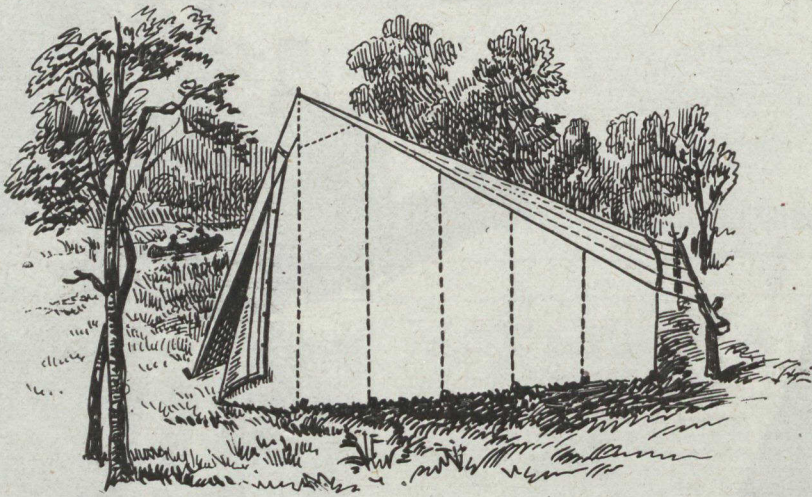


# Canadian Forestry Journal

September

1917

# TENTS



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# Canadian Forestry Journal

Vol. XIII.

WOODSTOCK, ONT., SEPTEMBER, 1917

No. 9

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The Canadian Forestry Journal will be sent to any address for one dollar a year, subscription including all other publications of the Canadian Forestry Association.

*Address all Communications to*

**THE CANADIAN FORESTRY JOURNAL**  
119 BOOTH BUILDING, OTTAWA

Printed by the Rod and Gun Press, Woodstock, Ont.

Entered at the Post Office at Woodstock, Ont., as second-class matter.



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**BOY FORESTERS MAKE WORK A HOLIDAY.**

A busy scene in the forest bracken at Campsey Ash, Suffolk, where boys from Framingham College are shaping for the market many trees that fell in the gale of March, 1916.



*Photo by A. M. Black, Nelson*

The process of building a fire ranger's cabin at Duncan River, British Columbia.

# Establishing a Plantation of Conifers on the Prairies

BY A. HARDING, LOUGHEED, AL'TA.

## What Trees to Plant and How to Plant Them—as Shown by Experience.

The planting of belts of trees on the prairie is becoming more extensive each year and the questions which are foremost in the minds of those who are undertaking the work are:

1st. What species of trees are best adapted for the soil and situation where it is intended to place the woodlot?

2nd. Where can they be obtained in the most economical and satisfactory way?

For most districts, the valuable native conifers, especially the white spruce, should be favoured above all the species of trees which can be grown on the plains and partially wooded areas of the west. They not only excel other trees in usefulness for the protection of buildings and stock but their drought-resisting nature and the comparative ease with which they can be grown place them foremost in the list.

Pines and spruce are rapid growers when once past the seedling stage and for a sustained growth and long life they must be placed in the shelter of other forest trees which are indigenous to the west.

Persons living within a moderate distance of a spruce or pine woods may obtain young trees for planting by carefully digging up the seedlings which are usually to be found at the edge of the forest or in openings which have been created by fires or logging operations. Preference must be given to those which are growing in the most exposed and sunny locations. The soil can be easily washed from the roots for convenience in packing and then the trees placed closely together in small bundles and

their roots wrapped in wet moss for transportation. It is usually best to take trees from 6 to 12 inches in height, though slightly larger ones may be successfully handled.

### *The Planting Method*

The trees should be carefully planted in the garden or in other specially prepared soil, setting them slightly deeper in earth than they were originally and cultivating them for several years until a suitable size for permanent planting is reached.

People who are too great a distance from the woods to procure their own trees, can have some one who lives by the woods dig up the seedlings, taking great care never to allow the fibrous roots to become dry for an instant, then packing the roots closely in wet moss and placing in a box lined with burlap or other sacking and shipping to destination by express. This plan has been carried out with perfect satisfaction by the writer.

### *Preparation of Soil*

Preparation of the soil for the plantation ought to be started early in the year previous to setting out the trees in order to conserve moisture and otherwise obtain a suitable condition for the trees. The soil should be plowed to a depth of 9 to 10 inches so that the tree roots can readily penetrate to a sufficient depth to withstand drought and become firmly rooted in the earth.

### *Spruce and Pine*

Spruce and pine should be lifted with as much earth as is permissible for handling and spaced 4 by 5 feet or 5 by 5 feet apart in rows.

In districts which have a fairly heavy average rainfall and where it is difficult to give time to cultivation, satisfactory results will be obtained by placing a light covering of hay or straw around the tree for a distance of about one foot and giving no further attention to cultivation except to cut down weeds. The light mulch will prevent weeds from crowding the trees and keep the soil from checking and readily becoming dry close to their roots. Where the annual precipitation is scanty, shallow surface cultivation can be given for a few years until the trees are firmly established. Cultivation should not be continued after August 12th.

In an experiment with two plantations of mixed spruce and pine, one was planted and mulched as described above, while the other received cultivation for several years. The results at six years from the time of planting were somewhat in favour of the uncultivated one, which indicate that cultivation is not essential where an ample rainfall occurs.

The height growth of spruce when once well established is commonly from eighteen to twenty-five inches and the growth of pine considerably more.

Where it is intended to carry on the planting of conifers for a long period of years no better method of procuring stock can be found than by growing it from seed, but several years can be saved by getting the young tree to start the plantation with.

Pines should be transplanted at two years and spruce at three or four. Spruce which have been allowed to stand in thick clusters in the seed bed until they reach a height of two feet can be lifted in blocks and the soil soused in water until the roots come apart and then be planted with as good success as the smaller trees.

Instructions for the care of the seed bed can be obtained through publications treating of nursery work.

#### *Size of Trees for Planting*

A suitable size for planting is two to three feet. Trees of this height are more expensive to handle but

they will escape injuries from grouse and other agencies to which smaller ones are more subject.

#### *Time of Planting*

Conifers are usually planted in the spring before growth starts, but where time cannot be taken for the work at that season of the year, equally good results may be had by planting from the 15th to the 25th of August, as the height growth is finished that date.

#### *Protection from Snows*

Where the plantation is exposed to drifting snow it is necessary to erect a snow screen at a distance of sixty to seventy-five feet from the plantation during the winter.

### **WASTE AND THE SMALL JOBBER**

"Noted improvement has taken place in recent years in logging waste, due to better market conditions and a growing market for inferior materials. This is not always the case, however, when logging is done by contract and one meets with considerable waste in high stamps, logs left lodged in the woods, oversized tops, etc. On some operations observed, this waste amounted to 5 to 10 per cent. of the stand.

"This could be prevented by a system of logging inspection and would not only pay for the inspection in increased stumpage but would be money saved for the operator. The fault is due largely to the fact that yearly contracts are made for logging, the logger trying to keep the cost per thousand at a minimum. The contractor's sole object is to make as much profit as he can (frequently little enough) and he will not take out difficult lodged trees or go to any particular trouble to cut low stumps unless checked up."

From Annual Report, Department of Lands, Fredericton, N.B.

### **CHESTNUT BLIGHT**

Chestnut blight has already done damage in Pennsylvania estimated at from \$9,000 000 to \$10 000,000. No tree attacked by it has been known to recover, although dozens of fake remedies have been brought out.

# Four-Thousand-Year-Old Sequoias

BY ERNEST G. DUDLEY

## Giants of California That Knew This World Ages Before Julius Caesar.

Thousands of tourists gaze at the "big trees" of the Sierra, with unseeing eyes, and then, content that they have seen all there is to see and know all there is to know, return home.

Alas,—if the Forester only knew as much as they!

The poet, as he watches the last dying glow of a California sunset enhance the already inconceivably rich coloring of an ancient Sequoia, murmurs to himself "deepening shadows," "forest dells," and "patriarchs of the forest." Artists vie with each other in their efforts to paint them and think of the colors,—reds, browns purples, and greens, and feel the soft elusive haze which their brushes cannot reproduce.

Scientists, with minds intent on prehistoric geologic history, topography, and the dynamic changes in earth's crust and climate which destroyed great forests of big trees, only to leave a few relics of past ages for man to wonder at, gaze with admiration on their beauty and vitality. All in their turn pay homage to the largest, oldest, and grandest tree that nature ever produced.

And the forester—perhaps a poet and a scientist at heart, works among them. Sunrises and sunsets he has seen of which the artist has only dreamed. He has heard the soft murmur of breezes mid their tops, high up in the clear blue California sky, and again the crash and roar of the storm king, which with inexorable fury, strives, as he has striven thousands of times before, to uproot and cast them to earth. He has marveled at their power of resistance, and with awe and wonderment, has seen one of them give up the fight on a calm and peaceful afternoon and crash to earth while trees merely nodded their heads as if in recognition

of the passing of one of their lifelong associates. Thus the forester sees them, and seeing them thus, bends his energy the more to protecting and insuring their future.

### *The Relics of The Past*

To do this he studies their past and their present. Geologists tell him that ages and ages ago whole forests of Sequoias abounded on the Northern Hemisphere. Fossil remains in Greenland, Spitzbergen, and the United States prove this.

Before the glacial periods, and there were no doubt several such ice ages, great forests of luxuriant vegetation were in existence. To-day only the Sequoia and the Bald Cypress of the Southern States (*Taxodium*) remains of this almost extinct vegetation.

All the more interesting is the fact that the two Sequoias, the coast redwood and the big-tree are found only in California and within so limited a range.

We know that glacial action in California was restricted to the crests of the Sierras and that the ice bodies moved, but here and there, under some protecting ridge, a Sequoia, or perhaps only the seeds of Sequoia were left, and as the ice melted these formed the nuclei of the present groves. Then followed years of torrential rains which made canyons, valleys, and plains.

### *5,000 Years' Growth*

The forester is, of course, interested in the size and age of these trees. The General Sherman, a tree in the Giant Forest, is 28 feet in diameter and 280 feet high. It is no doubt between 4,000 and 5,000 years old, although ring counts on the stumps of trees felled in logging

operations have so far only yielded a tree of 3250 years old.

Popular lecturers, in solemn tones, are apt to tell us, "Scientists agree that the big trees are 10,000 years old." This may or may not be the case. The foresters, however, after finding trees 3,200 years old, are willing to concede that there may be trees which took root between 4,000 and 5,000 years ago.

During logging operations in the Converse Basin of Fresno County, a clear boled symmetrical big tree was being cut, and, much to the astonishment of the sawyers, black sawdust appeared at several different intervals. When the tree finally succumbed to their efforts, it was found that at different times fire had burned through the bark and charred the wood. But the tree with infinite patience had each time enclosed the wound with new growth and left the trunk perfect as far as outward appearance was concerned, except for one fire scar.

The tree in question was 2,171 years old. It began its existence 271 B.C. At the beginning of the Christian Era it was already about twelve feet in circumference. When 516 years of age (A.D. 245) a burning occurred three feet wide on the trunk. It took 105 years to heal this wound. Then for 1196 years it grew without injury. When 1712 years old (A.D. 1441) two fire scars were made, the healing process taking 139 years. Again 217 years of growth followed without injury, until in

1797, when the tree was 2068 Years old, a great fire ate away the bark and attacked the wood in a scar 18 feet wide and nearly 30 feet in height.

During the following 103 years before it was cut, four feet of this scar had been covered with fresh growth. If the tree had not been cut we might have expected it to entirely heal over about the year 2250. Thus it would have taken four and one-half centuries to repair the damage wrought by one forest fire.

Any other tree would have been attacked by decay and completely destroyed after any of these fires; but the Sequoia, with its thick protective bark, and its equally wonderful disease resisting wood, stands out among trees and man as having the greatest vitality of any growing thing.

#### *Why in Groves?*

We are absolutely certain that many individual trees are at least 3250 years old. Many may be between 4,000 and 5,000 years old. Why, then, do we find them still remaining in the small isolated groves where the ice age left them? Why, as in the case of the pines and firs, did they not reach out and take their place, scattered all over the great forests of the Sierras? They bear millions of seeds and wind and water scatter these about the forest. Yet century after century they have grown in the same spot. A few young trees grow up to take the place of those which die, but still in sight of the same little spot of earth where their parent tree, perhaps, is standing to-day.

### A TREE 4,000 YEARS OF AGE

When one of the big trees in California fell, John Muir counted 4,000 rings from the heart out. That meant the tree was forty centuries old. Thus it was a strong young tree when Abraham went into Egypt; it was bearing seed when Sodom and Gomorrah were destroyed; it was old as America when Joseph was sold into Egypt, nearly a thousand years old when David slew Goliath, and older when Christ was born than the Christian religion is to-day!



# The Waste of Hemlock Bark in B. C.

BY J. H. HAMILTON,

Editor of "Industrial Progress," Vancouver.

There is one subject which is worthy of much closer attention than has been devoted to it up to the present, the utilization of hemlock bark as a tanning material.

In 1916 the cut of hemlock in British Columbia amounted to one hundred and one million feet board measure. Taking fifteen hundred feet board to provide one cord of bark, this is equivalent to sixty-seven thousand cords of hemlock bark. The value of hemlock bark f.o.b. shipping point in eastern Canada and eastern States is about \$14 to \$16 per cord. Taking the conservative value of British Columbia hemlock bark at only \$10.00 per cord, the 1916 cut represents a value of \$670,000.

B.C. hemlock bark should be worth more than Eastern Canadian bark, because it contains, on an average,

16 per cent. tannin against only 10 per cent. in the eastern bark.

## *The Hide Situation*

Turning to the raw hide question, there are approximately 25,000 cattle killed annually in British Columbia. The hides are shipped out of the country to the Western and Middle States and leather manufactured at those points is shipped into Canada. Consumers of shoe and harness leather in British Columbia have always had to import their sole and harness leather from foreign countries or bring it from Eastern Canada. Added to this, enquiries are coming to hand frequently from the Orient and from Pacific countries for sole leather. As an instance of the insistant demand, it may be stated that in September 1916, Japan purchased the entire available stocks of sole leather in the



Panoramic View of the farm of the Trappist Fathers at Oka, Quebec, showing some of the Lombardy Poplars bordering the highway.

Pacific Coast States and placed further heavy contracts absorbing practically the entire output for six months ahead. So far as the actual demand for sole leather in British Columbia is concerned, a conservative estimate places it at 250 "sides" daily, (a side being half a hide). This is equivalent to 120,000 "sides" per year. As above stated, British Columbia produces 25,000 hides (equal to 50,000 "sides") per year, so that the local market would more than absorb our local production of leather.

The above facts would seem to make a very good case for the establishment of a sole leather industry in British Columbia, the raw material being abundant and the consuming market steady.

#### *Difficulties in the Way*

We now come to the influences which have prevented the establishment of a tan-bark and tanning industry up to the present time.

Up till a few years ago, western hemlock was in little demand as a building material, the name suggesting the inferior eastern species. The prejudice against hemlock was so strong that timber limits containing a large proportion of this timber were almost unsaleable owing to mills finding difficulty in marketing hemlock lumber. Practical education has changed this and to-day the prejudice of prairie consumers has been removed, western hemlock commanding a price commensurate with its true value. In addition to this, hemlock is being very largely used as a pulp wood and its use in this connection will undoubtedly increase very greatly within the next few years.

It may be asked why hemlock bark in British Columbia cannot be marketed and used in the same way as the inferior eastern hemlock bark, the more so since its tannin content is so much higher. The difficulty is purely an economic one. In Eastern Canada there is a steady demand for hemlock bark at prices which make the peeling and marketing of the bark quite an adjunct to the

eastern timber industry. There the lumbermen send a section of their river-driving gangs back to the woods in early mid-summer to peel and pile tan-bark for drying, and before the fall rains it is hauled out of the woods on wagons. On the Pacific Coast this plan is not practicable, owing to the different logging methods in use and to some extent to the difficulty of haulage. Here most of the logging is done by donkey-engines and the log receives rough treatment in hauling over the ground to the loading deck, the comparatively soft hemlock bark becoming torn and pitted with stones and pebbles, which greatly lessen its market value. Efforts have been made by parties wishing to make experiments on a commercial scale, to secure regular supplies of hemlock bark from the loggers, but there appears to be a disinclination on their part to bother with the matter, as they did not feel assured a regular market will exist.

#### *Experiments Needed*

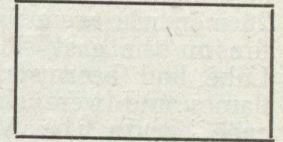
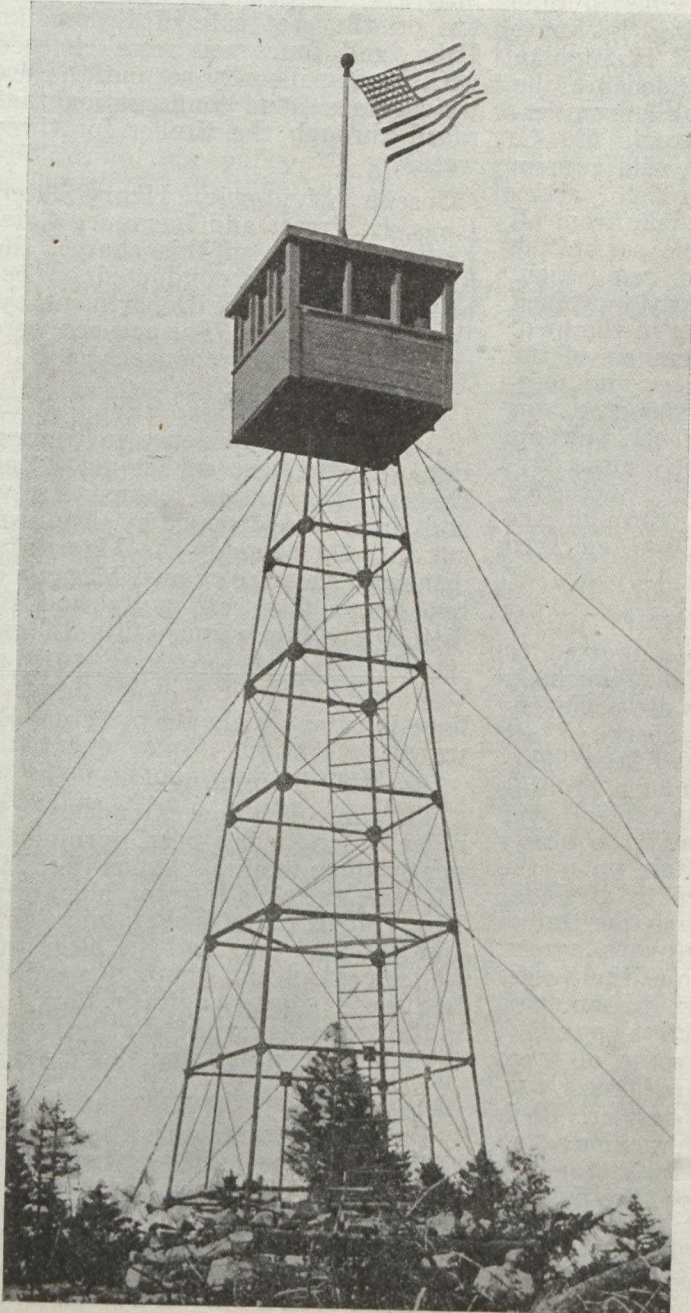
This situation is obviously one which should be studied by our provincial forest department. Some way can be found for creating regular supplies of the bark and it appears to the writer that the best plan will be to demonstrate to the loggers that it will pay them to peel the logs and market the bark. The process of extracting tannin from the bark is a simple one and the cost of establishing an experimental plant for manufacturing dry tannin extract would be comparatively small. Once the government have assured themselves of the feasibility of the business, there is not the least doubt that capital would readily be forthcoming to establish the industry on a large commercial basis. If the manufacture of dry tannin extract were carried on in British Columbia the product could be shipped to any part of the world, as the freight on the concentrated material would enable it to compete with similar products in the world's markets. Such industry could without doubt be established in conjunction with the

large and growing pulp and paper industry in this province.

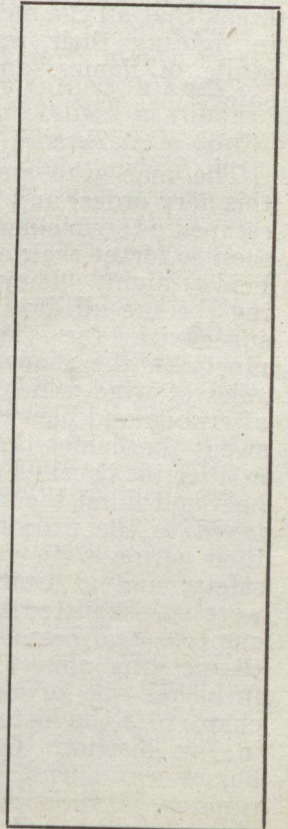
Western hemlock bark has been used as the exclusive tannin agent in at least one tannery in Washington for a number of years. This concern manufactures chiefly skirting leather for saddles. Its larger use has been

prevented by the lack of tanneries, due to economic reasons, rather than unsuitableness. The prevailing cost of hemlock bark f.o.b. tannery has been \$11.50 per cord.

Canada exported \$77,997,000 worth of wood and manufactures of wood for the year ending March 31, 1917.



A mountain lookout station in the State of Maine, equipped with a snug cabin at its top and having telephone connection. These towers, which in other designs are becoming extensively employed in Canada are an essential of all good fire prevention systems.



## CONSEQUENCES OF A DROPPED MATCH

"Seldom has the city been subjected to more apprehension and excitement than that occasioned last Friday night when word came in that 26 men who were fighting the forest fire on the east side of Kalamalka Lake had been surrounded by the flames and were shut off from escape," says the Vernon, B. C. "News". All sorts of wild rumors were prevalent and relief parties were rushed out to the lake from all quarters, every available car in the city being called into requisition. The worry and uncertainty continued through the night, many of the men, most of whom were members of the B.C. Horse, having wives and families in town, whose suspense was almost unbearable, until the welcome news was received shortly after day-break that all the men had succeeded in fighting their way through the girdle of flames, and had emerged safely.

### *A Terrible Ordeal*

The men who were subjected to this fiery ordeal and who so narrowly escaped a terrible death are not likely soon to forget their experience of last Friday night. They had been fighting the fire all day under a broiling sun, with the thermometer over ninety in the shade, and the heavy gales of wind which came up in the afternoon and blew steadily all night, swept the flames through the timber at a terrific pace. Faint with hunger, heat and thirst the men at times were taxed to the uttermost to maintain their struggle to reach a point of safety, and at times some of them were so exhausted as to almost succumb to weariness and despair. Their escape was almost miraculous and furnishes one of the most thrilling chapters in the history of fire-fighting in this district. One of their pack horses was burnt to death but fortunately all the men escaped without any injury beyond the strain of ex-

## MINIMUM FINE FOR GUILTY PERSON

As a result of charges laid by G. C. Melrose, District Forester, L. Norris, S.M., conducted an inquiry into the origin of the forest fire on the east side of Kalamalka Lake, and four men were charged with having illegally set out the fire which caused the conflagration that raged through the timber for three weeks.

Joseph Montague, Henry Slater, Chas. E. Fraser and Lawrence Carswell were tried on this charge, the prosecution being conducted on behalf of the Forestry Department by W. H. D. Ladner. The accused were not represented by counsel.

### *Magistrate's Dictum*

After hearing evidence in connection with the case on Thursday and Friday, the charges against Fraser and Slater were dropped by the prosecution. On Monday the Magistrate dismissed the case against Montague, but found Carswell guilty and inflicted upon him a fine of fifty dollars.

---

haustion to which they were subjected.

### *A Devastating Fire.*

The fire which now extends over 15 miles in length has been burning for nearly three weeks. At one time Mr. Melrose, the chief forester, along with Fire Rangers McCluskey and Mohr thought that they had the blaze well under control, but the high winds of last week gave it a fresh start. It is the worst forest fire that has raged here for the past twenty-five years.

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From a manufacturer in Baden, Ont.: "I am very glad of having the opportunity of joining the Canadian Forestry Association as I think it is engaged in a splendid work. My thanks are due to you for the chance to assist even if only in a small way."

## Fining Offenders for Causing Fires

The record of two acquittals and eleven convictions out of thirteen forest fire suits is mentioned in a statement of the Chief Forest Fire Warden of Pennsylvania. Altogether forty-seven suits have been started for the setting of forest fires. In addition to the above acquittals and convictions, thirty-one cases are pending and three have been withdrawn.

Following the policy of making the punishment fit the crime by pre-

senting bills for costs and damages caused by forest fires, no less than ninety-six cases have been settled out of court since April 1st through the payment of these bills by the guilty persons. Claims to the number of 415 have been presented for this spring's fires only, 226 of them to railroads. Settlements are still being made daily, and the chances are that almost one-half of the 400 cases will be settled without recourse to law.

## French Woodlands Razed in Retreat

The brutal vindictiveness of the retreating German forces on French soil, when nothing that remotely resembled "property" was left unspoiled, is described by the military correspondent of the Berlin "Lokal Anzeiger" in this manner:

"In the course of these last months great stretches of French territory have been turned by us into a dead country. It varies in width from ten to twelve or fifteen kilometers (six and a quarter to seven and a half or eight miles), and extends along the whole of our new position, presenting a terrible barrier of desolation to any enemy hardy enough to advance against our new lines. No village or farm was left standing on this *glacis*, no road was left passable, no railway-track or embankment was left in being. Where once were woods there are gaunt rows of stumps; the wells have been blown up; wires, cables, and pipe-lines destroyed. In front of our new positions runs, like a gigantic ribbon, an empire of death."

The Berlin *Tageblatt* is also found gloating over this destruction of the dwellings and property of helpless peasants in this burst of fine writing.

"And the desert, a pitiful desert, leagues wide, bare of trees and under-

growth and houses. They sawed and hacked; trees fell and bushes sank; it was days and days before they had cleared the ground. In this war-zone there was to be no shelter, no cover. The enemy's mouth must stay dry, his eyes turned in vain to the wells—they are buried in rubble. No four walls for him to settle down into—all leveled and burned out; the villages turned into dumps of rubbish; churches and church-towers laid out in ruins athwart the roads."

All this was done in the territory which the French armies had to cross before reaching their present position before St. Quentin. But to what avail?

It checked them not a bit. Across the desert waste they built highways and rebuilt roads. The wells were poisoned. The armies laid water-pipes for their supply. Every farmhouse and peasant's cot was reduced to dust. They carried their own shelter. The 'terrible barrier of death' was to them no barrier, only a reason why they must push forward with renewed strength and determination to hew down the vandals guilty of the barbarous destruction. Now in front of St. Quentin they see the *Boches* engaged in the same work preparatory to their next flight.



*Courtesy Romeyn B. Hough*

1. Branch of White Pine with mature cones bearing beads with pitch. 2. Detached clusters of leaves; 3. Seeds, some detached from their wings; 4. Young cones in Autumn, of first year.

The White Pine is one of the tallest trees of the forests of North Eastern America sometimes attaining the height of 200 feet with a long columnar trunk 3-5 feet in diameter.

When growing in the open it develops a wide pyramidal head easily distinguished from all other pines by its bluish green fine-needled foliage and the dark deeply-furrowed bark with which the large trunks are vested. It once constituted the bulk of large tracts of forest but being by far the most valuable timber tree of its range these tracts have been largely cleared away to meet the needs and wastes of a growing population, and now only occasional monarchs tower ng head and

— THE —  
**White Pine**  
BY ROMEYN B. HOUGH

shoulders above the surrounding forests of other growth suggesting the magnificence of the primeval Pine forests. Fortunately it is quick to reproduce itself and many

tracts of land where cultivation has been neglected become quickly covered with its new second growth.

The wood of the White Pine is the most valuable of the pines for house finishing, window sash, blinds, etc. It is light, soft, very easily worked, durable and of a light pinkish-brown color with thin lighter sapwood. Reproduced by permission from Mr. Hough's "Handbook of Trees of Northern States and Canada." R. B. Hough, Lowville, N.Y.

## *The Bamboos of Japan*

To Canadian eyes the sight of an enormous trestle work of slender bamboo poles carrying a railroad track across a mountain chasm might not immediately inspire confidence. Such, however, is a common occurrence in Japan, where bamboo is used for a multitude of structural purposes.

Japan has more than sixty species of bamboo which have been named. The tree grows with amazing rapidity. For commercial purposes it is often used split but more commonly in the original round shape for the power of resistance in bamboo against pressure is remarkably great. Cutting occurs at from three to ten years, which illustrates the reproductive advantage of the bamboo, as compared with Canadian spruce, for example, which for saw timber purposes cannot be utilized usually until above fifty years. Japan's supply of bamboo forests is constantly increasing as artificial afforestation is easy.

In the form of hoops for barrels and pails, the split bamboo is manufactured in great quantity.

Bleached bamboos are manufactured with a view to prevent un-

sightly change of color or to prevent splitting and other damage by extracting the oil while the bamboos are still in their original round shape. The process gives the bamboo an attractive lustre.

In the whole of Japan are over 600 species of forest woods. Twelve hundred and eighty men are employed on the state-owned forests for protection and improvement.

### DOES QUARTZ CAUSE FIRES?

A letter to the Forestry Journal last month from Mr. R. F. Davy, Assistant Engineer, Department of Public Works, Temiskaming Station, P.Q., raised the question whether fires have been caused by the reflection of the sun's rays on white quartz on a hill side. The Journal has since heard from an experienced woodsman, now a fire inspector, that he endorses the theory and that several years ago he knew definitely of more than one forest fire that could have owed its origin to no other cause than the sun's rays acting on quartz.



## *What the Woodlot Means to the Farm*

BY ROLAND D. CRAIG,

*Commission of Conservation.*

Woodlots on the farms can be made an important factor in the relief of the threatened fuel shortage. Farmers and the residents of smaller towns and villages situated within hauling distance of woodlots, should, as a measure of practical patriotism, use wood in preference to coal.

Few farmers realize the value of the crop which can be obtained from their woodlots. If even a small proportion of the attention given to other crops were devoted to the protection and improvement of the "bush" a good financial return could be secured. Aside from its value in affording protection against wind and storms, its importance in the conservation of soil moisture and its aesthetic value, the woodlot has a considerable value for the crops which can be harvested from it every year at a minimum expense. It should have a place on every farm.

Live stock should be excluded as they destroy the natural reproduction, injure the larger trees and pack the soil so that the growth of the trees is retarded. Defective and diseased trees should be removed first; then those of poor form, such as very crooked or very branchy ones

which interfere with the growth of better formed neighbours. The trees of the less valuable species such as dogwood, ironwood and hornbeam should then be removed. Every effort should be made to secure natural reproduction, but, if that be impossible, planting will be found profitable.

The tendency has been to encourage the growing of soft-woods suitable for lumber, such as pine, spruce and cedar, but the function of a farmer's woodlot is better fulfilled by producing hardwoods for fuel.

The fuel value of one cord of several of the common kinds of wood is equal to the following quantities of anthracite coal:

Hickory and hard maple, 1,800 to 2,000 lbs. of coal; white oak, 1,540 to 1,715 lbs. of coal, red oak, black oak and beech, 1,300 to 1,450 lbs. of coal; poplar, chesnut and elm, 940 to 1,050 lbs. of coal; pine, 800 to 925 lbs. of coal.

Therefore, hardwood is worth, to the owner of the woodlot, from \$6.00 to \$9.00 per cord, as compared with coal at \$10 per ton, plus the cost of hauling it out to his farm.



If a yield is to be sustained permanently, it should not exceed the annual growth which, in unmanaged woodlots, probably does not exceed  $\frac{3}{4}$  cord per acre. This production can be considerably increased by careful management. A woodlot may be considered as similar to a savings bank account from which the annual interest, represented by the growth, may be taken out or allowed to accumulate. In the case of the woodlot, however, the withdrawals can be so made as to greatly benefit the condition of the stand and improve

its productivity.

The Dominion Forestry Branch and the various provincial forestry organizations have done much to encourage farm forestry by supplying advice and assistance. The Dominion Government distributes annually between 3,000,000 and 3,750,000 seedlings and cuttings among the farmers of the prairie provinces. In Ontario, the Forestry Branch of the Department of Lands, Forests and Mines also supplies seedlings for planting in farmers woodlots.

## *Natural Forest in Contrast to Woodlot*

BY E. J. ZAVITZ,  
*Chief Forester of Ontario.*

The forest has been spoken of as an organism and the forest tree finds its best development as one of a community. Proper soil conditions, influence of trees upon each other, etc., are all lacking in the common woodlot or in the case of the roadside tree. It should be understood that the woodlot and roadside tree grow under different conditions from the forest tree, the former lacking many factors which influence the latter.

To understand the abnormal state of roadside and woodlot trees it is advisable to study the conditions of the forest.

The forest may be discussed in relation to the forest floor and the trees themselves. The forest floor meaning the soil, humus, leaf litter and undergrowth.

The nature of the soil in the forest is greatly influenced by the protection and cover afforded by the trees and by the amount of humus it contains.

Humus is formed by the decomposition of foliage, twigs, and other organic elements falling to the ground. It makes heavy soil less stiff and sandy soils more binding. It aids in preparing food for the trees and possesses great capacity for absorbing water. Humus is very essential to the proper development of trees.

The lack of it in the woodlot, owing to driving winds, makes a great difference between woodlot and forest. The litter of leaves, etc., has less opportunity of collecting and forming humus in the open woodlot.

In the natural forest, where normal conditions prevail, the undergrowth is composed of the more delicate plants which are not a menace to the reproduction of tree species. When an opening is created in the forest, soil conditions are such that tree seeds have an opportunity to germinate and grow before the opening is filled with grass and weeds, as is the case with the average woodlot. In the forest the tree seeds fall to the ground and are protected from sudden changes of temperature and moisture conditions by the leaf litter. Of course in many cases the leaf litter is a hindrance, as it prevents the seed from reaching the mineral soil. In the woodlot the seed may fall on the mineral soil, but the lack of protection prevents it from properly germinating.

After germination of the seed in the forest the young seedlings have protection which gives them a chance for a time. If an opening occurs by the falling of one or more trees these seedlings spring up to fill it. If the opening does not occur the seedling

may be shaded out and die.

The writer has passed through woodlots in May and early June where thousands of young seedlings had made a start. By the end of August these had all disappeared. What causes their disappearance? Not always stock grazing, but often drying out from lack of protection; this lack of protection being usually due to the want of leaf litter and humus as well as to the open condition of the woods.

It is difficult to say of what value a denuded soil is in relation to tree growth. On some sand formations in Ontario there stood in the original forest some splendid trees. After clearing the land, a few good crops were secured, but soon the sandy soil became weakened as it lost its covering of humus. To-day some of these lands are waste sand dunes.

Trees in the forest with tall, clean stems have passed through many stages. We are apt to think that

they always grew with many companions and passed from the seedling stage into the thicket or pole stage. Frequently some were crowded out to die. The tall forest tree we see to-day is the survivor of a long struggle and its roots may be taking up ground which in its youth produced a few hundred saplings.

The thicket or pole stage served its purpose. If the tall forest tree had been growing in the open it would have large branches a few feet from the ground and would never have reached the great height to which it has attained. To survive in the struggle, the tree in the thicket has to spend most of its energy in height growth during its early life, in which time the side branches are shaded out and die while very small. This cleaning of branches gives a clean stem on which a growth free from knots may be developed in the years to come.

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## *Unique Forestry Exhibit at Prince Albert*

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The Dominion Forestry Branch Exhibit at the Agricultural Fair in Prince Albert, Sask., on August 9th, 10th and 11th, attracted much favorable comment by both the public and the press. The miniature forest arrangement was most unique representing a regulated forest area containing various age classes. The species used were white and black spruce and jack pine. The oldest age classes were made up of trees twenty-five to thirty feet in height, some being trimmed up from the ground for six or eight feet thus providing a shady nook for tired visitors. Park benches were scattered around among the trees and were freely used by women and children. The trees from twenty feet down were not trimmed but left with their branches extending to the ground. Numerous of the trees had an abundant supply of cones—thus showing the seed crop.

A small area of nursery stock was shown in front of the forest as well as representative areas of burned forest, poor cutting area with high stumps, waste and no brush disposal. In contrast another area was shown alongside showing good cutting with low stumps miniature cordwood piles, some neat brush piles and some which had been burned. In this area was also shown the uninjured young growth coming up. A model ranger house presented by the MacDiarmid Lumber Co. of Prince Albert was placed among the smaller trees. Forest Reserve boundary notices and the numerous metal and cloth fire and Reserve notices were posted in conspicuous places.

Adjoining the forest a small ranger's camp was pitched with tent and camp fire and examples of how to extinguish camp fires with water and earth. A canoe used by fire

rangers in the north was shown with complete fire fighting equipment and outfit used by them. A large black bear loaned by the soldiers at the Armory was chained at the edge of the forest and attracted much attention by his antics.

At the rear of the forest with a path leading up to it a further exhibit was arranged in one of the buildings. This building was decorated with elk, deer and game heads, bunting and flags as well as numerous mounted birds and a large white-fish loaned by Mr. Geo. McDonald, Fisheries Inspector.

On the walls were arranged maps and mounted photographs showing the reserve activities and views of merchantable and young stands, planting and logging operations, brush piling and burning, forest fires and their results, effects of drifting sands, Forest Reserve improvements, grazing and uses. Outfits used by both forest and fire rangers for fighting fire were displayed from grub hoes to water alforjas. On two long tables were arranged for free distribution literature, bulletins, reports, blotters, rulers, pocket whetstones and other publicity material.

Two stalls were occupied by equipment and pictures showing railway fire protection. A small hand jigger used by railway patrolmen and a gasolene car used by inspectors were shown with their equipment. Samples of Saskatchewan Forest Products and a model house of White Spruce were

loaned by the Prince Albert Lumber Co.

The exhibit was arranged under the direction of Mr. G. A. Gutches, District Inspector of Forest Reserves for Saskatchewan and with the assistance of Chief Fire Ranger S. W. Thompson, Divisional Fire Inspector T. MacNaughton and Ranger In Charge A. Williscraft.

### THE CRIME OF A MATCH!

"The greatest crime that can be committed through the agency of a match is the lighting of a destructive forest fire. Consider the case of a building destroyed by fire. Money will replace it. In a year or two we may see another building rise on the same site, easily a better building than the one consumed. Then consider the destruction of a forest by fire. A flaming match, or a lighted cigar or cigarette stub, carelessly tossed among the dry leaves starts the conflagration, which sweeps up a hillside, leaving a bare and blackened ruin hundreds of acres in extent. *Money cannot replace it* Time may restore this forest to some measure of its former grandeur and value, but scarcely in the life time of a man. Consider this burned area ten years after—or even twenty years—a mass of brush and brambles, with the gaunt and weathered trunks of many fire-killed monarchs still standing in disfiguring array."—*Kennebec Valley Forest Protective Association.*

### FRANCE'S REGARD FOR HER FORESTS

"It is evident that France cannot supply her own requirements in wood. The policy adopted throughout France for the conservation of her forests, to cultivate them and to cut only as much as can be produced each year, necessitates the purchase elsewhere of the wood she needs for building purposes, etc. A change in this policy would bring about a revolution in France, where whole districts (communes) pay their taxes from the annual revenue from their forests, and in some cases even distribute a considerable surplus among the inhabitants."—*From report of Dominions Royal Commission.*

# THE USES OF WOOD PULP

BY JOHN S. BATES

*Superintendent Forest Products Laboratories, Montreal.*

## **Paper making is only one of hundred purposes to which pulp is put.**

The pulp and paper industry has expanded very rapidly in Canada during the past ten years and it appears that Canada is destined to become perhaps the leading country in the world in the manufacture of pulp and paper products from wood. This is largely because of our extensive natural resources of water-powers and suitable tree species. It is important to point out the opportunities and responsibilities for Canadian engineers in this technical industry. The consumption of paper increases so rapidly from year to year in the more highly developed countries that there is no indication of slackening development, at least for some years to come. Canada now has a total of about 90 mills many of which are large and of modern design. The export figures for the calendar year 1916 show that pulpwood, wood pulp and paper have increased to nearly half of the total export value (approximately \$100,000,000) of all forest products with the exception of the small proportion of specially manufactured articles.

### *Woods for Pulp*

The soft woods are the most important species for paper-making, spruce and balsam fir accounting for the bulk of the woods used with hemlock, jack pine, tamarack and other conifers coming into more extensive use. Poplar and basswood representing the "soft hardwoods" are valuable for making soda pulp and a variety of hardwoods such as birch and maple are used in smaller quantity. In 1915 the total reported pulpwood consumption amounted to 1,405,836 cords with an average value of \$6.71 per cord. In addition Canada exported 949,714 cords of pulpwood, which quantity has remained

fairly constant for several years while the consumption of pulpwood in Canada has rapidly increased.

### *Uses for Groundwood Pulp*

The groundwood process is the simplest method of manufacture, involving the wet grinding of pulpwood blocks. In 1915 this process accounted for 52.9 per cent of the total pulpwood consumption. An important direct use of groundwood pulp is in the manufacture of wallboard such as ordinary "Beaver Board" and the thicker "Insulite" board used for insulating cold storage rooms and refrigerator cars. Fibreware, represented by indurated pails and tubs, moulded egg cases and pressed milk bottles impregnated with paraffin, is composed mainly of groundwood pulp. Paper pie plates are cut and pressed from sheets of this pulp.

The sulphite process is the most important of the chemical processes and in 1915 used 33.5 per cent of the total pulpwood. The wood is chipped and steamed in large digesters with a solution of calcium (and magnesium) bisulphite containing free sulphurous acid, which dissolves most of the lignin and other non-cellulose material amounting to about one-half of the dry weight of the wood. Production of sulphite pulp has now reached about 1,000 tons per day, over half of which is used in the manufacture of paper in Canada. An important development is the increase in manufacture of bleached sulphite pulp for high-grade papers.

### *Making News-Print*

News-print paper is by far the most important manufactured product in the pulp and paper industry and is essentially a mixture of about 75 parts of groundwood pulp and 25

parts of sulphite pulp with suitable loading, sizing and coloring materials. Canadian production now totals about 2100 tons per day which is now over half the production of the United States. Only a small proportion is needed for Canadian newspapers so that about 89 per cent is available for export chiefly to the United States. Other products made by mixing groundwood and sulphite pulps are hanging paper (wall paper), the cheaper grades of wrapping paper and book paper, container board for paper boxes, liners for cars and boxes, paper for posters, etc.

#### *Hard Rubber Substitute*

Sulphite pulp in the unbleached or bleached state is used for making many papers of the higher grades including print paper, book and writing tissues and wax paper. Recent attention has been given to production of imitation parchment and grease-proof papers such as glassine. Sulphite pulp is well suited to the moulding of plastics such as toys and novelties by incorporating binders. Vulcanized fibre or hard rubber substitute is usually made by treating pulp with zinc chloride and mixing with red ferric oxide, with the addition of glycerine if a pliable product is desired. Some of the paper wheels and pulleys come under this head. A sample of surgical cotton substitute

from Europe turned out to be an excellent product from bleached sulphite pulp and it is reported that large quantities are being used by Germany during the present cotton shortage. Viscose is one of the artificial silk materials which can be readily made from wood pulp. Bleached sulphite pulp is first converted to alkali cellulose by treating with strong caustic soda and then to soluble cellulose zanthate by the addition of carbon disulphide. After pressing into threads through dies or moulding into heavier articles the material is readily converted back to stable cellulose in the form of artificial silk, films or moulded articles. It is also used for sizing textiles and paper. There are several plants in the United States and undoubtedly the industry will be established in Canada. The best gun cotton is made from purified cotton, but good grades have been made from bleached sulphite pulp in England and at the present time to a large extent in Germany. Cellulose acetate is ordinarily made from cotton and it is doubtful if bleached sulphite pulp will be used in America until the process can be improved. The non-inflammable and water-proofing qualities of cellulose acetate made it more valuable than nitro-cellulose for aeroplane varnish, films, artificial silk and celluloid substitutes. In



PICKING OUT A "JAM" ON THE KENNEBEC RIVER, MAINE.

some industries a filter mass of sulphite pulp has been successfully used in place of cotton fibre.

#### *Waste Liquors*

Waste sulphite liquor is one of the most frequently quoted industrial wastes, as millions of gallons are turned into the rivers every day carrying half of the original pulpwood substance together with most of the lime and sulphur used. Recovery of by-products is difficult and costly but it is safe to say that Canada will begin to practice recovery in the near future. In Europe and the United States evaporated liquor is used quite extensively as a binder for briquetting fuel and as core binder in foundry work. The tannin-like substances are separated and incorporated with true tannins in preparing sole leather. Sweden has taken the lead in recovery of ethyl (grain) alcohol and produced in 1916 over one-half million Imperial gallons of 95 per cent alcohol for industrial purposes, motor fuel and potable spirits. It is reported that Germany has established this process in fourteen sulphite plants in order to conserve potatoes which are the usual source of alcohol in that country. Waste sulphite liquor contains about 1.5 per cent of fermentable sugars which are produced from the wood during the cooking process and these sugars are fermented to alcohol by yeast. The direct recovery of sugars and other organic matter makes available a fairly good cattle food. Recent processes aim at the precipitation of the lignin content for use as fuel and a number of new plants are going up in Norway. Minor processes are the recovery of destructive distillation products, fertilizer and mordants for dyeing. There is also the possibility of recovering sulphur compounds which however do not originate in the wood.

#### *Twine From Paper*

The sulphate process used 13.1 per cent of the Canadian pulpwood consumption in 1915. This process is a development of recent years and produces a remarkably strong flexible fibre by the combined action of

caustic soda and sodium sulphide on the softwood chips. The value of kraft pulp is most noticeable in the brown, strong, thin wrapping papers which are now so widely used. A variety of ingenious uses for this pulp have been worked out in Europe and elsewhere. Paper twine is made by cutting kraft paper into narrow strips and spinning into a coarse strand now largely used for wrapping parcels and for binder twine. The threads may be assembled to produce first-class rope. By weaving there is obtained bagging material to replace burlap, carpets and matting, coarse cloth for upholstering furniture or even for wearing apparel, and also belting which is now used in Europe. By wrapping layers of kraft paper on a core and impregnating with tar binder conduits are made which can be turned and threaded; these are especially useful for underground electrical conduits and acid-resisting water pipes. Kraft pulp is also used for making imitation leather for suitcases, as well as counters and heels for boots and shoes.

In Europe the sulphate process is sometimes modified to give more fully cooked sulphate pulp which can be bleached and used for higher-grade papers such as book and writing.

#### *Oils From Waste*

The spent liquor is always evaporated, incinerated and causticized for the recovery of alkalise which are used again for cooking. One Canadian mill is now recovering so-called "resin oil" which separates from the spent liquor. Turpentine and small quantities of other light oils may be recovered from resinous woods by distilling with steam during the cooking operation and resin soap separates from the spent liquor on cooling. This applies particularly to manufacture of kraft pulp from longleaf pine in the Southern States. Methods have been proposed for the production of methyl alcohol, acetone, acetic acid, higher oils by the destructive distillation of the evaporated liquor with simultaneous recovery of alkali and perhaps oxalic acid from the residue.

# The Summons

By L. H. Bailey

Have you flung your arms and shouted  
till the forests answered back,  
Seen the footprints of the cougar or the  
black bear's shambling track?  
Have you ridden mountain horses as  
they follow up the trails,  
Seen the court'sying water-ouzel and  
the scuddling of the quails?

Then you come with me to Shasta  
Where the racing waters flow,  
Far behind the dome of Shasta,  
Where no tourists ever go,  
In the forests deep at Shasta  
Where the mighty fir-trees grow.

Have you smelt the pitch-knots burning  
as they snapple in the breeze,  
Have you seen the camp smoke rising till  
it billows in the trees?  
Have you stretched full length and  
slumbered on the needles for a bed,  
With the sun-flecks dancing on you  
through the tree-tops overhead?

Then we'll go to find the rivers  
Where they open to the sky,  
Wade the oozy turbid rivers  
Where the water-bushes lie,  
Feel the salmon in the rivers  
As it rises to the fly.

Have you heard the boiling waters when  
they bubble through the night,  
Felt the touch of roaming night-winds  
as they wander from the light?  
Have you breathed the wind of fir-trees  
in the silence of the wood  
With the night-damps closing round  
you where no human ever stood?

Then you join me in the darkness  
Where the night is dense and deep,  
Stretching silent in the darkness  
When the wild beasts lie asleep,

Hear a startle in the darkness  
Where a panther makes a leap.

Have you heard the rain drops tinkle  
as they strike upon the leaves,  
Have you felt the fore-winds freshen  
when they whistle in your sleeves?  
Have you sat beside the river when the  
rain begins to pour,  
Do you know the fragrant music that  
makes along the shore?

Then we'll hasten to the weather  
Be it rain or sun or cloud,  
To the hazy purple weather  
And the dust-deeps that enshroud,  
To the free and open weather,  
When the winds are wild and loud.

Have you torn thro' thorny thickets,  
walked a ten-mile at a stage,  
Floated down the falling rivers, past  
the sedge and saxifrage?  
Have you waited at the deer-licks  
for the coming of the game?  
Have you bivouacked in the forest till  
you've clean forgot your name?

Then we'll off into the forests  
Where the bubbling waters run,  
Shout our challenge in the forests  
At the rising of the sun,  
Build our night-fires in the forests  
When the careless day is done.  
—From "California Forestry."

## PULP FROM PAPYRUS

It is reported from Christiania that a company is being formed locally to utilize papyrus in the manufacture of paper pulp.

The name of the company is the Walmer Papyrus Pulp Co., Ltd., with a capital of 150,000 pounds.

Papyrus growing in North Zululand will be utilized, and it is stated that a concession has been obtained permitting exploitation for a term of 20 years.

## USING JACK PINE

A good example of the conservation tendency in wood using industries is shown by a Canadian wall board company which previously used a spruce centre for its product and recently changed to jack pine with what are said to be excellent results.

## Sheep and Goats As Tree Destroyers

Some Canadian planters of forest tree stock have had experiences with depredations of goats, both amusing and tragic. There is under way in the United States at the present time a discussion between the breeders of sheep and goats with regard to their availability as an agency to convert brush-land into grass land. The "Angora Journal" has the following to say:

"Sheep are a grass-feeding stock; they will not eat brush unless forced to do so by absence of other pasturage. They will browse on scant pasture, leaving the hazel, willow, or other bushes to grow unmolested if any grass is to be had. On the other hand, goats will leave grass to sheep and cattle if any green tree or shrub growth is available. They prefer it. Sheep never stand upright on the hind legs to browse; goats will browse off the foliage and tender bark to a height of six feet and even higher. Forest officials have adopted goats as a means of keeping fire-breaks clear of underbrush. Goats are used to do the pioneering ahead of other live stock on new lands in many Western States.

"The prejudice against goats is questionable. It has been created by the inhabitant of the vacant city-lot—a neglected creature that was forced to get subsistence by any means it could. It gnawed the labels from tin cans to get the taste of the paste beneath—and acquired a reputation for eating tin cans. The goat of the open fields and prosperous farms is as different from the vacant-lot or common type as is the Hereford thoroughbred from the raw-boned cow of the city suburbs. The goat is the cleanest feeder of the live-stock world. It will not eat straw or hay that has been under foot. It nibbles the choicest bits of foliage and rejects all uncleanness.

### ONTARIO!

Ontario's timber production last year valued at \$26,774,937 or 40 per cent. of Canada's total output.

Pine production,	905,442,000 ft. B.M.
Pulpwood,	246,282 cords.
Railway Ties,	5,704,459.

Ontario's woodworking industries, using 34 different kinds of wood, provide a ready market for the lumberman. Eighty-two per cent. of lumber used in Ontario's industries is purchased within the Province.

### COUNT OVER SURVIVORS

Mr. William Kilby, formerly of the Canadian Northern fire protection service at Winnipeg, is now with the Royal Flying Corps in France, has already been sent up as an observer and will qualify for his commission in a month or two. Writing to a friend, Mr. Kilby remarks: "We'll have to have a general pow-wow of foresters and kindred souls after the war to kind of count over the survivors"

### SAND BAGS OF PAPER

Mr. H. R. Christie, formerly of the British Columbia Forest Service has sent to an Ottawa friend a sample of the German sand bags made entirely of paper fibres. In appearance the article somewhat resembles a coarse brown linen bag but is smoother in finish, each strand being tightly rolled and woven with great exactness. Mr. Christie states that the bags are very serviceable except when exposed to moisture, when they rot. The Germans, he reports, do not use nearly as many sand bags as the British and French, for the reason that they have more timber at their disposal and make prolific use of it.



## Restoring Beauty to a Rocky Island

"The whole northern country was once well forested, bearing the only crop it was fit for growing; we have lumbered it out of existence without care to save maturing growth and thus retain continuity of forest stand and new crop," writes the Editor of the Peterboro Examiner. "Fifty or more years ago many of the islands of Stony Lake were well wooded. About half a century ago a forest fire swept them and left bare rocks. Nature has, in some parts, partially repaired the waste, and man might have done much that he has not done to reclothe the stony nakedness with the verdure of trees.

"That this is feasible is shown by the action and experience of Mr. J. B. McWilliams, as to his island on Stony Lake, near Burleigh. When, a few years ago, he built a cottage there, his island was, to use his own words, "almost all bare rock, and now I have about twenty-five different kinds of trees growing, besides numerous shrubs, all on less than two acres of area." Here is at once practical proof and precept. It shows what can be done when care and recognition of the value, and love of tree growth are allowed to become agencies in repair of waste and in forest restoration.

"On this island we have the beautiful and continuously growing evidence of what can be done on most of the islands of the Kawartha Lakes group, inexpressibly enhancing their present beauty, and in all the arid

and treeless region of the north country, that with proper government or county action might be clothed with a profitable growth of forest that would be a merchantable asset and source of revenue for future generations."

### DOLLAR COMPANY LOSES

A serious bush fire broke out in the Dollar Company's holdings back of Union Bay, British Columbia, in August. Upwards of 500 acres were burned over before the fire was subdued. The Dollar Company had only purchased the property a few weeks ago, had 65 men working, and lost about \$20,000 worth of logs, piles and poles. They saved all their machinery, however.

### A FEW DON'TS FOR HUNTERS

*Don't* pass a loaded gun for inspection to a brother hunter, or anyone else for that matter.

*Don't* leave a loaded gun around the house or camp or anywhere else.

*Don't*—whether it is loaded or not—lay hold of a gun by the muzzle and pull it toward you, from a canoe or a wagon.

*Don't* climb over a fence with a loaded gun in your hands.

*Don't* think you can do accurate shooting with a dirty gun.

*Don't* "walk up" on any wounded game without having a cartridge in the chamber of your rifle, ready for any surprise.

*Don't* by any chance set the woods afire.

## WEIGHTS OF TIMBER

Weight of one cord of green spruce pulpwood is about 4,500 pounds.

Weight of one cord of dry spruce pulpwood is about 3,000 pounds.

Weight of one cord of green white-birch is about 6,000 pounds.

Weight of one cord of poplar pulpwood is about 3,200 pounds.

Weight of 1,000 feet of old growth

spruce logs, (according to Maine or Holland rule scale) is about 6,000 pounds.

The weight of green lumber may be reduced from 30 to 50 per cent. or more in seasoning, while the strength of small clear pieces may increase in seasoning up to double the strength when green.

## What Slash Disposal Means

After a logging operation the fire risk is increased from 100 to 200 per cent. This risk decreases every year, and from 6 to 10 years becomes normal again, rarely extending to 15 years.

Director of Forest Survey, New Brunswick.

The slash disposal question is one that should receive the serious consideration of both the loggers and the Department officials. Slash disposal has passed the experimental stage and is being endorsed not only by forest administrators but by the loggers themselves in many localities. The cost for disposal varies from 25 to 40 cents per M., as practiced in Quebec, in similar stands, by lopping. Similar results have been secured in northern Saskatchewan.

In Minnesota slash is piled and burned generally as logging proceeds, and the results are shown from the following section from report of State Forester Cox, 1914:

"All kinds of slash do not burn the same, nor does any one kind burn the same under different conditions.

Green slash of pure cedar and spruce, for instance, is hard to burn, but, if a fire is started and the green slash piled on, it burns well. Pine slash burns well either in winter or summer. Where the timber is dense and the slash considerable, the expense of burning at the time of logging is very nearly balanced or may even be more than offset by the increased convenience in skidding. Actual operations have shown that where timber is heavy (150 M. per "40" or greater), slash will be so dense that considerable piling will be necessary before skidding can be done, and under these circumstances it would be much cheaper to burn at the time of cutting than to wait until spring. Figures from further operations also show that 25 cents is a fair average cost for burning of slash at time of logging, to say nothing of the increased benefit to skidding and to the operation as a whole.

"In summarizing conditions generally, the policy has been adopted to enforce winter burning, or very early spring wherever winter burning would entail unreasonable expense."

His general regulations for spruce and balsam stands are:

### 1. Upland Type.

Where spruce alone is cut and the stand is mixed with pine or hardwood, burn the slash as logging proceeds.

### 2. Swamp Type.

Where 40 to 50 per cent of the number of trees remain standing, fire line a strip at least 150 feet wide around entire slashing by burning slash in winter or early spring. If clean cut, pile slash in windrows and burn in early spring.

### 3. Any Spruce or Balsam.

Where most of spruce or balsam is cut out, but there is considerable timber remaining that may be valuable in the future, pile slash in windrows as logging proceeds and burn in early spring."

The question is of considerable importance, and one which steps should be taken to reduce to a minimum, either by lopping, piling and burning, or by intensive patrol during the danger period.

(From Report of Department of Lands, Fredericton, N. B.)

### MILLION YEAR-OLD TREE

A wood specimen found in glacial drift and estimated by the Wisconsin state geologist to be approximately a million years old has been identified by the forest products laboratory of the Forest Service as spruce.



Avoidable Waste in  
the Forest.

A lodged tree in a  
New Brunswick opera-  
tion left to rot.

A \$30,000 corporation has been formed by twenty-eight prominent business men of Dallas, Texas, according to the News of that city, to manufacture paper from cotton stalks. It is planned to increase the capitalization of the company, which had been chartered, and erect a one-quarter million dollar mill for the process. Samples of paper from cotton stalks have been made and the method it is announced, has been proven satisfactory.

### TEA BY THE OPEN FIRE

From the faucets of the fountain,  
And the bottles of the bar,  
I've tried many fancy gargles,  
Most as many as there are,  
But the drink that's first and fore-  
most,

If you put it up to me,  
Is the scalding can of ashes,  
Swamp juice, soot—and tea.

From "OUTING".

## *Estimating Fire Damage*

An effort to secure uniform statistics regarding forest fires and the damage caused by them was made recently by a special committee of the Canadian Forestry Association. The committee secured many valuable suggestions and criticisms which will be utilized in a report. Dealing with this subject, Mr. Ellwood Wilson, Forester of the Laurentide Company, writes:

"The necessity for uniform statistics of forest fires and the damage caused by them is a subject of great importance and likewise of considerable difficulty. It would seem to be necessary to have, whenever a fire occurs, the date, location, cause, area burned over, stand before the fire occurred, timber which can be salvaged, and timber burned. Value of timber or other resource destroyed is also important. The last three items are very difficult to ascertain. Protective agencies cannot be expected in the nature of the case to cruise and accurately determine the amount of timber on areas under their care. The ordinary fire ranger is certainly not qualified nor has he the time to make a careful estimate of the amount of timber which can be salvaged, nor the value of the trees destroyed. At best the most he can say is: green timber destroyed, or old burn, or logging slash or some such general description, and he can say timber scorched but fit to cut, timber all burnt, etc., and none of these designations are of any real value for statistical purposes. In fact, the determination of areas is really often beyond the capacity of the ranger, and again the difficulty of leaving his patrol to measure burnt areas crops up. Then when the question of valuing such damaged areas is encountered, further difficulties enter. Only an expert in local values is competent to say what timber is worth. The question of the value of young growth, of scorched timber and of areas which have just started to reproduce is a trying one, and no two

owners will agree as to the value placed on such areas. Much preliminary work is necessary, especially in a country which has not even been carefully mapped, such as all of the Canadian co-operative associations are operating in. It might be possible for these Associations to undertake such mapping and estimating work. This would give winter work for rangers and inspectors, a very important matter indeed."

### A RECORD LOG JAM

Probably the record log jam of the world is blocking the Glommen River in Sweden.

A quantity, estimated at about 450,000 dozens of logs, have piled up at Bingfoss lock, almost inextricably, to an enormous height, and it is only possible to extricate the logs one by one with immense work and difficulty. Instead of employing as usual about 20 to 30 men, the association has now 130 men engaged, who work day and night to try to loosen this mighty mass of timber. Although everything has been done to stop more timber from coming down to Bingfoss, the river still carries a great deal of timber, and the quantity at Bingfoss is thus steadily increasing. As the situation now is, it is hardly possible to clear the quantity of timber at the Bingen lock in a shorter time than two years, and there is no prospect of being able to release this year much more than one-half of the quantity of timber which has been marked this season for being floated in the Glommen River.

### CHEAP MEAL IN PLANTER'S CAMP

Roast veal, fried potatoes, stewed tomatoes, dried corn, canned peaches, hot biscuits, butter, cookies, coffee,—not a menu of a fashionable hotel, but of a meal served in a Pennsylvania State Forest tree-planting camp. It cost 16½ cents per man.

# Timber Resources of Northern Manitoba

BY J. A. CAMPBELL,  
COMMISSIONER OF NORTHERN MANITOBA.

## In Spite of Fire Damage Much Timber Exists as Basis of New Industries.

Many years ago the northern part of Manitoba as far north as what is known as the "Barren Lands," was thickly covered with a forest growth of spruce, tamarac, jack pine and other northern trees. Great areas of this was timber of merchantable size and besides there were immense stretches of valuable pulp wood, but during the last 25 or 50 years millions of dollars worth of this, one of our most valuable natural resources, have been destroyed by fire. In many parts of the burned area a new growth has sprung up which is now well developed and in the course of from 15 to 25 years, if properly protected, will be an exceedingly valuable asset. However, outside of the burned areas there are still great stretches of valuable timber and pulp wood which, taken in conjunction with means of transportation now available, and the prevalence of water power near them in almost every instance, form an exceedingly valuable resource and one which should be protected, conserved and developed with the greatest care.

### *The Havoc of Fire*

Mr. J. B. Tyrrell has made frequent trips into the north country and perhaps to him more than any other man is due our knowledge of this resource, as well as much other information regarding the country. From Mr. Tyrrell's reports it is learned a great deal of timber in the territory in question has been destroyed by fire. On Grass and Minago rivers there is still some forest of excellent white spruce but on the northern part of Burntwood river this is rather scarce. Black spruce and canoe birch grow on the more level and imperfectly drained areas. The aspen is the commonest deciduous tree as it grown on

the drier uplands everywhere, occasionally forming beautiful forests. "The forests surrounding Reed Lake are mostly of poplar, but there are some good growths of fine large spruce about 25 inches in diameter." On the southwestern shore of Lake Athapapuskow, "considerable areas are covered with large white spruce." At Wintering Lake, "the surrounding areas rise gently from the water and are densely wooded with close forests of white spruce, growing on the rich clay soil." An old fur station near Setting Lake was found by Mr. Tyrrell "considerably overgrown with large spruce trees quite indistinguishable from those of the surrounding forest."

In an exploration trip in connection with the Hudson Bay Railway, Mr. J. W. McLaggan covered the territory immediately north of The Pas and the following information is obtained from his report. The first portion is covered with small mixed timber. North of Cormorant Lake there are at least 5 million feet of good milling spruce and a very considerable area of the same south of Reed Lake. North of Herb Lake are spruce and poplar fit for railway ties and pulpwood. If fire had been kept out there would have been a big timber area in this district. Reafforestation is now being effected. Between Reed Lake and Elbow Lake he saw about two million feet of good spruce and poplar, averaging 12 to 14 inches in diameter.

In the report of W. Thibideau on an exploratory survey of the ground between Fort Churchill and The Pas in connection with the Hudson Bay route is found the following:

"All the timber between the head of the Little Churchill river and Churchill is reserved for fuel purposes.

The pulp wood belt as estimated below begins at Split Lake and extends to The Pas, ten miles in width on each side of the way proposed for route of Hudson Bay Railway. On this area, assuming one-sixth to be covered by pulpwood, the balance being river, lakes, ponds, swamps, etc., and assuming 10 cords per acre of an average of 6 inches in diameter, there would be 5,756,660 cords. This is a very low but safe estimate."

In 1910 Mr. J. R. Dickson, Dominion Forestry Branch, made an inspection of timber along the line of the proposed Hudson Bay Railway from The Pas to Split Lake. He covered a distance of some 235 miles along the line of railway. Mr. Dickson deplors the ravages made by fires in the past, but points out that a great deal of new growth will soon be suitable for pulpwood. He intimates that if general drainage conditions could in some way be improved so as to partially replace the black spruce with the white spruce the wealth producing power of the region would be immeasurably greater.

Mr. J. A. J. McKenna concludes each section of his report on the Hudson Bay route with a recapitulation or summary from which are taken the following:

"It would seem that after the Saskatchewan is spanned at The Pas, construction of a line of railway to Churchill would not be unusually difficult or expensive, and from reports it would appear there are in the intervening country stretches of fair timber. The country about the Bay has only been glanced at by explorers. Merchantable timber has been seen and vast stretches of pulpwood."

#### LAWSUIT ON TREE VALUES

An interesting lawsuit has arisen from the burning over of a portion of the State Forest in Elk county, Pennsylvania, by a fire which was undoubtedly caused by sparks from a locomotive. The land burned over was covered with very young trees of little value at the time of the fire—but of large prospective value. The Department of Forestry claims damages on the basis of the value of the

trees 60 years hence, when they would have been mature, discounted to the present at 3 per cent. interest. The railroad company insists on 5 per cent., which would make the bill considerably lower.

#### "UP-GO' OF LUMBER COSTS"

The Hardwood Manufacturers' Association has issued a little folder showing the comparative increase in cost of different articles.

Costs.		
	Percentage of increase	Percentage of increase
Logs, bo't. on mkt.	31	Saws..... 52
Stumpage .....	100	Planer knives .....
Labor.....	20	Belts .....
Horse and mules...	40	Packing.....
Oxen .....	41	Files.....
Feed.....	76	Emery wheels.....
Steel rails.....	93	Mill supplies.....
Railroad supplies..	88	Coal.....
Wire rope .....	91	Freight rates.....
Manila rope .....	103	Stationery.....
Machinery .....	60	Federal taxes .....
Oil .....	29	Lumber.....

#### NEW ISSUES AVAILABLE TO ALL MEMBERS!

The Canadian Forestry Association will have ready for distribution in the near future two special illustrated pamphlets. One deals with, "What Ownership of the Forests in Manitoba, Saskatchewan and Alberta really means!" and sheds some statistical light on the agitation for "provincial ownership"; the second pamphlet undertakes to make clear the present situation in New Brunswick and to impress the need for a reconsideration of the Government's method of managing the Crown forests. Ten thousand copies of the first mentioned pamphlet will be given careful distribution throughout the West, and five thousand copies of the New Brunswick issue will be available for propagandist work in that province.

Balsa wood, found in Central America, is said to be the lightest known wood. It is lighter than cork, and has an average specific gravity of only .104.

## Russia in the Wood Market

The eyes of the world are upon Russia, not only because of the perilous turns of military fortune following the Revolution but from the sudden flood of publicity relating to trade opportunities after the war. Writing of the Economic Resources of the Russian Empire, Mr. Ernest H. Godfrey F.S.S. takes some interesting statements from a recent article by Baron HeyKing, Consul General for Russia in the United Kingdom, and makes comparisons with Canada. As Russia is certain to offer much greater competition to Canada in the export lumber trade of the world, the Journal reproduces the following excerpts:

"The north of Russia is covered with large stretches of forest land, much of which has not been properly surveyed. Apparently there are no estimates of the quantities of timber available; but Baron HeyKing considers that the supplies are practically inexhaustible and that Russia is bound to become the chief source of supplies of timber for building, navigation, wood pulp and other purposes. Next to the grain trade comes timber as an article of export from Russia; and it is stated that for the year 1906-10 the average annual exports of timber from Russia were 164,516 tons from the port of Libau, 633,709 tons from Archangel, 962,903 tons from Petrograd-Cronstadt, and 262,903 tons from Windau.

In area, Baron HeyKing informs us, the Russian Empire extends over half of the continent of Europe and a third of the continent of Asia and comprises not less than 8,760,000 square miles. The Dominion of Canada embraces an area of 3,729,665 square miles; so that Canada, large as it is, is only equal to about two-fifths of the great Russian Empire, which in size is second only to the British Empire, now placed at something like 13 million square miles. The Russian Empire stretches over 163 geographical degrees from west to east and over

35 degrees from north to south. It is larger than the United States, Canada and India combined and more than twice the size of the continent of Europe. If, in area, Russia and Canada present so great a contrast, in population the contrast is greater still. The Russian Empire contains a population which Baron HeyKing places at 186 millions, which is equal to that of the whole American continent and Australia or to the combined population of the United Kingdom, France, Japan and Italy. The population of the British Empire exceeds 440 millions. Canada, with a population of a little over 8 millions, has a density of less than 2 per square mile; the average density over the whole Russian Empire is about 20 per square mile, the figures for European Russia being, however, about 72 and for Asiatic Russia about 4 per square mile. Yet notwithstanding the great differences between Russia and Canada, which these figures represent in favour of the former, the case is altered when we examine the degree in which each country has developed its resources. Both countries have enormous potentialities; but the Dominion of Canada with its comparatively small population has made much greater progress in the development of national resources. According to the Russian Statistical Annual the railway mileage of Russia in 1914 was not more than about 39,000 which represents only three miles of railway to every 10,000 inhabitants and under half a mile to every 100 square miles of territory. In Canada, for the same year, the railway mileage was 30,795, a 38½ miles for every 10,000 persons and 0.8 of a mile for every 100 square miles of territory. This contrast is sufficient to indicate how backward the great Russian Empire is in the means by which its products must be made available for distribution, and what a vast field there is for enterprise and capital in this one direction.

## The Pulp Industry as a Conservator

(BY J. L. LOVE, IN "CANADA LUMBERMAN.")

Probably no industry sheds so much waste as lumbering. Competent authorities, such as Dr. John S. Bates, head of the Forest Products Laboratories of Canada, estimate the logging waste left in the woods to be about 25 per cent. of the original tree. It is just here that the pulp mill gets in its first good work in its mission of conservation, and that in a double sense. Every lumberman is familiar with the "slash" that marks the trail of the logger through the bush; the tops and branches that are left behind to choke new growth and add to the fire hazard. Where a pulp mill is operated in connection with the sawmill a large proportion of this "slash" is trimmed and sent down the drive with the logs to be made into pulp. Not only is this hitherto absolutely waste material turned into considerably more money value than its bulk in merchantable logs is worth, but the fire risk is reduced considerably.

Waste eradication in the woods is only part of the pulp mill's mission, however. Having accounted for all the tops four inches and up at the narrow end, the mill still has a large field for raw materials to draw upon in the waste from the saws. This waste amounts to about 40 per cent. of the original tree, and only a negligible part of it is used in developing power to operate the plant. A conservative estimate is that the total waste lumber for the pulp mill to work up amounts to between 60 and 70 per cent. of the tree, and of this less than half is available for pulp, but in spite of this margin of quite irreclaimable refuse, the above figures indicate that the pulp mill is doing its bit in the present world-wide campaign to cut out waste, and, incidentally to place the lumber industry on a more stable foundation than its own unaided feet have

ever provided, of late years, at any rate.

There is a broad economic aspect to the operations of a pulp mill in addition to that already noted. A mill producing one hundred tons of pulp a day calls for two hundred cords of pulp wood. To provide this raw material requires larger lumbering operations than most concerns cover, and the farmer has to be called in to make good the deficit. Hitherto, clearing his land has been the bane of the farmer's existence, and it has been done largely only as government regulations compelled. Now, under the spur of high and advancing prices for pulpwood, land is being cleared as if by magic, and large sections of the reclaimed surface are being put under crop. The economic aspect of this is obvious. The farmer has more money to spend and industry is benefited right along.

### GOOD STROKES !

Readers of Industrial Canada may have been surprised during the past two months to see large advertisements for "Thrift In Forest Fires," in which were given reasons for keeping 1917 clear of needless loss.

The Provincial Paper Mills Ltd., Toronto, undertook to co-operate with the Canadian Forestry Association's work by using an entire page to set forth the message against carelessness with fire in the forest. Mr. I. H. Weldon, is President of Provincial Paper Mills, Limited, and a generous supporter of the work of the Association.

A half page advertisement was placed in the same magazine by the Howard Smith Paper Mills, Limited, Montreal, so that many hundreds of readers could not have failed to take some useful suggestions from the printed warning.



## Stories From the War-Front Forests

One of the mills of the Canadians behind the trenches in France runs day and night, and is rapidly eating up the neighboring wood. The noise of the circular saw mixes peculiarly with the constant throbbing in the air caused by the discharge of the heavy guns. A short distance from the saw-mill are the remains of buildings wrecked by enemy shell fire. A thousand feet an hour is the average output of the mill, and it will be doing better than this very shortly, as soon as the new machinery arrives.

Timber operations within range of German guns very naturally have their own peculiar inconveniences. Of course there is always the risk of the mill and its workers being blown to atoms by shell or by bombs from aircraft. Such dangers are part of the ordinary business of the day in these parts. The trees with which this particular mill is dealing have been "strafed" by the Boche intermittently for months past, which brings another problem to the workers in the mill. Chunks of shell are embedded in many of the trunks, and in the course of months these chunks have in many cases become overgrown and difficult of detection through superficial inspection, consequently there is trouble when such a trunk comes under the saw. But in spite of this and other difficulties the mill constantly turns out its thousand feet an hour, producing big balks for road mending and for the building of dugouts, lighter stuff for pit props and trench revetments, and timber of every kind which can be put to any use in the business of the war.

### *An Iron Cross Winner*

A journey of many miles from here into one of the fairest parts of France, into a part where the peasant even yet runs into the road to stare at the spectacle of soldiers in khaki, reveals still more of the Canadian foresters at work. They have a most interesting body of assistants—Boche prisoners. The

German in the French woods seems happy in his lot. They seemed tractable enough, and went about the work with at least a show of interest. All were sturdy fellows; some elderly, but the majority in the prime of life. One wore the ribbon of the Iron Cross.

They were all in German uniforms of field-grey, but the head-covering was most varied. A good many had the round cap of the German infantry, others wore trench helmets, one or two had the woolen "comforter" cap such as was sent out to our own men in the winter, a few wore ordinary civilian cloth caps. Here and there at a short distance were the soldiers of the guard, from English infantry battalions. The guard was not numerous. One man with a rifle is capable of looking after a power of his fellows who cannot summon such a weapon among them.

### *A Prisoner's Meal*

Work was suspended punctually at midday, and the company trooped off to dinner. It was served out hot under the trees by the prisoner-cook. An imperial officer accompanying us spoke a sentence to the man in his own tongue and learned that the prisoner was a cook by trade. "I speak half a dozen Indian tongues, but I believe it is the first time I have tried to speak German for seventeen years," remarked the officer. Having duly received their portions in their tins, the prisoners squatted in groups under the trees and jabbered away to one another volubly. More potatoes were put away in that picnic of Germans in a French wood than many people had consumed in London during the previous couple of months.

Another long journey through most beautiful country and they reached a third Canadian mill. Save for the villagers the Canadians have the district pretty well to themselves, and here, again, they are rapidly letting daylight into the woods.

## What Kinds of Spruce to Plant

There are three species of spruce native to Eastern Canada, namely the white, red, and black, but the white is much the best for ornamental purposes, and the black spruce has not done well under cultivation at Ottawa, says W. T. Macoun, Dominion Horticulturist in "The Canadian Horticulturist." The black spruce grows naturally in swampy ground and appears stunted when grown in well drained soil. The red spruce, which is a very prominent tree in the Maritime Provinces, is a good deal like the Norway spruce in color of foliage but is not as graceful a tree as the Norway. The white spruce is, however, a very desirable tree. One should get the bluest specimens that can be obtained as individual trees vary much in color, some being much bluer than others.

This native spruce is a more graceful tree than the Colorado blue or Rocky Mountain blue spruce, but both are necessary. Where there is only room for one the preference is given to the Colorado blue, as one cannot get quite as blue an effect from the white spruce and the Colorado blue spruce makes less room. Moreover, the white spruce suffers from the Spruce Gall Louse, which in recent years has injured the appearance of it. The variety of Colorado blue spruce known as *Kosteriana* is particularly blue. They are obtained grafted. If one has a large place and needs many trees the cheapest way to obtain blue specimens of this spruce is to buy small mixed seedlings and select those of best color, as the Colorado blue spruce varies from a most attractive shade of steely blue to green, and all gradations are found in the seedlings.

Well grown specimens of the bluest shades are expensive. This spruce is one of the hardiest. It succeeds well in the prairie provinces, where the temperatures are very low sometimes. It is a rather slow grower, but eventually reaches a good height.

One of the best spruces is a western native species, Englemann's spruce, which grows in the Rocky Mountains. This does very well at Ottawa. It has a more graceful outline than the Colorado Blue Spruce and while the leaves are not quite so blue they are of an attractive bluish green shade. The Norway Spruce has been planted on private grounds in Canada, more, perhaps, than any other species.

There are several reasons for this. It is one of the cheapest spruces to buy; it grows rapidly; and it is quite ornamental particularly for the first twenty-five or thirty years. The Norway Spruce is the fastest growing spruce of all the species which have been tested at Ottawa. Its pendulous branches make individual specimens very attractive and its large cones add also to its interest. It has been much used for wind-breaks in the province of Ontario and is very desirable for this purpose.

Many hedges have been made of this tree and where they get plenty of light are quite satisfactory, but if the hedges are shaded they lose their foliage at the bottom. There are large numbers of dwarf, variegated and weeping forms of the Norway Spruce but none of them are very attractive.

The Servian Spruce is a beautiful species which it was thought was going to be hardy at Ottawa, but in a very severe winter it was killed.

### FRUIT TREES ON THE PRAIRIE

The climate that produces the finest wheat in the world is not favourable to fruit trees. However, with great care certain hardy varieties of apples can be produced in some sections. There are wild plums in Manitoba; a number of the trees were planted on the Dominion Experimental Farm in Brandon some years ago and there is now a fine orchard. The plums, which grow abundantly, are small but of fine flavour. Black and red currants, raspberries and strawberries grow very successfully.



## THE WORLD OVER



### AFFORESTING SAND DUNES IN CADIZ, SPAIN

(De Castro, Manuel M. Fernandez, in the *Revista de Montes*)

The "navazos" form a characteristic method of improving sandy ground. The author describes those at the mouth of the Guadalete on the pliocene which, in the course of time has become covered with a sandy layer and transformed into sandhills. The land was redeemed for cultivation by converting it into "navazos." It is possible to form a "navazo" wherever a shallow and pervious soil overlies a sub-soil which is only slightly pervious, so that, between the two, a layer of underground water is formed, which replaces irrigation by rising under capillary attraction. In the locality under consideration these strata are formed by the layer of sand and the pliocene respectively.

The land round the mouth of the Guadalete had been converted into a series of "navazos" placed next to each other. As sand continued to form, it at length became impossible to hold them any longer, and the abandoned 'navazos' rapidly became sterile sandhills. It was then that the question of afforestation was considered.

The afforestation was carried out in 1905 to 1913 under the direction of the engineer *Angel Fernandes de Castro* by means of stone-pines (*Pinus Pinea* L.)

In those parts of the "navazos" which have not yet been invaded by sand, that is to say, in the ground that has been well manured by former cultivation, the trees have grown with great force, so that some seven-year-old pines have reached a height of over 16 feet, and there are annual growths of nearly 5 feet. Growth is slower on the higher ground which separates one "navazo" from another, but it is slowest in the ground where the sand has encroached.

The work of afforestation gave opportunities for various experiments. A group of closely planted trees was left to grow naturally, and it was found that the lower verticils of the *Pinus Pinea* died off completely, that is to say, a sort of natural pruning took place. Where trees were planted at normal distances from each other this natural pruning did not take place, and it occurred still less where the trees were sparsely planted. In the latter cases it is, therefore, wise to prune. Round Cadiz and Seville pruning is carried out very energetically, and the small branches which are removed are used for heating baking ovens. The pines which grow in abundance, also supply wood for the construction of river boats and fishing smacks.

### HOW INDIA'S FORESTS PREVENT TORRENTS

For over half a century, special laws have been passed in India for the protection of hill catchment areas by making reserved forests and protected forests.

The examination of abundant material collected in all the Provinces shows that the protective measures which were introduced during the last decades, and carefully carried out, have decidedly prevented de-forestation in districts where the effects of the denudation of the country had begun to be most severely felt. These measures were moreover taken at the right time. During the first half of the 19th. century, the destruction of the forests proceeded apace, as agriculture developed and villages increased. While the contractors cut down jungles, the villagers did still more

harm by uprooting stumps, grazing cattle on the young growth and firing the hillsides. The effect of such action was seen in the rivers, which became torrential during the flood season and shrank or dried up in the hot weather.

In the Central Provinces, it cannot be said that any wholesale denudation of forests has taken place, indeed, in some places the forests have improved rather than deteriorated. The same may be said of the Presidency of Madras. In accordance with these facts, the flow of the rivers and streams is equable. In the Punjab, the landslips, violent floods in the rivers, and the washing away of all cultivated soil in the Pabbi Range, the Hoshiarpur Chaos, the Siwaliks, the lower Himalayas and the Salt Range are doubtless due to the denudation of forest growth.

It can therefore be said generally that in most Provinces no serious damage to the flow of rivers has taken place, and no great injury has been done to cultivation. There are, however, local exceptions, and much damage has been done in the Punjab, in Bengal and Assam. Where damage was acknowledged, it was on the whole admitted to be due to forest denudation which changes the flow of the streams and accentuates their torrential character.

It may therefore be said that the measures of Forest Conservancy adopted by the Government of India during the last 50 years have entirely satisfied the climatic and hydrographic requirements of the country, and have resulted in the preservation of a sufficient area of forests, so that no widespread damage arising from the destruction of forest growth has occurred. This is chiefly due to the formation of reserved and protected forests in the large catchment basins and if, as has been said above, inundations and floods have occurred in certain districts, these are due to the measures for forest protection not yet having been definitely enforced in these parts of the country.

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## *Disastrous Fires from Trifling Causes*

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A man dropped a lighted match on the shore of Kalamalka Lake, British Columbia, on July 8th last. Within an hour a hot fire was racing through the underbrush. For three weeks after that there raged a series of forest fires, defying the organized efforts of hundreds of men.

At one time, 26 fire fighters were ringed about with flames while their relatives, shut off from them and helpless to aid, awaited news in terrorized suspense. Only after severe suffering from exhaustion, thirst and hunger did the band of workers force their way through to safety.

That experience is a big price to pay for one person's foolish act in handling matches in a forest. The court fined the careless man \$50 but that does not help the province to bear the enormous loss.

One lighted match dropped on one

inch of inflammable ground expanded into fifteen miles of ruin.

In the Spruce Valley fire of British Columbia of the same month, eleven men lost their lives, most of them tortured to death as they struggled over the mountain tops. The fuse to that disaster was supplied by a small piece of lighted tobacco carelessly thrown on the grassy floor of a tent.

Four out of five tragic holocausts could be avoided if every Canadian camper and fisherman kept vigilant watch on his own pair of hands, and every settler kept a tight rein on his clearing fires. It does not cost five cents or five minutes to put out a camp fire or a cigarette or a match, but it costs the people of Canada four or five million dollars a year to partially overtake the timber damage caused by runaway flames.

**BRITAIN'S HOUSING NEEDS**

The necessity for the construction of a great number of houses for the working classes in Great Britain was made the subject recently of an important interview by a deputation which called upon Lord Rhondda, President of the British Local Government Board. One of the deputations stated that approximately 30,000,000 pounds a year was required to provide for the normal growth of the population in England and Wales alone. Mr. Russell Taylor, of Liverpool, state, that 500,000 houses would be required after the war in urban and rural districts.

**PLANT COVER FOR A SANDY BANK**

A Winnipeg member of the Canadian Forestry Association recently inquired for a means of planting up a steep sandy bank near his summer cottage. The sand had refused to take any form of plant which the owner had tried to place upon it. The following suggestions were made by the Dominion Forestry Branch:

"Evidently the first step is to get some plant growth established on the bank in question—at first some herbaceous growth, as trees would require some time in attaining the necessary size. For this purpose the plant most generally used has been Beach Grass, known botanically as *Ammophila arenaria*; it is pretty common along the Great Lakes and is a vigorous grower, spreading by means of strong root-stalks. I do not, however, know of any convenient way

for you to obtain seeds or plants.

Another plant that suggests itself is the Awnless Brome Grass (*Bromus inermis*), which is now pretty extensively sown in the Prairie Provinces. It has vigorous root-stocks, and soon forms a regular mass of roots. It thrives on loose and comparatively poor land and is especially valuable for its resistance to drought, and generally to sudden climatic change. It does not attain its most vigorous growth till the second season. Ten to twelve pounds per acre has been found the best weight of seed in the West. While I do not know of a case exactly similar to yours in which this grass has been used, I think it is well worth a trial.

A pamphlet published about a year ago by the Michigan Agricultural College (Lansing, Michigan)—their Special Bulletin No. 79—entitled "Michigan's Shifting Sands," gives a list of sand-binding plants suitable for use in that state and contains other information that may be of value to you. You could probably obtain a copy by writing to the College.

Mr. E. J. Zavitz, provincial forester for Ontario (Department of Lands, Forests and Mines, Toronto) may be able to give you further information, as he has had quite a little experience in planting on sand lands in this province."

Lt. A. M. O. Gold, a Danish Forester, formerly of the British Columbia Forest Service has left for England as an officer in the Forestry Reinforcement draft.

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# **BOVRIL**

## **Saves Kitchen Waste**

There will be no more throwing away of good food if you keep a bottle of Bovril in the kitchen. Bovril helps you to make delicious dishes out of cold food. Better soup, better stews—less expense.

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## Rock Splitting Power of a Tree

The great expansive power of tree-growth is shown in *The Guide to Nature*, by H. E. Zimmerman. Writes Mr. Zimmerman:

"Accurate experiments have been made by scientific investigators to show the remarkable power of growing plants. It has been found that comparatively delicate plants have, in their growth, lifted weights totaling hundreds of pounds. Some years ago a picture was published in *Strand* magazine, showing how a plant had pushed itself up through a hard pavement constructed of asphalt, gravel, etc. The growing power of a tree, especially after it has attained considerable size, is correspondingly greater. Contrary to what many people think, most rocks have seams or cracks of varying definiteness, or they eventually develop them through the action of rain, frost, and sunshine. Into these cracks, however minute, the rootlets of small plants penetrate, carrying with them a little humus, to decay and to be followed by other roots. Moisture follows, which freezes and cracks off small rock-particles, when larger roots find their way in, carrying more dirt. The crack, widening and deepening through the course of many years, becomes filled with drifting dirt, when perhaps a seed of some tree blows into it, and then the real process of rock-splitting begins on a larger and more rapid scale. If the rock has a well-developed seam the expansive force of the roots of a tree is likely to split it entirely asunder.

### SWEDISH STORES OF PULP

No less than 200,000 tons of wood pulp are said to be stored at Swedish ports awaiting sale or shipment. Much of the pulp held in storage has been bought and paid for by British dealers, but cannot be delivered owing to the Swedish embargo on shipments of wood pulp to that country. American buyers have

abandoned their efforts to purchase wood pulp in Sweden. The Swedish Government now requires a guarantee that Swedish pulp exported shall be used in the country to which it is first shipped.

### A NOTE FROM A GUIDE

Burnt Church, N.B., June 22.  
Canadian Forestry Assoc.,  
Ottawa.

Dear Sirs:—

I received your card on the 10th instant asking to watch my camp fire etc. as never before, or my parties not to throw away any lighted cigarettes, so I will now watch and protect the forest even not my own parties but others that go about the woods.

Alex. Mitchell, Guide.

### ASSET IN CAMP DISHWATER

Lieut. Gordon B. Black, formerly of the "Western Lumberman" staff, Vancouver, was recently promoted from the Canadian headquarters staff at Shorncliffe to the position of assistant to the Director of Timber Operations in Great Britain and Scotland, with the rank of Captain, which was conferred in recognition of the high efficiency introduced by him in the task of supplying the needs of the various Canadian hospitals in England. Capt. Black writes that the conservation of food in the foresters' camps in England and Scotland is a live issue, as instanced by the fact that a new arrival was sent to the guard house for twenty days for throwing away a "hunk" of bread instead of placing it in the receptacle provided for food remnants. As a further instance of the saving methods in vogue, Capt. Black notes that the dishwater in all forester dining camps is skimmed twice. The grease thus saved is sold to the Imperial Munitions Board each week, the monthly revenue amounting to a handsome total.

The following telegram was sent to the "Timberman," Portland, Ore., by the Chief Forester of British Columbia, under date of August 13th:—

"May and June conditions were excellent throughout the province. July conditions were dangerous. Three hundred and fifty fires to date have been reported as the result of the hot weather and of no rain. The damage to property, including mills and logging equipment, is \$60,000. Seven men and 11 horses were lost in one fire at Cranbrook. The timber damage has not been compiled.

Summarizing the whole western pine situation the "Timberman" said:

"Only organized and effective forest fire fighting has kept the loss to a minimum thus far this season. The timber loss has been nominal and that of equipment small in proportion to the amount endangered. With a few exceptions the fires have been confined to slashings, but it has been persistent and sometimes costly work that has limited the damage."

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## Ten Thousand Canadians in Forest Corps

Answering questions addressed to him in the House of Commons, relating to the number of men in the Canadian Forestry Battalions and their rates of pay, Sir Edward Kemp, Minister of Militia, made the following statement:

1. List of Forestry Battalions formed in Canada and which have proceeded overseas:

Battalion	Officers	Ranks
224th. Forestry Battalion.....	47	1,536
230th. Forestry Battalion.....	30	1,038
238th. Forestry Battalion.....	44	1,084
242nd. Forestry Battalion.....	44	1,006
Total.....	165	4,664
		4,829
Drafts		
Drafts from various districts	109	3,567
Drafts from the 230th. Forestry Battalion Depot and not included in the 230th Battalion.....	40	913

122nd. Battalion (converted upon arrival in England).....	26	686
Total.....	175	5,166
		5,341
		10,170

In addition to the above a large number of men already overseas were formed into Forestry Companies.

The following special rates of pay are given specially qualified men after arrival overseas; these rates include regimental pay and field pay of \$1.10 per day.

	Consolidated rate of pay.
Millwrights, 2 per Co. of 250.....	\$ 3.00
Mill sawyers 2 per Co. of 250.....	3.00
Edgermen, 2 per Co. of 250.....	2.25
Saw filers, 2 per Co. of 250.....	2.25
Engineers, 2 per Co. of 250.....	2.25
Log setters, 2 per Co. of 250.....	1.75
Cooks 2, per Co. of 250.....	1.75
Saw hammerers, 1 per 3 companies	5.50

## Fines for Foreign-born Fire Setters

Reports have recently been received by the Director of Forestry in regard to convictions secured by the officers of the Forestry Branch against Galicians who started fires which did considerable damage in the month of May on the Riding Mountain Forest Reserve.

One fire which burned over 1500 acres, and the damage from which was estimated at \$1130, was deliberately set by a Galician who was caught in the act by the fire ranger. In spite of the fact that he was discovered setting fire with lighted grass on the edge of a hay meadow the man put up a strong fight and it was only after several hours in court that a conviction was obtained. He was fined \$100 and costs.

Another Galician pleaded guilty to setting out a fire on his own place which got away. He endeavored to put it out and helped the patrolmen to extinguish it, so was fined the minimum fine of \$25 and costs.

A third fire which ran over about 150 acres was also set out deliberately. The man who set the fire made a strong fight but was finally convicted and fined \$50 and costs.

These convictions will undoubtedly have the effect of making the foreign born settlers more careful in their handling of fire.

Pennsylvania has about 2,000,000 acres of waste farm land,—land once cleared and farmed, but now abandoned.





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## *Motion Pictures for Public Education*

The Canadian Forestry Association has made a commencement in the use of motion pictures in educational work. One film that vividly depicts the tragic consequences of a neglected camp fire showing a forest in flames, burning buildings, a settler's family fleeing from the fire, modern methods of fire fighting, etc., is being circulated by the Association through the settlements of Ontario and Quebec. A second film will follow in a few weeks and, if the Association's financial condition permits, there will be several graphic films in constant use henceforth at small towns and villages in the vicinity of timber, each film covering two theatres weekly. Motion picture films represent a high initial cost and the risk of damage and loss is heavy.

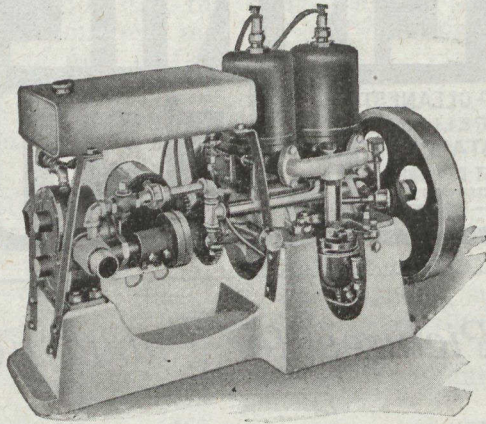
### THE FUTURE WOOD SUPPLY

James White, deputy head of the Conservation Commission, recently paid a visit to Victoria, B.C., and, after a tour of the Pacific Coast province, stated that he believed the pulp wood resources were in the neighborhood of 250,000,000 cords. He said that the situation was, however, serious throughout Canada, especially in the far east, where the extent of pulp wood had been grossly overestimated. Cruisers in Eastern Canada and the United States had, in some cases, reported, that there was enough material to last fifty

years. Later investigation had proved that about thirteen or fourteen years would be nearer the limit. Mr. White said that the result was that America must now look to the west for its supply of pulp wood. With the east facing exhaustion, British Columbia's pulp making-woods were destined to meet a large part of continental requirements. Soon Canada would be the world's greatest source of pulp and paper. If regulated, the forests of British Columbia could continue to give six million cords of pulpwood per annum for an almost indefinite period.

### ONTARIO'S FIRE POSTERS

Some of the most striking posters issued anywhere this year have come from the Forestry Branch of the Department of Lands and Forests at Toronto. They are printed on paraffin-coated cardboard, in two colors, and will be certain to arrest the attention of settlers, campers, etc.



## FAIRBANKS-MORSE FIRE FIGHTING ENGINES

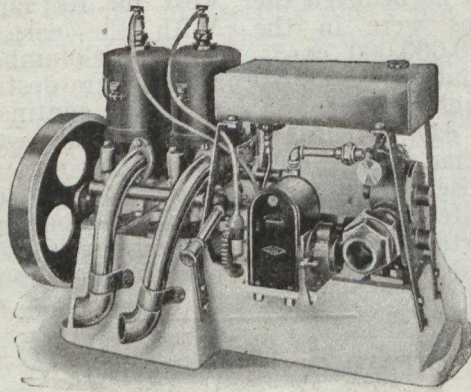
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## Fighting Fires in the Pacific States

An interesting report on the serious fire conditions on the Pacific Coast this year was issued by the United States Forest Service during August:—

“With the most serious fire situation in a number of years threatening millions of feet of western timber, it has been necessary for the Forest Service to suspend some of its operations in order to concentrate all available forces in fighting the forest fires.

“Reports received from the Northwest indicate that the situation is more dangerous than at any time this year. In Montana and northern Idaho two thousand men are fighting the flames under the direction of the Forest rangers. In these two States alone approximately \$170,000 has already been spent this season, and that figure is increasing by approximately \$15,000 a day.

“In Oregon and Washington valuable timber intended to furnish airplane stock for the fighting forces of the United States and its allies is being threatened by the flames. Logging operations are so badly interfered with that several large mills now supplying the Government with this class of material may be forced to discontinue operations. Numerous fires are reported as the result of incendiarism.

“The reports state that in many places little or no rain has fallen for weeks. The forests are now so dry that any fire which occurs is apt to become a dangerous conflagration, while high winds make it difficult to control even the smallest blaze. With such conditions, it is pointed out, there is need to keep all persons out of the woods. In order to accomplish this the Governor of Oregon has postponed the opening of the

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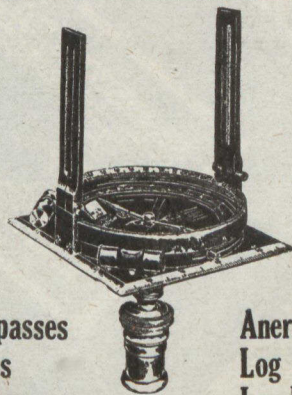
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hunting season in that State.

In spite of the unusually dangerous season, it is stated that until last week there has been a comparatively small loss of timber on the National Forests, private owners having suffered most of the damage done. This is largely explained as due to the increased efficiency of the fire-fighting force which has profited by the lessons of the past year. In many cases, too, luck has been on the side of the rangers in handling particularly dangerous fires. The outbreak of fires in the past few days is taken by officials to indicate that the situation is growing more serious.

The whole organization of the Forest Service, in the affected Districts, is devoting itself exclusively to fire fighting. In accordance with a pre-arranged plan, men from Forests where there are no fires are relieving the rangers who have been worn out by their long exertions.

While it may be possible to hold the damage to a minimum by these and other methods, officials say that not until the fall rains come will the danger cease.

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C. C. JONES, Chancellor.

## Ranger Jobs for Returned Soldiers

Several excellent suggestions have been heard in the Western newspapers that returned soldiers could well be employed in the work of forest patrol. A member of a local legislature went as far as to advocate a Ranger School at Prince Albert for the instruction of the soldiers in their duties.

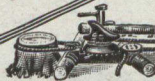
The idea, excellent in itself, would not be acceptable for a moment to the parties most concerned, the re-

turned soldiers, unless they could enter upon their work under a guarantee that the merit system and not the patronage plan would prevail in the conditions of their employment.

It is inconceivable that any soldier would accept the "boon" of spending five or six months at a Ranger School, only to find himself rated beside a political appointee who had monopolized the road to promotion through his personal "pull."

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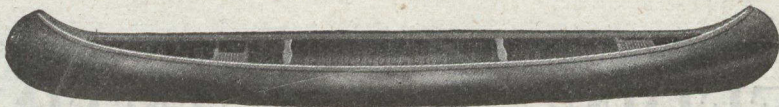
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