

Conservation

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U.S. Firms Control Canadian Fisheries

Dominate Lake Fisheries Because Chief Market Has Been in U.S.

The greater portion of the Canadian lake-fishing business is controlled by United States firms, and this is due to the fact that more than 90 per cent of the total output finds its market in the United States.

On our Great Lakes, a very large fishing industry is carried on, not only during the summer and autumn months, but also in mid-winter, when the fish are taken through the ice, and, owing to climatic conditions, can be transported long distances without requiring expensive methods of refrigeration. They are frozen naturally as soon as taken from the water and are shipped to various centres in the United States, especially in the Western states, although there is a growing demand for Canadian lake fish in Eastern markets also.

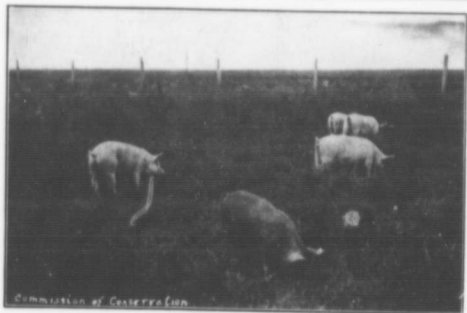
—From 'Fish, Birds and Game,' published by the Commission of Conservation.

Aim to Produce Pork More Economically

Greater Use of Pasturage for Hogs Would Lower Production Cost of Pork

Many farmers could produce pork more economically than they are now doing. Instead of selling off the last bacon hog this autumn, the Canadian farmer should keep one or two of the best young sows for breeding. It will cost but little to winter them; in fact, they are best kept in thrifty condition when not too fat. Next spring, arrangements should be made to have an out-door run for the pigs during the summer. A small field of clover, or an acre or two sown to rape or oats and vetches would be an excellent and economical place to raise the pigs. The green feed, supplemented by a little grain, and plenty of clean water will produce thrifty pigs and grow them cheaply to a size ready for quick finishing with a heavier grain ration in the autumn.

(One prominent writer in the



PIG IN CLOVER: THE BEST WAY TO PRODUCE CHEAP PORK (M. J. C.)

United States goes so far as to say that the supply of fats will be the deciding factor in the war. Certainly it is essential that immediate steps be taken to increase the production of pork in Canada. Some farmers seem to be prejudiced against those who are urging and working for increased production. The present, however, is a serious time, and petty prejudices should be utterly forgotten in one great effort to win the war. Only the farmer can do much to actually increase the supply of bacon. He has a great field for service in this matter, and a rare opportunity to supply, with profit to himself, what is greatly needed.

—F.C.N.

Hand-Loggers Waste Br. Columbia Timber

Estimated That 40 Per Cent of Timber is Wasted by Hand-Loggers Licensed by Government

The indiscriminate cutting of convenient shore timber by hand-loggers in British Columbia results in the injury of many good logging sites; for, as the hand-loggers are not allowed to use steam power, they fail to get to the water a large proportion of the trees they cut down. It is estimated that at least 40 per cent of the trees cut by hand-loggers are wasted in this way. Since these workings are nearly always situated at the foot

(Concluded on page 40)

How to Economize On Flour in Bread

Many Other Cereals Can Be Used to Dilute Wheat Flour

The familiar 'war bread' means bread prepared by combining a minimum amount of wheat flour with other materials for bread making. Since, in the process of manufacturing patent flour, about three-fourths of the mineral salt is lost, it is evident that, by milling a larger percentage of the wheat, the food value as well as the positive amount of bread-making material would be greatly increased. This added mineral matter may become a vital factor in making up the diet of children.

The manufacture of old-time graham flour, or wheat meal, which is simply the entire grain cleaned and ground, has been almost entirely abandoned, no doubt because of its perishability. Due to its bran and mineral salt content, flour of this type possesses laxative properties, which are often desirable, although the protein of the coarser flours may not be so completely absorbed. Much of the graham flour on the market at present is merely white flour to which bran has been added.

Some of the materials which may be substituted for wheat flour are: cornmeal, buckwheat flour, soybean meal and potato flour. Cornmeal may be used in the proportion of

(Concluded on page 51)

Flotation Case of National Interest

Chairman of Commission of Conservation Says It Should Be Settled Promptly and on Broad Basis

A company, known as the Minerals Separation Company, claims to be entitled to all the rights to the important method of concentrating ore known as the flotation process. Undoubtedly, this process can be used much more extensively in Canada with great profit. It is said that the company is making exorbitant and unreasonable demands with respect to the use of the process, and within the last few months an acute situation has arisen.

Apart from the legal and financial questions, under present circumstances the claims which are being made undoubtedly tend to interfere with production of essential minerals, and, therefore, are a detriment to our operations in connection with the war. It is not my province to express an opinion in regard to the merits of the dispute which has arisen or the suggestion that the Minerals Separation Company has alien enemy affiliation, but I have no hesitation in saying that the whole case is one which demands prompt and careful examination by competent and unprejudiced authority on behalf of the Government in order that the situation may be satisfactorily cleared up. I am told that the Canadian patents of the Minerals Separation Company are all granted under Section 44 of the Patent Act. An examination of this clause makes it quite clear that it, in connection with Section 52, gives the Government quite sufficient authority to take any action which may be determined to be at once just and in the public interest.

When the question is dealt with it should not be dealt with simply from the standpoint of the Cobalt mines. The question should be definitely settled in its application to the whole of Canada, so that the mining industry will know exactly where it stands with regard to this most important matter.

—Sir Clifford Sifton.

Public health means your health.

Fight is on to Save Our Valuable Pine

Currant and Gooseberry Bushes Spread Pine Blister Disease

That the pine blister disease constitutes an extremely serious menace to the white pine forests of Canada and the United States is indicated clearly by the large amounts of money which are being expended in its control. In Canada, \$25,000 has been appropriated by the Dominion Government, to be expended by the Department of Agriculture, which is co-operating with the provinces of Ontario and Quebec in the work of detection and eradication. The expenditures of the two provinces on this work will probably about equal those of the Dominion, so that the cost of fighting the disease in Canada this year will be approximately \$50,000.

In the United States, the Federal Government has made an appropriation of \$300,000 for the current fiscal year. Appropriations aggregating nearly \$200,000 have been made by the states of Massachusetts, New Hampshire, Vermont, Maine, Connecticut, Rhode Island, New York, Pennsylvania, Wisconsin and Minnesota. Of this amount, \$141,500 is available during the current year, the balance being expendable next year, under biennial appropriations. The largest single appropriation is that of Massachusetts, which is spending \$50,000 this year. As the pine blister disease has secured a very strong foothold in that state, stringent measures are imperative if its white pine is to continue as an important forest tree.

Unquestionably, the expenditure of large sums of money is both necessary and justifiable to ensure the future and the present of our white pine forests. The threat to the large areas of young forest growth of this species is especially serious, since the small trees are peculiarly susceptible to the disease.

In Quebec, the occurrence and spread of the disease is proving less serious than had been feared, in view of the situation to the south of the international boundary. Thus far, after careful work throughout the summer, it has been found only in the counties of Nicolet, Arthabaska, Lotbinière, Jacques Cartier, and Two Mountains, and there, only on the black currant, which is one of the alternate hosts of the disease.

In Ontario, the problem of eradication is proving even larger than had been anticipated, since, as a result of careful scouting, it has been found in a number of new localities. The infection is very general throughout a radius of about one hundred miles surrounding Toronto, with the worst infections in the Niagara district. The infections in the northern counties of Simcoe, Victoria, Haliburton and Peterborough, are,

according to Mr. W. A. McCubbin, of the Department of Agriculture, in dangerous proximity to the pine area of the Trent watershed. A number of infections in Haliburton are well within this pine area. The infection in the eastern part of the province is, indeed, of quite serious extent.

For the present at least, the work consists mainly of eradication of currants and gooseberries, both wild and cultivated. It has been found that in this way the spread of the disease to the pines can best be prevented. The present outlook for controlling the disease seems to centre on whether wild currants and gooseberries can be completely and economically removed, and whether owners of cultivated currants, particularly black currants, prefer to lose their bushes rather than the pine. The interest of the public in the preservation of the pine is so great that the issue can not remain in doubt. As a matter of fact, the laws provide in a wholly adequate way for the settlement of this question on a basis which recognizes the great public interest at stake.—C. L.

Hand-Loggers Waste Timber

(Continued from page 45)

of a mountain and at the water's edge, where a destructive fire is most likely to start and gain headway, the resulting debris produces a fire menace of the worst kind.

It is extremely doubtful whether the advantages gained in forest utilization by this means, or the furnishing of employment to the nomadic, irresponsible men who follow the occupation of hand-logging, are commensurate with the resultant damage. Though the discontinuance of hand-loggers' licenses was recommended by the British Columbia Forestry Commission in 1910, they are still issued.

During the last 28 years, hand-loggers have destroyed the timber on over 1,000 miles of shore line extending back from 100 to 1,300 feet, and covering an area of 50,000 acres. Though no figures are available as to the amount of timber cut by hand-loggers, it is estimated from personal observation, that they have marketed perhaps 500,000,000 feet, that they have cut and allowed to go to waste, 300,000,000, and have caused the destruction of an additional 800,000,000 feet through fire and windfall. About 210 of these licenses have been issued annually for the last few years, the annual revenue from which amounts to approximately \$5,000 for license fees, and \$19,000 for royalty, on an average cut of 125,000 feet per license. It would appear that the usefulness of the hand-logging system has passed, and that it should be discontinued as inimical to the objects of forest conservation.—Adapted from 'Forest Resources of British Columbia,' soon to be published by the Commission of Conservation.

Famine or Food?

Famine has always been a corollary of war. Even minor conflicts have invariably brought about more or less serious want in the nations engaged. At the present time, world famine is within measurable distance. The tremendous waste, coupled with a great decline in the production of foodstuffs is rapidly depleting available supplies and if the war continues for a prolonged period, nothing short of superhuman efforts can prevent the nations participating in it from going hungry.

Millions of the men of Britain, France and Italy are in the fighting line and, obviously, cannot be food producers. In normal times, these countries were dependent on other countries for much of their supplies of foodstuffs, but now they are more than ever so. To outline the situation concretely: It is estimated that the production of wheat in the United Kingdom, Belgium, France and Italy this year will fall short by 500,000,000 bushels of the pre-war average. It should be remembered that in the three years before the war these countries imported together about 750,000,000 bushels annually; also that war conditions make any marked increase in production within the next few years difficult, if not impossible. This deficiency in wheat has its parallel in meats and dairy products and only the most careful management will save the herds of those countries from serious, if not ruinous, depletion.

Such a situation can be mastered by two methods only. First, by conserving existing resources; Second, by increasing production. Both these remedies are receiving attention in the countries at war, but the shortage of land, labour and fertilizers presents almost insurmountable obstacles to any great increase in production in Europe. Further, the shortage of ocean going freighters and the great distance of Australia from the market largely eliminates the Commonwealth as a source of supply.

Canada and the United States must, therefore, in large measure, meet the difficulty. In 1915, slightly more than 39,000,000 acres in Canada were in field crops. In 1916, the area had decreased by nearly 4,000,000 acres. Whether or not this decline is due to shortage of labour, it is a serious falling off in time of war. If men are not available, the labour problem can be met by a much larger use of women on the farms, as well as by the use of larger and more efficient farm machinery. In Britain, many thousands of women have left the cities to work on the land; better machinery has been procured in some cases by the Government, by whom it is leased to the farmers at reasonable rates. In this way Britain has greatly in-

THE DECREASING MOOSE

The moose once ranged over a whole of our northeastern woods. Now, Minnesota is the only state in the United States where there are enough moose to be killed, and there are not very many there. The state of Maine, which has perhaps the most thorough and enforced game laws with regard to moose of any state, a close season was put in effect in 1915, for a simple reason that there are so many hunters. Along the southern frontier of Canada where the country is brought under development and where the moose once roamed in thousands, you will now seldom find enough moose to make it worth while to hunt them. It is very while in New Brunswick, because there they have been thoroughly protected.

They are scarce even in many outlying districts as, for instance, the Peace River valley, until recently regarded as remote but now thrown open to settlement. In 1912, the Beaver Indians were starved, because they could not get enough meat to keep them alive and one band of Indians travelled 150 miles up the Liard river to hunt moose. Yet a sportsman magazine printed a communication entitled, "A Game in the Peace River Country Unlimited," which showed a glowing picture of moose, deer and antelope roaming the woods in countless numbers. Where did the writer ever see an antelope roaming the woods? It shows that people do not realize the peril of fronting our animals.—F. K. V. in 'Fish, Birds and Game' published by the Commission of Conservation.

SCRAP METAL ON THE FARM

Farmers may not realize that they are unpatriotic if they are not selling their worn-out machinery and implements.

Large quantities of iron and steel are needed for guns, shells, bridges and other war purposes. There are many farms on which a good deal of junk is to be found. Higher prices are being paid for scrap metal than formerly, but, in order to save unnecessary expense in getting to the foundries, neighbouring farmers might co-operate and make one hauling do instead of seven.

A Southern California judge recently sentenced a man to 30 days in goal for leaving an unextinguished fire in a National forest. This sentence was later changed to one of debarment of the offender from a National forest for a period of one year.

Increased her production of foodstuffs, in spite of the tremendous drain that the war has made on the man-power of the country. Canada can, and doubtless will, follow the lead of the motherland.—A. J. P.

CONSERVATION, THE HOPE OF CANADA'S FUTURE

Large Increase in Canada's Nickel Refining Capacity

New Plants Producing 30,000,000 lbs. Yearly Soon to be in Operation

It was pointed out at the first annual meeting of the Commission of Conservation in 1910 that, although Canada was assessed of the richest portion of the world's supply of nickel, we were deriving only a comparatively small amount of benefit from it. The most expensive portion of the work of recovering nickel from the raw ore was done in other countries. This anomaly is now in course of being remedied. As the result of constant agitation and discussion we are likely to see by far the greater part of the work done in Canada.

The British American Nickel Corporation has under construction near Sudbury a new electrically-operated smelting refinery which will have a capacity of 2,500 tons of ore daily and a nickel production of 20,000,000 pounds per annum. The smelter will produce a matte carrying 80 per cent copper and nickel, which will receive final treatment in the refinery.

The International Nickel Company is constructing a new refinery at Port Colborne at a cost of \$4,000,000, which will be in operation in a few months. The initial capacity will be 15,000,000 pounds of nickel per annum, but it can be expanded in a few years to produce 60,000,000 pounds. The new plant, according to the company, will be able to supply the needs of the whole British Empire.

GRAND RIVER STORAGE

Chairman of Commission of Conservation Points to Experience of Quebec

Speaking before the ninth annual meeting of the Commission of Conservation on Nov. 27th, Sir Clifford Sifton, the chairman, said that for some years it had been a matter of public knowledge that the Grand River valley in Ontario had been suffering more and more from a diminished flow in that river. "I am confident," he continued, "to give an expert opinion upon the subject from an engineering standpoint, but it seems clear that the time has arrived when the Ontario government should make a thorough scientific examination of the subject with a view to ascertaining whether conservation works can be constructed which will remedy the evil. The experience of Quebec shows that where such works are practicable, they can be constructed without placing any burden upon the public exchequer."

SHOULD SAVE SLACK COAL

In the Canadian semi-anthracite mines and in practically all the sub-bituminous and lignite mines, the proportion of coal wasted as slack varies from 12 to 35 per cent. Everything possible should be done to encourage the use of this class of fuel and it would seem advisable to exact a royalty on total output and rebate all a portion of the royalty on slack coal

provided the same is utilized or marketed.

Under the present leasehold system, royalty is exacted on merchantable output only, which, therefore, tends to encourage the waste of slack coal.

Slack is produced during mining and handling of the coal and the amount produced is reduced by the use of mining machines and by care in handling.

TWO AND HALF CENTS AN ACRE IS COST OF SURVEY

Two years ago, New Brunswick inaugurated a survey to find out just what it possessed in the way of forest resources. To date, 1,200,000 acres have been covered, of which 600,000 were surveyed this year at a cost for the field work of only 2½ cents an acre. The J. B. Snowball Company is co-operating with the Provincial Government by making available to it the information which the company obtained in a survey of its forest properties.

The estimated amount of spruce and balsam in New Brunswick is only about 30 times the present annual cut for lum-

ber and pulpwood. One of the principal objects of the survey is to manage the forests on a permanent basis so that no more than the annual growth will be cut each year. Coniferous species are being heavily over-cut as compared with hardwoods.

DOMINION COAL LEASES DO NOT DISCOURAGE WASTE

Considerable Tonnage Wasted by Get-Rich-Quick Mining—Other Countries Have Taken Steps to Stop Waste

Coal-mining rights on Dominion lands are disposed of by the Dominion Government under leases, the provisions of which are so liberal as to afford the operator every encouragement. They do not, however, give any consideration to the relation of the coal seams, the order in which they should be worked to prevent waste, the quality of the coal in the several seams and the coal content in the leased areas. The result is that a tremendous tonnage of coal is wasted.

All other important coal-mining countries which dispose of coal-mining rights under a system of leasehold have found

What Provinces Are Doing To Improve Forest Services

Ontario, British Columbia, Quebec and New Brunswick Keeping Abreast of Times

Ontario has thoroughly reorganized its forestry service and put itself on a par with other up-to-date provinces whose forest services are under expert technical direction. New Brunswick is also swinging into line. A well-qualified forester, Mr. P. Z. Caverhill, has been appointed as the head of the forest service and is now making a survey of its forest resources as a basis for laying down permanent lines of forest policy. In this work, the Commission of Conservation has been assisting the province in an advisory capacity.

British Columbia and Quebec have long been in the forefront of the provinces that have had an efficient technically qualified forest service. Although Nova Scotia's forests have been nearly all cut over, an efficient forest service would be an investment for the province that would pay for itself many times over in conserving and utilizing the forest resources remaining. Two-thirds of the land area is better adapted to forest growth than to any other use and should be re-forested.

CO-OPERATIVE FOREST PROTECTION IN QUEBEC

Quebec has made a distinctive contribution to forestry work in establishing the success of co-operative fire protection associations. In these, the timber owners band themselves together to protect their limits from fire, sharing the expense on an acreage basis. The provincial government also contributes towards the expenses in consideration of the protection afforded unlicensed Crown timber lands. One great advantage of the association idea, especially when the provincial forest service is appointed for political reasons instead of for merit, is that the owner-members of the association see that only competent rangers are employed. Quebec now has four co-operative fire protection fully 67,000 square miles of forest lands, comprising the greater portion of the licensed Crown timber lands as well as a large portion of the Crown granted lands. Under this arrangement, the St. Maurice Forest Protective Association, the pioneer in the movement, looks after the St. Maurice district, the Ottawa River Association guards the large territory bordering on the Ottawa, and the newly formed Laurentian and Southern St. Lawrence Associations protect the districts on the north and south of the St. Lawrence river, respectively, in the eastern portion of the province.

DEPEND ON U.S. COAL

The total coal production of Canada in 1916 was 14,500,000 tons, while the imports were 17,500,000 tons. This shows our dependence on the United States and the necessity for retaining public control of water-powers.

TECHNICAL TRAINING AND CONSERVATION

It cannot be said that in Canada we have yet arrived at a proper conception of the economic utilization of our resources. We still persist in a great degree in the crude and wasteful methods naturally characteristic of a country where resources are abundant and where many of those who are engaged in their exploitation are totally lacking in the scientific education which is necessary in order to make the best use of that which is placed in their hands. We are still largely dominated in Canada by the idea that any ordinarily capable amateur can do the work which ought to be done by a trained scientific man, and until we eradicate this fallacy thoroughly, and in its place implant the view that men who are technically trained are the only men competent to deal with technical problems, we shall not begin to attain to general success in making the best use of the materials which are at our disposal.—Sir Clifford Sifton, before Ninth Annual Meeting of Commission of Conservation.

POWDERED FUEL

A large proportion of Canada's reserves of coal is unsuitable for use in the ordinary way as locomotive fuel. The coals of Manitoba, Saskatchewan and portions of Alberta are lignite or sub-bituminous, high in moisture, and owing to excessive 'sparking,' cannot be used as locomotive fuel because of their inability to set fires. There is a possibility that pulverization will overcome the disabilities of this type of fuel, and Mr. W. J. Dick, mining engineer of the Commission of Conservation, is investigating the problem and compiling information respecting the use of powdered coal and peat as a fuel for locomotives, stationary boilers, cement plants and metallurgical purposes. This class of fuel has already been used with eco-

nomie success in a few plants. If it can be proven to be a success generally, it will mean that we can utilize much low-grade coal that, heretofore, has been largely wasted, and will lessen the ever-increasing cost of generating power from high-grade coals and fuel oil.

B. C. Abolishes Patronage

British Columbia has again taken the lead in forestry administration by banishing the patronage system in its appointments to the field force of the forestry system.

Causes of and Remedies for Property Loss From Fire

Experience in Other Countries Shows Insurance Rates Can be Materially Lowered

Fire losses in Canada are chiefly due to (a) individual carelessness, (b) poor structural conditions, and (c) arson. At least 70 per cent of all fires are believed to originate from one or other of the multitudinous forms of carelessness and neglect.

Fire losses can be materially reduced by attacking the problem at its source. This is proved by the freedom from fires in foreign countries and by the experience of the Mill Mutual insurance companies in Canada and the United States. By enforcing proper fire prevention and protection measures in properties, these companies have been enabled to reduce the loss ratio from 40.25 to 40.03 per \$100 of the sum insured.

As property owners are not sufficiently influenced by their own interests to use effective means to check the fire waste, legislation should be enacted and enforced with a view to controlling the physical and moral hazards which primarily cause fires. The necessity for compulsory measures is shown by the futility of the numerous other expedients that have been tried.

Form of Legislation Needed

Existing conditions in Canada point to the need of legislation to especially deal with the following points:

1. The proper planning and laying out of cities and towns with a view to restricting industrial occupancies and hazardous pursuits to properly delimited areas.
2. Provision in every community of an adequate water supply and fire-fighting facilities proportionate to its character, area and population.
3. Minimum building requirements designed to give reasonable safety of life and property outside the limits of the larger municipalities where building ordinances are already in force.
4. Control of hazards attending the occupancy of buildings by requirements suppressing dangerous nuisances, such as the storage of explosives, combustibles, rubbish and ashes. All buildings to be systematically inspected to ensure the enforcement of rules for cleanliness and good housekeeping.
5. A fire marshal law in each province, providing for official investigation of the causes of all fires, with the object of suppressing incendiarism.
6. Enforcement of personal liability with heavy penalties in all cases where fire is occasioned by a breach of fire-prevention laws.

SETTLERS' PERMITS ON PRAIRIES

The permit system of regulating settlers' clearing fires has been instituted on Dominion lands in Manitoba and Saskatchewan. The administration, by special arrangement, is carried out by provincial officials.

Penny Wise, Pound Foolish

The operator of a coal mine on Dominion lands who looks to the future and mines his coal in a systematic manner carries on his operations at a higher cost than the one who takes the easiest available coal first, wasting that which is more costly to mine. This is true because a lease is granted to anyone desiring it and also because of the wide distribution of coal.

For instance, in a certain mine, owing to a great demand for coal, the directors instructed the mine-manager to produce an output greater than the development work justified. The mine-manager was forced, against his better judgment, to obtain the coal wherever he could. Some pillars were extracted and others were reduced to such dimension that they were not able to bear the weight of the superincumbent strata. As a result, there was

be achieved are well known and thoroughly understood. So far we have not been able to overcome official inertia and lack of appreciation of the necessities of the case.—*Sir Clifford Sifton, before Ninth Annual Meeting of Commission of Conservation.*

HAMMER AWAY AT FIRE LOSSES

It has been conclusively shown by the experience of England and other European countries that proper measures of fire prevention have immediately beneficial effects, but in Canada we have not taken any such steps. Losses do not diminish. They increase. During the four years from 1912 to 1915, the average fire loss was \$21,250,000 per annum. In 1916, the loss was \$25,400,000. The 1916 figure will be exceeded during the present year.

Fires are not gaining in frequency. The increased destruction is due to appreciation in values and to extensive fires. As an indication of the difference which

DRIVING HOME THE MEANING OF FIRE LOSS

CANADA'S fire loss in 1916, was \$25,400,000, and it will be greater this year. So vast is the amount that it is hard to realize its significance when stated in mere figures. Here are some other ways of stating it, which drive home its baleful significance:

The Canadian Government pays \$2,000,000 a month in separation allowances to soldiers' wives and dependents. The Canadian people burn property valued at \$2,250,000 a month.

Canada's annual fire waste is sufficient to pay 2 per cent interest on all the war loans floated in Canada and provide a sinking fund large enough to cancel the total indebtedness in 30 years.

One year's fire loss in Canada would purchase 12,000,000 bushels of wheat for our allies.

The value of grain and other agricultural produce burned in Canada in 1916 was equal to the average annual production of 1,500 hundred-acre farms.

Canada's fire loss in 1916 would have provided 3,500 aeroplanes or 25,000 machine guns or maintained over 20,000 men in the trenches for a year.

We have talked about the immensity of our fire losses for years. Isn't it time that laws were passed to reduce the waste? It can be done.

a "squeeze", the mine was badly wrecked and much coal has been lost.

It is time that the Dominion Government inserted provisions in its coal leases compelling economical mining. All other important coal-mining countries which dispose of coal-mining rights under a system of leasehold have found it necessary to prevent waste arising from the lessee sacrificing the public wealth for his private gain and to prevent waste due to injudicious mining.

Progress and No Progress

With regard to forestry, the various organizations at work have been successful in bringing about perhaps the greatest degree of improvement that is observable in connection with any department or branch of natural resources.

In the conservation of coal, which is one of the most important subjects, we can record but little improvement, though the means of improvement and the methods by which improvements can

exists in countries where proper precautions are taken, the total loss by fire in the whole of the United Kingdom, apart from fires caused by the enemy, amounted from August, 1914, to December, 1916, to \$41,000,295. During the same period, losses in Canada, exclusive of forest fires, amounted to \$52,027,000. These figures disclose a situation which calls for active and vigorous measures of prevention, and we shall continue to call attention to them until some steps are taken to apply a remedy.—*Sir Clifford Sifton, before Ninth Annual Meeting of Commission of Conservation.*

A COSTLY CURE

Four thousand two hundred men are employed by Canadian municipalities in waiting for fires to occur and then attempting to extinguish them. The cost of this service exceeds \$4,000,000 a year. This energy would be better employed if devoted to removing fire-breeding conditions and to enforcing proper regulations to prevent the occurrence of fires.

Will Soon Need All Power St. Lawrence Can Produce

Sir Clifford Sifton Takes Strong Stand on Export of Power

Twelve or fifteen years ago, it was not thought that the Hydro-Electric Power Commission could make use of 10,000 h.p., and accordingly, permits to export were more or less freely given. There is now, in round figures, an immediate demand for 300,000 h.p., and the demand cannot be satisfied.

A situation analogous to that in which Niagara power stood fifteen years ago now exists on the St. Lawrence river. A very large capacity for the development of power exists upon the St. Lawrence. There is a considerable development in the neighbourhood of Montreal, but the greater portion of the power still remains undeveloped. Attempts are constantly being made to fatally complicate the position with respect to St. Lawrence power by securing the privilege of private development which will be followed by contracts for the exportation of the power developed. I understand that the Cedar Rapids company exports something like 60,000 horse-power per annum.

An attempt was made some years ago to secure the privilege of developing the Long Sault power, the purpose being to export the greater portion of the power in the interest of a manufacturing corporation on the American side of the line. This project was defeated, largely through our efforts. A similar project is now being promoted, and we are resisting it with all our energy, and we trust with fair prospects of success. It is almost incredible that any responsible man should be so shortsighted as to favour this project in the face of the experience which we are now undergoing at Niagara. Within a very few years there will be a demand for every horse-power that can be developed on the St. Lawrence river to which Canada is entitled for use upon the Canadian side.—*Sir Clifford Sifton, before Ninth Annual Meeting of the Commission of Conservation.*

GETTING THE MOST OUT OF COAL IN BY-PRODUCTS

The by-products obtainable from coal are numerous and important, and the best authorities contend that it is unwise to burn it in the ordinary way. When burned under boilers to produce power, less than 15 per cent of the heat units in the coal is utilized. By low carbonization, the valuable light and heavy oils are obtained, the gas can be used to generate power and the residuum coke containing nearly all the original fixed carbon can be burned in the ordinary way to produce heat and power.

WEST NEEDS MORE RESERVES

Further extensions of the areas set apart in Western Canada as forest reserves are much to be desired. No such reserves have been made since 1913, though very considerable areas have been found upon examination to be chiefly valuable for forest purposes.

Develop St. Lawrence Power By International Commission

Chairman of Conservation Commission Enunciates Bold and Progressive Power Policy

The situation with regard to Niagara will undoubtedly be duplicated on the St. Lawrence, and if we are foolish enough to allow vested interests to be created upon the other side of the line, we shall inevitably find ourselves handicapped and embarrassed as we now are with respect to Niagara power. For myself, I have no doubt at all what ought to be done with respect to the great powers dormant in the St. Lawrence river.

Proposes International Development

The United States government is not interested in the corporations that are endeavoring to get possession of the St. Lawrence powers from the other side. Neither is the Canadian government interested in the fortunes of the gentlemen who are promoting their projects on the Canadian side. They are very few in number, and their interests are confined entirely to themselves. What the United States government and the Canadian government alike are interested in is that there should be a fair division of this power, that it should be developed in such a way that the neighbouring and tributary population should have the use of it upon fair terms. A thorough study of the whole question inevitably leads to the conclusion that there is only one sound and satisfactory method of developing these powers, and that is by an international commission, under which the greatest and the best use of the powers will be made, the most economical development will be effected, a just and equitable division of the power will take place and the governments concerned will be able to administer the power as the Hydro-Electric Power Commission administers the power of Niagara for the benefit of the people who are directly concerned in its use.

A Bold and Progressive Policy

This bold and progressive policy, if adopted by the government of Canada, will undoubtedly command the support of our people. It is not a case of advocating what is generally described as public or government ownership. We have here a peculiar set of circumstances giving rise to a problem that is capable of being solved in only one way, and common sense indicates that we should solve it in this manner.

Let me on this point add a word of warning. The institution of this Commission of Conservation arose as one of the consequences of a conference which was called by Mr. Roosevelt, then President of the United States, at Washington some time ago. At or about that time, Mr. Roosevelt pointed out in prophetic language how the people of the United States were being threatened with a water-power monopoly, and to the best of his ability he projected methods of resisting the efforts which were being made to bring about that monopoly. Since that time, water-powers have been monopolized in the United States to an extent that is almost incredible. I am

not at the moment able to give the exact figures, but I think that when the real figures are known, revealing the extent to which the available and easily developed water-powers of the United States have been monopolized by a very few corporations, the people of that country will suffer a shock such as they have never experienced before with regard to the transaction of any of their public business.

To Protest Private Development

It has become very plain within the last few years that hydro-electric power is the greatest of all factors in modern industry, and where any people endowed by nature with a vast supply of this essential element in modern manufacture, allow it to be monopolized and controlled in private interests, a sad awakening awaits them. Fortunately, in the Dominion of Canada, we got down to serious business in time, and there has been no serious monopolization of great powers. While large powers have been developed by private companies, they have served a very useful purpose, and in most cases their rates have been reasonable. A serious danger, however, would arise if, at that stage of development which we are now entering, these companies were allowed to combine their interests and by acquiring a few great powers which are easily accessible to in-

Rural School Teachers Help Better Farming Movement

The teaching of agriculture in the rural public schools of Ontario is optional with the teachers. In 1915, very few of the teachers in Dundas county, Ontario, where the Commission of Conservation is conducting illustration farm work, were giving instruction in agriculture. In 1916, it was being taught in 76 out of the 78 schools of the county.

Twenty-eight Dundas county teachers took the teacher's short course in agriculture at Guelph this summer. Thirteen was the highest number from any other county.

TEN YEARS' PROGRESS

The development of hydro-electric power in Canada, and especially in the provinces of Ontario and Quebec, during the last ten years has been almost incredible. At the beginning of the work of the Ontario Hydro-Electric Commission, the late premier, Sir James Whitney, stated the Commission would not require so much as 10,000 h.p. There is now, in round figures, an immediate demand for 300,000 h.p., and the demand cannot be satisfied.

WATER-POWERS OF CANADA

WITH coal at a high price and the prospect that we shall soon have to depend largely on our water-powers for heating our houses and running our railways, a reliable estimate of what our water-power resources are is of great value. The Commission of Conservation first published an estimate of this kind in 1911. Since then, it has conducted water-power surveys of British Columbia, Alberta, Saskatchewan and Manitoba, and has secured additional data on the powers in other provinces. It now submits the figures below as being the latest available.

PROVINCE	TOTAL POSSIBLE	DEVELOPED
	H. P.*	H. P.
Ontario	5,800,000	700,000
Quebec	6,000,000	640,000
Nova Scotia	100,000	26,000
New Brunswick	300,000	15,000
Prince Edward Island	3,000	500
Manitoba		76,000
Saskatchewan	3,500,000	10
Alberta		33,000
Northwest Territories		Nil
British Columbia	3,000,000	250,000
Yukon	100,000	12,700
Total for Canada	18,803,000	1,813,210

*The figures in this column are given with much reserve since it is practically impossible to arrive at exact amounts for any country. In addition to detailed surveys and flow records, such factors as artificial storage, economic land to be developed and kind of industry to be established all vary the estimates for each individual site.

stitute a monopoly. This would be the most serious of all mistakes and must be prevented at any cost.

With respect, specifically, to the application which is now before the Minister of Public Works for leave to dam the St. Lawrence river at the Coteau rapids, I purpose suggesting that our Committee on Waters and Water-Powers should give the matter attention, and, if possible, wait upon the Minister of Public Works and the Prime Minister to emphasize the protest which has already been lodged.—*Sir Clifford Sifton, before sixth Annual Meeting of Commission of Conservation.*

DAMS GIVE 430,000 H.P. EXTRA

The water-power interests have been greatly benefited by the conservation dams completed in 1915 on the Upper Ottawa to regulate the flow of that river. The reservoirs can supply an additional flow of 10,000 cu. ft. per second, thus increasing the total power possibilities between Mattawa and Carleton by some 400,000 h.p., while at Ottawa alone, where the water is being fully utilized, the increase is approximately 30,000 h.p.

Commission Will Undertake Forest Survey of Ontario

Will Follow Same Method as in Other Provinces—Ontario Government to Co-operate

The Commission of Conservation hopes to be in a position soon to undertake a survey of the forest resources of Ontario, similar to the investigations it has already made in British Columbia and Saskatchewan, and somewhat similar to that made of the forests of Nova Scotia by the Government of that province and the results of which were published by the Commission. Only the most fragmentary data respecting the forests of Ontario are now available, although there is a vast amount of detailed information with respect to specific localities in the possession of timber owners, government officers and railways, which could probably be secured the same as similar information was secured in the British Columbia and Saskatchewan investigations, *i.e.*, under a pledge that only totals and averages by large areas would be published.

The difficulty in undertaking such an investigation now, exceedingly valuable though it would be, is the small appropriation which the Commission receives and the scarcity of competent foresters. The Ontario Government has assured the Commission of its hearty co-operation.

Cutting Operations Not Controlled by Foresters

Curious to relate, the Dominion Forestry Branch, a well-qualified technical organization, has no administrative control over cutting operations on licensed timber berths on Dominion lands. It would appear from Section 58 of the Dominion Lands Act that jurisdiction in such matters was conferred on the Dominion Forestry Branch. However, this provision has never been made effective as to licensed Dominion timber lands. Cutting on these lands is thus allowed to take place without due regard for the interests of the future, which demand that operations be conducted in such a way that the forests shall be perpetuated. The Dominion Government can take but partial credit for the practice of conservation upon its forest lands as long as this condition is permitted to continue.

FOREST SCHOOL NEEDED

At the previous annual meeting of the Commission of Conservation, the urgent need for a forest school in the University of British Columbia was referred to. It is gratifying to note that the university authorities have definitely decided to establish such a school, although action is deferred because the intended head of the school is engaged on an exceptionally urgent war work.

A timber testing plant is needed in British Columbia. Just now such a plant could render very useful service in testing the spruce being purchased there by the Imperial Munitions Board for airplane manufacture.

Takes Over 30 Years to Reforest Pulpwood Areas

Investigation Shows Current Ideas Have to be Revised—Hardwoods Crowd Out Conifers

The Commission of Conservation has been investigating the reproduction and growth of pulpwood species on cut-over areas in the St. Maurice valley, Quebec, with a view of determining what technical measures are necessary to perpetuate the vast pulpwood forests of Eastern Canada. Although the investigation is only in its early stages, some startling facts have already been revealed. It has been the opinion of lumbermen that the spruce and balsam on these heavily cull lands could be cut over every 20 years and the same amount of material obtained as before, but the investigation clearly demonstrates that, henceforth, a period of from 30 to 60 years must elapse between such cuttings if these pulpwood species are to be perpetuated.

Another interesting fact brought out is that two-thirds of the stand on these areas is hardwood. As little of this is cut, whilst the pulpwood species such as spruce and balsam are being regularly exploited, the problem of securing a market for the hardwoods, especially yellow birch, becomes pressing. If the pulpwood species are cut regularly as now, the hardwoods will soon monopolize the light and air of the forest and prevent the growth of the young spruce and balsam.

HOPE OF AGRICULTURE LIES IN CO-OPERATION

Without it Advance Cannot be Made Beyond a Certain Point

I maintain the very strongest belief that through the work of the Commission of Conservation illustration farms in Dundas county we shall in the course of a few years be able to point the way to permanent improvement of agricultural conditions in Ontario. The basis of all such improvement must be co-operation amongst the farmers themselves for scientific instruction in regard to the best methods of improving production. Success depends upon the appreciation by the farming community that improvements depend upon themselves, and that, given the necessary scientific aid and instruction, they must themselves co-operate and carry on the work in the same manner as men engaged in any other line of business.

The unfortunate feature of farming in Ontario, and in Canada generally, has, so far, been that each individual farmer has jealously regarded himself and his farm as a unit separated from the rest of the community and to be managed without any reference to the views or interests of any other person. As a result, we have found that agriculture can only advance to a certain point. Then progress ceases, and for some years past, in the Eastern provinces, agriculture has been at a standstill, if it has not retrograded.

The problem of supplying and handling farm labour, of securing proper

scientific instruction, of improving knowledge of gardening methods, of insisting on proper teaching of agriculture in the schools, of proper study and development of the stock industry as applied to the particular locality, are all questions which can only be solved by co-operation amongst the farmers themselves. Lastly, the fundamental questions of co-operative buying and co-operative selling are those which furnish the solution for the most serious difficulties with which isolated farmers have to deal. It is my hope that the full development of the idea which we are applying in the county of Dundas may have most important practical results.—Sir Clifford Sifton, before Ninth Annual Meeting of Commission of Conservation.

CANADA INTRODUCES NEW IDEA IN SHELL-MAKING

An interesting development has taken place with respect to steel for shell-making, which has an important bearing on conservation. At the beginning of the war, all shells manufactured in England were made from acid steel. Practically all steel made in Canada was basic steel. The Canadian steel manufacturer had never made shells. It was not absolutely certain that they could meet the requirements of the War Office and changing from the manufacture of acid to basic presented many serious difficulties.

Col. Cantley, with whom the first shrapnel-shell order was placed, made a basic steel shrapnel shell that met the War Office requirements and thus demonstrated its practicality. In December, 1914, Col. Carnegie, Ordnance Advisor to the Imperial Munitions Board, took to the War Office the first machined shell ever made in Canada.

Later, he was able to convince the War Office that high explosive shells made of basic steel would also meet their requirements. These munition orders have tremendously stimulated the metal and many other industries, notably the recovery of by-products from the coke oven plants. Incidentally, also, we have derived great benefit from the standardizing of methods and processes and the high degree of skill required to produce a product that is gauged to within one three-thousandth part of an inch and check gauged to one ten-thousandth part of an inch. Over 250,000 workers have become skilled in such processes and in the use of such tools and gauges.

LARGEST FIRE PROTECTION SERVICE ON CONTINENT

Ontario Enjoys This Distinction—Service Has Been Entirely Re-organized

Ontario has the largest forest fire protection organization on the continent. Last year, at the height of the fire season, its staff consisted of about 1,000 men. With the appointment of E. J. Zavitz as head of the forest service, a new era has begun in the protection of the forests of the province against fire. The Forest Fires Act has been remodelled along modern lines, a forestry branch in charge of technically-trained men has been organized, generous appropriations

have been made by the legislature, whilst the co-operation of timber owners has been further stimulated by the imposition of a fire tax to help cover the cost of protecting their limits.

As for mechanical equipment, five automobile trucks with fire-fighting equipment have been provided for districts where roads exist. Some 625 miles of old trails and portages have been cleared out, 60 miles of new trails and portages built, 85 look-out towers have been erected, 45 miles of telephone line constructed, and the permit system of regulating settlers' clearing fires, which has long proved so effective in Quebec, has been put into effect with splendid results. Altogether, such a reformation has been made as a year ago could scarcely have been dreamt possible.

Farm Book-Keeping

Only one per cent of the farmers of Dundas county, where the Commission of Conservation is conducting illustration farm work, were found to follow a satisfactory method of farm accounting. A proper system has been installed on each of the illustration farms selected by the Commission, which will show where profits are made and where losses are incurred, and will be valuable and educational to the rest of the community.

ALBERTA NEEDS PERMIT SYSTEM

In the past season a number of serious forest fires have occurred from the spread of settlers' clearing fires in Alberta. A revision of the Prairie Fires Ordinance, which does not fit the conditions in the forested northern portion of the province, is urgently needed. In all the other forest provinces of Canada, the permit system of regulating settlers' clearing fires is wholly or partially in effect and is giving most gratifying results. Alberta would benefit greatly by falling into line.

AN INDEX OF PROGRESS

One hundred and fifty trained foresters are in the employ of governments and private corporations in Canada. As 73 forestry students have enlisted, there would have been over 200 foresters in Canada, but for the war. Seventeen years ago, when Sir Clifford Sifton, as Minister of the Interior, established the Forestry Branch, there was not known to be a single technically-trained forester in Canada.

GREATEST FISHING LOSS

Destruction of the salmon-spawning run in the Fraser in 1913 by a rock slide from the C. N. R. right-of-way is the greatest disaster recorded in the history of the fishing industry of the world. The loss to British Columbia in 1917 alone is in excess of \$8,000,000, and that of the state of Washington exceeds \$19,500,000, a total loss to the packers of that district of \$27,500,000.

Development of the Land Must be More Intelligent

Conservation of life not only means the saving of lives to the nation that are now being lost or made less efficient by avoidable causes; it means the development of life through improved training and environment and better opportunity, by the increase of skills labour, the better education of the population, and the reduction of waste-ful speculation. Production and wealth may be enormously increased without adding to our liabilities by borrowing new capital, and without, of necessity, adding to the mere quantity of the population by means of immigration. Those who desire a return of the kind of prosperity that is produced by forced growth of population in order that it may be exploited for speculative purposes are either unparitric or ignorant of the folly of their methods to promote national well-being. It is of course undesirable to encourage immigration of the right kind and subject to the proper regulation and planning of land settlement; but it is paramount that new settlers should be placed in positions where they can produce under sound economic conditions, and where their children may obtain adequate training in healthy surroundings.

We contend that the planning and development of the land as the chief source of primary production, and as an important factor in housing and industrial settlement must be dealt with more intelligently and on sounder principles, as a first consideration in connection with the above matters. But perhaps the greater need is for intelligent guidance as to how to achieve these results rather than as to the desirability of achieving them. The chief duty of the Commission of Conservation and its officers lies in giving this guidance, although our efforts are necessarily inadequate, because our means and equipment are far from being proportionate to the size of the task to be performed.—Thomas Adams, before Ninth Annual Meeting, Commission of Conservation.

Conservation Notes

The largest reserves of coal in Canada are situated in Alberta, Saskatchewan and British Columbia.

At least 70 per cent of all fires in Canada is believed to originate from some form of carelessness and neglect.

The gradual exhaustion of the anthracite coal resources of the United States means a higher price each year for the class of coal.

It is hardly possible to realize the amount of knowledge of proper gardening methods which exists among the farming population of certain portions of the country.

No more water-power development should be allowed on the St. Lawrence river until a power survey has been made of the river and a comprehensive law worked out for power development of the whole waterway.

**Commission of Conservation
CANADA**

SIR CLIFFORD SUTTON, K.C.M.G.
Chairman
JAMES WHITE
Assistant to Chairman and Deputy
Head

CONSERVATION is published the first of each month. 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 town-planning and public health.

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OTTAWA, DECEMBER, 1917

CONSERVATION AND PATRONAGE

It is doubtful if the people of Canada would have tolerated the patronage system as long as they have, had they fully appreciated the tremendous loss in dollars and cents which it was inflicting on the country. No one not in close touch with the public service can realize how great the loss has been.

Recently, a Canadian weekly, in referring editorially to the millions of dollars' worth of timber destroyed by forest fires, asked why government officials in charge of fire-protection services throughout Canada were not dismissed because of inefficiency in coping with the forest fire problem, pointing out that a private corporation would soon 'fire' the head of a department who could not produce results. This journal, however, overlooked the fact that most heads of fire-protection services in Canada have had to fight the patronage evil as well as forest fires. Hardly a year passes in which instances have not come to the notice of the Commission of Conservation where valuable forest property has been destroyed because a ranger or some other official had received his appointment because he was a politician and not because he was a competent forester. Is it just that the public should hold a fisheries official responsible for the depletion of certain fisheries when the assistants they give him are more interested in catching votes than fish-breakers? The secret of efficiency in public administration as well as in private business lies in securing the best-qualified, highest-salaried heads of departments obtainable, giving them a free hand and holding them strictly accountable for results. So long, however, as incompetent help is foisted upon them, good results cannot be expected.

The patronage evil is one of the most insidious enemies against which the conservation movement has had to contend, and the announcement by the new Union Government that it intends to abolish the last vestige of it from the Do-

minion public service is therefore of the highest importance to conservationists. The United States has found the merit system a good investment. British Columbia has adopted it and it is gradually making its appearance in the forest services of some of the other provinces. The time should soon be at hand when the people of Canada can, with justice, expect, and should, with public spirit, demand, a higher degree of efficiency from government departments.—M.J.P.

OUR ANNUAL MEETING NUMBER

To give our readers in brief, readable form an idea of what has been accomplished in the past year, and also of what is still to be done towards the conservation of our natural resources, we are making this issue of *Conservation* a special Annual Meeting Number and doubling its size. Much of the additional information it contains was laid before the Ninth Annual Meeting of the Commission, held at Ottawa on Nov. 27 and 28. It is presented here in condensed form for the benefit of the busy man who cannot spare the time to read lengthy reports, and also for the use of newspapermen who desire short, pithy paragraphs for use in their columns. Should the latter desire a second copy for reference purposes, it will be gladly sent on request.—M.J.P.

UTILIZING THE WOLF-FISH

The wolf-fish or sea-eat is a fish that Canadians as yet have not utilized. There are two forms of this fish, *Anarhichas lupus* and *A. latifrons*, the latter the more northerly form. The fish run from fifteen to fifty pounds in weight, are long but not exactly eel-like, and are quite big and heavy, with perfectly white flesh, whiter than halibut, and flaky and delicious. Thirty years ago a Scotch fisherman told me that he had eaten it and it was the best fish that swam. No one who has eaten it will deny that it is very superior. Great quantities of it are caught on our coast and thrown away. Once, when at Clark Harbour, Nova Scotia, I saw a number of them lying on the wharf, as they were considered absolutely of no value. They are exceedingly good fish. In the British market—the most particular market in the world—the wolf-fish is now being sold with the head removed, and probably is called a 'very superior cod.'—Dr. E. E. Prince, in 'Fish, Birds and Game.'

The United States Bureau of Fisheries has announced that the meat of whales and porpoises is suitable for human consumption. In texture and appearance it resembles beef, though a darker red, and is devoid of all fishy taste.

**OVER TEN THOUSAND
FORESTIERS OVERSEAS**

Four forestry battalions have been raised in Canada and have proceeded overseas, in addition to one battalion converted on arrival in England, and about 4,500 men supplied from drafts from various parts of Canada. All told, the number of men in Canadian forestry battalions totals more than 10,000, besides a large number of men already overseas who were formed into forestry companies. All the forestry battalions have been combined into a corps, into which reinforcements are drafted from the medically unfit infantry.

While exploitation and not conservation was the object of these organizations, it is interesting to note that a number of Canadian foresters employed their technical knowledge, in Great Britain at least, in constructing volume tables, estimating and appraising timber, measuring materials and even making forest descriptions and growth studies.

In the United States, a forestry regiment has been organized as a result of co-operation between the Forest Service and the War Department. About one-half of the officers are technically-trained foresters, of whom a very large proportion are present or former officials of the Forest Service. This regiment has now proceeded to France, for service behind the British lines in supplying the necessary timbers for military purposes. Other similar regiments are being raised, and will be officered by foresters and lumbermen.

Plans are already being laid, it is said, for a very extensive campaign of forest planting on non-agricultural lands in the British Isles after the war. Unquestionably, a very extensive programme of reforestation will also be necessary in France.—C.L.

How to Economize Bread

(Continued from page 45)

one part cornmeal to two parts wheat flour. Buckwheat flour combines well with wheat flour in any proportion. Soybean meal and cotton-seed meal are both useful in small amounts.

Potato flour, such as has been used abroad, is not generally available in our markets, but boiled mashed potatoes may be substituted for slightly less than half the flour. Boiled rice may also be used with flour in about the same proportion.

Equal measures of cooked bean pulp and flour are satisfactory in muffins.

Commissioner C. J. Yorath, of Saskatoon, suggests that municipalities be compelled to invest their sinking funds in Dominion Government securities yielding not more than 5 per cent interest.

**Making Rural Life
More Attractive**

**Analysis of the Problem of Keeping
Farmers on the Land**

To keep the farmers on the land when they get there has become a greater problem than that of first attracting them to the land. They are said to be leaving the land in thousands at the present time, and we are told that millions of acres of land, which had been occupied at one time, are now deserted, and that the present system of land settlement is productive of much poverty and degradation.* Whether these statements are exaggerated or not, the fact that they are made by responsible people indicates a state of affairs that demands a remedy. Why do men now hesitate to go on the land in the first place, and find it unattractive to stay in the second place? Why do women stay away, with the injurious consequences to rural life which is caused by their absence? The three outstanding reasons are:

First, the numerous ills caused by the holding of large areas of the best and most accessible land by speculators and the want of proper plans for the economic use and development of the land.

Second, the compelling social attractions and the educational facilities of the cities and towns, and,

Third, the lack of ready money and of adequate return for the labour of the farmer, because of want of co-operation, rural credit and of facilities for distribution of his products.

To secure any real improvement in rural life and conditions we must try to bring tracts of land held for speculative purposes into use, prepare development schemes of the land in advance of settlement, try to take care, at least, of the social and educational facilities of the cities into the rural areas, and, simultaneously, provide the co-operative financial and distributive conveniences that are necessary to give the farmer a larger share of the profits of production. —From *Rural Planning and Development*.

*Millions of acres of land homesteaded in Western Canada have been abandoned by men who failed as farmers.—Farmers' Advocate.

NEW VARIETIES OF APPLES

New varieties of apples are obtained by sowing seeds of cultivated varieties. Seeds from such fruit are more variable than those from wild trees, and, consequently, more likely to give desirable offspring. This operation is one of chance. Frequently, thousands of seedlings are grown without producing one valuable tree. The apple has passed through many changes. The majority of our cultivated varieties originated from seedlings found in America.

How to Conserve Supply of Gasolene

Supply is Failing to Meet Heavy Demands. Practical Methods for Motorists

About 29 per cent of the gasolene we use is produced from Canadian crude oil, while the remainder is either imported or is produced from imported crude oil. For both petroleum and gasolene we are largely dependent upon the United States. There, the consumption of gasolene is greater than the production, the excess being drawn from the surplus production of earlier years, and the greater demand, for war purposes, in 1918, will inevitably result in a greater consumption than formerly. At the same time, while the production of gasolene in the United States in 1917 will probably be less than in 1916, it is estimated that the consumption this year will exceed production by 60,000,000 barrels. This enormous deficiency must be drawn from the surplus of 150,000,000 bbls. that was in storage on January 1st, 1917.

In view of this situation and its effect on Canada, together with the necessity for conserving gasolene for war purposes, it behooves us to prevent waste, or needless use, to encourage the use of substitutes, and, if economically possible, to develop the oil shale industry in Canada. One-half of the gasolene used in the United States is used in pleasure riding, and doubtless the same proportion holds good in Canada.

To economize gasolene, the Director of the United States Bureau of Mines suggests the following to automobile owners:

(1) Do not allow your engine to run idle; (2) Use kerosene, not gasolene, for cleaning purposes in the garage; (3) See that the carburettor does not leak, and form the habit of shutting off the gasolene at the tank; (4) By judicious regulation of the mixture of gasolene and air in the motor, both greater power and economy of fuel may be obtained. Automobile owners need not lay up cars, but should use them either for trade or pleasure purposes thoughtfully and judiciously.—W.J.D.

CANADIAN DESIGNS FOR INDUSTRIAL PURPOSES

The war has cut off the supply of designs from Europe on which Canadian manufacturers depended and the Geological Survey is making an effort to develop a distinctively Canadian productive art, using as a basis the designs of Indian pottery, and also designs from our fruits, leaves, fossils, flowers and animals. Various museums scattered throughout Canada

furnish a wealth of material from which to adapt designs and manufacturers are taking a keen interest in the movement. There are 175 Canadian industries using ornamental designs in the manufacture of their products. Some of the products in which these designs figure most prominently are rugs, pottery, china, book covers, wall paper, fountains, lace, embroidery and jewellery.—Harlan I. Smith.

Danger from Fire In Picture Theatres

Nearly One-Third Are Of Frame Construction. Conditions Are Being Bettered

During the last five years, the moving picture theatre has become one of the leading sources of amusement. It is estimated that more than 500,000 people attend such theatres every day, and it is important, therefore, that every possible precaution be taken to ensure their safety. As a rule, women and children largely predominate in the audiences, and, in the event of panic, the danger is, therefore, at a maximum.

Over 29 per cent of the existing moving picture theatres in Canada are of frame construction. In 92 cases, families are living above theatres with stairways as the only means of escape in the event of fire. The actual figures are given in the table below.

The existence of so large a percentage of frame buildings is starting when the hazards connected with moving picture theatres are considered, but the fact is capable of simple explanation. While the moving picture business was still in the experimental stage, promoters were uncertain as to the profits that might be expected, and hence they were unwilling to risk large sums of money in sound construction. Many theatres were erected hastily and cheaply, and, in some cases, with little consideration for the question of safety. At the present time, statutes regulating the construction of theatres and providing for the safety of the patrons are in effect in all the provinces in Canada, and these are supplemented by municipal ordinances.—J.G.S.

STEEL PRODUCED FROM HYDRO-ELECTRIC ENERGY

The electrical production of such products as fine steel, calcium carbide, carborundum and other substances requiring high heat, is growing, and will undoubtedly utilize an increasing share of the electric energy derived from Ontario's water-powers.

The high prices now prevailing for coke and coal and for steel products make the electric furnace very attractive, and there is every indication that electric steel production in Ontario will grow rapidly during the next year or two. It is anticipated that the electric furnace will not only be applied to the production of high-speed tool steels, but that it will also be used to smelt the coarser grades now produced in the open-hearth furnace. There is also every indication that electric smelting of iron, copper and other ores will be an important factor in the mining districts of the province.

The British Forgings, Toronto, has installed ten electric furnaces of a capacity of 6 tons per heat each, or an annual capacity of 72,000 tons. This is the largest electric steel plant in the world, and uses electric energy generated at Niagara Falls. This, therefore, furnishes an additional reason why our water-powers should be kept under public control to ensure power to industries at the lowest possible cost.—L.G.D.

Conservation Defined

Conservation means the greatest good of the greatest number and for the longest time. It requires the right thing to be done at the right time in the right manner by the right person and brings the right result.

It must be regarded from a national viewpoint. The individual, through ignorance, does not usually conserve natural resources, hence needs education to discover many new ways of conserving all natural resources, including the human, to greater degree than now.—President Van Hise, University of Wisconsin.

MOVING PICTURE THEATRES IN CANADA

Cities and towns	Brick theatres	Frame theatres	Dwellings over theatres
Exceeding 10,000 population	338	27	26
5,000 to 10,000 population	59	31	15
1,000 to 5,000 population	115	109	27
Under 1,000 population	28	57	24
Total	540	224	92

Problems in Using Low-Grade Fuels

High Price of Better Grades of Coal Compel Use of Lower Grades

The plants in Canada which are steam to generate electric energy are faced with difficulties owing to the present high prices and poor delivery of the grades of coal which heretofore have been most popular for steam-producing purposes. The problem is not so much to secure the largest number of kilowatt-hours per pound of coal as to determine the fuel that can be utilized without making any major changes in the existing equipment, and to provide for its continuous delivery. Many other industries besides electric plant could profit by ascertaining the low-grade fuels available for the use, and, if necessary, so modifying their equipment that they could use it.

Many types of low-grade fuels being successfully burned, such as soft coal with high ash content, bone coal, culm, lignite, etc. Before changing to the lower grade of coal, however, each company should first determine the method whereby they will solve the problems involved in utilizing it. These problems include a reduced steam output from the same grate surface, additional moisture in fuel, clinkers, draft and the fuel of firebrick.

Electric companies now using lower grades of fuel than heretofore find it advantageous to cooperate with the mines in securing a full supply of coal in the summer when the mines have an ample supply on hand and the railways are in the best position to handle it.—L.G.D.

WAR HAS DEVELOPED MOLYBDENUM PRODUCTS

The demand for molybdenum in use in the manufacture of special steels has greatly stimulated prospecting and development of molybdenic resources. Numerous discoveries have been made which vary in importance from minor mineral occurrences to deposits which have already given considerable production. The most important deposit yet proven is the near the village of Quyon, Quebec.

The Federal Department of Mines has done much to encourage the concentration of these ores. After trial shipments had been made for test runs in the United States, the ore from Quyon was principally sent to the concentrating plant of the Mines Bureau. The company has recently completed a concentrating plant and take care of their output.