

Conservation

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Fire Prevention is Personal Business

Fire Losses Can be Reduced When
Earnest Effort is Made
Individually

Reduction in Canada's fire loss must be effected through recognition by the public of personal responsibility. Unfortunately, we have too long looked to other interests to initiate and carry out laws or regulations to reduce the heavy losses due to destruction of buildings and stocks by fire.

As insurance companies are directly interested in the fire waste much has been expected of them in the way of fire prevention effort. Fire insurance, however, is strictly business. Without fires there would be no need for insurance; the constant danger of fire is the principal and in fact the only reason for the purchase of fire insurance. Fire insurance rates are based upon experience; as the insurance companies have control of the setting of rates, it can readily be seen that they will protect themselves.

Insurance agents are paid by a commission on the amount of premiums collected, and it cannot be expected of that they should wish to reduce their incomes.

The reputation of a fire insurance company for prompt payment of losses is one of its best selling points for new business. It is not in the interests of the company to contest claims for losses, even though the cause of a fire may be suspicious.

A satisfied agent is also a great asset to an insurance company, and consequently the company hesitates to challenge the business he secures.

While many insurance companies and many agents are actively promoting fire prevention measures, they cannot be expected to shoulder the entire responsibility for performing this service. It is the duty of every individual to assume his or her own share of this responsibility.

Business interests are commencing to realize more clearly the importance of the fire waste, but greater effort must be made to interest the general public. With joint effort on the part of employer and employee to eliminate carelessness and to be increasingly watchful for fire dangers, many of our heavy fire losses would be overcome.

Conservation of Our Fisheries

In the time of Simon Peter and Andrew his brother, when hand nets were the most up-to-date gear for catching fish, and fishermen knew when their hauls continued to be light, that they had fished out a particular area. But, in these days, when demand may be increased and stimulated by long distance transportation facilities, the introduction of modern methods of fish catching, like the steam trawl, in which tons of fish may be taken at a lift, it is not so easy to determine quickly and accurately whether a given fishery is being fished out. Intensive modern methods of fishing may for a few years give a larger catch, even when the supply of fish is diminishing. Depletion is therefore an insidious thing, creeping upon our fisheries before we know it. Sometimes it is far advanced before we even suspect its beginning.

But there is one pretty sure way of detecting it—that is by statistics of catch (not of value) over a period of years. If the catch keeps going down year after year, we may be sure, despite intensive methods of fishing, that the species under observation is being cleaned out. A statistical enquiry of this sort shows that there are several species of Canadian fishes in process of depletion. One of these is the sturgeon, a fish caught in large numbers years ago in the Great lakes, especially lake Erie, and which was highly esteemed for its edible qualities. As late as 1900, the annual catch of this fish amounted to 2,645,722 lbs.; by 1910, it had decreased to 1,036,400 lbs., and, in 1919, only 27,700 lbs. was taken.

The shad, also, is almost extinct in our waters. In 1885, the catch was 14,535 bbls.; twenty years later it was 6,265 bbls.; in 1915, it went down to 3,867 bbls., whilst in 1919, production was only 1,038 bbls.

The "big run" of the valuable sockeye salmon, which occurred every four years on the Fraser river in British Columbia, is a thing of the past, due to over-

St. Thomas, Ont., Horticultural Society, in its annual report says: "War is being waged upon the billboard nuisance and the tacking of cards and signs upon fences and other places without permission of the owner."

fishing and to a rock slide near Yale during the construction of the Canadian Northern Railway, preventing the salmon from ascending the river to spawn in the tributary streams and lakes of the upper river. There are other fisheries, too, which a statistical study shows to be declining for Canada as a whole, and many individual streams and bodies of water are being depleted of valuable species. This is especially true of game fish which bring so many thousands of dollars worth of tourist trade into the country every year.

The remedy lies in prevention of over-fishing and in planting fry to replenish fished-out waters. It is remarkable what fish culture will do to rehabilitate our fisheries. In 1912, the Commission of Conservation, after a careful statistical study of whitefish production in the Great Lakes, represented to the Government that the supply of this valuable fish was being depleted and showed that the small annual plant of fry then being made was quite inadequate to make good the loss. Later, the Government increased its fish culture facilities and made larger plants of fry. The results speak for themselves. In 1910, the whitefish catch was 12,772,300 lbs. In 1915, it rose to 15,352,900 lbs., and in 1919 it reached 19,740,300 lbs., in spite of the heavy consumption of these fish during the war years. Private interests also have proved again and again that the planting of fry in streams and smaller bodies of water pays good dividends.

Alert public opinion and a well-informed independent press are the most powerful assets in conserving all natural resources, fisheries included. The onus rests on you and me and our neighbours to take an interest in these things which, too often, are nobody's business because they are everybody's business, and, through private influence, press, and fish and game clubs, the makers and administrators of our fisheries laws should insist upon the conservation of our natural wealth.

Campers and travellers were against responsible for 246 fires starting in the British Columbia forests. This was a considerable reduction from the previous year, credit for which is given to the educational work done by the newspapers.

Farmers Pay Dearly For Experience

Make Contract with Rainmaker
Entailing Less than Average
Precipitation

"Is it necessary to leave the farmer to learn wisdom at his own expense by becoming the prey of greedy plunderers? . . . It is a good thing to prevent forest fires; it would be still better to stop the squandering of the savings of the people."—*Mgr. Choquette, at Seventh Annual Meeting of the Commission of Conservation.*

The United Agricultural Association of Medicine Hat district has entered into a contract with "Rainmaker" Hatfield, under which, if four inches of rain shall fall between May 1 and August 1, 1921, Hatfield is to be paid \$8,000. He is to be given credit for one-half of the precipitation at \$4,000 per inch up to a maximum of four inches; in other words, if four inches of rain falls, Hatfield gets credit for two inches and receives \$8,000, while Providence is to get credit for the other two inches.

In order to carry out his part of the contract "Rainmaker" Hatfield is to "construct and build a rain precipitation and attraction plant" at a suitable location, also rain gauges.

The Dominion Meteorological Bureau, Toronto, says of this proposal: "In my opinion the whole thing is absurd. We are not ignorant as to the causes which lead to rain, and fully recognize that the forces of nature involved in the production of a summer shower are gigantic, so gigantic indeed that it is hard to conceive that any forces chemical or otherwise that man can bring to bear are otherwise than absolutely picaresque. The explosion which wrecked Halifax in December, 1916, did not lead even to the formation of a cloud."

C. V. Marvin, Chief of the United States Weather Bureau, says his department is "eagerly desirous of assisting in the protection of farmers and other against payment of money for rainmaking schemes and contracts," also that "unquestionably a long campaign of education is necessary to completely suppress the injuries of these fraudulent schemes."

Prof. E. S. Hopkins, of the School

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Street Trees—How Citizens Can Help

Improvement of Home Surroundings will Exert Influence on Neighbourhood

Over 29,000 trees have been planted in the parks and on the streets of Calgary since 1912 by the Parks Board of that city. What these trees will mean in comfort for the pedestrian and in the appearance of the city in a few years can hardly be appreciated. In the meantime, however, these trees must be cared for if the best results are to be secured. In commenting on this phase of the work the Calgary Herald says: "Many of the most thoughtful of the citizens assist in the work by watering the trees in summertime, keeping the weeds down and doing all they can to strengthen the hands of the parks department, and to hasten the time toward the city beautiful. It is also true that there are many that do not take the trouble that others do, and allow the weeds to grow, do not bother about watering, and generally adopt the attitude of leaving it to the parks department. True, it is their work, but the point is that the city is something that all have an interest in, and to a certain extent a share in, and a little work of this kind should not be dodged."

The support and co-operation of the individual citizens are a tremendous incentive to those who are labouring in their interest. A little effort in maintaining or improving home surroundings, including boulevards, streets and sidewalks, assists to enhance the general appearance of a district, and to induce others to do likewise.

Farmers Pay Dearly For Experience

(Continued from p. 13)

of Agriculture, Olds, Alta., speaking at the Soil Fertility Conference of the Commission of Conservation at Winnipeg in July last, showed from records of 36 years duration that during this long period the average precipitation at Medicine Hat for what is known as the growing season, May, June and July (the period covered by the Hatfield contract) was 6-14 inches. This average includes the three dry years, 1917, 1918 and 1919. *Water-Powers of Manitoba, Saskatchewan and Alberta*, published by the Commission of Conservation, in 1916, states that the average precipitation for the same three months for a period of 29 years preceding 1914, was 6-35 inches.

Hatfield, in securing such a contract from the Medicine Hat farmers, is therefore gambling on fifty per cent better than an even chance.

Well may Monseigneur Choquette appeal for protection for the farmers from those who, with nothing at stake, gamble against the savings of the farmers with loaded dice.

Power Progress in Canada

While the increase in power development in Canada in 1920 was substantial, in many portions of the Dominion new installations and developments have not yet caught up with the ever-increasing demand for hydro-electric energy. Increase in power development naturally accompanies expansion of industries. The pulp and paper industry has undoubtedly attracted the greatest attention during the past year, but a large number of smaller industries and the ever-increasing uses of electricity for power and domestic purposes, both in urban and rural communities, are important factors in the increasing power demand. While the total water-power installation of the Dominion at the commencement of 1920 was some 2,500,000 h.p., the ultimate capacity of undertakings, either completed during the past year or under actual construction, will increase this total by some 840,000 h.p. This figure includes the 500,000 h.p. Chippawa development of the Ontario Hydro-Electric Power Commission. Additional projects aggregating some 360,000 h.p. are also under consideration.

The Province of Ontario leads with some 650,000 h.p. in undertakings, which are either under construction or completed; Quebec shows 140,000 h.p.; the Maritime Provinces, 30,000 h.p.; Manitoba, 20,000 h.p.

Undertakings which are projected for the near future aggregate some 200,000 h.p. in Quebec; 15,000 h.p. in Ontario and 20,000 h.p. in the Maritime Provinces, while one project alone in British Columbia involves some 125,000 h.p.—L. G. Denis.

Karakul Sheep

"Persian lamb" is a fur which needs no introduction to Canadians. The sheep from which it is obtained is not so generally known.

The best skins do not come from Persia, but from Bokhara, a country which lies between Persia and Siberia and formed part of the former Russian Empire. The breed of sheep which has made this country famous is the Karakul. The lamb of this breed, when newly born, is covered with a black, glossy, tightly curled wool, which yields the highly prized "Persian lamb" of commerce.

Bokhara is an isolated territory and its inhabitants do not like to sell their sheep to foreigners; in fact, the export of the live sheep has been prohibited. Notwithstanding great difficulties, however, a few of these sheep have been brought to America and have formed the nucleus of flocks now in existence in Canada and the United States. It has been found that satisfactory crosses can be made with our long-wooled sheep, like Leicester, Lincoln and Cotswolds. By employing a few good Karakul rams, it is, therefore, possible to grade up a flock of

almost pure-bred Karakuls by crossing with certain well established breeds.

The mutton of the Karakul is said to be of very good quality and flavour. The wool of the adult sheep is coarse and is classed as carpet wool.

The Karakul is a very hardy animal and can live outdoors in the hardest winter weather. It is, of course, necessary to supply the sheep with food when the ground is covered with snow.

An advantage of keeping Karakuls is that the skins of still-born lambs can be utilized and there is, therefore, no loss from this cause.

There are known to be at least five Karakul sheep ranches in Canada at the present time. One rancher in southern Alberta reports very considerable success.

Care of Leather

Will give Greater Service if Properly Treated

The proper drying of boots and shoes after they have become soaking wet has much to do with their lasting qualities. The use of the proper kind of oil or grease will greatly increase the wear of shoe leather.

When leather is wet, it is soft and therefore readily stretches out of shape. The stitches cut through the wet leather easily and wet soles and heels wear away rapidly.

Great care must be taken in drying wet boots and shoes, for they often burn before it seems possible; moreover, if dried too fast, the leather becomes hard and the boots shrink out of shape. To dry wet shoes properly, first wash off all mud or grit with tepid water, and if they are heavy work boots, oil or grease them at once. Straighten the corners, toes and uppers to the proper shape, and stuff the toes with crumpled paper to hold the boots in shape while drying. Set the shoes in a place where they will dry slowly; wet leather burns very easily, and if it is placed where it is hotter than the hand can bear, it is almost sure to burn. The shoes should not be worn until thoroughly dry.

Before oiling or greasing boots, brush them well, warm them carefully, apply warm oil or grease, and rub in with the palm of the hand. Work the grease well in where the sole joins the upper and along the edges of the sole.

Neat's-foot, cod and castor oils and tallow and wool grease, or mixtures of them, are the best. Castor oil is the most satisfactory oil for use on polished shoes. If applied lightly, the shoes may be polished at once, if necessary, but it is better to wait a few hours.

A good mixture for waterproofing leather is: neutral wool grease, 8 ounces; dark petrolatum, 4 ounces; paraffin wax, 4 ounces. This should be heated, thoroughly mixed, and allowed to cool. Before using, it should be warmed to blood heat. Care must be taken when warming that it does not catch fire.

Carcasses Were Piled up Like Cordwood

Of Canada's Millions of Antelope but Few Remain—Special Preserves Provided for Them

Half a century ago countless antelope roamed the prairies of Canada, the United States and Mexico; to-day it is doubtful whether there are 15,000 of these graceful little animals in all this vast area, though in past years reliable observers have seen several thousand in a single day.

Mr. Thompson-Seton has estimated that, at the time of first settlement of the west, the range of the antelope covered two million square miles, and that there were no less than twenty million of these animals.

The rifle and the advance of agriculture have done their work. One writer, in describing the antelope herds of the "seventies," says "the prairie seemed to vibrate with the galloping of these swift little creatures, and they were slaughtered to such an extent that their outstretched carcasses were piled in heaps like cordwood."

The antelope is one of our most graceful animals; it is scarcely more than three feet high at the shoulder, and is fleetier than the swiftest greyhound. It is feared, however, that, while the antelope is absolutely protected in the western provinces, it is too late for the species to recover. The Dominion Parks Branch is endeavouring to save the antelope in preserves. In but one of these, however, is success reported. A herd of the little animals was discovered near Memiskam, Alta., and these were surrounded by a wire fence enclosing eight sections. As the land was eminently suited to the purpose, and unfit for agriculture, it has been created a national preserve for the preservation of the antelope. At the time of capture the herd consisted of forty-two animals, and this number has now increased to about one hundred. This, unfortunately, is the only record of increase of antelope in captivity, and is undoubtedly due to the fact that they are enclosed in their natural range.

Dr. W. T. Hornaday says: "The chief difficulty encountered in trying to afford protection to the antelope is in its own nature. It is delicate, capricious and easily upset. It is so sensitive to shock that it literally 'dies at the drop of the hat.' Owing to the extreme difficulty in maintaining this species in captivity, its total extinction at an early date seems absolutely certain, unless it is fully and permanently protected in its wild state, on its native range, for a long period."

Canada's action in giving universal protection and providing natural ranges for the antelope will undoubtedly prolong the existence of the species, but it is only a question of time when the advance of civilization will entirely absorb the free natural ranges and complete its extinction.

Commission of Conservation CANADA

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CONSERVATION is published monthly. Its object is the dissemination of information relative to the natural resources of Canada, their development and proper conservation, and the publication of timely articles on housing and town planning.

The newspaper edition is printed on one side of the paper only, for convenience in clipping for reproduction. The Commission of Conservation was created in 1906, by Act of Parliament, to promote the economic use of Canada's natural resources. Authentic information respecting the character and extent of such resources, and with reference to the problems associated with their efficient development and their conservation, is freely available on request to the Commission.

OTTAWA, APRIL, 1921

Fur Farming in Canada

The General Outlook

The Commission of Conservation is repeatedly in receipt of enquiries from correspondents regarding the raising in captivity of various fur-bearing animals. A few words will not be out of place, therefore, on the general position in the fur-farming industry.

About 90 per cent, or more, of the fur farmers of Canada are fox farmers. To be more specific, there are some 500 odd fox ranches in the Dominion and barely 50 ranches engaged in raising other fur-bearers. It is evident that, at the present time, fox farming is practically synonymous with fox ranching.

The reason for this is not far to seek. The silver black fox, provided it be of superior quality, is the highest priced pelt on the fur market today. Even the famous Russian sable is lower in price per skin and the almost extinct sea otter has not exceeded the highest-priced silver fox in value. Though prices have declined considerably from the peak of March, 1920, they are still remunerative and there is a general feeling that they have now reached a stable basis. A single fox skin is worth as much as the skins of, say 50 to 100 skunks, yet the amount of food and care required by a single skunk is almost as great as that necessary for a fox. So that, although the live fox represents a much heavier investment of capital and therefore of overhead charges, it is a far better paying proposition to raise fox than to raise skunk or any other low-priced peltries.

Fox ranching is now a well established industry. Though principally located in Prince Edward Island, it is now represented in all the provinces and in the northern States. There is a Canadian Silver Fox Breeders' Association, with headquarters at Summerside, P.E.I., and pure-bred foxes can be registered, like any other domestic animals, in the National Live Stock Records, at Ottawa. Last year a large live silver fox exhibition was held at Montreal; a

magazine specially devoted to the industry is published in New York; the Health of Animals Branch has its experts investigating vulpine diseases; much is known of the fox's needs and habits and good systems of feeding, management and ranch lay-out have been worked out. In short, fox ranching is past the experimental stage and has taken rank as a recognized branch of live stock industry.

The mink was the first fur-bearing animal to be raised for its fur on this continent. "Forest and Stream," in 1874, published descriptions of "minkeries" which were in successful operation at that early date. It is rather strange that mink raising has not developed to a greater extent. It is doubtful if there are as many as 20 mink ranches in Canada at the present day. Some of these, however, have been in existence long enough to demonstrate the feasibility of raising minks both successfully and profitably. Mink ranching may, therefore, be looked upon as a sound business for a man equipped with the necessary knowledge and aptitude. It can be carried on with much less capital and on a much smaller area than fox ranching.

Muskrats are not kept in captivity, but some persons own or lease marshes in which they monopolize the trapping privileges. All the care they give the animals is to trap their natural enemies and perhaps to supply some extra food in times of emergency or to plant aquatic herbs to increase the natural food supply.

Skunks and raccoons can be easily raised, but they are big eaters and the value of their skins is not high enough to pay for their keep in most cases.

The Karakul sheep, which yields the skin known as "Persian lamb," can be successfully reared in Canada. A few specimens have been imported from Bokhara and fairly satisfactory crosses have been made with long-wool sheep like the Cotswold, Lincoln and Leicester breeds. Pure-bred Karakuls are, naturally, very difficult to obtain.

Martens and fishers are not difficult to keep in confinement but show a decided disinclination to breed. Further experimentation may overcome this difficulty and then these valuable fur-bearers will, like the silver fox, be added to our list of domestic animals.

The logical way to rear beavers is in game sanctuaries; keeping them in small enclosures is impracticable. Nobody seems to have experimented with otters. Rabbits are prolific and easily raised, but do not yield sufficiently valuable fur. It may be stated, generally, that foxes, minks and Karakul sheep are the only fur-bearers now being raised in captivity which are "worth while" from a business point of view.

The forests of British Columbia in 1920 yielded products to the value of \$92,628,807, an increase of \$22,000,000 over 1919.

Asbestos

Quebec the Chief Source of World's Supply of This Mineral

Asbestos is one of the better known of Canada's non-metallic minerals. It is useful as an insulating material and enters into the production of many every-day appliances. It is found chiefly in the Eastern Townships of Quebec, the deposits there being the chief source of the world's supply. Asbestos is a fine, flexible fibre of silky appearance. It occurs in the fissures of the serpentine rock, which in this area is of a dark green or brownish color, so badly shattered that it is almost impossible to secure a block of the stone six feet long. Veins of asbestos, sometimes from four to five inches in thickness, are found with the fibres at right angles to the walls of veins.

Properly speaking, asbestos is not mined, but is recovered by the open-cut method from quarries, similar to stone quarrying. The over-burden is removed by steam-shovels.

Owing to its non-conducting properties and to the fact that it is resistant to common acids, asbestos has many and varied uses. It is largely used as insulation for heating plants and of refrigeration installations. Asbestos enters largely into the manufacture of electrical equipment, such as electric irons, toasters, fuse boxes, switchboards, etc. Other purposes for which it is used are as wall-board, sheathing under shingles for fire prevention, as gas logs in fire-places, as filament for kerosene and gas mantels; and as table mats and utensil holders.

The motor car industry has become a large consumer of asbestos, for insulation purposes and for brake linings, etc.

Owing to the facility with which asbestos fibre can be spun and woven, considerable use is made of it for filtering purposes in laboratories. Its resistance to the common acids renders it of special value for this purpose.

The production of asbestos in the province of Quebec in 1920 amounted to 177,605 tons, of a value of \$14,674,372. By far the greater proportion of this is exported, mostly to the United States.

Prevent Smut by Formalin Treatment

Oats were free from smut last year—on some farms. On other farms they contained as much as one-third smut. The difference was not in the land or, altogether, in the seed, but in the farmer. Those who carefully treated their seed oats with formalin escaped this severe loss. Smut is more or less common in practically all untreated oats, and many farmers who know about the treatment simply neglect to treat the seed. Those who have been persuaded to apply the treatment express

surprise at its simplicity and ease and are convinced that a gain of from one dollar to five dollars per acre has been made. The treatment for an acre requires only a few cents worth of formalin, a bucket of water and a few minutes work. The following method is recommended: Mix one pint of formalin with 40 gallons of water. Place the grain to be treated in a heap on a clean canvas or floor. Sprinkle the formalin solution over the grain, then shovel the grain over into another pile so as to mix it thoroughly, then sprinkle and shovel again. Repeat this until every grain is moistened by the solution; then cover the pile with sacking and leave for three or four hours. At the end of this time, spread the grain out thinly to dry; shovelling it over three or four times will hasten the drying. Forty gallons of the formalin solution is sufficient to sprinkle between thirty and forty bushels of grain.

Never expose wet grain to a temperature below freezing. If the grain is sown while moist, it will not run as freely as dry grain; for this reason open up the drill somewhat or the stand will be too thin.—F. C. Nunnick.

Tamarack Displays Marked Discovery

To any one who has travelled extensively through the forested regions of Ontario and has seen the timber areas where the tamarack was totally destroyed by the larch saw-fly a few years ago, it is very gratifying to see the wonderful recovery the tamarack is making in its excellent reproduction in portions of the Province. This is in evidence along the main lines of the Canadian Pacific railway and Canadian Northern railway east of lake Superior, a region which was extensively burned in the days of railway construction.

The most encouraging feature of the young tamarack is its rapid rate of growth as compared with its common associate, black spruce. An officer of the Commission of Conservation examined several young tamarack trees which were growing on a sand ridge a few feet above the level of an adjoining swamp. These trees averaged 22 years old and were from 15 to 18 feet high. They were between three and four inches in diameter at the ground. The interesting feature of their growth was its rapidity during the last few years. Of six saplings examined, two had grown two inches in diameter in the last six years and one had grown three inches in diameter in the last eight years.

At the present rate of growth of these young trees, there will in the near future be a new supply of tamarack fence posts and even railway ties in the territory described above. It must be noted, however, that the trees growing in the swamps are not growing as rapidly as those on sites with better drainage.—A. V. Gilbert.

Forest Growth on Cut-over Lands

Protection of Forests from Fire and Disease Necessary to Provide for Second Cutting

The recent study made by the Commission of Conservation in Algoma district, Ont., makes clear the value of the forest in this district after the first logging operation has been completed. Lumbermen and pulp operators who have considered only the first crop in financial calculations, will be agreeably surprised to learn of the large number of growing young trees left as forest capital for future operations, and the rapid rate of their growth in the area mentioned. The general pessimistic attitude toward the future of cut-over lands is not justified in this district, where the forest is comparatively young and has not reached a condition of stagnated old age as has been found in portions of the red spruce belt.

The hopeful prospect shown in the study has been previously obscured by the losses due to wind, fire, disease and insects, which tend to offset the growth and prevent the accumulation of timber that will appeal to the practical man as valuable. This loss has been heaviest following the logging operations, because of the exposure of the remaining timber and of other detrimental conditions created by logging operations. The influence of the slash left by the loggers has been previously considered only in its relation to fire risk, and its detrimental effect as a breeding place for insects and fungous diseases has been overlooked. It was found that the volume of timber which has died or been windthrown is nearly equal in ten years to that removed by the first cut, and few such trees have been windthrown or ill weakened by disease or insects. The primary need is, therefore, a closer utilization of all trees which will not survive to the next cut.

Sanitation of the forest is an essential feature of future logging operations. The prevalence of diseased and insect-infested trees in the virgin forest is one of the chief causes of low yield of the average virgin acre. Young trees are forced to struggle up to the light in competition with older established ones, and during this weakened and unthrifty stage they become diseased or distorted. In the keen struggle for supremacy in the forest the weak member is the one that falls prey to insects, disease and wind.

Such a heavy mortality without growth would soon deplete the forest. Yet the study shows a good stand of growing young trees, which have added volume fast enough to offset the losses during the past ten years, and the whole character of the forest has improved from the condition left by the loggers. This forest promises during the next fifteen years to gain in volume sufficiently to pro-

Important Forest Trees of Canada

SPRUCE

It is not generally appreciated that the value of the annual production of spruce lumber and pulpwood in Canada exceeds that of nickel, silver, gold, copper and lead combined. In 1919, the value of the spruce lumber was approximately \$44,000,000 and of pulpwood \$28,000,000, or three times the value of either the Douglas fir or white pine production.

This is probably due, at least in part, to the fact that spruce is a dual-purpose wood, being valuable for both lumber and pulp. The light colour, long fibres and easy pulping qualities make it the most valuable wood for the manufacture of paper. Spruce was at one time considered the only wood suitable for the manufacture of newsprint. Though the increasing difficulty of securing sufficient spruce to meet the demand has led to the use of other woods, chiefly balsam and hemlock, in combination with spruce, spruce still comprises over 70 per cent of the wood used by the pulp and paper mills in Canada. As lumber, it is white, soft, light and easily workable, possessing a maximum of strength for its weight, so that it is in demand for light construction and interior finish. The absence of a very distinct grain precludes its general use in a natural finish, but it is largely used in place of pine where it is to be painted.

There are five species of spruce in Canada. Red spruce (*Picea rubra*) is confined to the Maritime Provinces and the eastern part of Quebec. White spruce (*P. canadensis*) and black spruce (*P. mariana*) extend from the Atlantic coast to Alaska and as far north as the mouth of the Mackenzie river. In the southeastern part of its range, the black spruce is usually confined to wet or swampy sites, where it grows slowly and to a small size. In the northwest, it is found on better sites and is a better tree. White spruce is, however, the most important eastern species of spruce.

Sitka spruce (*P. sitchensis*) is confined to the Pacific coastal region. It attains very large sizes, up to 8 to 12 feet in diameter and 160 to 180 feet in height. During the war, it was found that Sitka spruce wood was the best in the world for the manufacture of the framework of air-craft, and 26,000,000 board feet of the finest quality was supplied by British Columbia to the Imperial Government for this purpose.

Engelmann spruce (*P. engelmanni*) is plentiful in the inland, mountainous region in the southern half of British Columbia. It is also a splendid tree, but does not attain the gigantic sizes of the coastal species.

All of the spruces reproduce well under proper conditions. They are all tolerant of shade, which enables them to reproduce and remain alive even under comparatively dense stands. They do not thrive under such conditions, however, and, unless relieved of the oppression in time, their recuperative powers will be weakened. If given a chance, all of the species, except possibly black spruce, will make a rapid growth, and will afford perhaps a better return in a forest managed for sustained yield than most other kinds of trees. This is especially true where small sizes can be utilized, as in the pulp industry.

Although reliable information is not available as to the amount of spruce in Canada, it is estimated that about one-third of the standing timber is spruce. There is, perhaps, between 100 and 150 billion board feet suitable for the manufacture of lumber, and, in addition, between 350 and 400 million cords of spruce pulpwood. A very considerable amount of this, possibly one-half, is not commercially accessible under the present conditions of market and transportation.

The annual cut of spruce is a little over two billion board feet. To this must be added the annual destruction by fire and by insects, which, during the last two decades, has far exceeded the amount used. The depletion of the pulpwood resources of the eastern United States has already created, and will continue to cause, an ever-increasing demand on the spruce forests of Eastern Canada.

Unless measures are taken to reduce the waste in logging, to check forest fires, and to provide for the development of new crops, the available spruce forests of Eastern Canada, at least, will be within sight of exhaustion inside of fifty years.

duce a second cut and still leave a good capital growing-stock for future returns.

The second lesson taught by this study of cut-over lands was an appreciation of the value of young softwood trees, already on the ground at the time of logging, but too small to be of use, since these are a surer reliance for future cuts of timber than the chance of seedling following the removal of the older tree. Trees less than one-

half inch in diameter at four and one-half feet from the ground were counted, and an average of 856 spruce and balsam per acre were found on the cut-over land. This represents an average of about 13,000 acres of such land. Two hundred and six larger spruce and balsam were found per acre on the cut-over land, in addition to the seedlings already mentioned. This good representation must impress every one as constituting a valu-

Severn River

Unused Power Sites on This New Ontario River

Among the larger rivers of the District of Patricia, New Ontario, the Severn is one of the most important. Its total length is some 420 miles, with a drainage area of 48,600 square miles. This is twice the area of the St. Maurice basin in Quebec which has acquired such importance from its water-power resources.

Information regarding the water-powers of the Severn basin is far from complete, but, judging from available data, the river affords valuable power sites.

Numerous large lakes, providing good storage opportunities. Among them may be mentioned Deer lake, 45 miles long and from 1 to 4 miles wide; Favourable lake, 25 miles long and from 2 to 5 miles wide; Muskrat Dam lake, 20 miles long and 4 miles wide; Sandy lake, 35 miles long and 8 miles wide.

The following are the estimated power possibilities of some of the known sites on the main branch of the Severn, given in the order in which they are met in ascending the river from its mouth:

Site	Head Feet	Min. h.p.
White Seal fall, 28 mi. from mouth	30	23,000
15 mi. above Favourable lake	25	4,000
20 mi. above Severn lake	6	1,000
32 mi. above Severn lake (in 2 rapids)	11	1,600
45 mi. above Severn lake	10	1,400
10 mi. below Sandy lake (in 2 rapids)	11	1,400
5 mi. below Sandy lake	18	2,500
10 mi. below Favourable lake	15	900
3 mi. below Favourable lake	25	1,500
2 mi. below Favourable lake	8	500
2 mi. above Favourable lake	12	400
5 mi. above Favourable lake	20	800
15 mi. above Favourable lake (5 chutes in 5 mi.)	50	2,900

—L. G. Denis.

Marble and granite to the value of \$922,725 were quarried in the province of Quebec in 1920.

able forest, deserving of care and protection from its natural enemies; nor should it be overlooked that this is the gift of nature, which, if destroyed, will be replaced only by nature's slow process.

Before planting or other expensive effort is made, the protection and improvement of such a forested area is the first and most logical step toward conservation of our forest resources. Failure to use the timber crop will not help, since natural mortality will take it away as it has done in the past, slowly replacing each year's loss with a new growth. By diligent and careful use this forest may not only be kept in a growing condition but the quantity and quality of the timber can be improved.

Finally, it must be understood that the study covered only a specific area of Ontario just east of Lake Superior and its results are not applicable to other parts of Canada, without consideration of other factors.—E. F. McCarthy.