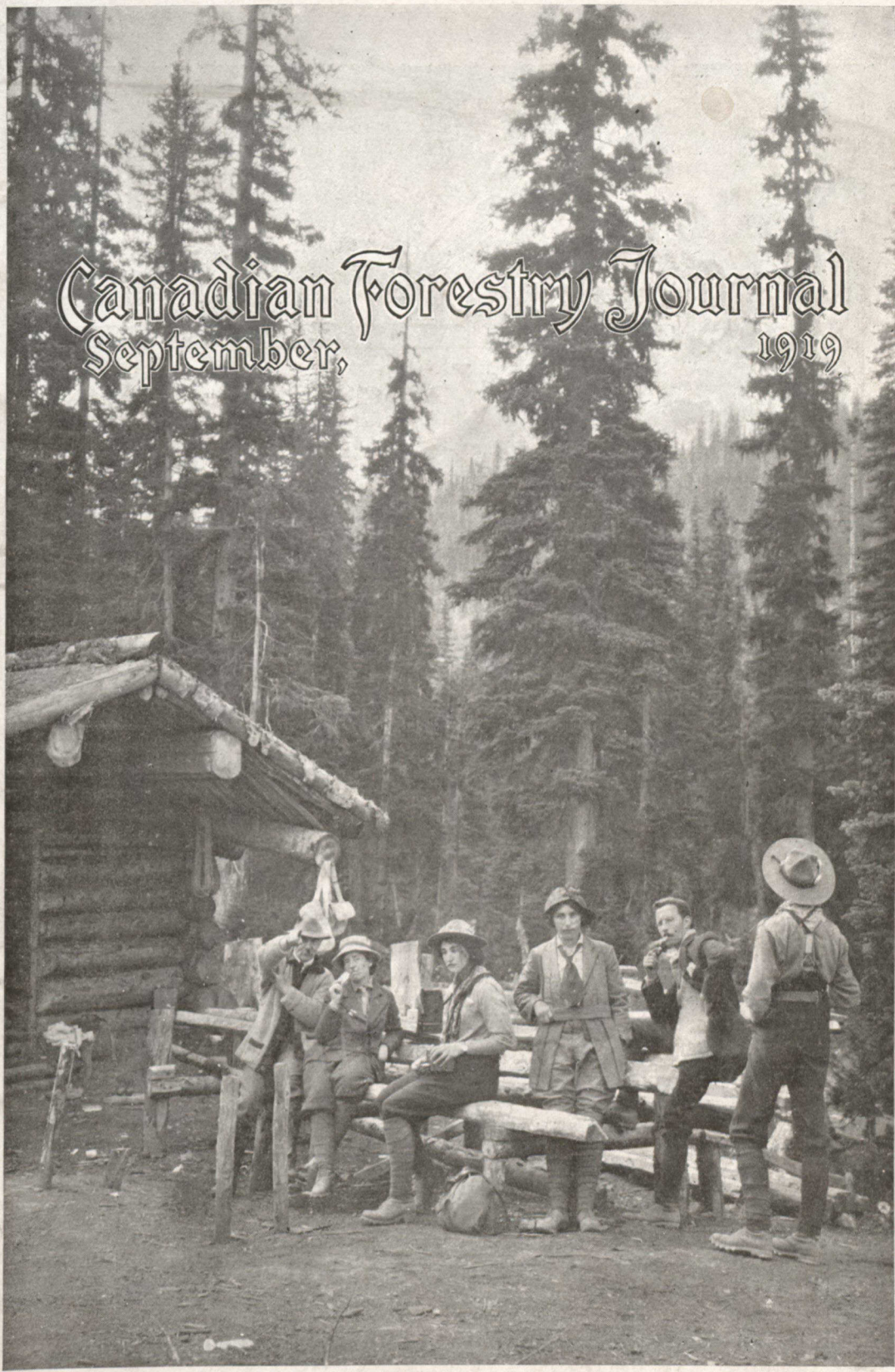


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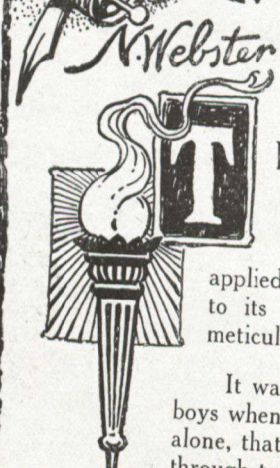


WITH THE ALPINE CLUB IN BRITISH COLUMBIA.



Webster On "Morale"

MORALE (Mo-ral) n. (F. See Moral, a.) the moral condition, or the condition in other respects, so far as it is affected by, or dependent upon, moral considerations, such as zeal, spirit, hope and confidence; mental state, as of a body of men, an army, and like.



WHAT is Dr. Webster's definition. Many of us know the word only in its war-time application.

Webster dwells firstly upon the usage of the word "morale" as applied to the common-place happenings of every-day life. His allusion to its reference to an army comes later. And Webster is correct—meticulously so.

It was their private-life morale that made such splendid soldiers of our boys when the time came for them to don the khaki. It was that, and that alone, that made them take the first step, and it was that which carried them through to victory. If their every-day morale had been neglected, the Army could have done little with them and success would not have crowned their efforts.

It is the many little incidents of your daily routine that make up your morale—the morning shave, your clean linen, polished shoes, brushed clothes. Webster speaks of zeal, spirit, hope and confidence. It is by attention to the small details of your personal appearance that these may be attained.

The Gillette Safety Razor enters as much into the morale of everyday life as it did into that of the trenches. It helped our soldiers to maintain their confidence and bearing. It will do the same for you. The Gillette Safety Razor makes the daily shave come easy—there is no pulling or scraping—no honing, or stropping—just five minutes of perfect shaving comfort. And, afterwards, a chin that tells of morale and self-respect.

Sold at most stores catering to men's needs.

MADE IN

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The Gillette Safety Razor Co. of Canada, Limited, Montreal, Que.

Canadian Forestry Journal

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OTTAWA, CANADA, SEPTEMBER, 1919.

Nos. 8 and 9.



English Sparrows appreciate bathing and drinking facilities as much as do more desirable species.

HOW TO ATTRACT BIRDS TO THE HOME*

By P. A. Taverner.



Arranging Nesting Quarters, Guarding Against Trespassers, Providing Food During Fall and Winter Seasons.



When poor Tom Paine wrote "Home Sweet Home," he sounded a note that found an echo in every human heart. In the second stanza he wrote:

"The birds singing gaily,
That come to my call";

thus suggesting the intimate association existing between the sticks and stones of that which we call "Home" and its animate surroundings. In fact "Home" is not merely that shell of brick and wood and plaster in which we abide and the ground that surrounds it, but includes also a host of associations of which we consciously or subconsciously feel the influence. A home without these delicately haunting memories is but a name, and one of the essentials to home building and the development of its higher refining influences is the creation of these subtle

intangibles that after all finally rule the world. That birds are not the least important of these influences is declared by all the poets and is confirmed by our own experience. In the days of careless childhood or busy young manhood, we may not have particularly noted the common birds about us, but in after life they have made an indelible impression when the twittering of a flock of swallows takes us back to the old hay-mow with its attendant flight of birds or the chatter of the kingbird reminds us of the orchard with its refreshing shade and its noisy guardian driving off intruders.

From the purely esthetic side therefore, the encouragement of birds about the home and the introduction of the impressionable child mind to them makes for stronger home ties and a better coming generation, while the benefit of having numerous feathered allies in our constant fight against insect pests must be ac-

*Published by permission of the Geological Survey, Canada.

cepted as economic justification for attracting birds by the most hard-headed and practical man of material affairs.

The Investment in Bird Beauty.

As a rule he who gives nothing receives nothing in return. If we want birds intimately or permanently about us we usually have to give them something in return. However, the price is small and can be paid without impoverishing ourselves and the returns are large. Food, water, protection, and nesting sites include practically all their requirements and when we supply these they ask no further price but come freely to our assistance and pleasure with all their charming personality and melody.

Of these requirements, that most commonly and easily furnished is the nesting site. In these days of intensive cultivation, when even the trees have their surgeons and every rotting or hollow stub or branch is filled with antiseptic concrete, many of our best bird friends are hard put to find suitable cradles for their young. If we remove or destroy their natural nest receptacles, it is no more than fair that we should supply artificial ones. At any rate in the reproductive season such situations are absolutely essential to the presence of birds in any locality. Of course, not all species require such cavities and branches of trees with convenient forks are all that many need as foundations for their nests. To others, however, and amongst them some of the most attractive species, such cavities are absolutely essential. In Canada, such species include, the Purple Martin, Tree Swallow, House Wren, Bluebird (both eastern and western forms), Crested Flycatcher in the east and the Arkansas Kingbird in the west, the woodpeckers including the Flicker, nuthatches and chickadees as well as the Screech Owl and the Sparrow Hawk. The inclusion of these two birds of prey as desirable tenants may cause some surprise, but the Screech Owl is a notable mouser, the equal of several cats, and does much more good than harm. Besides it is a most interesting little fellow and, where small bird welfare permits, a most desirable neighbor. Its soft tremolo notes, libelously called "screech," is a pleasant sound to have drift in on one through the darkness and adds a charm to the night that is only otherwise supplied by the mournfully lonely whippoorwill or the occasional night song of other species. The Sparrow Hawk is an even less doubtful character. As a grasshopper destroyer it deserves every encouragement in the vicinity of cultiva-

tion, and as a mouser it is not to be despised. The building of bird houses is too long a subject to go into its details here, but a discussion of the subject with plans and drawings of different types of birds houses will be forwarded to any reader interested in the subject on receipt of a post card addressed to the writer, care of the Geological Survey, Ottawa.

Water for Bath and Drink.

The next great attraction to birds is water. In the hot dry days of summer water is often scarce, and birds have frequently to go far for the moisture necessary to them. No elaborate receptacle is necessary to contain it. The main requirements are that it is changed often enough to be fairly fresh, is shallow enough that they can bathe in it, and that it is well out from cover that may hide lurking enemies, cats for instance. A flat pan set on a small slope so that it is shallow at one end is sufficient to attract numbers of birds. More elaborate containers can be used; from rough concrete slabs, made picturesque with rock as ingenuity suggests, to highly sculptured bird baths of monumental character, or larger tanks or water-gardens in which lilies and lotus may be grown and which may have bird requirements provided for in their construction. It is astonishing how many birds such a grateful supply may attract. The robins are particularly constant visitors to water and it is no uncommon sight to see half a dozen awaiting their turn for a bath or a drink. Sometimes each will be impatient of the presence of the others and sometimes a procession of them may be seen chasing each other about the bath too occupied with driving off intruders to attend to the real business for which they came. Song sparrows will visit the water regularly, splash a while in the grateful coolness, come out and preen, and then return for another dip. Afterwards their song of happiness from some nearby vantage point is ample repayment for the slight trouble it has cost. Kingbirds, Orioles, Chippies, Yellow Warblers, Goldfinches, all come in succession to the water, some making prolonged visits, others alighting for a moment like the Goldfish for a sip and then off again with undulating flight and merry little oft-repeated "per-chick-o-pe." Occasionally, depending upon surroundings, other birds pay visits. The Flicker once in a while deigns to drink and unless restrained Bronzed Grackles keep the other birds in continual uproar with their undesirable presence. Swallows dip into it if the water is expansive enough and I have even



A Cedar Waxwing sunning itself on a fence post.

known Bitterns to be momentarily attracted by a small artificial lilly pond in the city outskirts.

The Search for Sanctuaries.

Next to water comes protection as a factor in attracting birds. The life of wild things is one continuous watchfulness against danger. Their enemies are innumerable and their personal histories are little more than a sequence of escapes. They discover isles of safety as it seems that they associate locally with danger and soon learn to avoid spots where they have been repeatedly endangered. Under these circumstances it is hardly surprising that a place where they can lay aside some degree of their ever watchful constraint has an attraction for them, and it is surprising what results where protection from enemies will produce. To see

hundreds of wild geese, the wariest birds, as tame as barnyard poultry at Jack Miner's place at Kingsville, Ontario, simply because they know they are safe, is an object lesson. In Meriden, New Hampshire, through co-operation throughout the village, all the birds are equally tame; come to the hand and be fed, and show a confidence in man and his protection that is more like the Golden Age than this one of Steel and Iron.

Beware the Cat!

Principal among the bird dangers to be guarded against in settled communities, is the common domestic cat. The toll taken by gentle pussy from bird life is, in total, enormous. No cat but is a hunter on opportunity. Even the best of care and feeding fails to restrain the feline nature in this direction. Of course hungry cats who have to hunt to live, kill more birds than the pampered pets, but not even the aristocratic Angora or Persian is guiltless. How to control the cat is rather a difficult problem. A cat-proof fence about the grounds is the most satisfactory method. High fences of poultry wire, or topped with the same with an outward flare of eighteen inches left loose and flapping is usually sufficient. When old fishnet can be procured, a three-foot strip strung along the top of the fence supported loosely by lath supports at wide intervals, is unclimbable by cats and will keep them out. The most desirable solution of the cat problem is undoubtedly a cat license. We should no more tolerate a lot of underfed, ill-kept cats, living by their wits, than we do a number of ownerless dogs. If anything, cats are a greater danger to the community. Rabbits amongst dogs is a very rare disease, but the cat's potentiality for the spread of disease is great indeed, as they prowl everywhere and come closer in contact with us, hugged and kissed by the children, nesting in the woodshed corners in unexpected places, and



Cock Robin takes his morning tub.

even licking the top of the early morning milk bottle. However closely a house is quarantined there is one member of the family that comes and goes at will, and that is the cat. However, pussy is too old a companion, I almost said friend, of man to be lightly dismissed. The cat purring on the hearth rug is almost an essential to a real home, and the pleasure she gives the little ones is too real and human to be disregarded. As a mouser or rather the cat is not efficient. No badly infested locality was ever cleared of such vermin by cats. When San Francisco inaugurated its crusade against rats the cat was found useless and not until systematic trapping and rat-stopping was inaugurated was headway made against them. Any one should have a family cat, if they wish, but if they do not want them enough to pay a nominal registration fee their desire is not enough to balance the very real menace they constitute. Such a registration fee would prevent none who really desired from having their pets, but would control the host of half-starved felines that now infest our alleys and vacant lots.

Early Morning Perils.

Various methods have been suggested to prevent cats from catching birds, such as putting a bell on them or even the use of a tether. Neither of these or many other schemes so far proposed, have worked out in practice. The most practical plan is to keep the cat in at night or rather in the early morning, only letting her out after the dew is gone. Most cats kill practically 90 per cent of their birds in the early morning hours when morning hunger reduces caution and when chilled by the morning air, and wet with the dew from foliage, birds are slower in motion and less on guard. If the cat is kept in until the birds have resumed their usual daily attitude of watchfulness it will do but a small amount of harm.

Of course the small boy with the sling shot, air gun, or small rifle, have obviously to be guarded against, but their case is comparatively easy. Other enemies of common garden birds are the Blue Jay, Red Squirrel and Bronzed Grackle. These are all confirmed nest robbers and are not adverse to taking adults upon occasion. The saucy Red Squirrel is particularly pernicious and though we cannot help admiring his spritely ways and intelligence, he should not be allowed to increase unduly. An occasional squirrel adds an interesting though peppery personality to the landscape, but too many of them mean no birds. A choice must be made be-

tween the two, we cannot have both in abundance.

Fighting the Sparrow.

The Blue Jay is not likely to disturb the garden community as it usually keeps a little farther away from the immediate vicinity of man and his works, but the Grackle is especially fond of the ornamental evergreens and constantly invades the garden. No one can observe the wild protests its presence arouses in all the garden inhabitants in nesting season without realizing that it is undesirable there. Besides it is gratingly noisy and a very dirty nest-builder, filling the trees or the cornices of the house with even more bulky masses of rubbish than the English Sparrow.

Under the head of protection this little undesirable importation should also be mentioned. Originally imported to control insect pests, it turned out more of a seed than an insect eater, and whilst driving away our native insect destroyers failed to more than partially fill their place, leaving us worse off than before. It drives away more valuable species in three ways. First by being early on the ground in the spring and pre-empting desirable nesting sites, second by competing with them, during nesting season in the common food supply necessary for all nestlings, and third by their aggressive and quarrelsome nature making an eternal hubbub and inducing more peaceably inclined neighbors to seek quiet life elsewhere. For these reasons English Sparrows should be kept under control and especially out of the nesting boxes until more desirable tenants have established themselves. After this less attention may be paid to them.

Winter Supplies of Food.

The question of attracting birds by food is mostly a winter problem. During the summer food is plenty as a rule and does not have to be supplied. A few berry-bearing shrubs will attract many species, and also serve to protect early fruit from their attack. Wild Cherries, Bush Honeysuckle and Mountain Ash or Rowan trees will attract numbers of Robins, Cedar Birds and others. A few heads of lettuce allowed to run to seed or fruiting annual Larkspur are attractions to Goldfinches, whilst a row of seeding Sunflowers is a never failing lure to many species in summer and autumn. It is in the winter, however, when birds and food are scarcest that the greatest results come from feeding. Grain, seeds, suet and nuts are great attractions, and many methods have been

evolved for distributing and displaying them. Scattering on the ground is wasteful as it is soon covered by snow and is not found by inhabiting species. Shelters can be made where ground feeders can be fed and the food protected from snow. Shelves can be set on low posts, some times with weather vane attachment to present the shelter to the storm. Mixture of various food components with suet, or suet alone, can be tied to tree branches or fastened with various devices. Window shelves are also popular as feeding stations as they bring the hungry banqueters close under observation and are easy to renew or keep free of snow. To list and describe all the details that

ingenuity have found practical for this work would take much more space than can be spared here. Fuller information can be found in other publications, notably those published by the United States Department of Agriculture and by the Commonwealth of Massachusetts, which can be obtained at a nominal cost. I would particularly like to recommend Harold Baynes' *Wild Bird Guests*,* a perusal of which with its practical demonstration of what may be accomplished is an inspiration and example to all who love nature and desire to have her on friendly terms about them.

*Published by A. E. Dutton, New York.



Stubs, like those in the photograph at the left, prevent the bark from growing over the wound and healing it, as it is doing in the centre picture. The bark wound at the right is healing properly, and in a few years will be hardly noticeable.

THE CARE OF BARK WOUNDS IN TREES

By C. L. Meller.

Bark wounds endanger the life of a tree more than most people realize. This is due to the fact that all the nourishment the tree receives is carried in the thin green layer just under the bark. When the bark is injured, the flow of the sap in the green, or cambium, layer is stopped, and the tree fails to receive the proper nourishment. Bark wounds may be of many kinds, but among the most serious are those caused by cutting off limbs improperly.

In removing a limb, the cut must be made as close to the trunk or branch from which the limb grows as is possible. If the work is done so that a stub remains, it is impossible for the bark to grow over the cut end. The stub then dies and the decay is carried into the trunk or branch itself. By cutting the limb off close to the trunk, the new bark, with the cambium layer underneath, gradually grows inward over the cut part, in a narrowing circle, until the

wound is completely covered with bark, and thus protected. For added protection, while the healing process is going on, the exposed wood should be given a heavy coat of good paint. This should be repeated as often as necessary, until the wood is entirely healed. When this is properly done, healed wounds are difficult to detect.

Many wounds are caused by horses rubbing against trees used as hitching posts. Others are caused by sharp objects tearing off pieces of the bark. When neglected, these wounds permit decay as readily as do those caused by cutting off limbs in the wrong way. All loose or torn bark should be removed from such wounds, and the exposed wood given as smooth a surface as possible; also, the sound bark surrounding the exposed wood should be cut so that it has a continuous smooth edge. The outline of the area cut away should never be square, but should come gradually to a point at the top and bottom of the wound. Cutting the bark in this way allows the sap to flow freely around the wound and thus easily nourish the new bark that is forming.

Water must not be permitted to gather in the wound, under any circumstances, as it always hastens the decay of the remaining wood. A small groove cut into the lower end of the wound will allow the water to trickle away as rapidly as it collects. To protect the exposed surface better, it should be given a good coat of white lead or other available paint. One coat will not last all the years it takes for such a wound to heal; the wound should be given a new coat of paint whenever the previous one is worn out.

Properly treated, bark wounds will not seriously endanger the life of a tree. Repairing damages after the wood has had a chance to decay deeply is a very different matter. The same principle of removing all injured or decayed wood and bark, and preparing the surface to exclude water and to permit rapid growth of new bark, applies to the advanced condition. The photographs show bark wounds in various stages of healing, also stubs of limbs which were not cut off properly.

New Books on Forestry.

Forest Management, by A. B. Recknagel, B.A., M.F., Professor of Forest Management and

Utilization, Cornell University, and John Bentley, jr., B.S., M.F., Assistant Professor of Forest Engineering, Cornell University. A condensed and simple treatment of the subjects, Forest mensuration, Forest organization, Forest finance and Forest administration, written in such a manner as to be readily understood and used by the layman timber owner and manager. Non-professional students of forestry in colleges and universities, and in professional courses not of post-graduate grade, will also find it of value as a text. In fact, the book occupies a middle-ground between the highly technical and the very elementary textbooks extant. Intelligent study of the principles advocated in this book will stimulate the practice of forest management by owners of timber land—large and small, public and private—to the end that this important natural resource may be systematically maintained and developed. 267 pages, 6 by 9, 26 figures, cloth, \$2.50, net (11s. 6d. net).

SOCIAL SERVICE BY PAPER COMPANY.

The Laurentide Company is more than a manufacturing concern. From the last copy of *Le Digesteur* it is seen that they are encouraging the proper care of babies and the admission of fresh air to houses by printing descriptive pictures. They also conduct a class for the little housewives. More than forty are enrolled.

A SETTLER'S EXPERIENCE.

A settler named Olson and two others of the Haileybury, Ont., district, had a trying experience. They sent their women folk out when the fire drew near. The Olson home was first surrounded by the fire and the other two went to help protect it. Olson got on the roof and pulled up pails of water which the two below carried to him. The nearer the fire got the hotter it became. Finally the house was completely surrounded and the dense smoke made it impossible for the trio to escape. It then became a battle for their lives, and those depended on their keeping the house from burning. It soon became so hot that the skin on Olson's face as he sat on the roof began to peel. He maintained his position by dumping every second pail of water over his body. They won the fight, but suffered terribly.



No housing problems in Spanish Honduras. Photograph shows homes of native Carib Indians, beside cocoanut palms.

CRUISING MAHOGANY IN CENTRAL AMERICA

By *L. C. Tilt, B. Sc.F., Formerly of Dominion Forestry Branch, Winnipeg.*



A Unique Journey Into Spanish Honduras in Search of Precious Woods—A Lazy Population.



Due to the proximity of New Orleans to Central America, that port has secured a large part of the trade carried on between the independent states of Central America and the United States. In consequence of this trade good accommodation can be secured on the steamers carrying machinery, etc., to these countries and returning with fruit, sugar, hides and timber.

I left New Orleans on a steamer of about 4,000 tons and after three days arrived at La Ceiba on the north coast of Central America, due south of New Orleans. From here a small government gasoline launch was taken to Truxillo, 60 miles east along the coast of Spanish Honduras. Truxillo is noted in history as being the first place on which Columbus set foot on the mainland of America. Truxillo and La Ceiba are the two largest towns on this part of the coast having a population of about 4,000 each, 95 per cent of which is Carib Indian, negro or half-breeds mixed with Spanish or English. The coast is bordered by a series of mountain ranges from 1,000 to 2,000 feet high which are densely covered with the forest

growth peculiar to that country. The small areas of low level land along the shore are covered with cocoanut palms or are being planted up with bananas by the American fruit companies, which are developing the country.

The Journey Inland.

At Truxillo I secured an interpreter, as the native language is Spanish. This interpreter was a negro, a native of British Honduras and very loyal to the British flag. I also secured a native to drive the pack mules. Leaving Truxillo we followed the old trail running from the coast, over the mountains inland to the capital, Tegucigalpa. This trail was built several hundred years ago by the Spaniards, all the grades being paved with large flat rocks. Three days along this trail took us about 70 miles inland to the vicinity of the timber to be examined. There we secured the services of four natives, a mahogany hunter, cook and two trail cutters. We did not carry tents, but built wide shelters out of the palm leaves which is the universal material for protection from the rain and rays of the sun.

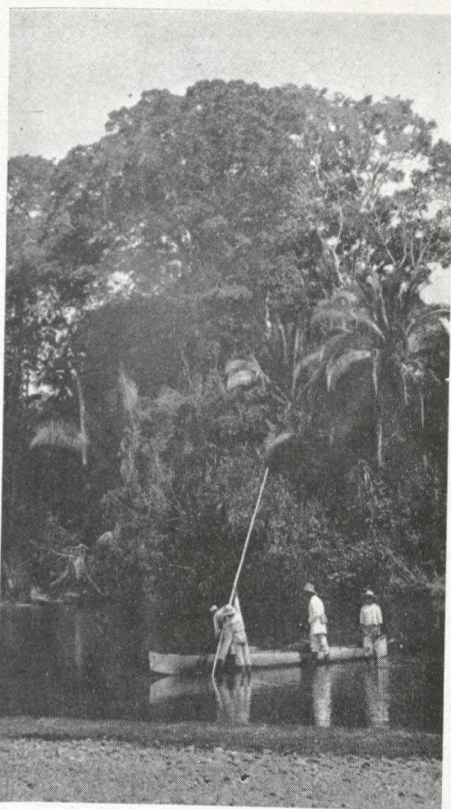
A Land of Laziness.

The natives of the country, that is the true Honduranian, is of Spanish descent. Those living in the forest and on the small farms are easily pleased from the point of view of comfort. Their houses are rude structures built of poles, with clay plastered walls, clay floor and thatched roof. The furniture consists of a rawhide drawn over a frame for a bed, a rough table and a couple of blocks of wood for seats. Sanitary conditions are very poor, the cow and pigs and chickens spending as much time in the house as the human portion of the family. Due to the ease of obtaining a living in that warm climate, the people are far from being industrious or thrifty, and live under conditions a northerner would not tolerate.

During the dry season, which lasts from April to October, the temperature at night is from 75 to 85 degrees. During the day from 35 to 95 degrees. In winter, November to March, the rainfall is excessive and the cool, damp winds cause the natives to succumb to cold and pneumonia, because they have no way to warm their



A good specimen of a mahogany in a dense Honduras forest—15 feet in diameter, at height of six feet.



With a Canadian party hunting mahogany in Spanish Honduras. Note the native dugout canoe.

houses, nor any warm clothes to put on. With the thermometer at 95 degrees in the shade it is certainly hot, although the heat is not oppressive and there seems to be little danger of sunstroke.

On the very sandy soil a few groves of pine were found, the wood of which was hard and full of pitch, closely resembling the southern shortleaf pine. All of the other trees are hardwoods (deciduous). About 30 species of these were common and I have seen places where 15 different species of trees could be counted while standing in one place. About the only trees similar to any trees in Canada were a species of oak and also one of locust. The oak, however, as a rule, grows short and scrubby, seldom being found on the high forest. Of the other species the leaves resembled those of the sycamore, beech, locust and walnut, while the woods were similar to that of ash, maple, beech and basswood, some hard and some soft. One species, the Granada, has wood which is very hard.

A Variety of Trees.

The conditions peculiar to the forest in this region are first: The extreme density; second, numerous tree species; third, buttressed roots, hard and dark in color, somewhat like ebony. The greater number of the trees are from 2 to 4 feet in diameter breast high, and 90 to 125 feet high, and as a rule 60 feet clear of limbs, and with very little taper. The dense growth of palms from 20 to 50 feet high, the climbing leaves and the small plants growing all over the larger trees give the forest an aspect totally different from the northern forest.

Wasting Mahogany.

At present there is no market for any of the woods except mahogany and Spanish (cigar box) cedar. On the area examined, consisting of 14,000 acres of actual mahogany land there were about 7,000 mahogany trees of commercial size and about 250 cedar. The trunk, especially the bark, is very much like the ordinary white elm. The crown while large is unlike the elm, rather irregularly branched. The tree grows to a diameter of about 6 and 8 feet; those above 7 feet being rare. In the dense high forest it frequently attains a height of 75 feet to the crown, but in the vicinity of the Savannahs is much shorter. The mahogany is always the tallest tree in the part of the forest where it is growing, always successfully overtopping all the other trees. The rate of growth on trees from 2 to 4 feet in diameter seemed to be from 4 to 6 rings to the inch.

The trees are felled with long-handled axes and cross-cut with saws. The logging is very wasteful on account of the logs having to be perfectly sound and with little curve or crook. Then besides the minimum sized log is 16 feet in diameter and 12 feet long, so the waste is enormous. The logs are hauled with oxen, six yoke of oxen hauling about a thousand feet board measure, or four or eight wheeled wagons.

In the river the logs, which float very low in the water, are handled loose or in rafts. London and New York are the largest markets.

Preston, Ont., July 24, 1919. L. C. TILT.

MAKE THE GUILTY PAY!

(Montreal Star.)

When one considers how valuable lumber is to-day, the destruction of large forest areas by fire, which are now being reported, makes depressing reading. Canadian forests are valuable beyond computation, and their preservation is a matter of national concern.

It is to the credit of the Dominion and Provincial authorities that steps have been taken to preserve our forest lands, but very much yet remains to be done. There is abundant proof that a large percentage of forest fires can be traced to careless actions on the part of settlers, hunters and others. Those who gather around camp-fires and march away, leaving embers aglow, should be indicted for criminal carelessness. There is no excuse for such gross stupidity. Lives in addition to monetary loss are annually sacrificed to it.

TERRIFIC FIRES IN UNITED STATES.

(Press Dispatch)

Racing over mountain ridges of Western Montana and Northern Idaho, forest fires which have been burning during July continued to spread destruction, and threatened several small towns which have been severed by flames from communication with the United States Forest Reserve headquarters at Missoula, Mont.

The fire near Henderson, Mont., jumped the mountains into the Mullan Gulch country, where there is said to be practically no opportunity to stop it. The fire near St. Regis, Mont., crossed the Clark's Fork river, and is spreading unchecked over a large area. Only with favorable weather conditions is there any possibility of controlling the flames, District Forest Service officials said.

It was reported that the sheep caught at Alberton between two cross-fires and destroyed numbered 1,700.

One of the worst fires in the district was said to be in the Salmon Forest, just across the Idaho line, south of Dillon. The fire is sweeping over the mountain on a six-mile front with the wind blowing a hurricane to fan the flames.

THE CIGARETTE ONCE MORE.

(Nelson, B.C., News.)

A small bush fire was put out by D. Cameron and W. Billington on the Granite road. The blaze was thought to have been caused by a cigarette stub tossed away by a passerby. It only burned out a few yards of brush, but if it had not been noticed in time would have resulted in a serious fire, as it was close to the ranch homes on the road. It is pointed out that persons walking or riding on the country roads should be extremely careful about throwing away matches or stubs of cigarettes and cigars, as in this hot, dry weather the flames spread rapidly.

"TREE WIRELESS"—A NEW APPLICATION

By Douglas R. P. Coats, Montreal.

No More Elaborate Towers and Expensive Aerials Liable to Breakdown—Just Trees Themselves.

An article of great interest to me as a wireless man, but particularly so on account of my experiences as demonstrator of radiotelegraph equipment on the Canadian Forestry Association's exhibition car last year, appears in the "Electrical Experimenter" for July.

In this article, Major-General Squier, Chief Signal Officer, United States Army, describes some experiments in which he has used growing trees as radio "antennae" with remarkable success. The layman who has seen wireless stations or pictures of them will have noticed the high masts or towers and the elevated arrangement of wires which have become so associated in our minds with wireless stations as to make us think of their threatened existence—for science is declaring them unnecessary—with the same feelings of regret with which we note the disappearance of revered landmarks. Radio engineers, however, have been eyeing these picturesque structures with entirely different sensations, begrudging the cost of materials required in their construction and maintenance, but objecting particularly to their prominence where secrecy of location would be most desirable, for the average wireless mast simply will not be "camouflaged!"

In non-technical language, the prime function of the aerial is that of radiating energy from the transmitter into space in the form of aether waves, which, meeting aerial systems at receiving stations elsewhere, can be absorbed and converted into audible signals. Generally speaking, the waves emitted from a station are radiated fairly equally in all directions, though in many cases aerials are constructed with distinctly directional properties, that is to say, the bulk of their energy may be propagated so as to produce a much greater effect on a receiver situated at the point. It is obvious that if energy is radiated in all directions, the amount absorbed by any one receiver must be extremely small, and even where both transmitting and receiving aerials are designed to have strong directive properties one to the other, the waste of energy is still so enormous

as to necessitate elaborate aerial systems at each station and the use of very delicate receivers responsive to the feeblest currents.

Amplifying Sound.

Recent advances in receiving apparatus have now revolutionized radio communication to such an extent that we hear of signals quite inaudible with types of receiver used only a few years back being amplified several million times so as to produce sounds of such intensity as to permit the operator to place his head telephones on the table, walk a hundred feet or more away and still hear them! As a result of these improvements the transmission range of any given powered apparatus may be said to have been increased, though not in the strictest sense, for it is not so much that signals can be made to go farther today with a given input of power than hitherto, though this is also true, but rather that the sensitiveness of receiving instruments has been so increased as to permit of their being detected at greater distance.

With signals amplified as we are able to do today, we can get along minus any receiving aerial at all in many cases—unless a simple loop of wire suspended in the operating room may be called an aerial—with an arrangement of buried wires such as was invented by a Mr. Hughes in the States and used for communication with submarines, or with what may be found most suitable for wireless in Canada's forests—a "tree aerial" system as worked out by Major-General Squier.

How a Tree is Used.

In his article he says that radio messages have been received in America from England, France, Germany and Italy by connecting a wire attached to a nail driven into a tree! The nail is driven near the top of the tree, and the insulated wire is joined to a small piece of wire netting laid on the ground beneath the tree. "One of the best arrangements is found to be an elevated tree terminal in the upper part of the tree-top and an earth consisting

practically of several short pieces of insulated wire, sealed at the outer end, radiating from a common centre, and buried a few inches beneath the surface of the ground in the neighborhood of the tree."

In view of the work now being done by aeroplanes in patrolling certain forest districts, it is interesting to note that "Radio-telephonic messages from airplanes were readily received and transferred thence to the wire system . . . and finally received at any point desired," and also that "Radio-telephonic transmission through the tree antenna was received by another tree antenna and automatically returned to the sender on a wire system, thus making the complete circuit."

Of the marvellous achievements of the wireless telephone I hope to have the pleasure of writing in subsequent articles for the readers of this journal. It is unfortunate that the repeated publication in the newspapers of far-fetched radio "records" should have sickened a considerable section of the public till many of them have reached the point of taking truth and falsehood alike with a "grain of salt." This fact, coupled possibly with a growing inclination among men living in a wonderful age to accept things as they come, and to regard nothing new with half the astonishment which greeted the appearance of the first steamboat, may account for the little attention paid to the announcement of President Wilson's radio-telephone conversation from the "George Washington" in Brest harbor with Secretary Daniels in his office at the Capitol! The distance was about 3,000 miles, and the voice was carried by land wires to the coast and thence by the aether to the "George Washington"—truly a wonderful thing, if we men of the twentieth century will only think back twenty years or so and imagine what such an announcement would have meant then!

With a rapid and efficient means of communication by radio-telegraph or radio-phone between selected points in our forest regions and with patrolling aeroplanes, Canada's annual fire-waste will be tremendously reduced. With no wireless stations in the forests, enabling aeroplanes to report without coming down or dropping messages likely to go astray, the aviator observer is going to work under a great disadvantage.

There is little doubt in my mind that wireless will ultimately come into general use in the forest. No line wire system can offer the

same service as will be provided by Radio which permits communication with land, sea and air either by telegraphic signal or by transmission of the human voice. It will be interesting to see if further experiments with the "tree aerial" will lead to its adoption for forest wireless stations, and surely it will be strikingly appropriate if, for their own protection, we employ the trees themselves!

A GREAT TESTIMONIAL TO PRAIRIE PLANTING.

Until this last two years I have always felt that while tree plantations about the buildings were most highly desirable, they also had their drawbacks. While there is nothing that protects the farm home like a grove of trees and gives it a homelike appearance, the trees take a lot of moisture and it is almost impossible to grow a garden close to trees or inside a small windbreak. Further, in the spring after a heavy snowfall the trees hold the snow and frequently keep the ground near them wet very late in the spring. A row of trees along the road sometimes makes the road impassable for weeks.

Last spring, however, and again this spring, I have come to put a higher value on the trees on my farm. I have a windbreak running south from the road for about 20 rods. It was planted ten years ago and is 14 to 20 feet high. A field just east of this windbreak was summer-fallowed and seeded to wheat in 1918. It ran south the full half-mile and was 60 rods wide. Over half this field at the south end was completely drifted out. Where the shelter belt protected the field from the west and northwest winds I never had a better crop and it checked the force of the wind right across the 60-acre field.

This year I noted the same effect on a neighbor's farm. On my own farm the field was spring plowed and none of it drifted badly. I have come to the conclusion that the policy of planting a system of windbreaks is the only permanent measure of controlling soil drifting. In planting, I would suggest that they be planted in rows half a mile apart running north and south. Nearly all the high winds that do the damage are almost directly due west winds. I realize that such a plan must be started on a small scale, but it would soon grow to be the greatest tree plantation ever undertaken.—G. H. Scott, in a letter in the Farmer's Advocate.

WHAT IS CALLED FOR IN AN AEROPLANE

(*Timber Trades Journal.*)

To make aeroplane propellers "bone dry" they are subjected to terrific tests, and a propeller has to make 1,700 or more revolutions a minute to make good. Even at that, wood which has been dried to the lowest possible moisture content will "drip" sap after a test. Whereas for ordinary commercial uses a piece of wood showing a slight defect may be safely and advantageously used, there is no "margin of safety" with aeroplanes. Every bit of wood that enters into its make-up must be perfect. A thousand feet of lumber may have to be taken out of a forest to secure 50 feet or 100 feet which will measure up to aeroplane requirements, or the whole lot may sometimes be rejected. This shows the need of more tree plant-

ing, of proper forest conservation, and a national forest policy which will provide for the future. Walnut is the best wood that grows for propellers, as also for gunstocks, but practically all of the framework of the air machine is of spruce. Most of the parts of an aeroplane are of built-up or laminated wood in which thin layers are glued together, the lamination dividing the stresses and making possible the use of small pieces, which are more likely to be absolutely free of defects. The terrific pressure, the twistings and manoeuvres to which an aeroplane is subjected, compel the use of perfect wood that will "give" properly under prodigious strain without breaking.

DROP "WOODLOT" AND USE "WOODLAND"

(*Bulletin of the Forest Service, U.S. Department of Agriculture.*)

The increased interest in the subject of private forestry, particularly with reference to farm forestry, has brought about the general acceptance of the term "woodland" or "woods" instead of the original one of "woodlot."

A large proportion of the woodlands in the eastern United States is in irregularly shaped tracts, spreading out over ridges, ravines, slopes, swamps, and poor lands, whereas "woodlot" carries the idea of a small-sized, regularly shaped, and, in a large section of the country, fenced tract. When applied to the large or irregularly shaped tracts, it is obvious that the word inadequately describes the conditions. "Woodlot" probably originated in New England and seems fairly well established there. So long as only conditions like those in New England were considered, "woodlot" was accepted as adequate, but in the last few years farm forestry has been developing rapidly throughout the country. The private forestry movement is of tremendous importance not only to the owner of woodland, but to the whole community in which he lives or in which the timber occurs. It is extremely desirable that the success of the movement should not be hindered by the use in forestry literature of a term which does not fit the conditions.

"Woodland" and "woods" are more satisfactory, more expansive, and avoid the possibility of creating confusion in the minds of the people over most sections of the country where the word "woodlot" has never been in local use.

NEW HEAD N. B. FOREST SCHOOL.

Albert V. S. Pulling, B.Sc., in Forestry, of New York State College, who has been engaged in practical forestry work in New Hampshire, has been appointed Dean of the Forestry School of the University of Fredericton, N.B., and comes highly endorsed for the new post.

"CRIMINAL DISSIPATION."

(*Montreal Star.*)

In the older countries the planting and care of forests is zealously carried out, the splendid monetary return being thoroughly understood. Canada's natural lumber wealth is practically the envy of the world, and the dissipation of this wealth is criminal. Public funds can be set aside for no better purpose than forest preservation.

WHEN TREES GROW!—A NOVEL STUDY

By Prof. J. S. Illick, Chief, Department of Silviculture,
Pennsylvania Department of Forestry.



What Four Years' Daily Measurements of 200 Trees Disclosed—Common Conceptions Proved Erroneous.



Editor's Note: In Pennsylvania the northern and southern forests have a common meeting place. No doubt a study in Ontario or Quebec similar to that of Prof. Illick would alter the data in some degree, but at the same time the conclusions likely would not differ materially.

PROF. ILLICK'S CONCLUSIONS:

Trees grow almost twice as much at night as during the day.

White pine and Norway spruce cease growing (in Pennsylvania at least) by July 1st.

Such knowledge is of high utility in choosing the season for transplanting young trees.

Nothing about the numerous processes of trees is more readily comprehended than that they grow, for the results of growth are so obvious, and in some cases striking, particularly in temperate regions where annually a period of

vegetative rest alternates with a period of vegetative activity. I propose to present for your consideration some interesting and essential facts pertaining to the growth behavior of our common forest trees: Growth, however, is such



Photo by J. S. Illick.

The new growth of Norway Spruce is flexible and drooping for a brief period immediately after the maximum height growth of the season has been laid on.



Photo by J. S. Illick.

Terminal twigs of Norway Spruce are erect and stiff at the end of the growing season.

a comprehensive subject, and some phases of it so technical that I have decided to limit myself to the question *When Trees Grow?*

200 Trees Measured Daily.

The data which will be presented herewith were collected near Mont Alto, Pennsylvania, by myself and by several of my former students under my direction during the past four forest tree growing seasons. The field work embraced the measuring of many trees at rather regular, usually weekly, intervals, and the keeping of meteorological records, especially of temperature and rainfall. In order to obtain detailed field data over 200 trees were measured daily during the 1918 forest tree growing season, and in a number of cases specific groups of trees were measured both in the morning and in the evening.

The belief is prevalent that trees grow throughout the general growing or vegetative seasons, which embraces in Pennsylvania from 150 to 200 days, and extends from the last killing frost in the spring, that is, when the leaves of the larches, birches, cherries, and maples appear, to the first killing frost in the autumn when the leaves exhibit their autumnal coloration. This, however, is a mere supposition, for most of the native and introduced forest trees in the vicinity of Mont Alto make 90 per cent of their height growth in less than 90 days.*

The date when the different species start the elongation of their twigs depends upon the inherent tendency of the species and the factors of the environment. The late opening of the buds of Norway spruce is not a local characteristic, but an inherent tendency for records from Germany show that they usually open after May 8th, and in the extreme northern part the end of May. On the other hand, factors of the environment, such as latitude, altitude, exposure, shade and shelter, also have a strong influence on the starting time of the season's growth. As a rule, buds open about $2\frac{1}{2}$ to 3 days later with each degree of latitude, and about 2 to $2\frac{1}{2}$ days later with each 350 feet of altitude. White oak begins its growth from 7 to 14 days later on northern than on southern exposures on the Mont Alto State Forest. Trees with small and partially or completely imbedded buds such as Honey Locust, Black Locust, Kentucky

Coffee-Tree, Tree of Heaven, and Catalpa, begin growth relatively late. Nature seems to protect the tender growing points of these trees from the cold of winter by placing them within small buds which are almost completely imbedded within the twigs. This means of adaptation also protects the tender new growth of spring from late frosts, for the small and deeply imbedded buds are not stimulated so early in spring as large exposed buds; hence, the resultant vegetative growth usually appears after the damaging frost period.

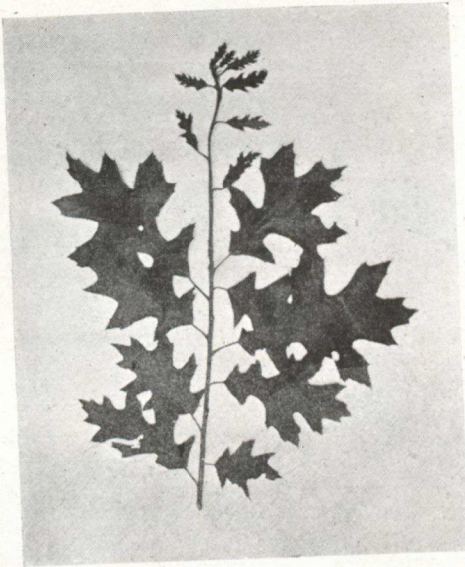
All Growth Ceases by August.

The range of the period during which the height growth of forest trees ceases is longer than that during which height growth starts in the spring. Most species of forest trees in southern Pennsylvania cease growing during the latter part of May and the early part of June. Only a few species continue their growth into July. On June 10, 1919, I examined 179 different species of trees in the vicinity of Mont Alto, 55 of which, that is 70 per cent, had already ceased growing in height. On June 18 and 19, 1919, I examined 50 species of trees in the vicinity of Bedford, Pennsylvania, and found that the height growth of 40 had already stopped. This is an unusually high percentage of growth cessation, and is probably due to the extremely cold period during the early part of extremely cold period during the early part of May, followed immediately by an unusually hot period during late May and early June. Such extreme temperatures and the abrupt transition from one extreme to the other are potent factors in retarding growth and in extreme cases may cause entire cessation of growth. The white pine, which usually stops growing in the vicinity of Mont Alto about June 15, but may continue to grow as late as June 30, ceased growing this year (1919) about June 3. It is the writer's belief that 85 per cent of the forest trees of Pennsylvania have already (June 20, 1919), completed their normal height growth for the season. Of the remaining 15 per cent the Tulip tree, Sycamore, and the Larches are prominent species, which may continue to grow until the middle or latter part of July. By the 1st of August the normal height growth of all the forest trees of Pennsylvania has, as a rule, ceased.

Trees Rest Between Spurts.

In order to determine the progress of the height growth each species must be examined by itself, for each individual species possess dis-

*Editor's Note. Prof. Illick's table of representative Pennsylvania trees, indicates that white pine starts its growth on April 18th, attains 92 per cent of growth on June 1, and ceases growth by July 1. Norway Spruce starts growth May 6th, achieves 74 per cent of development by June 1. Growth ceases approximately at the same time as with white pine.



HOW TREES OFTEN TAKE A HOLIDAY IN EARLY SUMMER AND LATER RESUME THEIR JOB OF GROWING.

The terminal twig grew 27 days, then rested for 23 days, and again resumed growth for about 25 days. The immature leaves indicate the portion of the twig which was developed during the second period of growth.

tinctive inherent growth characteristics. Some place their growth without a break, while others rest it by leaps and bounds alternating with rest periods. In this respect the method of working followed by trees, and growth surely is work, differs little from the methods of other organisms, including man. Rarely does any organism work continuously, but rest periods are usually, and sometimes frequently, interspersed between the periods of work.

Few comprehensive statements can be made regarding the growth behavior of forest trees during the growing season. Yet, in spite of wide divergence the fundamental features of the growth procedure throughout the growing season may be summarized as follows: **Growth begins slowly, after a variable period rises rapidly, then reaches a maximum which is maintained for a short while, finally falls gradually to a minimum, and then ceases completely.**

The period during spring and summer when height growth does not progress may be regarded as a resting period, or a period of preparation. The trees apparently rest, but in reality they are preparing for the next upward thrust which may be longer than the original advance. Furthermore, the writer believes that the recurring rest periods may become a rather fixed and regular feature of the growth of certain

species. This is certainly true in the case of normal young Pitch Pine in the vicinity of Mont Alto, which exhibits annually a cessation of growth for a period of 2 to 3 weeks.

Greater Growth by Night.

The rate of tree growth not only fluctuates throughout the growing season, but also during each day. The maximum growth usually occurs late at night, apparently after the preparation and translocation of food and other essential materials becomes less active, and the minimum growth falls in the afternoon of each clear day when the greatest activity in the manufacture of starch and sugar is in operation.

About twenty trees of each of the four species given in the following tabulation were measured regularly at 7.30 p.m. and 7.30 a.m. for a specified period. The derived results for height growth during the day and at night are given in the following tabulation:

Species.	Day	Night
Tree of Heaven -----	35 p.c.	65 p.c.
Tulip Tree -----	40 p.c.	60 p.c.
Norway Spruce -----	18 p.c.	82 p.c.
White Pine -----	39 p.c.	61 p.c.
Average -----	33 p.c.	67 p.c.



The foregoing tabulation shows that trees grow about twice as much at night as during the day. By using instruments of greater precision the percentages would no doubt be changed somewhat, but the general comparative rate of growth would still stand unchanged.

To some persons it may appear that the problem of growth behaviour of trees has only an academic application. This point of view is, however, untenable for there is an economic side to the study. If conducted in a scientific manner it will supply the basic data for the preparation of a rational schedule for transplanting in the nursery and setting out trees in the wood-lot and forest. Foresters, silviculturists, and plant physiologists recommend that planting and transplanting operations should be conducted when the material to be planted is in a dormant condition. No fault can be found with their recommendation, but in order to execute it properly one must know when trees really are dormant. This can be ascertained best by determining when trees grow, since growth is so evident and measurable, and whenever trees are not growing they are dormant, that is, in a static condition, the duration of which is hard to determine.

Furthermore, such a study facilitates the preparation of a schedule for field work covering the problem of growth. That determination of the quantitative and qualitative growth on cut-over lands is one of the most important and urgent problems in American forestry is conceded by the most authoritative foresters. Heretofore, we have generally been instructed that the height growth of the season cannot be accurately ascertained until late in fall or during the winter months when the weather is relatively

unfavorable for field work and the days rather short. Consequently, it now follows that since trees actually cease growing in height in May or June, no reasonable exceptions can henceforth be filed against the collection of height growth data immediately after the cessation of growth in summer.

It should be understood, however, that the problem *When Trees Grow* is but a prelude to the major problem, which is far more comprehensive, and includes also a study of diameter and volume growth of the stem and the growth of roots, all of which should be undertaken; for the results derived therefrom would be of great economic value.

A knowledge of *When Trees Grow* also aids in the determination of the best time to peel bark. Bark can be peeled satisfactorily only when the sap is abundant and active. Briefly, the bark peeling season coincides with the growing season of trees.

Light on Annual Rings.

A thorough study of the growth of trees will also furnish much-needed information to the legal profession. Many legal decisions concerning boundaries and titles hinge on the question whether each growth ring represents the growth of one season, or if fictitious rings are sometimes formed. The writer examined a large number of Pitch Pine and Chestnut Oak trees and found that fictitious rings are regularly formed when a prolonged resting period occurs within the growing season. Hence, in some cases two rings represent the growth of a season, instead of one annual ring.

I wish to add that the problem, *When Trees Grow*, is not only of technical interest and economic value, but might be used as a means of developing real tree appreciation among the children of our public schools.

PLANNING FOR FOREST REPRODUCTION

Dr. C. D. Howe visited the provincial forest survey parties on the head waters of the Miramichi, about 40 miles north of Boiestown, New Brunswick. The limits in this vicinity are mainly held by the Miramichi Lumber Company. Arrangements were made whereby a special party of four men will carry on the regeneration work and annual growth study the entire season directly under Dr. Howe's supervision. Dr. Howe spent about ten days with this field party. The balance of the time was spent in visiting the limits of the Bathurst Lumber Company and the Pejepscot Lumber Com-

pany, in order to study the condition of their lands which have been cut three times. Also slow-growing lands were examined, and it is possible that through the co-operation of the Bathurst Lumber Company and the New Brunswick Government an experimental plot of 600 acres may be established and receive special treatment in the method of cutting. This will come directly under Dr. Howe's supervision, through the New Brunswick Forest Service. If this plot is established it will be one of the largest in Eastern Canada.

HATCHING TREES BY THE MILLION

By *Gustave C. Piché, Chief of Forestry Service, Quebec.*



Splendid Results at Berthierville of Quebec's Forward Policy in Reforestation—Trees for Highways Too.



The nursery of Berthierville was established in 1908 by Hon. Mr. Turgeon, then Minister of Lands and Forests, in view of furnishing planting material to the private owners of waste lands and also to enable the government to make practical demonstrations in reforestation. It was the first provincial nursery, it is the only one yet devoted entirely to this purpose. At the origin, it was a farm of 70 arpents which had been abandoned for many years with the result that the buildings and the land were in a very bad order; even the woodlot exhibited evident signs of mismanagement. The first years were devoted towards re-establishing order throughout the property and to raise on a small scale forest tree seedlings.

On the 22nd of May, 1908, the first sowings were done, and in the autumn we found that the nursery contained a little over 200,000 plants of which the white pine, the Scotch pine, the Norway spruce, and the European larch formed the bulk. I must say that, at first, the neighboring farmers were very skeptical about the success of our enterprise, but many of them began during the second year to admit that there was something in the idea which the Government had endeavored to propagate in the province and very soon the nursery was, and is still, the favorite spot where they bring their visitors to see the great curiosity.

To give my forestry students a practical knowledge in reforestation, it was arranged that they would work two months each spring at the nursery. We must congratulate each class of the Laval Forest School for the good qualities that they have displayed during their stay here; indeed, it was very hard for these college boys to be put on the spade, to harrow or to weed under the burning sun, but they accepted their instructions cheerfully and worked ten hours per day, just as ordinary laborers, faithfully and with great interest. I must, in justice, at-



G. C. Piché, Chief Forester of Quebec.

tribute to them a good deal of the success that we have obtained so far.

A Helpful Minister.

It would have been impossible to carry on our programme which meant to increase the production more and more every year, in order to cope with the increasing demand for trees if we had not obtained the continuous support and the encouragement of the present Minister of Lands and Forests, the Hon. Jules Allard, who, as you know, has helped so much to the development of a sound forest policy in this province. It was he who obtained for us each year the necessary credits from the government and with the sinews of war we were able to increase every year the area under cultivation.

In 1910 some of the seedlings were big enough to be shipped, and we started the re-

clamation of the shifting sands in the parish of Lachute. These shifting sands, as you are no doubt aware, are the result of poor methods of cultivation that have exhausted some of the farm lands in that section; gradually the grass cover began to disappear and the sand to show up; very soon the wind caused the displacement of its particles; every year things went from bad to worse, till finally there was a dune of about $3\frac{1}{2}$ miles in length, broadening in its middle to about one half-mile. The sand not only prevented any cultivation upon the area affected, but also invaded with persistence the adjoining farms so that the area of waste land was increasing gradually. The government of the province passed an agreement with seven owners to buy their land at \$1.00 per acre in order to reforest same, giving them the option to buy it back after 15 years for \$10 an acre. We began our work by planting on the western edge of the sand dune some 20,000 pines and spruces, with a few elms and ash; these broad-leaf trees were used exclusively for experimental purposes. The next year 50,000 more pines were set in to replace part of the trees that had died (about 20 per cent) and also to increase the surface planted which is now equal to 45 acres. To-day these trees have not only maintained their hold on the pure sand, but have grown up to five feet in average; many are ten feet in height; the sand has been stopped from shifting and a grassy vegetation is exhibiting itself here and there. Beech grass was also used. The result is so satisfactory that the former owner of the land has assured us that he would buy back the land at the expiration of the contract. Similar work has been done at Berthier Junction in recent years.

The same year we began shipments of trees in various lots to private individuals, colleges, etc., and we have continued this ever since.

On the Perthuis Seignory.

In 1911, the Seigneur of Perthuis ordered fifty thousand pine and spruce trees to be set near Notre-Dame-des-Anges, and every year since he has repeated his order for about the same quantity. I have just received a report of these plantations and the white pine trees thereon show a growth of 4 to $5\frac{1}{2}$ feet in height, whereas the spruce range from 2 to $2\frac{1}{2}$ feet in height. According to those who have seen the plantations they are a real success and a good example to follow.

At the present time the stock of trees in the nursery exceeds four million plants; and we are preparing ourselves to be in a position to ship

every year from two to three million plants as we believe the demands will not only reach this amount but will most likely exceed it before long.

As a consequence of the initiative of the government some limit-holders have also established forest nurseries and we hope the every large forest operator will do the same thing.

With a few exceptions all the seeds used at the nursery have been purchased either in America or in Europe, but we would like very much to be able to use the indigenous seeds as they offer greater chances of success.

We would like to obtain each year from the various parts of the province a sufficient supply of the seeds of our white and red pine, of our spruce, hemlock, cedar, white and yellow birch. We will obtain not only better seed but also cheaper seed. It is our ambition to produce at this nursery all the seeds needed not only for our work but also for the other nurseries in the province and to meet this purpose we intend to build in the near future a large seed house where we will extract the seeds collected after the most modern methods.

Aim at 10 Million Seedlings.

Having attained this object, we could then realize our second aim which is to produce to not only two or three million plants per year but ten to twenty million plants, if needed, in the province, and I think that before long we may be planting more than that. This intensive production of plants would greatly diminish their cost and I calculate that, if we could produce here ten million plants per year we would be in a position to sell them after caring for them for two years, for \$1.50 per thousand, whereas we are now asking from three to five dollars per thousand for the same material. These young plants could be transplanted in the various nurseries that would be established in the neighborhood of the lands to be reforested so that they would be acclimatized before the final setting.

During your visit at the nursery you will see many trees of foreign origin; for example, you will come across the Scotch pine which will appear to you as a sturdy tree, in fact it gives us great hopes for the reforestation of our waste lands. The Norway spruce, though not always as good as our native white spruce, will also give excellent results as it grows fairly well. The European and the Japanese larches will certainly interest you as they appear to be more immune from the attacks of the saw-fly that annihilated our tamarack some thirty years

ago. These foreign trees have been tried and we can recommend them to the planter. We have extended this research to most of the forest trees growing under the same climatic conditions of this province as we have studied also the bull pine of the Rockies; the black pine of Austria which is excellent for the plantation of limy soil; the Engelmann spruce and the Blue spruce of Colorado have been found to be of more value for ornamental purposes than for reforestation; the Douglas fir does not appear yet to be acclimatized enough to our conditions to justify its plantation extensively; yet we have found it to be hardy in some cases, and should this experiment come to a good conclusion I think the nursery will have achieved very much as it is a first-class tree.

Shade Tree Supplies.

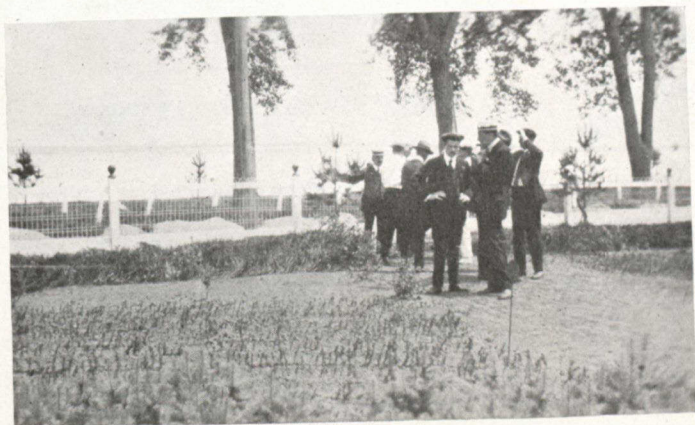
We have also endeavored to produce trees for ornamental purposes. As you are aware the building of the national highways in the province will necessitate a vast amount of

planting and we expect to have soon some ten thousand trees to devote, per year, to this purpose.

Everywhere people desire more and more to beautify the surroundings of their property by the plantation of hedges and of trees, and many farmers have called upon us to secure a few trees which we have gladly given them.

The railway companies have also been on the market, and we have sold to the Canadian Pacific Railway, the Temiskaming and Northern Ontario Railway, the Canadian Northern Railway, many thousands of trees for the beautifying of the stations, the holding of the railway banks, etc., etc.

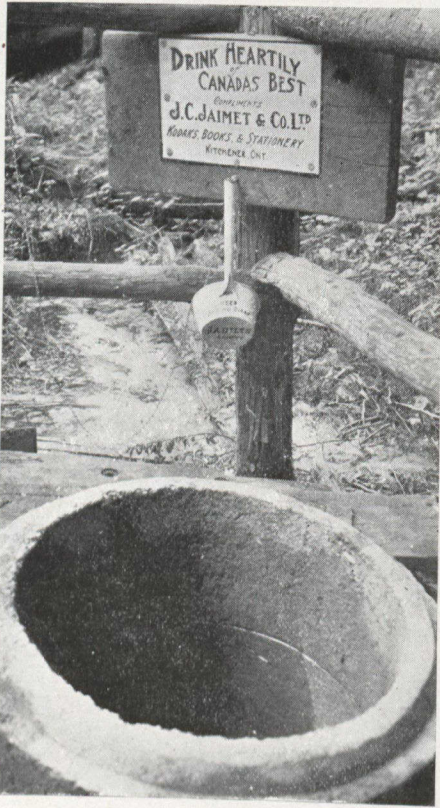
Our arboretum which has an area of some five acres, is located between the nursery and the woodlot. It may be interesting to you to learn that ten years ago this land was pastured and covered only with a meagre grass. By preventing the grazing we have allowed the forest to re-establish itself solidly on the eastern half, and you will find there some grey birch



At the Berthierville, P.Q.,
Forest Nursery.

Studying some interesting
instances of Spruce growth.





—"by the side of the road,
And be a friend to Man."

An advertisement, maybe, but a welcome one. Mr. Jaïmet of Kitchener, Ont., prepared this drinking spot over a woodland spring.

of about twenty feet in height with a diameter of three inches. Here and there we have made plantations of several foreign trees in order to study their development under these conditions.

A Model Woodland.

Coming to the woodlot, you will find a good example of what could be done similarly by each farmer in this province. Its area is close to twenty-five acres; it rests on a soil formed by a coarse sand of the poorest quality, yet you will find the trees to be in good health, tall, and of a fair size. The composition of the stand is also interesting as almost each specimen growing in the province is represented. In the first half we have aimed to develop a mixture of maple and white pine, favoring however the production of white pine. The other half is devoted to the best trees as they appear.

This woodlot was divided into eight compartments of equal size, and contains some

5,400 trees with a total volume of over 500,000 feet board measure. Two excellent roads made by the students divide the property equally. Each tree measuring four inches and up was calipered and numbered last year, and record is also kept of its health conditions. We expect to continue these measurements every two or three years so as to judge of the progress and increases in its growth. Each tree that is removed during the year for silvicultural purposes is calipered and scaled, so that we will prepare eventually a volume table for this section of the country.

Already one-quarter of the forest has been culled under a rigid system of silviculture and you will see that the forest does not appear to be in a bad state though the cutting of one compartment yielded seventy-two cords of firewood and two thousand five hundred feet of sawlogs; the whole being valued at eighty-four dollars. These operations will not only increase the value of the stand by the selection made of the best species and of the best trees, but the growth will also be increased and stimulated by the treatment.

WHOLESALE LAND CLEARING.

(Edmonton Bulletin)

Experiments in clearing land in the Peace River country of poplar, green willow scrub and dead timber have been made recently by a party which returned from the north. The method which it was desired to test was that suggested by Hon. J. L. Cote, member for the Grouard district, a number of years ago, namely burning it during the early spring while the ground is still damp. Their tests proved that it can be done without injury to the soil.

Normally when a fire sweeps across country the soil is burnt out to a depth of several inches. The experimenters discovered that in the early spring, when the grass is starting and the leaves budding, by firing the scrub along the top it will burn down the slope to the low damp ground where it goes out owing to the moisture. If done at this time of year the soil is not injured and moreover fire guards are created which are protection later on. There are hundreds of thousands of acres of rich land in the Peace River country that might be cleared by spring firing which, unless cleared, will lie uncultivated for many years.



How the Quebec Forestry Service is stabilizing shifting sands by planting trees at Berthier Junction. Forty-five thousand trees were planted with a 15 per cent loss.

TORONTO'S WOODLAND SCHOOL FOR CHILDREN

One of Toronto's interesting educational experiments is the Woodlands School in Victoria and High Parks where desks are placed beneath the trees and the little folks take two hours sleep every afternoon. It is operated by the Board of Education and Board of Health in combination.

Sharp at 9 o'clock each morning a cup of cocoa or milk is served to each child, and then lessons begin. On fine days the studying is all done in the open-air school-rooms, blackboards and benches being arranged in three different parts of the grounds. At 10.15 another cup of milk is served, and the children are allowed to play for twenty or twenty-five minutes, then follow lessons once more, until nearly 11.30, when preparations are made for the mid-day meal.

At the long zinc trough to the rear of the pavilion, the children go through their "wash drill," from which they emerge clean and sweet, and ready for dinner. This repast is served in the dining-room, at six long tables, the food

being prepared in the conveniently-equipped kitchen. On rainy days the dining-room serves also as a class-room.

At 1 o'clock the children betake themselves to their beds, under the tall trees, and at least ninety per cent of them sleep soundly each day for two whole hours. At 3 they are awakened, rise promptly and make their own beds, and then are treated as a usual thing to the ever-popular story. After that there is time for a little play, and just before they leave for home, at 4.30, every boy and girl has another glass of milk.

Each day from 10 in the morning until 2 in the afternoon, a nurse is present, and looks well after the health of the children, and once a week all are weighed. Special care is taken to train the pupils in the care of their teeth, and always after dinner there takes place what is known as the "tooth-brush drill." On fine days, too, when the water is warm, there is swimming in the lake.

JACK MINER'S SCRIPTURAL FLIERS

Readers of the Forestry Journal are well acquainted with the wonderful work of Jack Miner, of Kingsville, Ont., in constructing a bird sanctuary and studying the migrating habits of ducks and wild geese, season after season. Here is a new feature of Mr. Miner's unique story, dealing with his custom of attaching tags to the legs of birds before they start on their journey to the north or south:

The Story of the Tags.

Nothing more clearly exemplifies the originality of Jack Miner than the story of the tags. Since 1911 he has set his mark on 287 wild ducks, and over 100 tags belonging to them are now in his possession. He has also had returned 34 goose tags. These are little strips of aluminum. Upon one side of each is printed, "Return to Box 48, Kingsville, Ont.," and on the other outlined in large, clear characters, is a verse of Scripture.

"I believe I am the first man on earth to use the bird as a missionary messenger," said Mr. Miner. "The idea came to me one day, and I acted upon it. It can't do any harm, and it may do good."

Here he produced a letter from a man in Illinois, who shot down a bird whose tag bore the message, "He careth for you." "While this really belongs to you, I would like to keep it on account of the message it brought me," read the letter. Needless to say, the writer was granted his wish.

A still more impressive story had to do with a colony of negroes in the State of Louisiana. It happened that several negroes on a plantation went to hunt for wild geese. Into the hands

of a negro preacher there fell a grey goose bearing a tag. To the superstitious mind of the negro the verse of Scripture it bore was as a voice from heaven, and in a state of great excitement he returned to his people and forthwith there began one of the greatest revivals ever known in that part of the country. The truth of this tale is vouched for by a lady who was visiting in the vicinity when the evangelistic fervor was at its height. She afterwards heard Mr. Miner lecture, and gave him the story in writing.

A Home for Bob White.

The quail, Mr. Miner declares, is the most valuable of all Canadian birds, and is well deserving of protection. Owing to the fact that it does not migrate care must be taken to carry it through the severe winters. In January, 1918, a terrific three-day storm almost exterminate this bird in the neighborhood of Kingsville, but the very mild winter of a year ago was favorable to the few survivors, and they are increasing very rapidly. Delightful winter quarters are being made ready for the quails in the sanctuary. Hundreds of Scotch pines have been set out by Mr. Miner during the past five years. These mature quickly, and when larger grown will form a close covering for their winter residents, so that no storm will ever harm them again. Plans are also under way for the building of food racks. And just here let me say that Mr. Miner advises the planting of wild grapes, elderberry bushes, mulberry trees and any other shrubs that bear fruit, so that birds, once in safe quarters, may not find a scarcity of food.

FOREST FIRE ITEMS OF THE MONTH

The United States Government has been spending \$15,000 a day to fight forest fires in Montana and Idaho.

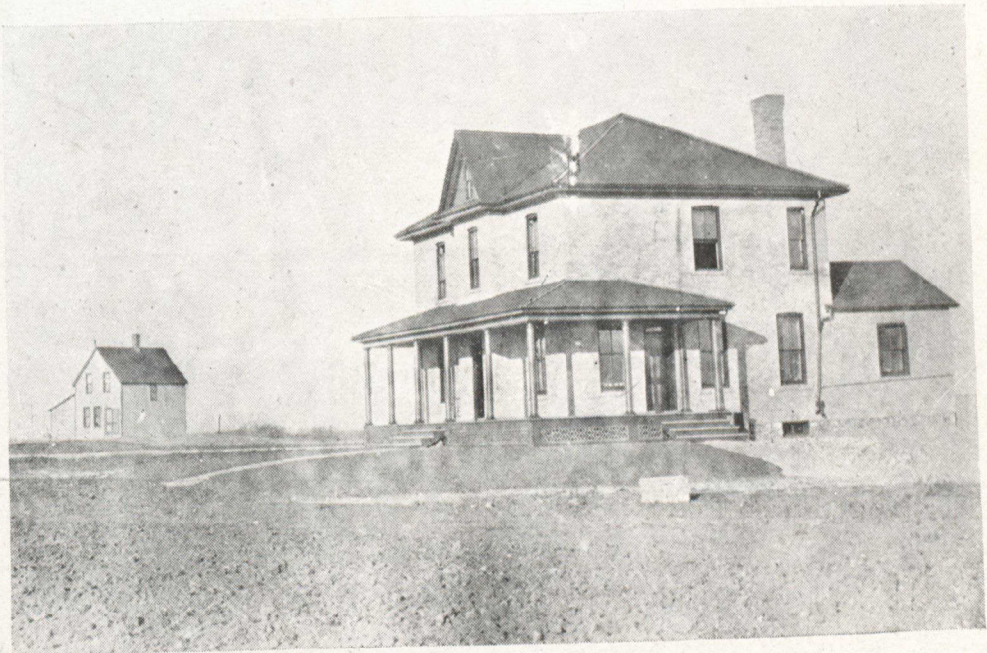
A sawmill owner near Fort William, Ontario, was forced to take to a small boat with his wife and family to escape forest fires that destroyed his \$25,000 mill. The party spent the entire night in the middle of a lake.

Camp fires started by fishermen in the Elbow River districts of Alberta have caused serious timber losses this year. One of the worst timber fires in Alberta's history was started by a fisherman in 1910. He was fined a ten dollar bill "and severely reprimanded."

Tree Planting on the Prairies.



Here is seen the beautifying effect of tree planting and gardening about the residence of Mr. Norman M. Ross, at Indian Head, Saskatchewan. There is no reason why the majority of homes on the "bald prairie" should not be transformed in a similar manner.



The home of Mr. Ross at Indian Head before tree planting was commenced. The place is hardly recognizable when compared with the top picture and yet the difference is entirely represented by trees and shrubs. The secret of "Home, Sweet Home" is a tree planting programme.

How a Tree Plantation is Started.



Girls removing young seedlings from the Laurentide Company seed beds at Proulx nursery preparatory to "heeling in" for transplanting. Mr. Ford is foreman in charge of the work.



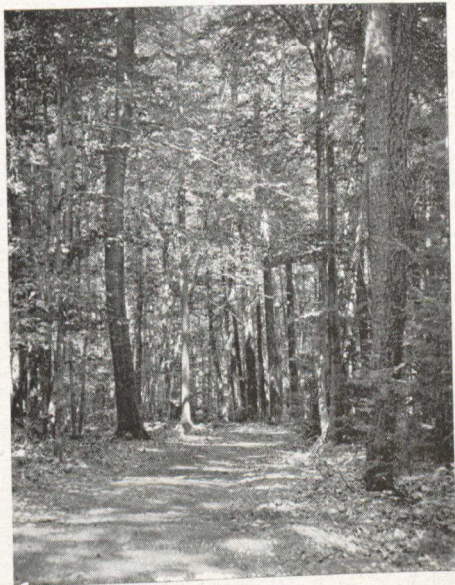
How the seedlings are "threaded" into the planting board. Note the empty board leaning against the corner of the cabin. Portable cabins are employed in this work. Incidentally, Girls have been found to be much more dexterous workers than boys.



Transplanting the seedlings to the open field. The girl holds the planting board while the men pack the earth against the roots of the seedlings. "Planting boards" are great labor savers and do more accurate work.



Here we see the baby trees set out in their final site—at Proulx, near Grand Mere, P.Q. The casualties are very light, even at this tender stage. Eventually the waste land will bear a heavy crop of spruce trees to feed the ever-famishing grinders of the pulp mill.



Photos by courtesy of J. C. Jaimet, Kitchener, Ont. Waterloo County's conservation spirit is here exemplified. Photographs show typical scenes in Cressman's woods, which are a continual source of delight to thousands of people every summer. Many of the trees are 100 to 150 feet high.

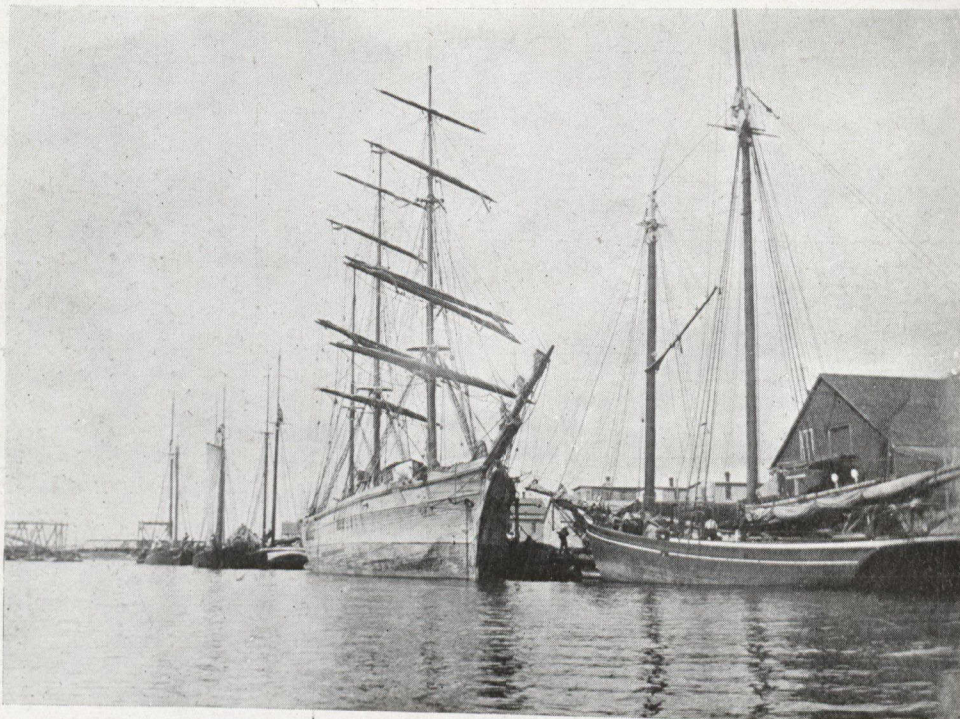


Photo by kindness of J. D. Irving, Ltd.

NEW BRUNSWICK AND FOREIGN TRADE.

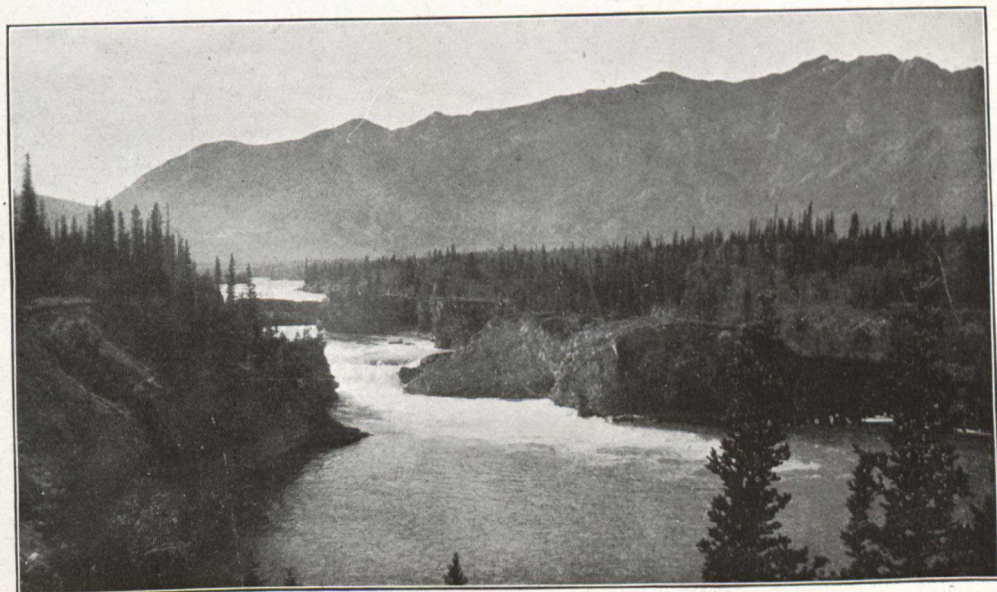
The upper waterfront at Buctouche, N.B., showing vessels loading lumber and other products.



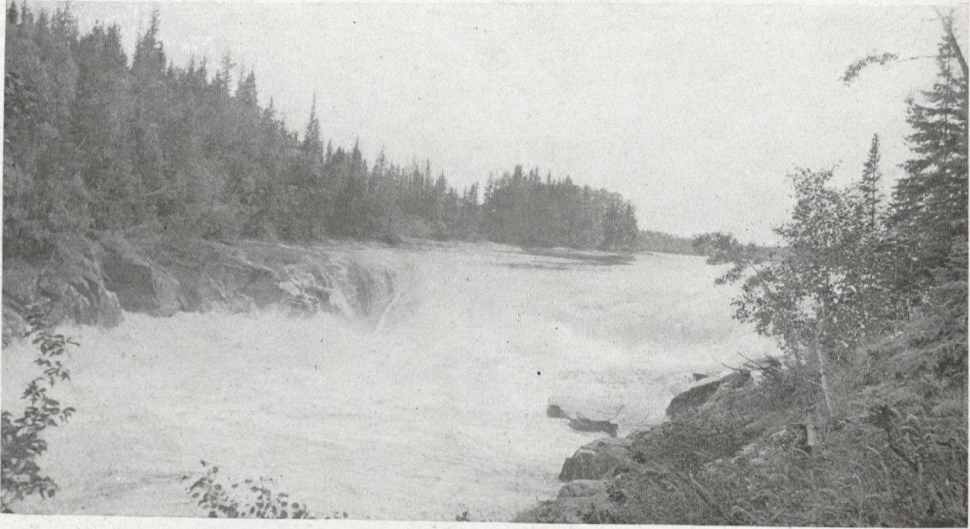
On the Athabasca River.



Lower Kananaskis Falls, Bow River.



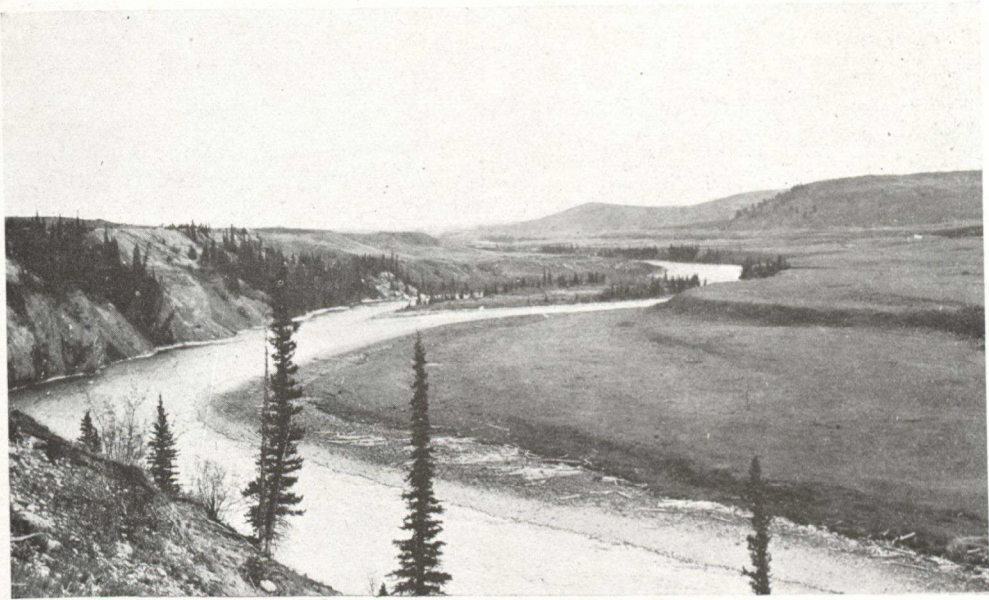
Kananaskis Falls, Bow River.



On the Nelson River.



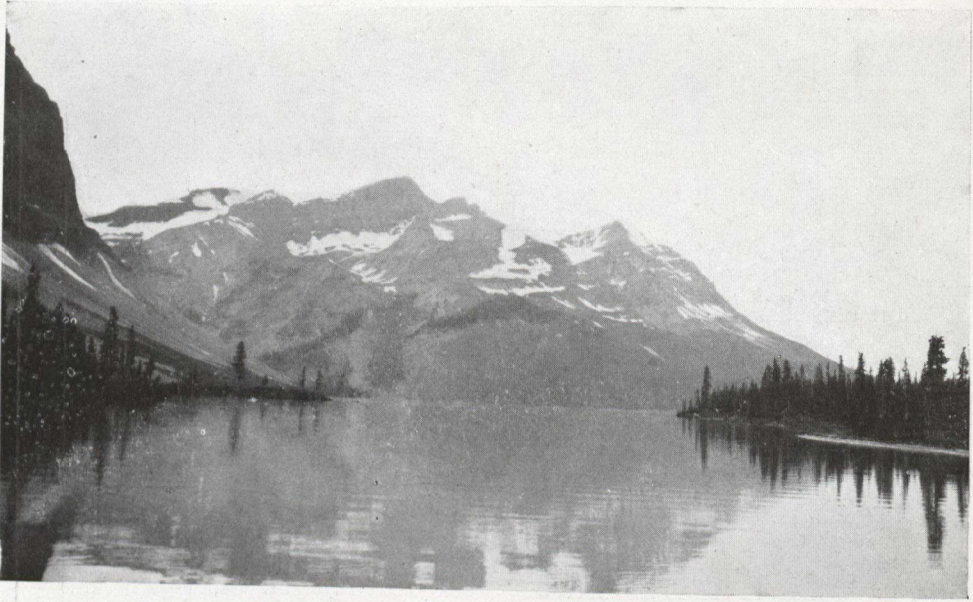
Four million feet of logs in the drive of J. D. Irving, Ltd., Buctouche, N.B. Logs are the life-blood of New Brunswick's greatest industry and forest conservation is the secret of a continuous log supply.



Bow River.



Athabasca River. Grand Rapids from below.



A STRIKING VIEW OF BOW LAKE.



GRAND RAPIDS, SASKATCHEWAN RIVER

QUEBEC SUFFERS SOME FIRE DAMAGE

Quebec, July 16, 1919.

We have had a good deal of trouble in regard to forest fires as the extreme drought that prevailed during the whole month of June has caused such a serious situation that the reports of fire are coming in from every direction. Besides several settlers took great risks in lighting, without permit, their clearances, so that the staffs of the associations and of the Forest Service had a hard time to control the situation.

On the south shore of the St. Lawrence, there were practically no bad fires though outbreaks were frequent, but the good organization checked them rapidly.

In the Ottawa district the fires have not caused any great damage.

On the St. Maurice two bad fires were caused by the railway at Vandry and Timbress, causing

the loss of a large tract of forest. There are provincial officers on the ground to investigate the damage done.

In the Lake St. John district great fires occurred at the head waters of Riviere-aux-Ecorces, Riviere Chicoutimi and Riviere-a-Mars. There the difficulty of bringing men allowed the fire to extend rapidly, but most of it ran through cut-over lands, reducing the damage to some extent. Here again there is no positive data for the present.

In the Abitibi, there were at least 30,000 acres of slash to be burnt and the situation was grave; fortunately the rangers succeeded in holding the fires in check and in saving the properties and lives from the threatening danger.

From the information gathered, the damages ought to prove small. Yet there will be a few miles of green forest destroyed.

MEMORIAL TREES

By Dr. Frank Crane.

They are threatening to put up Memorial Arches. A Memorial Arch or statue or some other such ornament doubtless can be made very pretty, although most of such things that I have seen in cities are about as useful and as comforting as the parlor clocks they have in the hotels all over Europe, clocks that never run and are not very valuable toward elevating the soul.

Patriotism is beautiful, and the sentiment is beautiful which wishes to commemorate in some abiding way the heroism of the men who went to die in France. But why must all sentiment run in ruts of convention?

They have been building monuments, tombs, mausoleums, from the days of the pyramids. Man is a tomb builder. How much better it would be if we could get away from this idea entirely and put up Memorials for the dead that should keep their memory green in the much surer way, by ministering unto the living.

I have already written upon the project of erecting community buildings to be dedicated to our heroes, and this plan, I am glad to note is being adopted in many towns.

Another idea has been advanced which is equally sensible and beautiful. It is to plant memorial trees.

In one city they are planning an "Avenue of the Allies," to be lined with trees in honor of the allied nations. The Lincoln Highway Association is considering the proposal to plant memorial trees along portions of its transcontinental route. In Louisiana memorial trees are to be planted, one every forty feet, along the Jefferson Highway. This is the road that leads to Winnipeg, and the slogan is "from pine to palm."

AN ECHO OF THE WAR.

The managing editors of *La Papeterie*, the office of which is in Paris, announce the re-appearance, after an interval of fifty-eight months, of that publication. "We would have resumed publication earlier," they add, sadly and significantly, "but all the cuts, type and stocks of paper which were at Chauny have been stolen by the Germans and the printing office sacked."

FUTURE FACTS THAT THE PRESENT MUST FACE

By Hon. E. A. Smith, Minister of Lands and Mines, New Brunswick.

On one section of our best growing Crown lands, Dr. C. D. Howe reports as follows on the average of a number of sample acres studied:

"This land was cut 25 years ago, and 37 spruce trees 12 to 20 inches in diameter were removed per acre. It was again cut 10 years ago, and 19 spruce trees 10 to 12 inches in diameter removed." This means that approximately 56 trees or about five thousand board feet was removed from this land during the last twenty-five years.

"There is now standing on this a total of 149 trees, 58 spruce trees per acre and 91 fir trees, over one inch in diameter. Of these growing trees 7 spruce and 8 fir trees are now of commercial size and if cut now would still leave 11 spruce and 10 fir trees, which would reach commercial size during the next thirty years. That is, there are 36 trees to provide the cut for the next 30 years." Dr. Howe states that if all our cut-over lands gave as good a showing and this, there would be little cause for worry, but the following counts made in another part of the province will give many of us cause for thought.

This locality was cut over three times, 30 years ago, 16 years ago and 4 years ago, and 97 spruce and 15 fir trees removed per acre averaging 8 to 18 inches in diameter on the stump. This means that 112 trees or probably between 9 and 10 thousand board feet or more was cut from this area during the last 30 years.

The trees still standing on the area show an average of 108 spruce and 186 fir per acre over one inch in diameter, but there are only nine of these trees large enough now to reach commercial size during the next 30 years. Dr. Hawe says: "That this has been a very productive area, as the 112 trees removed per acre shows, but it has been quite evidently abused, as there are only 4 spruce trees that can reach commercial size in the next 30 years."

Plainly stated, this average acre from which at least 9,000 feet was removed during the last 30 years cannot produce more than 1,000 feet of commercial sized lumber during the next 30 years.

Of course these averages were secured over small areas, but they serve to indicate the need

of thorough study of this problem of annual growth.

Maintaining a Great Asset.

Dr. Howe is one of the most widely known and experienced foresters in Canada and I have been able to arrange with the Conservation Commission to allow Dr. Howe to continue his study of the cut-over lands in New Brunswick. This particular branch of the Forest Survey will be given special attention during 1919, and I expect that Dr. Howe will be able to give us fairly definite estimates of our annual growth and also suggestions as to what changes are necessary in our logging regulations in order to maintain our greatest asset, the forest, in its fullest producing capacity.

The greatly depleted forests of France and England, together with the enormous requirements of lumber to rebuild the devastated portions of France and Belgium must open a greater market for our Canadian woods, and while we must take full advantage of this demand, we must be very careful not to ruin the potential value of our forests, but to conserve the greatest natural resources of our land, and in turn hand down to posterity, unexhausted, the great heritage so freely bestowed by nature.

MY GARDEN.

A garden is a lovesome thing, God wot!

Rose plot,

Fringed pool,

Ferned grot—

The veriest school of peace! And yet the fool

Contentends that God is not—

Not God! In garden! When the eve is cool!

Nay, but I have a sign!

'Tis very sure God walks in mine.

—Thomas Edward Brown.

OUR SEED FOR BRITISH PLANTING.

Canadian tree seed is being supplied to British woodland planters in a steady stream. The Dominion Forestry Branch at the request of British authorities sent over 125 pounds of miscellaneous seed in 1917, 450 pounds of Douglas Fir seed last year, and will duplicate that amount both in Douglas Fir and Sitka Spruce seed this year.

EVERYONE SHOULD BE A BIRD MAN.

"Do you know that if all our birds were destroyed, in three years this continent would be without life? The insects would first eat all vegetable life and then eat us." said Charles P. Shoffner in a public address delivered recently. "Do you know that insects cause a loss of more than \$1,200,000,000 every year to the farmers, truck-raisers, and fruit-growers of the United States? Whatever affects the producers affects every consumer on the country. You know what will happen if this keeps up much longer: We will all have to go to work. Do you know that the farmers of the east pay more than \$15,000,000 a year for materials to kill the potato bugs? Who pays that? We do—and it is getting so I lift my hat every time I see a potato. Do you know that the cotton boll-weevil causes a yearly loss to the Texas cotton-growers of \$50,000,000? Do you know that the apple-producing States pay more than \$2,000,000 a year for spraying trees to keep down the San Jose scale-louse and the codling moth? Do you know that many species of caterpillars eat twice their weight in leaves daily? Do you know that certain flesh-eating larva consumes in twenty-four hours 200 times its original weight? Have you an idea of the reproducing capacity of insects? Do you know that the offspring of one pair of potato bugs, if allowed to increase without molestation, would in one year number more than 600,000,000? Do you know that one pair of the hop-vine aphid is capable of producing through the thirteen generations of the species in one year ten sextillions of individuals? Do you know that the unrestricted increase of one pair of the gipsy-moths would in eight years devour all the foliage in the United States? Talk of your Rooseveltian families! If ever birth-control is needed, here is a real honest-to-goodness job.

"I do not know why insects were created, but I do know why the birds were created. It was to keep in check the insects, the pests, and they can do it. In our brilliant career as Americans, and with a strong hold on the thought that the Lord will provide, we have killed just about 90 per cent of our birds. Is it any wonder that the ten per cent can not keep down the pests? Insects have appetites, but let me tell you about the birds:

"A quail taken in Texas had 127 cotton boll-weevils in its craw. Another taken in Pennsylvania had 101 potato bugs.

"A tree-swallow's stomach contained forty entire chinch-bugs. Two stomachs of pine-siskins contained 1,900 black olive-scales and 300 plant-lice. A night-hawk had eaten 340 grasshoppers, fifty-two bugs, three beetles, and two wasps."

A "LEAVE-IT-TO-GEORGE" SPIRIT.

(Correspondence in *Toronto Globe*.)

"I was reminded in this incident a fortnight ago in the brief time that my train was changing engines at Schreiber. Immediately east of the village is a mountain the sides and top of which are covered with vegetation. A little way up the side, and in easy reach, fire, that had probably been started by a careless smoker, was just getting under way. Half an hour's work by a dozen idlers about the station would have extinguished the fire. But no one paid any attention to it, and had the dry weather then prevailing continued, the whole mountain side would have been changed from beautiful green to a blackened waste. Indeed the fire might easily have spread much farther, with the result of destroying young timber growth for miles around. Fortunately, nature was kinder than man and a couple of heavy rains in the following week put out the blaze and the only trace left is a brown blotch on a mat of green."

QUEBEC'S FOREST OUTLAY.

The Legislature of Quebec has appropriated \$100,000 for the provincial forest service and the inspection of lands for the fiscal year ending June 30, 1920; also \$7,000 for the maintenance of the provincial forest nursery at Berthierville. The amounts are very materially supplemented by the expenditures on forest fire protection incurred by the Ottawa River, St. Maurice, Laurentian and Southern St. Lawrence Forest Protective Associations, which patrol the great bulk of the licensed and privately owned timber lands in the province. The expenditures of these four associations on fire protection during the past year total \$177,729.

The Motion Picture Bureau of Ontario has released through Regal Films, Limited, three copies of "The Story of Paper," featuring the manufacture of newsprint from the forests of Northern Ontario.

TESTS PROVE FOREST'S EFFECT ON STREAMS

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

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

of the two streams with the Hornbach certain apparatus registers automatically every five minutes, day and night, the volume of the water flowing.

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

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

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

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

PLEA FOR THE NORTHERN ONTARIO HOMESTEAD

Geological Survey,

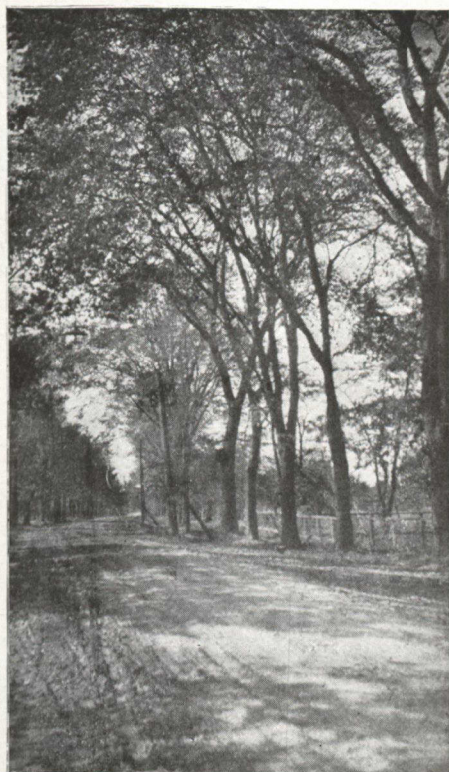
Ottawa, July 25, 1919.

Editor, Forestry Journal,—I have just returned from the newly opened territory in Northern Ontario, where farms are in the earliest stages of the making. What most forcibly strikes one there is the unnecessary desolation and discouraging ugliness of the majority of these beginnings at homesteads. It is enough to take the heart out of any prospective settler before he has well begun, let alone those immigrants from towns, cities and the garden-like areas of older settlements.

The first thing that seems to be done is to burn off everything clean, and then set the site of the future home in the middle of the burnt waste as far as possible from every grateful shade from summer sun or shelter from winter wind. In course of time, without doubt,

scorched brule will be replaced by smiling fields and gracious pasture, and shrubbery and shade will be planted or spring up spontaneously in the vicinity of the house, and things will gradually assume an attractive and more homelike aspect—for another generation. But why wait all these years in discouraging ugliness when a little care in clearing and some thought as to the situation of the home site will obviate it almost entirely? The pioneer's life is hard at best, why not do what can be done to ease it?

The first great demand of the pioneer in a wooded country is cleared, arable land. The fear of fire naturally almost amounts to an obsession, and there is every reason for the future farmer to put as broad a belt of clearing as possible between his buildings, home and livestock and the stubborn threatening forest. But surely this does not necessitate the destruc-



Lieut.-Col. W. N. Ponton, of Belleville, Ont., with his father, planted every elm tree seen in the picture, and a long row of maples on the opposite side of the road. The life time of one individual has thus witnessed the development of a splendid avenue of shade trees which are counted as a real asset to the community. Photo taken on Bay Shore, Trent road, just west of Belleville.

tion of every green thing about the house nor is it incompatible with the existence of an oasis of comfort in the centre of broad clearings, cleanly underbrushed and safely removed from the fire threat of the surrounding forest.

The Government has done and is doing much for the comfort and prosperity of these home-seekers, but it seems as if an educative campaign in the direction of making the new homes homelike and attractive would go a long way towards establishing a contented psychology and contribute largely to the success of the project.

This suggestion does not mean that a large grove should be left as a fire danger or that tall unsafe isolated trunks be permitted to remain where they can fall disastrously, nor does it necessarily presuppose that more permanent or ornamental foliage be not planted in the future. Two or three medium-sized conifers with a few

small birches or even poplars allowed to remain properly trimmed and the ground beneath cleared of brush and debris would constitute no danger from either fire or wind fall, if the site is properly chosen and conditions would be obtained in the beginning that it will otherwise take years to develop. It might take a small amount of time to restrain the clearing fires just when time is most valuable and work is pressing, but I am certain the greater contentment and comfort that would ensue would be of inestimable benefit and in many cases make all the difference between ultimate success and failure. Sincerely,

P. A. TAVERNER.

THE FORESTER'S BUSINESS.

"The business of the forester is to manage the forest," observes the Australian Forestry Journal. "A great deficiency in the past has arisen from the fact that forest officers have seemed to think their greatest responsibility was to administer an Act and Regulations. They have lived in offices, stifled in an atmosphere of red-tape, and losing sight of the big point at issue—the satisfactory treatment of the trees in their forests. Regulations are an aid to management, but the administration of them will not make trees grow nor produce good timber.

"The foresters of Australia must go into their forests and live among their trees, studying them, and understanding them, and always remembering that what they do to-day will bear fruit in years to come. The forests are the property of the people—not the people of to-day, but their children and their children's children for all time. With the political barriers removed there will be no excuse if the heritage of future generations be squandered in a revelry of administration obscuring the sound investment of management."

FIRES SWEEP HAY FIELD.

Forest fires are continuing their ravages throughout Algoma district and dense smoke overhanging the river detained many vessels, which were compelled to anchor at the Soo before being able to proceed up the lakes. Just outside the Soo a big quantity of hay along the line of the C.P.R. was caught in the path of the fire and destroyed, and farmers kept their horses and cattle tied to wagons in readiness to escape with what they could take with them in the event of the fire destroying their homes.

THE EMPIRE GETS TOGETHER IN FOREST CONSERVATION



British Government Has Summoned an Imperial Forestry Conference in London to Consider Urgent Forest Problems.



Canada's forestry problems will be brought before a round-table conference in London, England, next December or January.

Under authority of the British Government, a meeting has been announced for the purpose of considering the present position of the timber supply in all parts of the Empire, the policies of forest conservation now in force or in prospect, and the possibilities of arranging closer trade intercourse in wood materials. Leading societies, trade associations, Government Forest Departments, and others will be invited. Arrangements are being completed by the "Interim Forest Authority" at London, and dates are being arranged so as to coincide with the Empire Timber Exhibit, an event of wide importance and interest.

It is also proposed that out of the Imperial Forestry Conference should be developed a permanent Bureau of Information on Imperial forestry affairs, which, doubtless, would extend its functions to matters of inter-Imperial trade.

About four months ago, the summoning of an Imperial Conference and the organization of a Bureau of Information was suggested by Mr. Robson Black, Secretary of the Canadian Forestry Association to leading forestry authorities in Canada, the United Kingdom and other Dominions. The proposal met with such a happy reception, particularly on the part of Sir John Stirling-Maxwell of Glasgow, that it was placed before the Royal Scottish Arboricultural Society, the English Forestry Association and other bodies, their endorsement being readily given. The approval of the Interim Forest Authority at London was next obtained and steps were at once taken by the chairman and secretary of the latter body to formulate a programme and issue invitations.

The Canadian Forestry Journal is confident that the Conference will have far-reaching effect

in stimulating the forest conservation cause in this and other Dominions.

A letter received from Mr. A. G. Herbert, Secretary of the Interim Forest Authority follows:

Interim Forest Authority,
Hotel Windsor, Victoria St., S.W.

Robson Black, Esq.,
Secretary, Canadian Forestry Assoc.,
Ottawa, Canada.

Sir,—I am directed by the Interim Forest Authority to refer to your letter of the 14th of May last, addressed to Sir John Stirling-Maxwell with regard to the establishment of an Association competent to act as a clearing house for forestry information, and as to the holding of an Imperial Forestry Conference in London, and I am to thank you for your suggestions, which are of great interest to the Authority and have been discussed with representatives of the English Forestry Societies and of certain departments.

As a result of the informal discussions which have taken place, the Authority have applied to the Treasury to sanction the necessary expenditure for an Imperial Forestry Conference, to be convened in connection with an Exhibition in London of Empire timbers, which is being arranged by the Department of Overseas Trade to be held in London in December or January.

I am to add that the Authority are taking steps to arrange for a committee to be assembled to organize the Conference, such committee to include representatives of the leading societies and trading associations interested in forestry and representatives of certain departments.

It is proposed that this committee should consider some suggestions, which have been prepared for discussion, with regard to the scope of the Conference generally, and as to the services, societies, etc., to be represented.



The first flight of an aerial forest patrol in Canada. Photograph taken near Grand Mere, Quebec, of Lieut. Graham in a flying boat. Courtesy, "World Wide."

IS THERE PROFIT IN PLANTING TIMBER TREES ?

By G. C. Piché, Chief of Forestry Service, Quebec,
Before Woodlands Section, Canadian Pulp and Paper Association.

Public Prosperity Demands it and Financial Rewards Invite it—A Thorough Study of a Live Topic.

Six million acres in Quebec, useless for agriculture, demand immediate re-planting with trees. Does it pay to plant a timber crop? Mr. Piché's conclusions are strongly in the affirmative. Who shall reforest the cut-over lands? Several solutions are suggested. Legislation is needed to protect the tree planter from a ruinous increase in local assessment.

We must consider the question of a progressive policy of reforestation for the Province of Quebec.

It is rather surprising that a country so rich in forests as ours it should be necessary to discuss this point, but those who have travelled throughout the country have been surprised to see how quickly the forest has disappeared from the shores of the St. Lawrence and also how the cost of lumber and pulpwood has always been on the increase.

First of all, the plantations require so many decades to produce results that it will prevent many persons from investing part of their money in this operation. Yet, in Europe many of the old families have retained their rank through the revenues that they derive in the management of forests planted by their ancestors.

There is no reason why farmers, large corporations, the towns and the government should not consider this matter in a broad view. There is no use in hiding the truth: there are in this province millions of acres of land that have been impoverished either by improper cultivation or by wasteful lumbering, whilst others have been ruined by repeated fires. According to the census reports there would be about three million acres of such lands owned by private people here that would require immediate reforestation. It is certain that upon the timber limits there is also a certain quantity, but as we have no definite survey of same we can only say that its area is very large, perhaps equivalent to that of the private lands.

Why Plant the Waste Lands?

The reasons that would induce us to plant the lands not fit for cultivation would be the following:

1. To establish a forest cover on these lands so that they may be again put into value and rendered productive of revenue;

2. To prevent, as in the case of shifting sands, the devastation of the adjoining lands;

3. To increase the amount of timber per acre in the woodlots or timber limits. The studies made of cut-over lands show that, in numerous sections, the stock left is very low and if we consider the forest as a capital, it will naturally take many years before the compound interest accruing each year by the annual growth of the taxes will form a sufficient amount of timber to pay the expenses of lumbering the tract a second time;

4. It will be necessary, in many cases, to introduce new species in the forest, especially in the glades which will increase its wealth;

5. To protect the headwaters of streams; it is a well-known fact that the forest is a great power to retain the moisture and regulate thereby the seepage;

6. To shelter the basin of the waterworks. It is not necessary for me to insist upon the good qualities of the water that is found in the gentle streams shadowed by trees in comparison to the poor water found in the ugly brooks running in the open;

7. To furnish the necessary supply of timber for the farmers and also for the lumbermen or papermakers. The increased development of the lumbering industries, especially that of pulp and paper mills, has produced such a big demand upon the forest that we can see, within

a relatively short time, some of the companies having either to reduce their production or to purchase new timber holdings. Owing to the enormous amount of capital invested, those interested must necessarily seek for a continuous supply of their raw material;

8. The ownership of waste lands by a private owner is such a burden that, too often, the yare abandoned and fall to the charge of the rural municipality, whereas if they were stocked with trees they would have a sufficient future value to induce the owner to pay his taxes.

Does it Pay to Replant?

There has been yet no complete survey made of the plantations executed in Canada, as many of these plantations are either too young or of perimental purposes. Therefore we are compelled to seek our information from other sources. However, from the studies made here upon the growth of trees in height and diameter, we can see that the results recorded elsewhere will certainly be obtained also in this country. The State of Massachusetts has published a booklet entitled, "The Older Plantations in the Commonwealth of Massachusetts," in which you will find information that will please anyone interested in the matter. For example, a plantation made by John Tingwick, of white and Scotch pines, has produced in 38 years from 10,000 to 17,000 feet per acre. Those made fifty-five years ago, on the property now held by the Misses Dawe and Hobert have produced trees running from 6 to 17 inches in diameter, and the yield was estimated at 43,000 feet per acre. As you see these results are very good; the tabulation of all these various inventories has enabled the Forest Service of that state to publish an estimate of the future production of white pine and we find that same, on an average quality of soil, will be as follows:

At the end of 25 years, 32,800 feet b.m.
At the end of 50 years, 46,500 feet b.m.
At the end of 60 years, 53,200 feet b.m.

The Real Profit.

It will be interesting to know what will be the financial return of this investment, and a good forester could not induce anyone to plant without saying what will be the ultimate results of the work. In the above cases the forester has first taken into account the value of the land, calculated at four dollars per acre and which naturally must pay a rental; then come the expenses of planting which were estimated

at seven dollars per acre; the taxes must be paid as well as the annual charges of maintenance and protection against fires. Then, all the money spent at the start and afterwards must necessarily pay a rate of interest which was calculated at five per cent. We find that, after deducting all these expenses from the gross returns of the sale of the timber produced, the plantations would give the following net profits:

At the end of 30 years, \$24.85 per acre.

At the end of 40 years, \$102.57 per acre.

At the end of 50 years, \$248.50 per acre.

At the end of 60 years, \$90.17 per acre.

But if the rate of interest was 6 per cent instead of 5, the financial returns would be as follows:

After 30 years, a loss of \$4.44 per acre.

After 40 years, a profit of \$115.76 per acre.

After 50 years, a profit of \$151.97 per acre.

After 60 years, a loss of \$114.30 per acre.

It will be seen by all these examples that the best time to cut a white pine plantation would be when it has reached the age of about fifty years, that is when the annual increment in volume will begin to diminish.

Does Spruce Planting Pay?

Of course the pulp and paper makers are more interested in the question of spruce plantations. Here I must say that we have no positive American nor Canadian data on this subject, and we must use the European figures: they are also very satisfactory. We find that, on an average quality of soil and locality, a spruce plantation may produce the following quantities of timber. Taking all the material over three inches in diameter at the small end:

At the end of 30 years, 6,700 feet b.m., or 11 cords per acre.

At the end of 40 years, 21,600 feet b.m. or 35 cords per acre.

At the end of 50 years, 36,700 feet b.m. or 61 cords per acre.

At the end of 60 years, 50,600 feet b.m. or 84 cords per acre.

In admitting that these figures could not yet be obtained in this province, we can by reducing them by, say, one-third, arrive at good conclusions:

After 20 years the stand would furnish 7 cords per acre.

After 40 years the stand would furnish 20 cords per acre.

After 50 years the stand would furnish 36 cords per acre.

After 60 years the stand would furnish 50 cords per acre.

Those who have had the chance to see the national forests of France and of Germany will admit with me that these figures are not exaggerated because every spot of these forests is devoted entirely to the production of trees, and of good trees, whereas in this country the good trees will only form, too often, an insignificant proportion of the stand, the remainder being occupied by swamps, inferior species or blanks.

It would be therefore of capital importance for the future operators to be assured that instead of cutting as we do now from four to ten cords per acre, they could find from twenty-five to fifty cords after an interval of thirty to fifty years. I need not insist upon the effect that such a yield per acre would have on the cost price of lumber; and also on the value of the forest property. This brings us to the subject of:

Who Must do Reforestation?

Owing to the fact that no practical returns can be expected before at least thirty years after the plantation, it requires therefore continuity or almost permanency in the possession of the property to be reforested. The problem is easily solved as regards the private lands: it will be a sound and profitable investment for the farmer, the towns and the corporations owning some private lands not fit for cultivation to go into this business, as they will do a national work and also create an excellent and steady source of revenue for themselves.

But when we come to the question of reforesting the timberlands leased from the government, the problem is more complex. Though I have studied it a long while, I have not yet come to a satisfactory conclusion. Will it be better for the government to do this work exclusively or should they rather allow or compel the limit-holder to make it for and by himself or should both co-operate in the plantation. The latter alternative may be the more logical since the government owns the soil and keeps the title of the property, it might then furnish all the planting material required and also the technical direction to do the work, whereas the limit-holder would defray the expenses of replanting. Someone has raised the important question, "Would the limit-holder continue to pay the ground rent on the parts of his limits that have been reforested?" I think he should continue to do so, if he wants to retain his

lease, but I believe that his share of expense, that is the cost of planting, should be kept separate and returned to him as a deduction on stumpage charges either at the moment of the plantation or with the accrued interest of say three or four per cent when the trees will have reached maturity. This plan is not altogether satisfactory to me, and I just present it as a basis for discussion rather than as a remedy to the difficulty.

To Encourage Reforestation.

The first measure to adopt for the welfare of the plantation is unquestionably to give them a satisfactory protection against fires. It would be ridiculous to make a plantation on a tract that would not be easily reached and defended against forest fires.

Cut Down the Fires.

We must carry on further the policy of protection against forest fires; we have already done a good deal in that direction, but we find that much of our forests is still vanishing away in smoke, and this spring we have had several big fires in the Lake St. John and the St. Maurice districts; most of them being caused directly by the railways. Nobody can dispute that fact as we have secured complete evidence in each case, establishing that the railway engines have been the cause of two large fires, one at Vandry and the other at Timbrell on the Transcontinental Railway. I firmly believe that we cannot allow our forest wealth to be depleted in such a manner, and the time has come to see that each engine travelling through a forested district will burn something else than coal or wood. We have water powers in abundance and we should study the electrifying of the railways in the forested regions. Someone will say that this may be too expensive, but it will be less expensive than the burning of fifty square miles of timber limits per year, and besides, we will be thereby developing our natural resources and diminishing at the same time our dependence for coal upon our neighbors. If we cannot electrify the locomotives, we could have them burn oil, as is done in the Adirondacks and as was done with success by the contractors who built the Gouin dam. Anyhow, the railways will have to burn something else than coal or wood and I hope the Pulp and Paper Association will support any movement in this direction. Many fires may be attributed to the poachers, the fishermen and hunters. Nobody should be allowed to roam at will in the forest. We should make it a close property and oblige everyone

to have a permit before entering in same. More preventive organizations should be made; it is much easier to prevent an ill than to cure it, and this is especially true of forest fires. We should have more patrols, telephone lines connecting all depots and observatory towers, etc.

To facilitate the work of the hydroplane service which is being inaugurated, we should establish in connection with the Geodetic Society more lookout stations.

Much has been done and said by the different protective associations which are doing splendidly, but we must complete our protection service so that the fire danger will be totally eliminated and then we can plant, but not before.

Protection From Taxes.

In regard to private lands, an important point is that of the taxes. The valuation of the properties reforested should not be modified just after trees have been set. A law should be enacted as early as possible to protect the citizens who have the courage to reforest against the unjust raising of the land valuation and thereby of their taxes. I contend that for at least thirty years the first valuation of the land planted should not be modified; the appraisal could take place to determine then the actual value of the forest crop separately from that of the soil and this valuation should stand for one decade at least. The ideal would be to repeat these appraisals at each interval of ten years after the first period has elapsed.

Allocate the Mills.

I think the time has come for the government to exercise a full control over the wood-working establishments in this province, as we

find too often sawmills being located in a locality where there is not enough wood supply to justify their appearance. Naturally the mill owner, to obtain his raw material, must get it at the expense of the adjoining limits and this is the beginning of the timber speculation of which we have suffered so much. All the wood-working establishments in the province should be licensed and compelled each year to obtain a permit to operate. The government will then be in a position to determine if they have enough timber lands to justify their operating and to prevent enlargements when there is no supply in sight.

Punish the Wasteful!

Up to the present we have found the lumbermen of this province ready to co-operate heartily with the government in all the reforms made by the administration. Our province can boast with justice of having made great progress through this co-operation. Now that the lumber industry in this province is in a rather stable state, we can look ahead and adopt a definite policy of reforestation and of management of our forests. We should cause those who waste their forest through bad lumbering to replant their holdings at their expense, while those who have done all they could to lumber correctly should be helped to the fullest extent. We should endeavor to make every acre of waste land and of timber land produce the fullest quantity of timber possible. We can make this province the largest timber producer in the world, not only in lumber but also and especially in pulp and paper products and I am sure that with the spirit, the energy and the co-operation of all we will undoubtedly realize our ambition.

SETTLING LAND DOES NOT SETTLE THESE ACCOUNTS

A settler near Kedgewick, New Brunswick, taking the "personal liberty" point of view, started fires to consume a few piles of brush. He broke the law in that he did not take out permits and follow safety regulations.

This is the result:

Loss to the lumbering village of Kedgewick, about \$150,000.

Householders lost between 35 and 40 houses.

Three lumber mills were destroyed, plus lumber piles, and three by five miles of territory was burned over.

WHO WILL PAY THE FORESTRY PIPER?

The following portions of an article in the "American Lumberman" by B. A. Chandler, have an interesting relation to the contention of Canadian conservationists that the Provincial Governments, notably of Ontario and Quebec, and New Brunswick, are "cashing in" each year on their forest resources and selling the capital assets regardless of the effect on the future interest returns.

Of course, there is a handy rejoinder that the provinces do not know their timber resources and therefore estimates of excess cutting are speculative. A lawyer might comfort himself with such a thought, but exceedingly few lumbermen or professional foresters will. It has frequently been urged that Ontario, Quebec and New Brunswick will soon have no other alternative as a matter of self-preservation, than to put back into replacement account the bulk of income now derived from forest taxes.

Mr. Chandler is discussing, not the Canadian position, where the Governments own the forests and are masters of the situation, but the American dilemma consequent upon private ownership of the nation's main timber supply.

No Future Supply.

"The public in the long run, gets what it wants. Many a city wanted an electric railway, purchased it at the price of an unlimited franchise, and would not give much to be rid of its bargain. Such cities are repenting in 'sackcloth and ashes' that they did not look farther and think deeper before making their demands. Yes; the American public gets what it demands, but it is sometimes sadder and wiser because of the unforeseen results of its action.

"At present much is said about the failure of the lumber industry to provide a future supply of timber to take the place of the crop now being harvested. Evidently some now feel that it is time for the pressure of public sentiment to be applied to the lumber industry.

"That the lumber industry is in a very bad economic condition and that a future supply of timber for our wood-using industries is not being provided are two facts beyond doubt.

Permanent Management.

"The lumber industry has frankly cut out one region after another without making any provision for a future crop. The pulp companies have been a little more interested in natural

reproduction and planting; but few, if any, of them have provided a permanent supply of raw material. The difficulty with which certain species were obtained for war purposes makes it evident that the supply of our more valuable species is getting low. The condition of any region after a wood using industry has moved on it is so bad that it is, for this reason alone, to the interest of society to establish permanent forest management as soon as possible.

Private Funds for Planting.

"The growing of timber has already attracted private capital on a small scale. The writer knows of men who have purchased small tracts of cheap land and planted them to forest trees instead of buying a life insurance policy for their children. Private individuals have been doing considerable planting within the last few years and most of it has been done on the investment basis, although very few of them are keeping accurate enough accounts to tell just how much they have invested. However, when a shortage in the supply of timber has forced the price of wood products high enough to attract large quantities of private capital it will be too late to save our forest industries or our communities dependent on them. Private capital can not be depended on to respond soon enough to any situation which requires as much time as it does to grow a crop of trees.

Broad Issues Suggested.

"If we can hope that private capital will handle the situation and we have not the moral right to force private capital into it, the only way the investment idea can be carried out is by the Federal and several State Governments. Since our governments have not surplus capital for investments, the only way is by bond issues. The principle of bond issues for public improvements which are expected to last over long periods of years has been accepted to a great extent. These public utilities all depreciate in value, and those who get the first use get the best use. A young forest is of no use at first and is continually increasing in value. If it is just to tax the coming generations to pay both the interest and principle on bonds on depreciating improvements it would surely seem just to tax them to carry timber bonds on which both the principal and the accumulated interest will finally be paid by the consumer of the for-

est products. It should be remembered that if this policy is adopted state and national governments will be the largest owners of timber

land and stumpage prices can be made high enough to cover the bonds and the accumulated interest."

THE BUSINESS SENSE OF OLD FRANCE

Lieut.-Col. H. M. Stickney, jr., who was with the American Expeditionary Force, comments as follows upon conditions in France:

"The French Government, even in peace times, is extremely careful of its forests, husbanding them with the utmost care, even though they have a great deal of timber, far more than is supposed. Everywhere one drives through the country, there are large forests which are kept with all the care of a well-ordered farm. The entire forest administration is a Government matter, and every forest has its forester in the employ of the Government. He has supervision over all matter pertaining to the use and care of the woods, game protection included. He personally marks with paint every tree that is cut, and only marks those trees which have reached their maturity, and are on the point of starting downward in the quality of the timber. When a tree is cut, the merchantable logs are taken to the nearest mill, slung under a gigantic two-wheeled cart with no body at all, being simply a long timber with chains which support the log. Sometimes, if the log is big enough, or two or three logs are carried at a time, the rear end is slung under an extra front wheels and only held to them by the log itself. So much for the timber. The balance of the tree is limbed, sawed into firewood, and piled ready for distribution. The limbs themselves down to the smallest branches are also cut into firewood, and piled, the very small ones being cut with a sort of knife which resembles a combination of Spanish machete and butcher's cleaver, and bound together with withes into bundles about 6 inches in diameter. The early growth of timber is rationed to the different industries and to private families for firewood in accordance with a fixed schedule which is strictly adhered to, even in peace times. This makes French forests an actual industrial proposition, which under efficient administration, will last the people forever, if they don't have too many wars.

The Saving Sense.

"It is very interesting to see the users of lumber making use of every possible economy, saving every stick and using the wood in some cases

several times, as long as there is anything left that can be used. For example, in the iron mines at Marron, one of the small mining properties which was not captured by the boche, they timbered their galleries with upright posts from three to five inches in diameter, with a slab usually about three or four feet long, which supports the roof. It was almost inconceivable that such light timber could hold the loads. As a matter of fact, I saw several galleries in which the timbering had started to break down under the tremendous pressure of the burden. When they have finished taking all the ore out of a gallery, instead of letting it cave, timber and all, as we do, they hire a class of men who are from generation to generation in taking out mine called in French 'wood-drawers,' who are expert timbering and do nothing else. These men, beginning at the further end of the gallery, take out these posts and slabs, letting the gallery cave in behind them. The strange part of it is that there are very few accidents. These posts and pieces of slab are used over and over again until they become broken, when the slabs are returned to the little mill and cut up for other purposes. When broken the posts are sawed into ties for the narrow gauge railroads upon which ore is carried out to the main line. The foregoing is a fair example of timber economy as it is practiced in France.

Rigid Laws.

"The rigidity of French forest laws is well shown by a case which happened in the early spring of 1918 when one of my captains ran out of wood for use in his company kitchen. He was camped in a big forest which was probably 4 miles square, and he cut one old maple tree which was hollow one-third of its length, and which should have been marked by the forester for cutting years before. He cut it close to the ground, covered up the stump and used all the wood for firewood. The forester on one of his inspection trips, found the stump and fined the captain 34 francs (about \$6) for cutting the tree, as it had been agreed between our army and the French that no trees would be cut for wood other than those specified by the forester

and supervised by our quartermaster department. The captain had to pay the fine out of his own pocket.

"Some time later, in fact just before the St. Mihiel attack, a French balloon station established itself near my headquarters in the same forest, and to make a place for their balloon bed, they cut several large trees, with the full authority of the forestry officials, of course. It became necessary for me to build some dug-outs and bomb-proofs, and as these logs which they had cut had laid in the ditches for some time obstructing the drainage, I took them out and used them in the roof of my dug-outs, using two layers of logs and about three feet of broken stone. The logs were not cut or injured in any way, and yet the French forester measured each log carefully, and charged it up against the United States Army. When you stop to think that all this happened close to the front line in an area which was entirely under the German barrage zone, you will get some idea of how the Frenchmen take care of their forests.

"The one thing that strikes me about the whole industrial system is the great economy of raw material and money. Labor is apparently the least of their worries."

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Like all well-regulated ships, the transport "George Washington" has a phonograph. It also has wireless telephone equipment of the latest design. On a recent occasion the phonograph horn and the telephone transmitter were brought face to face, and the music started. A hundred miles away, soldiers and sailors on the transport "President Grant" gathered eagerly around a loud-speaking receiver, from which issued the merry strains of song and fox trot, as the concert ship threw its melodious vibrations into space. Within the hundred-mile radius were several other radio-equipped ships, and when the concert was over the "George Washington's" operator was kept busy receiving encores.

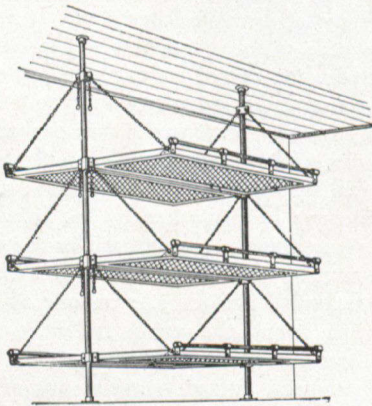
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FOREST FIRE LOSSES IN THE WEST

(Covering 1919 Season to end of June.)

Owing to a most unfortunate combination of adverse factors, the present fire season gives promise of being one of the most disastrous which has been encountered since the Dominion Forestry Branch was established twenty years ago.

In the first place there was very little snow last winter and when this disappeared early in April it was followed by an abnormal period of drought and continuous, high, variable winds, which in some parts, and more particularly in southern and central Alberta, has continued up to the present time. Coincident also with this failure of precipitation, the water in the lakes and streams has never before, in the memory of old settlers, been so low as during the past spring and early summer.

1.—Forest Reserves.

A.—Manitoba.—The first serious fires to attack or threaten the forest reserves broke out along the east side of the Porcupine Forest Reserve in Manitoba early in May. These appear to have been settlers' clearing fires that by accident or design got beyond control and resulted in very heavy loss of merchantable timber in licensed berths and of young growth outside. In the other Manitoba reserves no fires of serious magnitude have as yet occurred, although the danger has been acute and many small fires have been fought and extinguished. A factor which increased the difficulty of protecting the reserves is that the labor famine during the past two or three years has made it almost impossible to maintain the boundary fireguards as efficiently as is necessary.

B.—Saskatchewan—During the latter half of May extensive and serious fires raged throughout northern Saskatchewan and did great damage to the forest reserves. It is now believed, however, that the loss is not so great as at first feared, but so far the forest officers have been busy in patrolling and in fighting incipient fires that definite reports are still awaited. The reserves south of Prince Albert appear to have escaped any considerable injury this year up to date. The most noteworthy cause of the widespread fires in northern Saskatchewan appears to have been the unregulated use of fire by settlers, in clearing their lands. The excellent "Forest Fire Act" of Saskatchewan is in

this regard largely a "dead letter" because as yet the Provincial Government has made no organized provision for requiring the settler to secure a fire permit before setting out fire. It is to be hoped that this important section of the Act will hereafter be enforced.

In summing up the general situation in Saskatchewan, the District Inspector says in an interim report dated June 11th: "Starting about a month ago one was, in travelling about the country, amazed at the number of land and meadow clearing fires set out and apparently running at will along the southern boundary of our reserves and fire ranging districts from one side of the province to the other. These fires during the last three weeks swept north almost in a solid line into the reserves and ranging districts. With the extreme weather conditions at the time all efforts to check them were futile. The loss on the reserves and fire ranging districts cannot at the moment be even guessed at, but it is certain that it is large. Every one of the northern reserves was to a large, but unknown extent, burned over. However, I am of the opinion that when we have had an opportunity to map in the burned areas these will probably not be as large as at present is feared."

C.—Alberta—Coming next to Alberta we are confronted with an exceedingly grave condition of affairs. By the middle of May the reserves in southern and central Alberta had become dry as tinder, and indeed the fire situation generally throughout Alberta became extremely serious. By careful patrolling and good fortune the Crowsnest forest was kept free of fire until early in June when a destructive fire which killed at least fifteen million feet of valuable timber, broke out in the Porcupine hills. This fire was finally extinguished after a three weeks' fight.

Perhaps the worst fire so far reported on any of the reserves is the Sheep Creek fire in the Bow River Forest. This tremendously destructive conflagration originated through the carelessness of a railway laborer who failed to properly extinguish a fire made to boil a pot of tea. It escaped into the Lineham Lumber Company's slash on May 22nd and continued to spread until about July 15th, in spite of every

(Continued on page 382)

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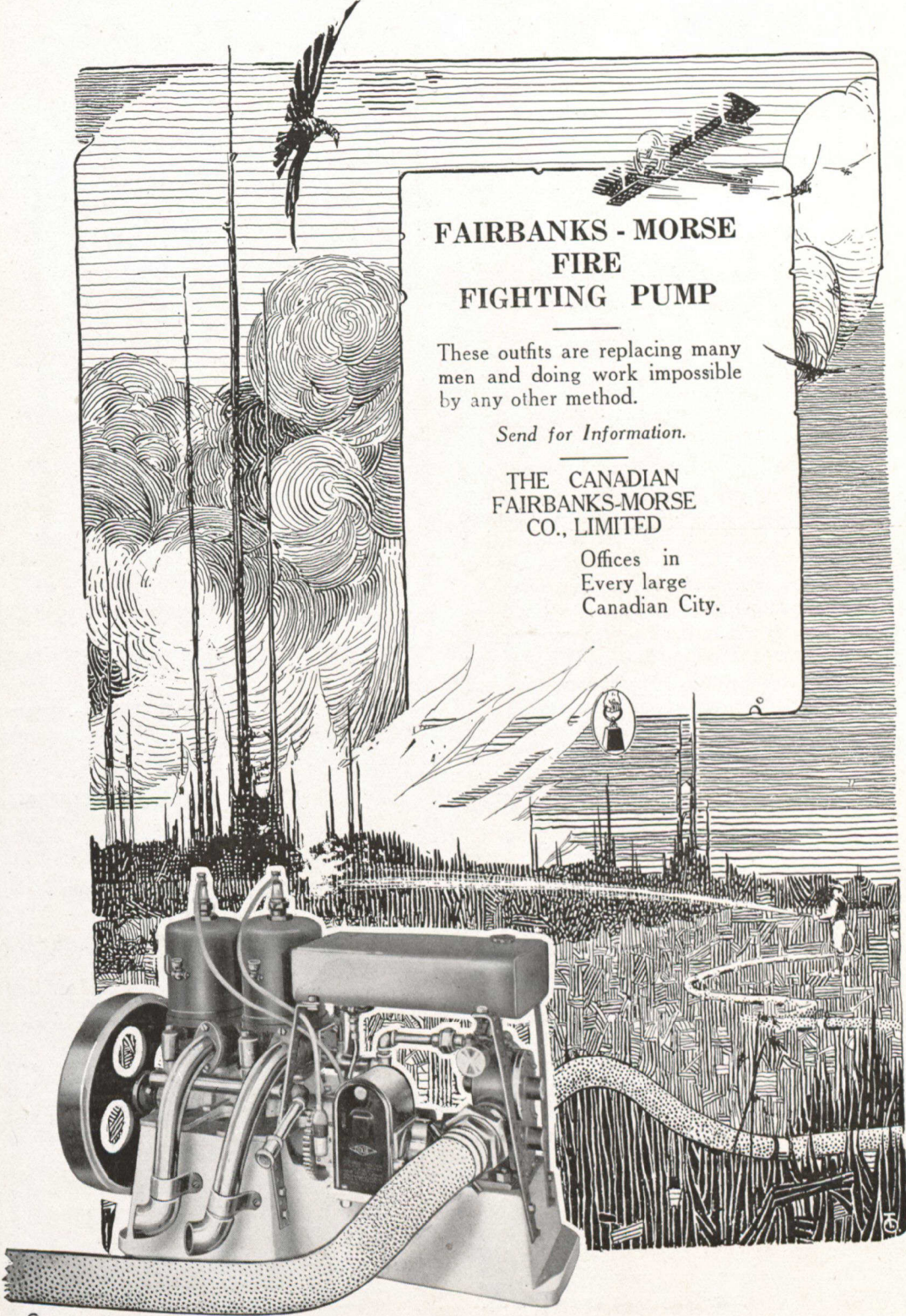
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The illustration is a detailed woodcut-style drawing. In the foreground, a Fairbanks-Morse fire pump is shown in profile, facing right. It has a large flywheel on the left, a fuel tank on top, and various pipes and hoses connected to it. A thick, textured hose extends from the pump towards the right. In the background, a forest fire is depicted with large, billowing clouds of smoke and flames rising from a line of trees. A person is visible in the distance, working with a hose. A large eagle is shown in flight in the upper left corner. The entire scene is framed by a simple border.

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PROSECUTING SETTLERS.

A large audience assembled at the office of Justice Lemieux of Kedgwick, on the 16th of July, to attend the trial of twenty-one offenders under the Forest Fire law. The cases covered: neglecting slash fires, neglecting to report forest fires to the fire warden, and neglecting to secure fire permits.

Justice Matheson, of Campbellton, presided, Justice Lemieux, of Kedgwick, acting as clerk of court. Forest Rangers Roy, Hocquard, Blanchard, Inspector Brophy, Caretaker Somers and Provincial Forester Prince were present. Assistant Chief Fire Inspector L. A. Gagnon acted as prosecutor on behalf of the Department of Crown Lands.

The court sat for two days, twenty cases being completed at time of writing, fourteen of which resulted in convictions.

The evidence was taken in both French and English, and the department took the opportunity of explaining to the people that they did not wish to deal harshly with the residents, but that the fire law must be observed in the interests of themselves as well as their neighbors and surrounding timber owners. Justice Middleton gave the offenders severe reprimands, pointing out not only the danger of neglecting slash fires, but the terrible destruction rendered by the recent fires in which nearly \$122,000 damage resulted, and in which many of the settlers lost their homes and property. It was stated that thirty buildings were burned and three small sawmills. Insurance covered about one-half the damage. Justice Middleton ascertained carefully the amount of damage each of the offenders suffered by reason of the fire and the fines against those who lost heavily were allowed to stand. It is interesting to note that none of the defendants pleaded ignorance of the slash-burning law, but claimed that they did not expect their fire would do any damage. At the time of the fire, June 12th, the slash and ground was extremely dry and the fire swept over even hay and oat fields in which there was nothing to feed the flames excepting scattered stumps. In much of the area covered by the fire all vegetable matter is burned out of the soil and it is rendered almost useless.

It is hoped that in the future the residents of Kedgwick will carefully take every precaution in burning, as it is considered miraculous that some of them did not lose their lives in the recent fire as well as their property. Several spent the day in the railway cuts to escape the smoke.



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C. C. JONES, *Chancellor.*

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FOREST FIRE LOSSES IN THE WEST.

(Continued from page 375)

effort by hundreds of men to get it under control. In the interval the timber loss has been enormous, as several timber limits have been wiped out and very large areas of promising young growth destroyed. It is estimated that fully fifty million feet of fine saw-timber has been killed by this fire up-to-date.

Near the end of May a second great fire broke out on the Stony Indian Reservation west of Calgary, and soon spread to the forest reserves in the Ghost River Valley. This very destructive fire has been fought by a small army of men for seven weeks, and, the latest report received, dated July 16th, states that it is not yet under effective control. Again, in early June another large fire started in the Sarcee Indian Reservation and finally spread westward up the Elbow River, extending however only a short distance into the forest reserve. It was finally placed under control on July 13th. Meantime another very large fire started farther north, between the Red Deer and Clearwater Rivers. Our latest report, of July 16th, shows this fire running south into the Bow River forest and so far defying all efforts at control. As to the exact extent of the damage occasioned by any of these fires, no definite reports are yet available.

The Brazeau and Clearwater forests appear to have sustained very considerable damage, at least three large fires having occurred on each, but owing to rather more favorable rainfall conditions farther north the Athabaska and Lesser Slave forests have fortunatel yescaped so far with comparatively light fire losses.

D—B. C. Reserves—On the British Columbia Reserves also the fire hazard for a time was considerable, but our protective organization succeeded in carrying them through this danger period without experiencing any serious fires.

2.—Fire Ranging Districts.

With the exception of the districts in British Columbia an abnormally serious fire situation is reported to have occurred on all the fire ranging districts. The chief fire ranger at The Pas says: "This is the worst fire season that the West has seen for twenty years—woods all dry as tinder even in the muskegs." In Prince Albert fire ranging district heavy losses are reported, and in the Battleford District twelve large fires had occurred before the end of April, covering some 55,000 acres. No Battleford

May or June reports are yet in hand, but it is certain that they will tell of still more widespread destruction in this part of the West.

In regard to the region north of Edmonton, the district ranger says: "All through this district large fires have occurred." One of these fires destroyed the town of Lac la Biche, and the chief ranger reports that another—the one which swept timber berth No. 1900—killed some fifty-five million feet of merchantable timber that the same condition of danger and loss from ber. A May report from Fort McMurray shows fire has been experienced this season even in the Mackenzie Basin.

No. 3.—Railway Fire Ranging.

From reports received, it is evident that the Railway Fire Ranging Service has done some excellent work this season. For instance, of the numerous fires reported in April, practically all were extinguished before burning over more than 10 to 30 square yards, thus demonstrating the efficiency of the patrol system employed.

With reference to the fires on forest reserves in general, and those in Alberta in particular, it must not be forgotten that the war greatly depleted the administrative and ranger force and also largely stopped the construction and proper maintenance of protective improvements such as trails, telegraph lines, lookout towers, and fire-guards.

With normally effective protective machinery and good laws properly enforced governing the burning of slash by lumbermen and settlers, there is every reason to believe that even in such an abnormally dangerous season as the present, the forest can be adequately safeguarded from fire loss.

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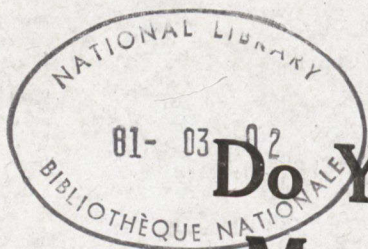
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