

Conservation

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Vacations Should be Spent in Canada

Beauty Spots Invite Our People to Visit them this Summer

Planning vacation trips is one of the pleasures in the average Canadian home. The approaching holiday season tempts the mind to wander to shady nooks, to the seaside, to the fishing ground and the camp.

Canada offers to her people all the attractions it is possible to desire, either for recreation or change. We have all conditions of temperature and altitude from the sea level to the mountain heights. In our inland lakes and streams we have almost every variety of fresh water fish, with boating and bathing to satisfy the most exacting.

Why, then, should we look beyond our borders for summer resorts? There is an old saying that "the fishing is always better on the other side of the creek;" can it be that this is the reason why so many Canadians cross to the United States each year to spend their vacations, regardless of the superior attractions at home?

Canada wants us to see our own country. By spending their money at home, Canadians will realize more fully what a wonderful heritage we possess, and will help to overcome the discount to which our money is subjected on the other side of the line.

The Dominion Parks Branch and the passenger departments of our railway and steamship lines have much interesting literature on Canada's beauty spots, which will be sent free for the asking. These booklets contain much information that will help to decide Canadians to spend their vacations in their own country.

Wild Life in Dominion Parks

In his annual report for 1920, Mr. J. B. Harkin, Commissioner of Dominion Parks, reporting on the value of wild life protection, says: "The continued increase in wild life in practically all of the parks is most gratifying and affords the best evidence of the value of sanctuary protection. Reports from the various superintendents show that in the three parks on the eastern slope of the Rockies

Our National Wastes

FOREST FIRES

With the opening of another fire season, the question of forest fire losses becomes of direct personal interest to every Canadian. Forest protective organizations, Dominion, provincial and private, are increasing in strength and efficiency, but still the provision made is far from adequate in every forest province of the Dominion. Our average annual losses from forest fires still run into the millions of dollars. Most of these forest fires are preventable.

To check this enormous drain upon our resources, it is necessary that the individual citizen should interest himself and make his interest felt in the matters of improved administration, and increased appropriations for the better protection of our forests. Governments and legislative bodies are, for the most part, alive to the situation, but they are keenly susceptible to enlightened public opinion, and, in fact, require its support when measures are under consideration involving large expenditures or material changes in policy.

Expenditures on forest protection must be regarded as an investment not only for the future but for the present as well. If existing merchantable timber is to be kept from destruction, for immediate use, and if the vast areas of young forest growth are to be preserved, to comprise the forests of the future, very substantial expenditures must be incurred for this purpose and to so administer them that non-agricultural lands will be kept in a permanently productive condition.

The forest is a crop, which may be perpetuated by wise use, but which will inevitably be destroyed by unwise use. Irrefutable evidence of this may be seen over thousands of square miles in both Canada and the United States.

In all of our forest provinces, other than the Prairie Provinces, adequate protection will involve the expenditure of only a reasonable fraction of the Crown timber revenue. There has in the past been too strong a tendency to divert an unduly large proportion of the forest revenue to purposes of general governmental administration, leaving the forest to be regarded as a mine to be exploited, rather than as a crop to be reproduced.

Educational propaganda for greater care by the general public in preventing and extinguishing forest fires is of inestimable value, and can scarcely be over-done.

It is of the greatest importance to Canada to perpetuate the source of the raw material upon which are dependent the great timber industries of the Dominion. These industries provide employment for some 80,000 men and an avenue for the investment of probably more than \$400,000,000 of capital. Forest products comprise one of the largest items in our export trade and are a vital factor in the exchange situation.

With adequate protection, and scientific yet practical administration, these great industries may be still further developed and maintained for all time to come. Without, they must inevitably diminish, as are already the great timber industries of the eastern and southern States, for lack of these vital elements.

Really adequate protection from destruction by fire is the keystone of the forest arch.—Clyde Leavitt.

both big game and game birds are coming back in large numbers. The superintendent of Jasper park reports that this year the bighorn, which a few years ago in that park had been reduced to very small numbers, now total 5,000. In the Southek River hunting country contiguous to Jasper park last season there were reported to be 2,000 bighorn, evidently an over-

flow from Jasper park. Similar reports of better hunting come from practically all districts outside park boundaries indicating that the protection afforded by the parks is not only increasing the wild life within their boundaries, but it is resulting, as predicted, in a natural overflow of game which is restocking the hunting areas."

Rodded Buildings Immune to Lightning

Fire Losses Almost Negligible in Buildings Protected by Lightning Rods

"We have not had a rodDED building burned for years, and the damage to them is very small. . . . We make a difference in rates in favour of rodDED buildings, and over half are rodDED."—Manager, Mutual Fire Insurance Co.

In 1919, Ontario alone had 1,104 fires caused by lightning, in all classes of buildings, the greater portion of which were farm barns and residences. The monetary loss on farm buildings and contents amounted to \$401,711, that on buildings being \$248,396 and on contents \$153,321. Insurance provided for \$223,144, while the farmers in whose property the fires occurred had to stand the loss of \$178,567.

It has been clearly established that installation of lightning rods constitutes an efficient protection against lightning fires. The Canadian Fire Underwriters' Association and farmers' mutual fire insurance companies have had the advantages of lightning rods so impressed upon them by actual results that most of them grant a preference in rates to rodDED risks.

Unfortunately for the lightning rod industry, some thirty or more years ago many farmers were swindled by unscrupulous agents, and the experience is still remembered in many farm homes, to the disadvantage of representatives of the companies now in the field. It would seem the part of wisdom for an educational campaign to be initiated by the farmers themselves, to impress upon the rural population, in an unbiased manner, the almost absolute protection to their lives and property which can be secured through the installation of an efficient and thoroughly inspected system of lightning rods. The Ontario Fire Marshal has recently published in pamphlet form an address by Mr. George F. Lewis, on *Lightning: its Origin and Control*, which will be sent upon request.

In New Brunswick, during 1920, there were 312 forest fires from all causes, burning over 94,787 acres, and representing a monetary loss of \$690,306.

Recovering Alcohol from Sulphite Waste

Ethyl Alcohol and "Coal" Produced from Sulphite Lignin that Now Pollutes Streams

The weakest point in Canada's industrial position is her dependence on outside sources for a large proportion of her fuel. Any development which will reduce this dependence on imported fuel is of essential interest to Canadians.

In a recent number of the *Pulp and Paper Magazine*, an article by Mr. N. E. Clementson, of Sweden, describes a method of manufacturing alcohol and a fuel which he calls "coal" from the waste liquor of sulphite pulp mills. This process is being used commercially in forty-five plants, chiefly in Europe, but also in one plant at Mechanicville, N.Y.

The waste liquor, or sulphite lye, as discharged from the pulp mills, carries with it about 50 per cent of the wood substance, in the form of free and bound sulphurous acid, organic acids, fermentable and unfermentable sugars, organic sulphonates, etc.

The quantity of these dissolved organic substances in the lye varies considerably with the kind of wood used and the process followed in the pulp mill. Only about one-half can be secured in a sufficiently concentrated form to pay for treatment.

The first step in the process is to get rid of the acids. Fermentation, which changes the sugar into alcohol, is then induced by adding yeast and nourishment for the yeast. When the fermentation has proceeded far enough, the alcohol is distilled off and the residue is evaporated to obtain the "coal."

The alcohol so obtained is over 95 per cent pure ethyl alcohol, and is equal to that made from grain, potatoes or other materials, which can be used to better advantage as food.

Ethyl alcohol is valuable for many purposes. In the chemical industry, it is used in the manufacture of ether, acetic acid, chloroform, chloral, iodoform, etc., and in the preparation of aniline dyes, varnishes, etc. It is used also for heating and lighting purposes to some extent. The sphere in which it gives greatest promise, however, is as a substitute for gasoline. In Sweden during the war, the scarcity of gasoline necessitated increased use of alcohol for driving motors, and it was found that, by adding 10 to 15 per cent of benzol for carbureting and by making some minor changes in the carburetor alcohol could be used to advantage. If motors of high compression were used, it was found to last as long as gasoline. This field offers opportunities for alcohol, provided it can be produced at a cost that will enable it to compete with gasoline.

It is claimed, that in a pulp mill manufacturing 20,000 tons of

sulphite pulp per year, 320,100 gals. of 95 per cent ethyl alcohol can be produced, at an average cost of 21.4 cents per gallon, by this process.

It is claimed also that the "coal" derived from this process can be manufactured for \$3.00 per ton, which, on a calorific basis, is equivalent to \$5.13 per ton for the best steam coal. The quantity that can be recovered varies, but in a mill producing 21,000 tons of pulp, the equivalent of 7,200 tons of steam coal could be produced, which should be sufficient to run the mill. If by this process even the sulphite pulp mills can be made self-sustaining as far as fuel is concerned, it will represent a tremendous saving in our annual imports of coal.—*R. D. Craig.*

Electric Energy for Our Rural Districts

Assistance by Farmers During Slack Periods Would Reduce Costs

Generally speaking, it may be said that Canadian industrial centres are exceptionally well provided with cheap electrical power, mostly hydro-electric. As Canada's wealth and prosperity are due, in a large measure, to her agricultural development, it is highly desirable that electric service should be extended also to the farms to enable them to enjoy the full benefits of this service.

The *Electrical World* recently remarked editorially that rural electric service helps to solve national problems. Anything which encourages decentralization of the population, by making rural districts better places in which to live, ought to be supported by every available means. If electric light and power were generally available in the agricultural regions, there would be more encouragement for local industries and better opportunities for building up country districts.

Other provinces, including our Prairie Provinces, should work along the same lines as the Hydro-Electric Power Commission of Ontario. New legislation was obtained in this province last year to facilitate rural electric distribution. Men are engaged continually in making surveys in different parts of the province as to the kind of farms, and the market for power.

It has been suggested that their farms could help build the lines. During several months in the year the farmer's work is slack, and he could assist in constructing lines if it were to his own benefit to do so. There are several different suggestions, one, that all the lines be built by the government; another, that the farmers supply the labour and cartage at a certain rate; and third, that the commission supply a working superintendent who would show the farmers how to build the lines, haul poles, dig holes and string the wires, with the exception of tying-in, which would be done by the lineman.—*L. G. Denis.*

Berry-Pickers Start Destructive Fires

'Destruction of magnificent timber in a six-mile area, mountain slopes now blackened wastes, and thousands of dollars expended in wages to fire-fighters, are some of the results of Lynn Valley's greatest forest blaze. . . . And all due to the carelessness of a few berry-pickers.'—*Vancouver Province.*

In New Brunswick last year 60,000 acres of Crown lands were burned over. During the season 2,410 permits were issued for slash burning, and of these only 19 got beyond control. There were 57 convictions for infractions of the forest fire law.

British Columbia had 389,846 acres burned over, in 1920, the result of 1,251 fires, of which 246 were chargeable to campers and travellers.

In the Prairie Provinces, 1,313 fires burned over 5,491,215 acres. Campers and travellers were responsible for 152 of the fires.

Berry-pickers, camping parties, hunters and others who visit the woods for any purpose whatsoever, have a great responsibility for the care of the forests. The city resident looks forward to the time when he can get away to the woods, but he seldom gives a thought to the fact that only the strictest precautions in connection with the camp fire can preserve the forest which has such a fascination for him.

Conserving Labour in Handling Grain

The Pennsylvania railroad has recently installed at Baltimore four grain-car dumping machines. The grain-car is run on to the machine, end and side supports are automatically placed, the removable grain door is pushed in, and the car is then tipped, first sideways 30 degrees, then endwise to an angle of 45 degrees; the endwise tipping is then reversed, so that the grain is completely discharged from the car. The time occupied in emptying the car, including placing and removing, is seven minutes. Each loader replaces the labour of 16 men, and will more quickly release the cars for service.

Migratory Birds

Increased Penalty for Violations of the Convention Act

An amendment to the Migratory Birds Convention Act increases the penalty for violation of the act from \$100 to \$300. Section 12 now reads as follows: "Every person who violates any provision of this Act or any regulation shall, for each offence, be liable upon summary conviction, to a fine of not more than three hundred dollars and not less than ten dollars, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment."

CANADA'S MINERAL PRODUCTION

The value of the mineral production of Canada, by provinces, in 1920 was: Nova Scotia, \$30,187,533; New Brunswick, \$2,225,261; Quebec, \$27,722,502, Ontario, \$27,749,178; Manitoba, \$3,900,207; Saskatchewan, \$1,711,580; Alberta, \$33,721,898; British Columbia, \$38,044,915; Yukon, \$1,512,006. Coal constituted by far the greater portion of the mineral production of Nova Scotia, Saskatchewan and Alberta.

Providing Power for Canadian Industry

Competition in Manufacturing Will Depend upon Supply of Cheap Power

Figures given by Henry Flood, Jr., in connection with the super-power survey of Eastern United States, illustrate the industrial importance of proper power supply. Based on past progress, it is evident that power requirements are due to increase with extraordinary rapidity in the very near future, and the value of hydro-electric energy will become more and more evident. Great as are the power requirements of to-day, they are small compared to those of to-morrow.

In the northeastern portion of the United States, considered in the above mentioned survey, the total power requirements have increased from 15 billion kilowatt-hours in 1910 to 27 billion in 1920, and it is estimated that they will reach 50 billion by 1930. If the predicted progress in electrification of the heavy traction railways of this region is achieved the present requirements of 500,000 k.w.h. per year will increase to about 6,000,000 k.w.h. by 1930.

In 1918 England undertook a study of its power conditions; a definite policy has been worked out, and the form of centralized control adopted will do much to secure an adequate and standardized power supply.

In Germany a system is actually under construction which provides for very large power plants, situated at coal mines, to supply cheap energy for manufacturing purposes. Switzerland, Holland, Italy and France are each taking active steps to make available more power for their industries.

Canada is possessed of exceptional advantages, with her bountiful latent power resources, but it is also evident that action for co-ordinated development and distribution is essential, in order to reap the maximum results.—*L. G. Denis.*

According to "The School," in a safety first crusade, carried out among the school children in Detroit last year, it was found that out of some 600 accidents classified by cause, 450 were associated with automobiles.

**Commission of Conservation
CANADA**

Hon. W. C. EDWARDS
Acting Chairman
JAMES WATTS
Deputy Head

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 townplanning.

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 1909, 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, MAY, 1921

**Study Your Country
and be Prepared**

To be Proud of Canada Intimate
Knowledge of Her Resources is
Necessary

A knowledge of one's country is one of the first essentials of an education, even of those who are unable to proceed to the higher courses. With the amount of literature available on Canada and its natural resources, there is little reason for Canadians not being fully conversant with the many advantages Canada possesses.

A review of current literature on such subjects as the water-powers on our rivers, the protection and development of our forests, and our mineral deposits only whets the appetite for more detailed information. To those desirous of knowing more fully what Canada's heritage really represents, the Commission of Conservation can supply a number of reports on water-powers, on forests and on mines and minerals. These have been produced in a form to give them permanent value, and are generously illustrated.

The school teacher, with limited library and often of limited means, will find in the Commission's reports such information that will be of assistance in teaching, apart from providing the opportunity of acquiring knowledge of Canada and her resources at a minimum of expense.

Work for the Birds

Value Equal to One-third Canada's
Budget Destroyed Annually by
Insects

"The annual loss in Canada to field, orchard and garden crops due to destructive insects, is, on a conservative estimate, upwards of \$200,000,000. To this huge devastation must be added the enormous annual destruction caused by forest insects, stored produce insects, etc. It is certain that these losses would be much greater if it were not for our insectivorous birds."—Arthur Gibson, Dominion Entomologist, in *Agricultural Gazette*.

**Care of Municipal
Property**

In our towns and cities one cannot go far without observing conditions of neglect and carelessness due entirely to the lack of interest of the people themselves.

Unfortunately, the average citizen feels that once he has paid his taxes he has fulfilled his duty, and the city can do the rest. He overlooks the fact that the city is but an aggregation of units, of which he is one; that any improvements or maintenance charges must be paid for by these units, and he must bear his share.

It is a well-known axiom that a careless employer is reflected in a careless employee, which largely accounts for the fact that in altogether too many cases the cost of municipal public works is largely in excess of the cost of such works when privately carried out.

Many instances might be cited of losses due to either wilful damage or carelessness by the people themselves. In an eastern city during the past month a sewer became blocked by the depositing of material which could not be carried away. Many cellars were flooded and a cost of \$30,000 entailed. These losses are reflected in the tax rate, and just so long as so much of the public revenue must be utilized to replace or repair the effects of neglect or disregard of public property, just so long will the tax rate continue to increase.

**Must We Continue to
Pay This Heavy Cost?**

The Constantly Mounting Fire Losses
Are a Great Drain Upon Our
Resources

The fire loss on buildings and contents for first quarter of 1921, amounted to \$7,085,600, equal to \$55 per minute, or \$872,000 more than for the same period of 1920.

Canada is passing through a season of business depression; the demand on all sides is for the exercise of economy, not only in private life but in public affairs. Parliament is critically surveying every item of the national budget for possible reductions. The estimates call for the largest sum Canada has ever been required to raise, over \$565,000,000, and yet, large as this sum is, the Minister of Finance could go into the open market and borrow the money at approximately the same cost for interest as is represented in our annual fire waste.

Unfortunately, there is little indication of a reduction in the fire loss; to much the larger portion of fire sufferers the loss is made easy by the fact that it is covered by insurance, while this same condition tends to make the general public callous of the fire danger.

During the present period of receding values, there is a temptation to unload property on to the insurance companies by cash-

ing insurance policies, and the greatest vigilance should be exercised by insurance companies, fire marshals and fire departments to guard against this danger.

May is usually a prolific month for fires among the smaller risks, due to cleaning-up fires, removal of stoves to summer kitchens, use of wood for temporary heating, etc. Rubbish fires may easily get beyond control, consequently they should never be left alone or in care of children. Stove-pipes and chimneys should be cleaned and, where pipes go through walls or partitions, they should be protected by metal thimbles with air-spaces. It requires but ordinary precaution to overcome any of the above causes, and a little care may avert a conflagration.

Protected Forest Areas

In the Province of Quebec, nearly 90 per cent of the licensed Crown timber area is comprised within the boundaries of the four co-operative Forest Protective Associations, the St. Maurice, the Ottawa River, the Laurentian and the Southern St. Lawrence. These Associations are maintained primarily by the limit-holders and timber owners, but the Provincial Government co-operates financially and otherwise, and the officers of the Associations hold appointments as officers of the Crown. The Provincial Forest Service administers fire protection direct on areas outside Association boundaries, including a large territory north of the Transcontinental railway.

The total area in the four Associations is 40,123,083 acres. During 1920, fires reported totalled 947, of which 634 were extinguished by the rangers without extra labour, 313 requiring the employment of extra men for this purpose. The total cost of extinguishing fires, amounted to \$56,714, aside from the regular staff. Total assessed income for the four Associations was \$290,055.

The total area burned over within Association territory was 252,795 acres, of which 67,886 acres, or 27 per cent, was merchantable timber. Young growth comprises 12 per cent, cut-over land 24 per cent, and old burns 37 per cent.

The total number of men on regular patrol was 450, and these men issued 7,652 permits for the regulated burning of settlers' clearing operations.—Clyde Leavitt.

The Batican River

Attractive Power Sites, with Many
Lakes Available for Conservation
Storage.

Owing to their situation, near the central portion of Quebec province, the water-powers of the Batican river are destined to become of much importance in the near future. Rising in the Laurentian mountains, the Batican is an important tributary of the St.

Lawrence, entering that river at Batican. Its drainage basin lies immediately east of that of the St. Maurice river, and covers an area of 1,800 square miles, including over 200 lakes, a number of which could be used for conservation storage. The largest of these, Lake Edward, has an area of 26 square miles, and is situated at an elevation of 1,186 feet above the mouth of the river. Among its other lakes are Batican, Little Batican, Clair, Des Iles, Algoquin, Three Caribous, Sable and Turtle, each covering an area of from 1 to 3 square miles.

Railways are conveniently situated along the greater portion of its course, affording transportation facilities in connection with the future utilization of the power.

Although the Batican offers many attractive power possibilities, as may be seen from the list below, the only site at present in use on the river is at the Grand fall of St. Narsaise, where a 1,350-h.p. hydro-electric plant is in operation. This plant, which supplies electric energy to Three Rivers, is of historical interest. It was the first long distance transmission line in the British Empire, being constructed about 1893, with a length of 18 miles.

Some of the more important power possibilities of the Batican, in the order in which they are met in ascending the river from the mouth, are as follows. Most of the information was obtained by the Quebec Department of Lands and Forests:

Power Site	Head in feet	Possible h.p.
Chimney fall and below, 12 mi. from mouth.	50	4,600
Grand fall, St. Narsaise....	50	Utilized to operate a 1,350 h.p. hydro-electric plant.
Flat fall	27	2,000
Lalets fall	28	2,100
Price or Murphy fall, 15 mi. from mouth.	15	1,200
St. Stanislas fall, 16 mi. from mouth.	13 1/2	1,000
Grand Manitou 24 mi. from mouth.	10	800
..... from mouth.	12	800
361 mi. from mouth	10	700
361 mi. from mouth	15 1/2	1,025
..... from mouth.	10 1/2	700
43 mi. from mouth.	12 1/2	850
N. D. des Anges, 46 mi. from mouth.	69	4,600
Just below Jeanette river	17	1,000
Rickaby rapid, on Little Batican	19	500

The power shown for the various sites could doubtless be greatly increased by proper use of the numerous conservation storage possibilities which the basin offers. The minimum power of the adjacent St. Maurice river has been doubled by the operation of the Gouin and Manuan storage reservoirs.—L. G. Denis.

Graphite

One of the non-metallic minerals with which the public is more intimate is graphite, otherwise known as plumbago or black lead. It is a soft, dark grey, opaque solid, of a greasy metallic lustre found in detached masses, beds, crystals and sheets. Ceylon is the chief source of the world's supply of graphite, but it is also produced in Canada, England, New Zealand, Siberia, Germany and the United States. In Canada it is found in Northern British Columbia, in Eastern Ontario, in Ottawa, Argenteuil and Pontiac counties in Quebec, in Carleton, Charlotte and St. John counties in New Brunswick, and in Cape Breton, Inverness and Halifax counties, Nova Scotia.

Graphite occurs usually in the fissures or veins of granitic or similar rocks, but is also found as isolated plates, patches and pockets in what are known as bedded veins. It is commonly associated with quartz, calcite and mica, according to the rocks in which the graphite occurs.

The crude graphite must be very finely ground, to detach it from associated minerals, after which, by a concentration process, it is separated from the accompanying mineral particles. It is very carefully graded, both as to fineness and purity, to eliminate particles of grit.

Graphite is best known through its use in the manufacture of lead pencils. For this purpose it is mixed with clay, moulded into shape and baked. The proportion of clay used regulates the hardness of the pencil. For pencil-making the best graphite is secured from Borrowdale, Cumberland, England, and Bakuval, Siberia.

Other uses of graphite are in the manufacture of stove polishes, and paints for ironwork, of crucibles for the casting of metals, and of electrolytes. As a lubricant graphite is used, both in dry form and mixed with grease or oil, in many industries where heavy work and high speed are required. In foundries it is used in facing moulds to give smooth-finished castings. The electrical industry is using large amounts of graphite, and in the manufacture of gun-powder it is utilized as a moisture-proofing material.

Canada produced 2,227 tons of graphite in 1920, valued at \$173,537, as against 1,360 tons in 1919, of a value of \$100,221. In 1920, Quebec contributed 233 tons and Ontario 1,994 tons, while, in 1919, almost the entire output was from Ontario.

By the use of by-product ovens, the coking plants at Sydney, N.S., Hamilton and Sault Ste. Marie, Ont., and at Anxox, B.C., in 1920, produced 14,026,172 gallons of tar, and 19,142 tons of ammonium sulphate. In 1919 the production was 12,304,249 gallons of tar and 11,765 tons of ammonium sulphate.

Important Forest Trees of Canada

Douglas Fir

(*Pseudotsuga mucronata*)

Both botanists and lumbermen have experienced difficulty in selecting a name for this tree. It has been classified as pine, spruce, hemlock and fir, and is largely known yet in the export lumber trade as "Oregon pine." Though the wood somewhat resembles southern pine in appearance and texture, the tree has none of the distinguishing characteristics of pine. The leaves are very much like those of the true firs (*Abies*), but in other respects it is quite different.

Though almost entirely confined in its distribution to the Pacific states and the southern half of British Columbia, it is perhaps the most important tree from a lumber standpoint on the continent. In Canada, it is second only to spruce (which includes several species) in the quantity of lumber produced. In 1919, over 800 million feet, comprising 22.6 per cent of the total lumber cut in Canada, was Douglas fir, and exceeding the cut of white pine by 70 per cent.

The growth of the Douglas fir industry is due mainly to the large accessible supply and the superior quality of the wood.

The survey of the forest resources of British Columbia, conducted by the Commission of Conservation, showed a total stand of 76 billion board feet of Douglas fir. Not all of this is commercially accessible at present, but, since over 80 per cent is situated on Vancouver Island and the adjoining mainland, a large proportion is within reasonable hauling distance of salt water. About one-half of the fir in the interior of the province is adjacent to rail or water transportation. The extensive system of protected waterways along the coast offers exceptional opportunities for logging and for the towing of logs to manufacturing centres, which greatly facilitates the exploitation and marketing of the timber.

Extensive tests have demonstrated that, of the native species, Douglas fir is the strongest wood for its weight and it is, therefore, particularly valuable for construction purposes. There is considerable variation in the strength of different samples of Douglas fir, due to different conditions of growth. In order to secure maximum and uniform strength, the lumber should be graded according to the density rule which has recently been adopted. For dense Douglas fir, this rule stipulates that there must be at least six annual rings per inch, and that at least one-third must be summer wood. Though technically a softwood and easily worked, Douglas fir presents a hard wear-resisting surface, especially on the edge

grain face which makes it valuable as flooring. The distinct alternating rings of light spring-wood and dark summer-wood form a very attractive grain when cut tangentially, and for this reason it is extensively used for sash, doors, panels and other interior finish.

The trees grow to immense size, frequently exceeding six feet in diameter and 200 feet in height. Owing to its intolerance of shade, the lower limbs soon die and drop off in the dense forests, leaving long, clear boles with very little taper. This makes it possible to secure timbers and masts of very large sizes and also a high percentage of clear lumber.

Douglas fir reproduces prolifically and grows rapidly under suitable conditions. A light fire, such as is secured in slash burning after cutting, promotes the reproduction. It is being used extensively for reforestation in Great Britain and continental Europe, where it is found to succeed better than the native species.

For planting in eastern Canada, care should be taken to secure only stock from the interior mountainous portion of British Columbia, as the coast type will not withstand the severe winter climate. It is doubtful if even the mountain type will prove of much value in the east except for ornamental purposes.—R. D. Craig.

Hogs on Pasture

Cost of production plays a very important part in determining the net profit a farmer makes on what he has to sell. Manufacturers of the articles that a farmer has to buy study the question of cost of production very carefully. The farmer produces many of the things the urban worker has to buy and should do more towards lessening production costs. Take as an example the production of pork. Economical production of pork depends largely upon the cost of feeds. This may be materially reduced by the use of pasture and forage crops in conjunction with

the grain ration. If the pasture is luxuriant, mature hogs may be maintained in a satisfactory condition with a very small amount of grain in addition to the pasture.

Pasture forage has a variable composition. Alfalfa, clover, vetch and peas furnish feed much higher in protein than most other crops.

Where such leguminous crops are used for hog pasture a smaller ration of concentrates is necessary than where timothy, bluegrass, or where the non-leguminous cereals are sown for pasture. Hog raisers differ in their opinion as to the quantity of grain that should supplement the pasture. Some give the hogs all they will eat, others from two to three pounds of grain per hundred pounds live weight of the animals, while some feed as low as one pound of grain per hundred weight of the live animals. The amount of grain which should be fed to growing hogs or hogs being fattened must depend on the quality and abundance of the pasture, the length of time available for finishing the animals and the gains being made. Plenty of clean water, clean quarters, and succulent pasture, along with the grain ration, will certainly reduce the cost of producing pork and increase the profits.

—F. C. Nunnick.

A Meal of Cut Worms

C. A. Nash, of Toronto, records an experiment with the robin as a cutworm destroyer. One young robin, kept in confinement, ate 165 cutworms in a day. Had he been compelled to find his own food he would probably have varied it somewhat, as he would not likely find so many cutworms. What he could do when he had the opportunity was clearly demonstrated.

Killing Surplus Buffaloes

The increase in the number of buffaloes in Buffalo Park, Wainwright, Alta., has reached such proportions that it is proposed to slaughter 1,000 of the animals this year. It is expected that a considerable sum will be realized from the sale of the meat, hides and heads.



Hogs in Alfalfa near Indian Head, Sask.