Three samples of standard kinds of bituminous coal were also submitted to Prof. Ellis for purposes of comparison, which gave in heating power as follows:—

	Units.
Hocking coal, Ohio	6.820
Massilon coal, Ohio	7.425
Reynoldsville, Penn.	7.480
Mean	7.241

The heating power is expressed in metric heat units.

It will be seen that the two specimens of peat are nearly alike in heating power, and that in this respect they stand respectively in the relation of 71 and 73 per cent. of the mean value of the samples of coal. The average price of Reynoldsville coal at Toronto, where it is said to have control of the market for heating purposes, is $4.25 per ton, so that on the basis of calorific value alone these peats would appear to be worth about $3.00 to $3.10 per ton. The percentage of moisture does not materially differ in the two samples, being 7.4 and 10.2 respectively, and it is probable that experience would show the inutility of going to the trouble and expense of reducing the contained water below the smaller of these figures, as on exposure to the atmosphere the absorbent qualities of the peat would doubtless be sufficient to restore the percentage of water to at least this point. The greatest difference between the samples is in the matter of ash, in respect of which there is a marked inequality, one sample showing 19.5, and the other 2.9 per cent. This is of course due entirely to the composition of the bogs from which the samples were made, and has no bearing upon the merits of the processes of manufacture themselves. If the crude peat contains a considerable proportion of incombustible matter, no amount of trituration, compression, or other subsequent treatment will lessen it, and the plain inference is that in the manufacture of peat fuel, only those bogs should be employed which careful experiment shows to be reasonably free from inorganic substances. The proportion of ash contained in the more impure of the two samples, 19.5, is so high as to seriously detract from its value as fuel, and would lead to the conclusion that the bog from which it was made is not well suited for the manufacture of the article.

A recent letter from England gives an account of a process by which Mr. J. D. Brunton of London, is attempting to utilize the peat of Dartmoor, in the production of pig iron from hematite ore, of which abundant supplies exist in that district. He proposes to use, by a happy reciprocity, the waste gases from the blast furnaces to dry the peat, and the peat, apparently without being charred, to smelt the iron. It is estimated that 200 tons of peat will suffice for a yield of 100 tons of pig iron per week. The cost of iron ore is put at from 3s. to 6s. 6d. per ton, and the cost of the pig iron made under these conditions after ample allowance for contingencies, at £2 15s. per ton. If the selling price of the iron be put at only £5 per ton (a low price for charcoal iron) a profit of £2 5s. is expected to be realized. A square mile of the Dartmoor peat ground, is said to be sufficient to supply fuel for a make of 100 tons of pig iron per week, for 100 years. The application of the hot gaseous products of blast and other furnaces to the desiccation of peat is not however, original with Mr. Brunton. On the continent of Europe, kilns for drying peat have been constructed in which the hot waste gas of furnaces is driven in through the roof by means of a fan, made to descend through the peat, and thence to pass into a chimney communicating with the interior of the kiln at the bottom by two flues, one on each side. Kilns on this principle are said to have been first intoduced by Schlagel, into Austrian smelting works, and extensively adopted especially in French smelting works. The distinguished Swedish iron master, Gustaf Ekman, in 1856 erected a peat kiln upon this principle with, it is reported, an entirely favorable result. Ekman heated his kiln with the waste gas of a charcoal finery, which gas after having been used for heating pig iron, the blast of the finery, and an annealing furnace, was admitted into the kiln. Kilns constructed on the principle of taking in the hot gas at the top, are said to dry the peat more equally and quickly than those in which the gas enters at the bottom. Peat, and peat charcoal are used to some extent in the smelting and refining of iron in European countries, but where, as in Great Britain, mineral coal and coke are abundant, the latter are more generally employed. Dr. Percy, after a somewhat exhaustive review of the subject in his work on fuel, gives it as his opinion that "by a judicious selection of peat and suitable treatment, peat charcoal might, so far as relates to its capability of producing peat, serve as an efficient fuel for metallurgical operations." He adds that "the use of peat charcoal for fuel must in great measure depend upon the cost of its production, inclusive of the cost of the original peat, and its capability of competing in that respect with other fuel, namely, wood charcoal, certain kinds of coal, and coke."

The widest field of usefulness for peat in metallurgical processes would appear to be as material for the production of gas for use in the so-called regenerative furnace invented by the brothers Siemens, which has come so largely into use for smelting and refining purposes. To quote Percy again: "Experience on the Continent has conclusively shown that peat-charcoal may be used in some metallurgical operations with success; also that peat may be successfully used for the production of gaseous fuel in a gas producer. Mr. C. W. Siemens, indeed, has informed me that putting its cost aside he should even prefer peat to coal for use in the producers of the regenerative gas-furnace. Now, the metallurgical operations to which gaseous fuel has been applied are already numerous, and it seems capable of even much wider application. The drawback in the employment of peat when high temperatures are required, resulting from its containing a large quantity of water, is obviated by converting it into gaseous fuel and subsequently condensing the moisture contained in the latter. So far, therefore, as the suitability of peat for metallurgical purposes is concerned, we may not unreasonably conclude that it could be widely substituted for coal with success." Percy goes on to state his conviction that peat can only compete with coal in countries where the cost of production and carriage of peat is relatively very low, and the price of coal relatively high, and that as regards Great Britain, circumstances must greatly change before these favorable conditions for utilizing peat are fulfilled. Percy's convictions as regards Great Britain is doubtless well founded, but the state of things in Ontario and Quebec is vastly different from that in the mother land. The pregnant fact that while there is abundance of coal in England, there is none at all here, changes the situation entirely, and conclusions which may be justly arrived at in the case of Great Britain are altogether inapplicable in our own. The cost of carriage which in England would be greater upon peat than coal, is here decidedly in favor of peat. Our only supplies of coal lying either a long way to the south in another country, or a long way to the east in another province, the item of freight charges must always be a heavy one, and must continue to add largely to the cost of the coal used here, while on the other hand once a really practical and economical system of manufacture was introduced, the peat bogs which are found in all quarters of Ontario and Quebec might be sources of fuel supply to surrounding districts at a minimum cost so far as freight charges are concerned.

There are very large areas of peat in Ontario. Mr. E. B. Borron who has penetrated through the wastes of the Hudson Bay slope tells us that in his opinion there are 10,000 square miles overlaid with peat from six to twenty feet in depth in that part of the Province. In the district between the Ottawa and the St. Lawrence rivers, in the vicinity of Lake St. Clair, in Elgin county, in the Parry Sound district, in Waterloo county, in Welland county along the Welland Canal, in the counties of York and Simcoe, along the line of the C.P.R., west of Lake Nipissing, and in many other sections of the Province are peat bogs of large area, and were they to become valuable as a result of a perfected process of manufacturing peat fuel the existence of many others would no doubt be revealed.

Peat fuel has been successfully employed for all the purposes for which coal and wood can be used. For some of these purposes it is owing to its bulk, less adapted than coal, as for instance in steamer and locomotive boilers, where economy of space is a great object, while for others, as we have seen, it is a very efficient substitute. Even in the production of illuminating gas it has been employed with good results, as for example in Dartmoor, England, where the prison at Prince Town is or was lighted with gas made from peat.

In conclusion I have only to express my conviction that this problem of the utilization of peat for fuel is one of the most important and pressing of the economic questions which are to-day engaging the attention of the people of Ontario and Quebec. Though the difficulties which be in the way of its solution have proven themselves to be many and formidable, the ingenuity of man I am convinced is equal to the task of overcoming them. I cannot think that the quest after a good and cheap peat fuel is the chase of an *ignis fatuus*, but on the contrary I cherish the hope that ere long we shall see a process in successful operation which will utilize our own resources, give us a first-class fuel at a cost below that of coal, and deliver us from the yoke of a foreign monopoly.

The Peat Industry of Canada.

R. W. ELLS, LL.D., Ottawa—The importance of the peat deposits which are found in all the provinces of Canada has long been recognized, and a number of attempts have been made from time to time to turn them to profitable account. Some of these have for a brief period given fairly satisfactory results, but all have, owing to various causes, gradually been abandoned. At present, however, there appears to be a growing interest in the question of their utilization, and it is to be hoped that, profiting by the mistakes and experience of the pioneers in the industry, some more practical scheme than has yet been in operation may be devised, so that the manufacture of peat, either for fuel or furnace purposes, may be placed on a paying basis.

This industry has a more important bearing upon the provinces of Ontario and Quebec from the fact that, while the inhabitants are there largely engaged in manufacturing pursuits, requiring a large supply of fuel, it has long been a settled question that in neither of these provinces can any natural supply of coal be expected. In Ontario this lack of coal for fuel may be, to a certain extent, met by the use of crude petroleum, burned in properly constructed grates, and the experiments already instituted in that direction have shown that, for heating and the generation of steam, this substance possesses very many admirable qualities. In Quebec, however, this source of supply appears to be unavailable, in so far at least as the researches in the Gaspè district, which may be regarded as our only oil field, have proceeded. Natural gas has also of late years entered the field as a possible competitor in the matter of fuel, more particularly in the province of Ontario, though wells giving a limited flow of gas have also been bored at different points in the St. Lawrence area, east and north of Montreal. This source of supply, however, does not meet the requirements of the case as satisfactorily as could be desired, owing doubtless, to some extent, to uncertainty as to its persistence, and also to the fact that it is unsuited to many purposes requiring a solid fuel. The fact also that the nearest available sources of coal fuel in eastern Canada are situated in the province of Nova Scotia, the nearest of which to Montreal being about 700 miles by rail, while the great areas of Pictou and Cape Breton are still more remote, must also be carefully considered in the discussion of such a question as the utilization of the peat deposits near home. True it is that the adjacent province of New Brunswick has a very considerable development of carboniferous rocks, and has by many been quoted as a great source of future supply of mineral fuel, but from a careful examination of that country it must be remarked that, owing to the thinness of the coal seams, rarely more than twenty to twenty-two inches, and the peculiar soft character of the coal itself, which unfits it for much handling, as also for other purposes for which a hard coal is now required, the utilization of this fuel must be, to a very large extent, merely local. The other remaining sources of supply, more especially for Quebec, are the distant coal-fields of the British Islands, from which, during a certain portion of the year, fuel can be cheaply brought owing to a low rate of freight, so cheaply, in fact, as to enter into close competition with the output from the Nova Scotia mines, and the deposits in the United States from which, owing also to canal transportation, fuel can be laid down at certain seasons almost as cheaply as from the lower provinces. Still the fact remains that freight rates both from Nova Scotia and the Pennsylvania fields are such as to make the price of coal fuel laid down in the manufacturing centres of Ontario and Quebec so high that many of the manufacturing and mining industries in both these provinces are seriously hampered, through the comparatively great expense involved in keeping our steam engines in motion and thus providing the power necessary to successfully carry on the various industries of the country.

The value of the peat deposits must however, after all be merely a comparative one. If it can be conclusively shown that a peat fuel can be produced, possessing let us say, 100 heat units and placed in the markets of Ontario and Quebec, at a well defined less rate as regards cost than 100 heat units of coal, taking the coals of Nova Scotia and the United States in ordinary use as the standard, then it should be apparent that our peat deposits are worthy of attention as an important factor among the manufacturing, or power producing agents of the day. To do this however, we must first of all consider several important features of the industry, such as the extent of our peat deposits, the calorific power of well prepared peat fuel, the convenience of handling and the advantages it possesses, if any, over the fuel at present at our disposal, and, in addition to this, and this is an especially important item, the cost of its manufacture.

In the utilization of our peat bogs we must, however, bear in mind the fact that other phases of the question possess an equal if not even a greater present economical value than that of fuel supply. For instance the question of the application of peat to sanitary purposes, for the reception and economic disposition of the sewage of large cities, is now being considered, and it has been ascertained that in this respect no substance yet known, possesses presumably greater or more valuable properties in this direction than this produce of our peat bogs, so long regarded as practically valueless. Further, a comparatively new indurstry has come into prominence in connection with these deposits, which, in Holland and elsewhere, has already reached a very extensive development and which should also furnish handsome returns on capital in the country, viz., the manufacture of moss litter. This material from its great absorbent properties has been found to surpass all other substances in the utilization of stable waste, and for promoting the comfort and cleanliness, and as a consequence the health of all animals these kept. So great is the importance of this industry, as yet comparatively unknown in Canada, that the peat bogs of Holland are now supplying the markets of London and New York, with this prepared moss litter, with a demand apparently unlimited and at a price quoted on the London market of 21 to 26 shillings per ton, according to quality, which should furnish highly remunerative results.

In the report of the Geological Survey for 1845-46, attention was directed to the Canadian peat deposits, and the results of the investigations on this subject by Dr. T. Sterry Hunt appeared in subsequent reports. Among those of special importance are the articles in the geology of Canada, 1863, and in the report for 1866. In the pamphlet prepared for the Paris Exhibition, 1878, further information is presented more particularly relating to the trials carried on in the deposits east of St. John in connection with the Hodge process, and at St. Hubert, in the county of Chambly, at which places very extensive bogs of excellent peat occur. A very considerable quantity of prepared fuel was produced at these places aggregating in 1875 about 13,000 tons in all, a small amount being used for domestic purposes while the rest was employed by the Grand Trunk Railway for their locomotives. Changes in the company, however, appear to have acted unfavorably as to the continuance of the industry, and since that date but little has been done in this direction. A small quantity of prepared peat was also produced about the same time near Port Lewis, in the county of Huntingdon, as well as at Newtonville, near Port Hope, in Ontario. Unfortunately no reliable data as to the cost of manufacture at either of these places is at hand and no subsequent developments appear to have taken place.