

Canada's Supply of Coal

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briquettes from mines in British Columbia, Alberta and Saskatchewan. But this does not apply to the Province of Ontario, and for economic reasons stated before, Nova Scotia coal cannot find a market in Ontario.

Peat as a Substitute

The other sources of heat, light and power are peat, wood and hydro-electric power. Of these, peat and hydro-electric power only can be considered as substitutes for coal. With regard to peat, the Mines Branch of the Department of Mines has demonstrated the fact that peat can be successfully and economically used for fuel and power purposes. Estimating the cost per ton of peat at the bog, \$2.00, and the cost of soft coal \$14.00 per ton, in car lots f.o.b., the fuel cost per brake horsepower year (3,000 hours) would be as follows:

Peat producer gas plant* . . . \$7.50
Coal producer gas plant 9.00
Steam plant 36.00

Mr. B. F. Haanel of the Mines Branch, in commenting on the foregoing, states that when peat is manufactured on a large scale with machines provided with mechanical excavators and other labour-saving devices, the cost per ton of peat at the bog will be considerably less than \$2.00.

While power generated from peat may be successfully used in certain localities in different parts of the country, owing to the low cost of hydro-electric power and the abundance of water-power, the chief substitute for coal which will make Ontario almost entirely independent of United States coal, will be hydro-electric energy. The Hydro-Electric Power Commission has done much to further the use of hydro-electric power by distributing this power to different centres, and vigilance must be exercised to see that the sources of this energy are not disposed of in such a manner as to deprive the people of power at reasonable rates.

*Paper by B. F. Haanel, *Journal of the Canadian Peat Society*, No. 1, page 11.

Protest Against Chicago Diverting Water From the Great Lakes

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treat to the sea. Every inch subtracted from the available depth represents a loss of cargo capacity and a loss of income that is aggravated in low-water years such as 1911.

Lessens Power at Niagara

The Commission contended, that every cubic foot of water abstracted at Chicago, would reduce the amount of power that could be generated at Niagara falls and in the rapids of the St. Lawrence river.

This would injure the provinces of Ontario and Quebec, and the state of New York. The Chicago Drainage District contemplates using the water diverted from Lake Michigan for generating power near Chicago, but this would involve an economic waste, because of the lower head available there. The amount of water used to produce one horse-power at Lockport, Ill., would generate from 5 to 7 horse-power at Niagara.

Diversion Not Necessary

It was further contended that Chicago did not need, for sanitary purposes, the amount of water she was asking permission to divert. The charter of the Chicago Sanitary District provides for a dilution of the sewage effluent of 333.3 cubic feet per second for every 100,000 of population. This is double the dilution considered necessary by the British Rivers Pollution Commission. The Commission of Conservation held that Chicago should be compelled to treat its sewage to reduce the bacterial content before emptying it into the Drainage Canal. With a bacterial reduction of one-half, the present permitted diversion of 4,167 cubic feet per second would provide for a population 600,000 greater than the present one of 2,183,283. A bacterial reduction of two-thirds would suffice for a population of 4,157,000 people. The additional diversion, therefore, could not be said to be needed for sanitary purposes.

Power Development

As a matter of fact, the promoters of the Chicago Drainage Canal have not been backward in stating openly that they intended to develop and sell power from the Drainage Canal to reimburse themselves for expenditures made. Lyman E. Cooley, late Chief Engineer of the Sanitary District and one of the principal promoters of the project, declared it was his "hope and intention" to excavate a channel having a capacity of 16,067 cubic feet per second, and this he estimated "will produce 173,000 horse-power, and with the revenue therefrom, the State of Illinois proposes eventually to recoup itself for its expenditures and contribution to the deep water-way." From this it would seem that the present application was only the beginning of the demands for permission to divert more and more water.

The Commission of Conservation argued that this diversion, for the purposes of water power development, of waters, belonging essentially to international boundary waters, could not, on the ground of international law, be justly sanctioned.

Concluding the protest says: "The Executive of the Commission of Conservation expresses the opinion that the application is without even the semblance of necessity, and desires to place on record its unqualified opposition to the proposition which is before you."

Retaining the Fertility of the Soil

Investigation Shows Yields are Decreasing—Crop Rotation Will Help to Increase Them—What English Experiments Show

The most important source of this country's wealth is in her soils. Upon their continued productiveness will depend in large measure, the density of our population and the future welfare of the people. If they are maintained in fertility, the coming generations will be prosperous; if they are depleted by unwise soil management, it will bring disaster to great numbers of people. Unfortunately, the present methods of soil management on many of our farms are not maintaining the fertility. They are exhausting it. In the Prairie Provinces the single cropping system to a large extent prevails. Grain follows grain, with little or no thought of the effect upon the soil.

Yields in Manitoba

This excessive cropping to grain robs the soil of the available plant food, and surely and steadily diminishes its productiveness. A very good example of this was brought out by the Agricultural Survey of the Committee on Lands of the Commission of Conservation, in 1911. In Manitoba, one hundred farms in three representative districts were visited. In comparing the yields of to-day with those of ten and twenty years ago, it was found that not a single farmer reported an increase but that 46 per cent. reported their yields to be 11 per cent. less than ten years ago and 50 per cent. reported their yields to be 14 per cent. less than twenty years ago. Nearly every farmer visited in Manitoba stated that the farms were not giving the yields they did or should.

Bad Crop Systems

In the older provinces there are very few who are following a systematic rotation of crops. The tendency is toward a system having too many years of hay and pasture in it with not enough roots or other hoe crop. Grain followed by hay and pasture for from six to eight years is the system too often followed. This long grain, hay and pasture rotation, where the hay is sold, does not maintain the fertility of the soil and has the additional disadvantage of allowing noxious weeds of all kinds to make great headway.

It is, of course, true that many men who are following a rational system of crop rotation and live stock feeding are maintaining the fertility of the soil and, in some instances, are increasing it; but these men are few in comparison with the number whose soils are diminishing in productiveness.

There are two principal ways in which our soil is being abused. The first is by the use of the single-cropping system of grain after grain, and the neglecting to fertilize the soil by some wise means. We may

well include under the single-cropping system the long-course rotation of grain followed by hay for many years. The two principal remedies for these abuses are the systematic rotation of crops, and the paying of proper attention to the production, care and use of manures and fertilizers of various kinds.

Rotation of Crops

Rotation of crops means that the crops grown on each field are changed from time to time, so that there will be a succession of crops which will regularly repeat itself each time the course is run. It is desirable to arrange the rotation so that the same land will not have the same crop twice in succession.

All crops do not use the same amount of the various plant foods found in the soil. Some are shallow feeders; some are deep feeders. Some crops use up the nitrogen in the soil, while others have the power to store up nitrogen in the soil.

In the experiments at Rothamsted, England, conducted by Lawes and Gilbert, potatoes were grown on a piece of land continuously for a long series of years, until it finally refused to produce potatoes. But when it was sown to barley it yielded a crop of seventy-five bushels to the acre. This was probably because different plants select different food from the soil. Potatoes are potash-lovers, and in the years they had so reduced the potash content in it that potatoes could no longer be grown; but there was still enough to produce a fine crop of barley, the food requirements of which are very different.

The foregoing clearly illustrates one of the great essentials of crop rotation, namely, the planting of crops that feed on different food. Another essential is the planting of crops that will allow or assist Nature to repair her waste places. An example of this is to be found where continuous wheat crops have to a large extent, exhausted the nitrogen. The soil will no longer give satisfactory yields of wheat, but will grow a leguminous crop, such as cowpeas, beans, or clovers, which does not require as much nitrogen as the wheat, and which also has the power to get it for itself from the air and store it in tubercles on its roots for the benefit of succeeding crops.

EDITOR'S NOTE: The specific benefits and advantages of a systematic rotation of crops will be dealt with in subsequent numbers. In the April issue the subject will be Crop Rotation in Relation to the Control of Weeds.