The railways of Ontario also are entirely dependent on imported coal.

## Preparation of Lignite and Peat for Economic Utilization

The utilization of certain of the lignites for some purposes is possible without any subsequent treatment. With others, however, notably those of Saskatchewan, the lignites as mined are not suitable for use. This is due to the physical and chemical properties peculiar to this type of fuel.

Lignites usually contain large quantities of moisture, ranging from 16 to 35 per cent. of the weight of the fuel, and the evaporation of this moisture, whether by natural or artificial agencies, results in the disintegration of the fuel. This disintegration, however, does not discontinue when the evaporation of the moisture is complete, but appears to go on indefinitely.

One more peculiarity must be mentioned, viz., the dangerous sparks emitted from the stacks of locomotives when lignite is burned. These sparks, when they emerge from the stack, burn with a small flame and this flame is not extinguished by its passage through the air, as is the case with bituminous coal or anthracite coal sparks, but continues to burn after lighting on the ground. On account of this dangerous property, lignites cannot be safely burned in locomotives.

Lignite, unlike the true coals—bituminous and anthracite—lacks definite structure. (This term is employed in its physical sense.) To this may be attributed the reason for the difficulty with which lignites submit to mechanical treatment.

The characteristics of lignites must be altered before they can be converted into a satisfactory fuel. Experiments on a commercial scale have demonstrated beyond doubt the fact that our lignites cannot be briquetted in the raw state with or without the addition of a binder. Briquettes made in this manner appear, on casual examination, to be entirely satisfactory, but when submitted to a water test, or when burned, they will invariably disintegrate.

The characteristics of a lignite are changed by carbonizing it at low temperature. During this process, the moisture and volatile matter are completely distilled off, and there remains in the retort a residue composed of practically pure carbon. This residue is then mixed with a suitable binder, and briquetted. In order to render this briquette waterproof, a second heat treatment, or baking, is necessary. A fuel entirely satisfactory in every way, waterproof, capable of resisting disintegration when exposed to the weather, standing rough handling without breaking, not emitting flaming sparks, and capable of maintaining its physical structure or shape under the action of heat until completely consumed, has been produced by such a process. In order to demonstrate that this process will solve the problem in connection with our western lignites, it is advisable to erect a commercial plant capable of producing one or two hundred tons of lignite briquettes per day. Such a plant would have to be equipped in such a manner as to allow of a certain amount of experimental work being performed, e.g., in connection with binders.

I am of the opinion that it would require only a comparatively small amount of money, *i.e.*, compared with the immense value which the solution of this vitally important problem would be to the country—to successfully demonstrate that the lignites of the west could, by means of such a process, be converted into a fuel entirely satisfactory for domestic and industrial purposes. The establishment of briquetting plants at strategic points throughout the lignite provinces of the west would very greatly help in reducing our dependency for fuels on other sources. While a domestic fuel is, of course, of first importance, lignite briquetting industries would prove also of great value to the railways traversing the lignite belts. It would even be within the realm of possibility to economically supply at least a portion of the province of Ontario with this class of fuel.

The only remaining low-grade fuel to consider is peat.

## Peat Fuel

The exploitation of our peat resources for the manufacture of a' fuel does not involve any research work or experimentation. An economic process for the manufacture of raw peat into an excellent fuel suitable for domestic and, to some extent, industrial purposes, is in use to-day, and has been employed for many years in the peat-using countries of Europe. There is a flourishing and extensive peat industry in several of the European countries, but, in Canada, a country possessed of magnificent peat resources, and dependent to so large an extent on foreign supplies of coal, no peat industry exists. This deplorable state of affairs is due to misdirected energy in connection with the many attempts made to manufacture a fuel from peat, and to a general lack of interest towards anything connected with "peat" by the influential men of Canada.

Whether or not a particular natural substance shall be exploited has usually been decided from a "profit" point of view. Peat, not holding out great prospects for fabulous profits, failed to attract the attention of the large capitalists and industrial men. The creation of a peat industry was, therefore, left to the mercy of a few earnest and honest men with insufficient capital to prosecute an undertaking of this kind to a successful issue, and to a few fakirs and otherwise unscrupulous promoters, whose sole aim and purpose was "to get away with the money" be-fore being discovered. Without going into detail, it will suffice to say, that several attempts have been made and as many failures with loss of capital involved have been recorded; but the larger portion of the capital lost could have been saved and a flourishing peat industry long ago established, if the promoters had been advised by accredited engineers who understood their business. Instead, however, of profiting by the experience of European investigators-gained at great expense-money was expended in developing and trying out ideas which had long before been discarded as impracticable, and, in many cases, impossible, by the investigators and engineers of the peat-using countries of Europe. Not until the results of the investigations conducted by the Mines Branch of the Department of Mines concerning the economic methods employed for the manufacture of peat fuel in European countries were placed at the disposal of the public, were men with impractical ideas dissuaded from interesting people in their schemes. Men of this description are still found going from place to place in a vain endeavor to interest capital, but they are rapidly disappearing.

Not until the utilization of a natural substance is forced by absolute necessity, will the most sincere and earnest efforts be put forth to successfully and economically convert it into a usable product. It appears to me that the time is at hand when necessity will decide that we Canadians utilize our peat resources, and in the most efficient manner.

Peat, in its natural state, is generally associated with about nine times its weight of water. It is, therefore,