a general discussion in which the point was brought out that the belief of all present was that the only way to cure the forest fire menace was to have thorough and hearty co-operation among all responsible for forest protection. The work of the St. Maurice Valley and Lower Ottawa forest protective associations was endorsed and their good results recounted.

These meetings will be held periodically and a number of those connected with lumbering have signified their intention of being present. During the work of the evening, a resolution was passed expressing the sympathy of the club with the family of the late Mr. A. Knechtel, forester of the parks branch.

The Authority of a Fire Ranger

While I have noted and read many articles and suggestions of considerable value to those directly interested and responsible for the welfare and protection of our forests from destruction by fire, I observe that there is one matter which not only requires attention but is of vital importance and worthy of serious consideration and early action, if we are to continue to improve our fire protective organizations so that they become a recognized force in the land and gradually reduce the enormous losses caused through careless or thoughtless setting out of fires.

More Backing Required.

The subject in mind is the great need for a "New Fire Ordinance," especially in the three western provinces. Fire rangers are appointed each year for the sole purpose of protecting our forests from fire; an ordinance known as "The Prairie Fires Ordinance" is their only legal guide, under the statutes of which they are given no more authority or power to enforce the act than any citizen of good standing. Unlike game guardians or other officers appointed to administer the law and

protect our interests, who are granted the authority to arrest and bring before a magistrate or justice of the peace any offender, the unfortunate fire ranger may catch a person in the very act of setting fire to a valuable tract of timber, and the only action he can take is to proceed, after extinguishing the fire, to the nearest magistrate or justice of the peace and swear out a warrant for the arrest of the offender. I would ask your readers where they would expect to find the culprit, after possibly making a two days' journey by canoe to swear out a warrant?

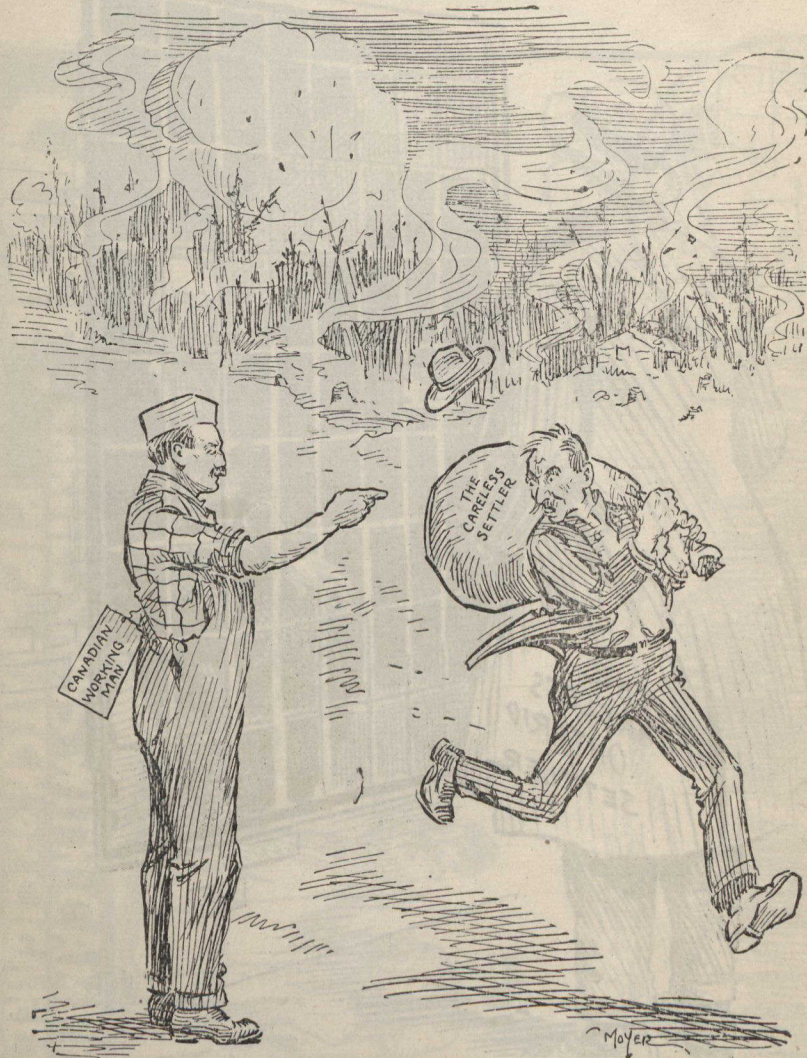
Rangers Powerless.

The very reason why so many people are careless with fire is, because they are posted in the law of the land and know there is very little to fear from their local fire ranger, who, under the present act, is given a more or less burlesque position.

I would suggest the issuing of an amendment to "The Dominion Forest Reserves and Parks Act," granting the necessary authority to the rangers and extending the jurisdiction of the act to cover all Dominion and Crown lands.—T. McN.

The New Cartoon Service

The cartoon is a weapon which should be employed for forest protection as powerfully as it is used in politics. During the past six weeks the Canadian Forestry Association has undertaken to issue a regular cartoon service to newspapers, and the first three sent out to dailies and weeklies show a cordial reception from editors. An effort will be made to prepare two each month, dealing not only with forest fire protection but other important aspects of forest conservation. The best Canadian cartoonists are employed for the purpose and 150 duplicates in the form of stereotypes and paper matrices have been placed with newspapers. Quebec Province cartoons will be issued with regard to the necessities of the dual language. All expense in connection with this service is borne by the Association. After giving prominent space to one of the cartoons the publisher of a leading Ontario newspaper wrote: "Many thanks. If you have any more cartoons as good as this which you are passing out to your friends, we trust you will not overlook us." Other publishers appear to receive the cartoons in the same generous spirit. A few examples are reproduced in the following pages.



Canadian Forestry Association

The Man-in-Overalls: "How dare you set that forest afire?"
The Fugitive: "I don't see that it's your business."
The Man-in-Overalls: "You don't eh? I represent 110,000 Canadian workmen who get their living from forest products. You people who burn down the timber are worse enemies to Canadian labor than all the alien dynamiters put together."



Canadian Forestry Association Ottawa

The Visitor: "What crime brought you here?"

The Man in Stripes: "I burned down a fifty-dollar shed."

The Visitor: "Great Scott! We settlers burned down a million dollars' worth of Ontario's forests last summer and nobody said 'Boo!'"

(Newspaper note: "Eighty-five out of every hundred forest fires in Ontario during 1915 were caused by careless settlers. Unlike British Columbia and Quebec, settlers in this province have no supervision of their clearing fires during the danger season.")

**CAUSE = CARELESSNESS WITH CAMPFIRE
PIPE, MATCH OR CIGARETTE**





Fire Automobile in Rocky Mountains Park, Banff, for transporting portable fire pump, hose and other tools.

Better Apparatus for Fire-Fighting

By H. C. Johnson,

Fire Inspector, Board of Railway Commissioners.

Much has been done or suggested in the prevention and discovery of forest fires, but we have heard very little of progress being made in the methods of extinguishing fires. Apparently this most important phase of protection has been neglected. Modern management of forested areas, and modern trend in the discovery of forest fires bids well to far outpace the present methods used to extinguish fires. In the matter of extinguishing or combatting forest fires a review of present day methods does not show up very well when compared to the gigantic strides made in the modern methods of attacking fires in our cities and towns. An extract from the annual

report report for 1911, United States Forest Service states as follows:

"An analogy has often been pointed out between protecting forests and protecting cities against fire; this analogy is worth reiterating. City property cannot be made reasonably safe unless there are, first: regulations to lessen fire risk in the form of building ordinances, rules regarding combustibles, etc.; secondly: a considerable investment in signals (fire alarm boxes), fire fighting apparatus and quarters, and thirdly, an adequate and well-organized force of disciplined men suitably located. So forests must

be guarded against causes of fire and conditions favorable to its spread, must be equipped with means for discovering, reporting and reaching fires and must be manned with a reliable body of fire fighters, stationed at the points of greatest need."

In my opinion, to this should also be added modern mechanical fighting apparatus with which to fight forest fires.

Many forest fire fighters have placed their views on record in this particular direction and in the words of one of them: "It was found that merely the quick and accurate locating and reporting of fires in conjunction with the old methods of fire-fighting with pine tops, wet gunny sacks, shovels, etc., did not by any means suffice for fire control." Again I quote the utterances of another: "It was found that the most energetic use of the old ordinary methods of fire fighting was entirely inadequate."

Need of Better Apparatus.

The question of supplementing the old fashioned fire fighting equipment, namely, the pine top, gunny sack, axe, shovel, mattock and water pail—for old-fashioned they are in these days of modern trend toward mechanical devices, has been one of the problems under consideration by the officers of the Dominion Parks Branch, Department of the Interior of Canada, for some considerable time. It was conceded there was a need for some mechanical device that would place in the hands of forest fire fighters a means whereby water could be taken from a natural or artificial source of supply to the scene of a fire in sufficient quantities that would make the use and adoption of such mechanical devices practicable.

The aim was to devise some mechanical method of transporting water from the nearest source of supply to the fire. This meant the

adoption of a suitable type of engine and pump with water line. After studying various types and arrangements of engines and pumps and keeping in mind the vital question of weight, portability and easy manipulation, a marine type two-cylinder gasoline motor was decided upon to supply power. This was coupled to a special rotary pump and the whole and necessary attachments were mounted on a single base. The principle worked out is based somewhat on city fire fighting methods, that of engine, pump and hose; in practice, the placing of the engine and pump at a source of water supply and forcing water through a line of hose to the scene of a fire. There were, however, many factors that had to be taken into consideration, principally that of portability, which governed weight. Three other features, to which much attention was given were quantity of water per given time, distance, and height water could be delivered. These features combined were in turn governed by the amount of power it was found possible to develop, which in turn was governed by the greatest amount of horse power it was possible to get out of the assembled parts without exceeding a fixed weight. Ultimately a gasoline portable pumping unit No. 1 was built. This outfit will pump approximately 20 gallons of water per minute, and has actually in tests lifted water 172 feet, vertical height. In a capacity test, water was pumped through 1,500 feet of 1½ inch hose to a height of approximately 85 feet. A description of the outfit in detail follows:

Base of Aluminum.

Engine, marine type 2 cylinder, 2 cycle, water-cooled, rated 4 to 5 H. P. Exhaust manifolds of copper, Ignition, Bosch magneto, driven from fly-wheel shaft. Circulating water is taken from delivery side of pump and regulated by a small valve.

Lubrication, sight feed to shaft bearings, cylinders, pistons, cranks and crank pins by mixture with gasoline fuel supply. Crank encased. Fuel supply by gravity system. Fuel tank holds one gallon of gasoline. Base of aluminum bolted to oak baseboard.

Pump, bronze rotary, 2-inch suction, 1½-inch delivery. Capacity 20 gallons per minute.

Engine and pump are coupled direct. The overall dimensions are approximately as follows: 21 inches high, 17 inches wide and 28 inches long, and the combined weight, complete with gasoline tank holding one gallon of fuel, couplings for suction and delivery hose, pressure gauge, oak base-board and carrying handles complete, ready to run, is 135 pounds. At first, one-inch rubber-lined cotton hose was used. It proved, however, too heavy and it was decided to use 1½ inch diameter linen hose; 1,500 feet weighs 240 pounds complete with couplings.

Tests Satisfactory.

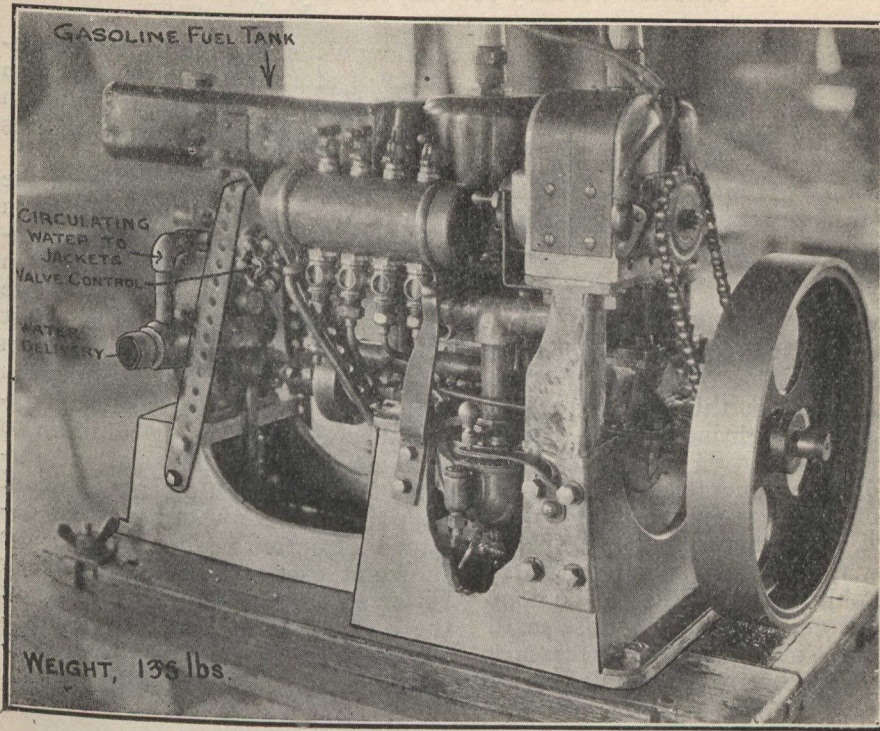
The method in which it is proposed to use such apparatus is in units of two or more according to conditions prevailing in the territory in which they may be adopted; each unit relaying water by the use of canvas tanks. In this manner, No. 1 pump, placed at the source of water supply, pumping into a canvas tank, would supply No. 2 pump, which in turn would supply a third outfit, and so on. Under ordinary conditions, when the ground is practically level, two pumps, by relaying should supply water approximately 2,500 feet from the source of initial supply. In country which is rough and mountainous, it might be possible to have No. 1 outfit deliver water only 500 feet away, but 150 to 170 feet above the point of suction, and then No. 2 outfit would relay a further 1,000 feet, and 75 to 80 feet more elevation, so that water would be delivered 1,500 feet from the point of suction at approximately

245 feet elevation. No. 1 outfit has already been used in practical work in the Rocky Mountains Park at Banff, controlling slash-burning operations. Those in charge report that the whole apparatus was given a very fair four-day test while burning large piles of brush and small timber and undoubtedly enabled the fire to be kept within the required area. Water was taken from the river and pumped to points where required, varying from 50 to 150 feet above water level. A pressure of 90 pounds was developed and a stream of water was thrown about 40 feet from the nozzle. It enabled the brush to be burned in large piles within a clearing of 40 feet in very dry weather without scorching the trees. The fire was kept within bounds and completely extinguished before leaving in the evening. By holding the nozzle close to the edge of the fire, a ditch from four to six inches deep was made all around the fire, at the same time saturating the ground. Calculating the pump discharged 20 pails of water per minute, and allowing a man 10 minutes to carry a pail of water over the same distance pumped, a speed which could not be maintained long, due to the hilly nature of the country, it is evident that the pump did the work of at least two hundred men, thus showing its great efficiency in this direction.

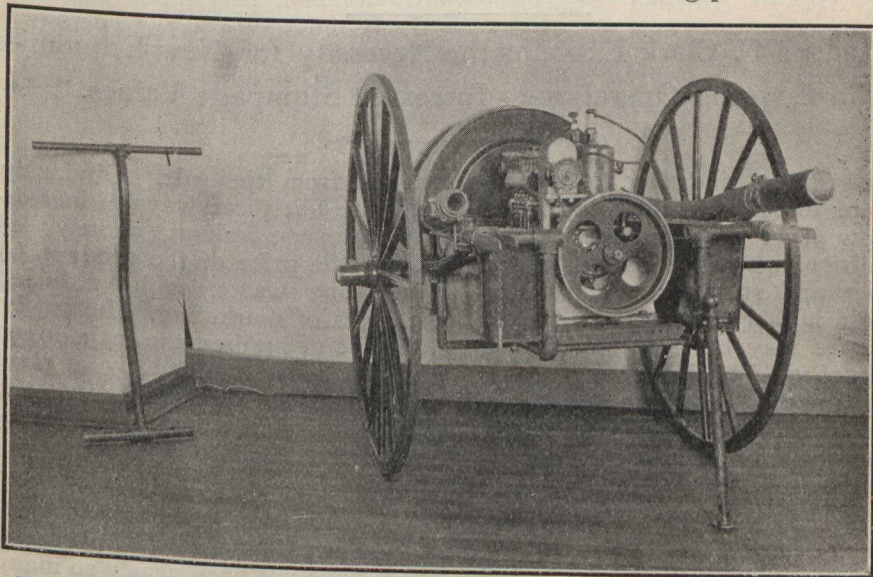
Simple to Transport.

For the rapid transporting of the outfit and necessary hose along any of the roads in the Dominion Parks, an automobile chassis equipped with a suitable box body, into which the outfit is loaded, enables any point along any of the roads now existing in the Dominion Parks to be reached in a very short time. For carrying over suitable trails, a specially designed truck was built to be either hauled by hand or horse power, the gauge between the wheels being three feet.

The outfit can also be packed on



pack-horses, and by having the fly-wheels of the engines made detachable to reduce weight, by using a suitable frame of light construction, two pumps can be packed on one animal, the hose being packed likewise.



Engine Truck.—Carries engine and pump forward. Reel holding 200 feet of one-inch hose in rear. Suction with coupling and strainer and auxiliary gasoline-tank holding five gallons also lubricating oil tank holding one gallon. Tool box. Water pails and other tools that can be strapped to frame.

Where it is impossible to take pack horses the outfit can also be carried by two men. In territory where there are numerous canoe routes, as for instance in the Algonquin National Park of Ontario, little difficulty should be experienced in transporting one or more such outfits in canoes.

Other Uses of Engine.

There are many ways in which the use of a portable outfit of this type can be used in the forests besides the actual fighting of fire. Such uses are back-firing and controlling slash-burning operations. The question of water supply can be taken care of, where natural supply is lacking, by the artificial storing of water at suitable points. This can be done by construction of dams across small creeks to impound the necessary supply of water or by the sinking of

shallow wells, or other artificial methods of storing water. Usually in forested territory water is found in valleys, where the majority of fires start.

The writer does not advocate the adoption of mechanical apparatus in a haphazard manner. Such apparatus will only be used successfully in conjunction with other up-to-date fire-protective measures. One most essential feature is the preparation of forest-plans of the territory in which it is proposed to use such apparatus. Such plans, in addition to showing the usual physical and forestry features, should show in detail all points where water can be obtained. Contours should also be shown at least every hundred feet, or better still, every fifty feet. And at the back of it all must be a thoroughly organized force of men suitably located.

The Handicap on Forestry

Dr. Judson F. Clark Explains the Necessity for New Economies in Logging Operations—Increased Stumpage Values.

The greatest hindrance to the progress of forestry in this country is the low level of stumpage values. In Europe, where labour is much cheaper and stumpage values several-fold higher than with us, forest properties may be maintained on a perpetual yield basis and pay a fair return on the investment. What obtains in Europe to-day will obtain in America to-morrow. The practical question is, "How may we hasten it?" In a large measure the answer to this question will be found in the development of the art of the logging engineer.

Stumpage is that which remains when the cost of marketing the forest product has been paid out of the

returns from the sale. Obviously, there are but three ways of increasing stumpage values, namely, by raising the price of the product, by eliminating waste, or by reducing the costs of marketing. Unhappily, the price of lumber, the main forest product, is determined by a great variety of considerations, most of which are wholly beyond the control of the friends of the forest.

Use of By-products.

The utilization of materials previously wasted makes slow progress. There have not been nearly so many by-product developments as could be wished, and every step in advance—no matter how rich in early promise of good financial returns—

largely defeats its own hopes on account of the overwhelming supply of raw materials on the one hand and market limitations for the product on the other.

Until lumber prices substantially and permanently advance, the main hope of bettering forest finances, and thereby widening the field where forestry may be practised, rests in lowering the costs of marketing the forest crop.

The cost of marketing the forester's crop may be roughly divided into logging costs, milling costs, lumber transportation, and selling costs.

The sawing and finishing of lumber, together with lumber transportation, have already been highly standardized. No doubt many further economies will be effected in these departments from time to time. A start, which has every promise of large results, has already been made in the, heretofore, much neglected field of lumber salesmanship. But perhaps the largest field for economies is that of logging, and the hope for greater efficiency in this quarter is in the development of the art of logging engineering.

The Science of Logging.

As agriculture calls to its aid so much of the sciences of chemistry, physics and biology, so the logging engineer, in the development of his profession, takes toll from the whole field of mechanical science, and calls for much of the best that has been produced by that modern alchemist, the metallurgist. No occupation calls for greater resource and adaptability. Every logging unit differs from every other in the complexity of variations in topography and stand; of the thousand ways in which logging may be done there are not many profitable ways, and there is, of course, only one best way. The man who knows and can effectively carry out one or more of these better ways is a potential logging engineer.

The successful logging engineer of the past has compelled success by a more than average ability and adaptability. How may the average logging foreman improve his methods and thus take the first steps to qualify as a logging engineer? Must it not be through bringing to him the results of the best thought of the thousands of men who are devoting their lives to this work?

The graduate of the forest school, with a special training in the department of logging engineering, may hope to be of considerable service to a logging company from the start, but, to be of the greatest service in the end, he must be willing to start his practical apprenticeship at the bottom and work up.—Dr. J. F. Clark, of Vancouver, B.C.

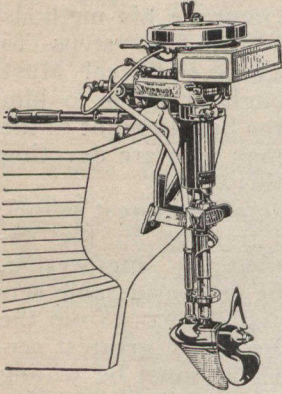
"The Forests of the District of Patricia"

In the February issue of the Canadian Forestry Journal will appear an article under the above heading by Mr. J. B. Tyrrell, M.A., F.R.S.C., F.G.S., the well-known mining engineer and explorer, who was delegated by the Ontario Government to report upon the resources of the new District of Patricia and the harbor possibilities at the outlet of the Nelson River. No one in Canada is better fitted to handle an informative discussion of the forests of Patricia and the article is done with Mr. Tyrrell's usual skill. A number of excellent photographs will illustrate the text.

Mr. L. R. Andrews, formerly District Forester at Vernon, is now in England, a lieutenant in the Canadian Expeditionary Force. Mr. G. P. Melrose is now Acting District Forester for Vernon District.

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How Japan Fights Fires

Patrol methods are followed in protecting Japanese forests from destruction by fire, a ranger's district covering from 5,000 to 6,000 acres. Volunteers fight the fires. When areas are cleared for reforestation, lines of about 40 yards in width are left open, and kept clear to prevent the spread of fires. In Japan there are seven major forest districts, and within these are 205 subdivisions, all under comprehensive control. Areas may be cleared for farming, but in Japan the farm units are small, averaging only three acres for each farm.

White Bark Pine's Range

Some new northern range marks for *Pinus albicaulis*, the white bark pine, were reported last summer by members of the British Columbia Forest Service. Mr. H. R. Christie found some rather large trees grow-

ing at the western end of Eutsuk Lake, and also on the shores of Whitesail Lake, a smaller lake immediately north of Eutsuk and separated from it by a short portage a little over a mile in length. The latitude is about 53° 30' and the altitude of the lakes in the neighborhood of 3,000 feet. The lakes lie at the extreme western margin of the great interior plateau region, directly against the eastern side of the Cascade Range, which extends along here like an enormous wall.



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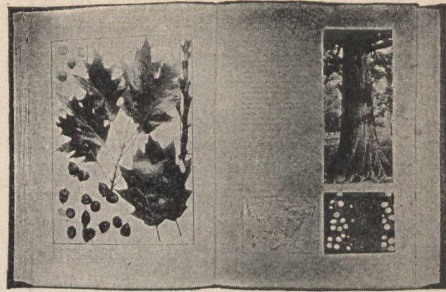
Marble Arms & Manufacturing Co.,
5160 Delta Avenue. Gladstone, Mich., U.S.A.

"Somewhere in Belgium"

(The following interesting letter was received by Mr. R. H. Campbell, Director of Forestry, from Mr. A. E. Wyatt, who was employed as clerk in the office of the Tree Planting Division at Indian Head:

Rest Camp, Somewhere in Belgium,
Dec. 5, 1915.

"Words can hardly convey the pleasure the receipt of your Christmas card, photographs and typed note regarding the case of apples, gave me. It is as good as a physic getting such kind remembrances from dear old Canada and from employers with whom I was working such a little while. It only makes one keener, if possible, to once more take up the work which was getting so very interesting. I shall look forward with great relish to the case of apples and I will of course notify you of their arrival. The photos are excellent and a happy reminder (two of them) of some happy days spent at Indian Head and if I am spared I shall lose no time in getting back there. I have sent the photographs to my wife for safe-keeping as in our valises or haversacks they would stand a very poor chance indeed. I hope you are and have been keeping well during the year, I was glad to hear from Mr. Norman Ross some little time ago to the effect that they had had a very satisfactory season. Also, apart from this, that the crops of Saskatchewan, and in fact all Canada, have been good. Canada has certainly earned a good name for herself over the troops she has supplied and is still ready to supply. The boys of the first contingent just certainly made a great name for themselves and things have gone excellently with their contingent. We were not over here much over two or three weeks before we were order to take over a front line of trenches. These particular trenches we hold now. At one point, known by us as the "glory



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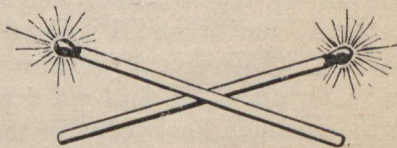
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hole" we are only a distance of 35 yards from Fritz and sometimes quite a comic conversation has been carried on between ourselves and the poor beggars opposite. On the Kaiser's birthday I should imagine they must have had a pretty heavy ration of rum for they were very hilarious. They once set off a mine under one of our companies and did some ugly damage, but they paid very heavily indeed for it for we gave them a heavy dose of pills in the shape of "coal boxes" and wizz-bangs. We have had, of course, some very uncomfortable times in the trenches recently owing to the rain and mud. The latter for five days was up to our knees and entrance and exit to the trenches was sorry work as it had to be done over open ground. I hear that snow is now well on the ground and I do hope that things are well at the forestry station. I trust you will excuse my writing this letter in pencil but ink is a rare commodity in these parts. Thanking you once again for your kind thoughts, which have been appreciated more than I can say, I must now close, hoping you will have a Happy 'Xmas and that the New Year will bring you good luck and the best of health."

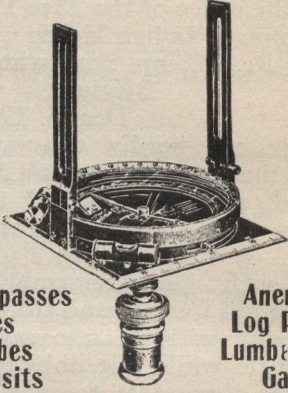
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Settlement and Forest Protection Near Cochrane

By Judith Kingdon in "Saturday Night."

EDITOR'S NOTE.—The attention of readers of the Journal is called to the following article in Toronto Saturday Night. According to the author of it the general conditions of Northern Ontario in the neighborhood of Cochrane form an incentive to deliberate forest destruction.

As something very worthy their attention, I should like to see the Government of Ontario make a thorough and exhaustive enquiry into the waste of human energy and hope, and their possible conservation, in the settlement of the northern part of their province.

It should be made possible for the first man who takes up a lot to stay with it and succeed. As things are now, a large percentage of those who take up lots, after one year or two years, or three years, decide they cannot make it go, so they leave. Should the settler be given his lot with a few acres cleared, stumped and ploughed, giving him a better chance to stay on his lot? The charges against this improvement could be made payable at some future date when the farm was a going concern.

It is true a great deal of road work has been given the settlers, but when they are doing this work is the time they should be logging up and stumping on their lots. They cannot stump in the winter. Many settlers have left since the road work stopped.

Nor can the average settler make a living out of his timber. The government tells him he can sell every stick on his lot. This is really true. He can—but not at a profit, often at some cost. A man I know has just sold some pulp-wood. On every cord he sells he loses nearly a dollar.

But since he has it cut, he must do that or suffer a total loss. He is not going to cut any more pulp-wood. It is the same with fire-wood and saw-logs. Only those near a station, siding, or mill can make even wages. The haul kills it. Moreover, the settlers are scattered, and one team can keep the road open only with the greatest difficulty, on account of the depth of snow and its sand-like quality. He usually cannot draw a full load.

Timber of a size suitable for saw-logs is mostly scattered, making the cutting and skidding too expensive. If much small stuff be cut, again the haul kills any profit on account of the extra number of slabs. If he live far out, he cannot give away his timber on the stump.

When the settler has "burned his fingers" this way, or watched his neighbor go in the hole, he begins to think favorably of fire. If he can fire his bush standing, he is inclined to do so. Then the stumps are rotting and the dead trees keep constantly blowing down. After that he tries to coax the fire through each summer, burning much of the fallen stuff and weakening the stumps. Incidentally he burns off all his black muck, so he may later have to persuade a crop of clover to grow to be turned in. He also quite frequently burns out several of his neighbors or himself.

Dean Adams on Forest Preservation

At a recent meeting of the Montreal Forum, Dean Adams, of McGill University, spoke very strongly about the need of safeguarding our forests. This is a subject which has been brought to the attention of the public so much in the past that doubtless a considerable number are weary of it, but there seems no other way to arouse public opinion than by this process of reiteration. The question is too important to leave to individual effort. A progressive firm or individual here and there becomes so impressed with the national danger that action is taken, but the great mass of those concerned do little or nothing in the matter. It is just for these that Dr. Adams' warning is published.

After showing that our forest areas were being depleted at a rapid rate, he went on to point out that the forests in the Northern belt were not of such value as those in the Southern belt, but in the latter the really good timber was seriously depleted. One-half of the total timber in the Dominion was located in British Columbia. There had been enormous destruction of forests in the past, the lumbermen having cut out the trees in such a way that the latter contributed to the spread of fire, and more timber had been burned down than had been cut by the lumbermen. In some instances the fires had so seriously affected the soil that replenishing was out of the question. Dr. Adams referred to the methods of the St. Maurice Forest

Protective Association, and of the Lower Ottawa Association, to guard against fire, and said their efforts were examples of what could be done to resist fires.

It was supposed by some that the northern forests were inexhaustible; surveys, however, showed that this was a mistake, and it was possible that our forest wealth could be exhausted. How could we conserve our forests? We could protect them from destruction by fire, and he was glad to note that in British Columbia efforts were being made to this end. We must also replant our forests, and follow the example of European countries, where reforestation had proved successful. He suggested in particular a scheme for conserving the forest resources in the northern belt, so that the country would have a permanent source of supply which would bring in a large annual revenue. The reason why such a scheme was not carried out was to be found in the changing character of governments, who preferred to pass it on from time to time rather than incur the great expense. A strong public opinion was needed in order to force a government to take up this question; it was only in this way that any government could be compelled to make the necessary expenditure.

One thing is certain. Our forests are not inexhaustible, and further, there is little or no concerted action on the part of the authorities to safeguard and preserve them. Action is needed.—(Pulp & Paper Magazine.)



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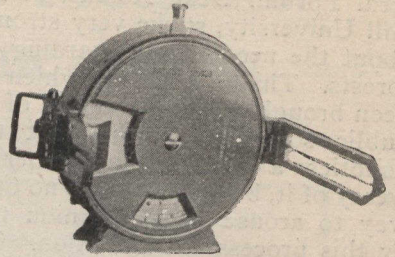
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