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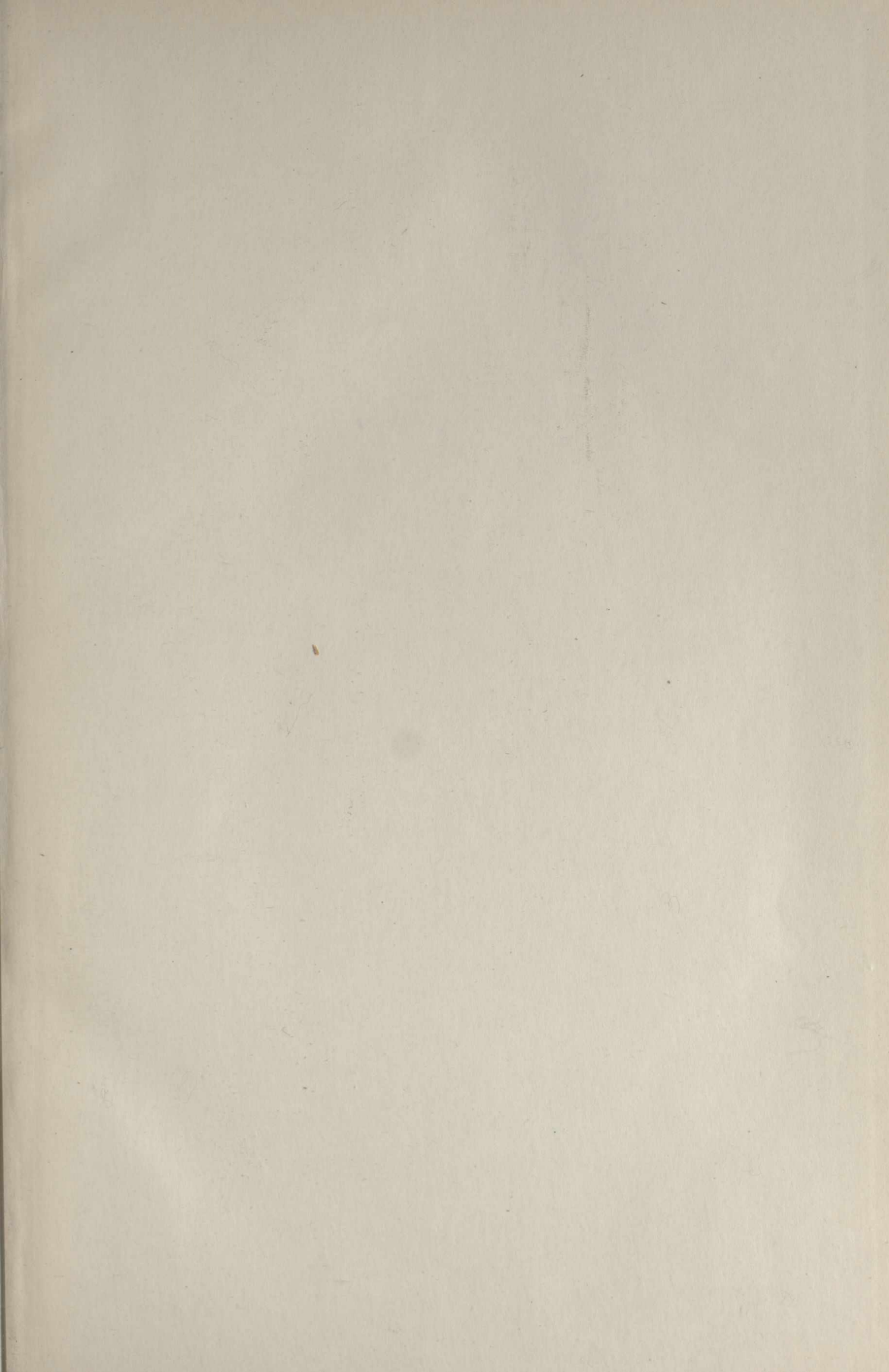
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THE SENATE OF CANADA

REPORT

OF THE SPECIAL COMMITTEE

ON

THE FUEL SUPPLY OF CANADA

TOGETHER WITH

THE EVIDENCE RECEIVED BY THE COMMITTEE

The HONOURABLE J. S. McLENNAN, Chairman



OTTAWA

F. A. ACLAND

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

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2. Coal supply of Canada by Provinces. Output and distribution. Sources and consumption.

ORDER OF APPOINTMENT

EXTRACTS from the Minutes of Proceedings of The Senate

March 8, 1923

"On motion of the Honourable Mr. McLennan it was:—

"Ordered, That a Special Committee of this House, of five members, be appointed to consider the question of the fuel supply of Canada, its most efficient use and whether such Committee can assist the work of the Dominion Fuel Board; such Committee to be composed of the Honourable Messieurs DeVeber, Hardy, Laird, Webster (Stadacona), and the Mover."

March 23, 1923

"On motion of the Honourable Mr. McLennan it was:—

"Ordered, That the Honourable Mr. Calder be a Member of the Special Committee on the Fuel Supply of Canada."

ELECTION OF CHAIRMAN

EXTRACT from the Minutes of Proceedings of the Committee, March 13, 1923

"On motion of the Honourable Mr. DeVeber, the Honourable Mr. McLennan was elected Chairman of the Committee."

REPORT OF COMMITTEE

The Honourable Mr. McLennan, from the Special Committee on Fuel Supply of Canada, presented their Second Report.

The same was then read by the Clerk, as follows:—

THE SENATE,

COMMITTEE ROOM No. 534,

THURSDAY, June 21, 1923.

Your Special Committee on the Fuel Supply of Canada respectfully submit their Second and Final Report.

On March 8, 1923, the Committee was appointed by the Senate to consider the question of the fuel supply of Canada, its most efficient use and whether such Committee can assist the work of the Dominion Fuel Board.

The Committee during the course of its inquiry held twenty-four sittings and examined the following witnesses:—

- (1) Charles Camsell, Esq., Deputy Minister of Mines, Ottawa.
- (2) William Pearce, Esq., Natural Resources Department, Canadian Pacific Railway Company, Calgary, Alberta.
- (3) B. F. C. Haanel, Esq., Chief Engineer, Division of Fuels and Fuel Testing, Department of Mines, Ottawa.
- (4) Sir Henry Thornton, President Canadian National Railways.
- (5) J. A. Ellis, Esq., Fuel Controller for Ontario, Toronto.
- (6) J. B. Challies, Esq., C.E., Director Dominion Water Power Branch, Department of the Interior, Ottawa.
- (7) F. L. Wanklyn, Esq., Provincial Fuel Commissioner, Montreal, Quebec.
- (8) Howard Stutchbury, Esq., Trade Commissioner, Province of Alberta, Edmonton, Alberta.
- (9) Donald A. Macauley, Esq., Newcastle Coal Company, Drumheller, Alberta.

- (10) Reginald M. Thayer, Esq., Coal Mine Operator and Coal Merchant, Saskatoon, Sask.
- (11) Daniel D. Gray, Esq., Superintendent, Experimental Farm, Ottawa.
- (12) Louis Simpson, Esq., Industrial, Mining and Consulting Engineer, Ottawa.
- (13) Joseph Errington, Esq., Mining Engineer, Toronto.
- (14) Cardin S. Bagg, Esq., Secretary-Treasurer, Montreal Light, Heat and Power Company, Montreal.
- (15) James J. Humphreys, Esq., Engineer and Gas Manufacturer, Montreal.
- (16) Robert J. Mercur, Esq., President, R. J. Mercur & Co., Ltd., Montreal.
- (17) William Hutton Blauvelt, Esq., Consulting Engineer, New York.
- (18) F. P. Jones, Esq., President, Canada Cement Company, Ltd., Montreal.
- (19) F. A. Combe, Esq., Consulting Combustion Engineer, Montreal.
- (20) Farquhar Robertson, Esq., President, Farquhar Robertson, Limited, Montreal.
- (21) Thomas C. Shiels, Esq., Asst. to the Manager, The Elias Rogers Company, Limited, Toronto.
- (22) F. W. Gray, Esq., Asst. to the Vice-President, British Empire Steel Corporation, Sydney, N.S.
- (23) Frank E. Lucas, Esq., Economy and Fuel Engineer, British Empire Steel Corporation, Sydney, N.S.
- (24) E. P. Mallory, Esq., Director, Bureau of Statistics, Canadian National Railways, Montreal.
- (25) W. B. Lanigan, Esq., General Freight Traffic Manager, Canadian Pacific Railway Company, Montreal.
- (26) Jean T. Oigny, Esq., Mechanical Engineer, Montreal.

In addition to the examination of witnesses, your Committee has through correspondence ascertained the views of various authorities with respect to the problems involved in the inquiry, and the essential parts of such correspondence will be found in the published reports of our proceedings.

Your Committee has endeavoured to avoid covering ground inquired into by the Mines and Minerals Committee of the House of Commons dealing with the same subject.

In the Report your Committee has endeavoured to set forth briefly and concisely the various phases of the problem inquired into and its suggestion or recommendation in each case.

For the purpose of convenience Appendix "A" sets forth, with an index, the evidence of witnesses examined and correspondence.

COAL RESOURCES

There is an abundance of evidence to the effect that the coal areas of Canada, east and west, are sufficient to supply the fuel needs of our entire population for an indefinite period of time. In other words there is no shortage of coal in Canada, neither is there a lack of developed mines. A large percentage of the collieries now in operation—more particularly those in Western Canada—are capable of increasing their output to a very considerable extent with little or no capital cost, and would undoubtedly do so if markets for their increased output were available. In the coal fields of the east, the situation is somewhat different. Many of the mines of that area would not be able to increase production to any material extent without the expenditure of very large sums of money on capital account.

Representations were made to your Committee regarding the advisability of opening up further coal areas in Western Canada through the building of branch railways. Your Committee is agreed that every such proposition should be

most carefully scrutinized before public funds are used or pledged for this purpose. To this general finding there may be one exception. Evidence was submitted to the effect that there exists in northern Alberta and British Columbia extensive fields of anthracite or semi-anthracite coal of a high grade capable of easy development and within reasonable reach of a projected railway from the Peace River District to the main trunk line of the National Railway System to the south. The building of this railway will likely be necessary in the not distant future for the purpose of (a) providing a western outlet for the agricultural produce of Northern Alberta, and (b) tapping a coal field that will supply the Pacific Coast as well as the four western provinces with a grade of coal much superior to that now available.

Your Committee suggests that such intensive exploration of these fields as will remove any doubt as to the quality of the coal and its extent be carried out, before these fields are made a factor in such railway extension. The development of these coal areas should not be undertaken until there is an assured market for their output.

OUR REAL FUEL PROBLEM

With our super-abundance of coal resources, and with a sufficient number of mines in operation to supply all needs, the question at once arises as to why Canada should have any fuel problem at all. Our public requirements are of a twofold nature: Anthracite coal which is in general favour for domestic purposes; and bituminous coal which is required for power purposes and steam heating. The existing collieries east and west when working normally readily supply the Maritime Provinces and Quebec as far west as Montreal or close thereto, and the four western provinces as far east as Winnipeg, with bituminous coal. Under conditions now existing central Canada from Montreal to the head of the Great Lakes is very largely if not entirely dependent upon the United States for its coal supplies of both classes. The reason for this is apparent. The coal areas in the United States from which central Canada draws its supplies, are so near to the Canadian market that hitherto it has been found commercially impossible for operators in our eastern and western fields to successfully compete with United States importations.

Within the past few years there has been a growing public sentiment to the effect that it would be in the national interest to reduce our coal importations to the minimum and within recent months the coal operators and transportation interests of Canada with that end in view have been giving a good deal of consideration to (a) the question of reducing freight rates, (b) the desirability of providing further and better facilities for handling and storing coal, and (c) the necessity of educating the public to use Canadian coal and emphasizing the advantage of securing their supplies at those seasons of the year when railway and vessel facilities are available and the mines are capable of supplying requirements. In this connection your Committee recommend that the Dominion Fuel Board be empowered to co-operate with the various transportation and other interests involved for the purpose of ascertaining what may be accomplished in a practical way along the lines indicated.

In a recent communication received from the President of the Canadian National Railways, the offer is made to transport Alberta coal by train loads to Ontario points during the months of May, June and July, at the rate of \$9 per ton, and that like treatment or its equivalent would be offered the coal operators of the Maritime fields. In so far as western coal is concerned officials of the Canadian Pacific Railway Company gave evidence to the effect that the \$9 per ton rate quoted was less than the actual cost of transportation, and that Alberta coal could not be landed in central or southern Ontario at a lower rate than (approximately) \$12.40 per ton, if the company was to move coal on the same freight basis as grain.

Without expressing a final opinion as to the possibility of supplying central Canada with bituminous coal when hauled by rail from east or west your Committee is strongly inclined to the view that the geographical location of the mine areas from which central Canada draws its supplies is such that it is extremely doubtful if this handicap can be overcome unless the railway companies are prepared to transport coal at less than cost.

It was admitted in evidence by representatives of the Alberta Government that the high cost of transportation in competition with traffic from the United States precludes the possibility of a market in central Canada for western bituminous coal such as is used for power plants and steam heating purposes. On the other hand it was contended that with a freight rate such as suggested of \$9 per ton, there was the possibility of supplying a comparatively large portion of central Canada's needs with a high grade of what is commonly called "Domestic" coal. Your Committee is of the view that there is a reasonable prospect of the cost of production being reduced if the output is increased and mining operations are spread over all months of the year.

As regards Nova Scotia coal your Committee are of the opinion that central Canada in the future may be able to secure a much larger share of its requirements of bituminous coal from that source provided navigation, storage, handling and shipping facilities west of Montreal are improved.

Your Committee is impressed with the necessity of having this phase of our fuel problem more thoroughly investigated and recommends that the Dominion Fuel Board should continue its investigations along this line.

FUEL FAMINES

In the past practically all parts of Canada have occasionally had their fuel famines, due to one or other of the following causes: (a) the shutting down of collieries in Canada or the United States by reason of strikes or lock outs, (b) the lack of transportation at critical periods of the year by reason of strikes, (c) the periodic lack of transportation owing to severe weather conditions, (d) the failure of the general public to secure their winter supply of coal in ample time to avoid the results of the three other conditions previously referred to.

While it has no suggestions to offer as regards strikes, etc., your Committee is convinced that any measures that may be devised by legislation or otherwise to prevent the periodic closing down of mines will to a considerable extent put an end to the coal famines in the future. For long years to come the coal resources in sight both in Canada and the United States are amply sufficient to supply all needs provided nothing intervenes to prevent the mines from producing their normal output and transportation facilities are available to carry supplies to the consumer.

ANTHRACITE VS. BITUMINOUS COAL

The populations of eastern and western Canada have been accustomed to use bituminous and so-called domestic coals, and all their industrial, household, and other arrangements including power plants, furnaces, ranges, grates and storage have been governed accordingly. But not so in central Canada. The public in this region, more particularly for domestic purposes, have until the past few years been provided with ample supplies of anthracite coal from the United States fields and as a result they do not feel at all inclined to use any other variety. For this they cannot be blamed as there is no doubt that for domestic purposes anthracite coal is superior for reasons which are obvious.

From the evidence submitted to your Committee it would appear that the sources of supply of anthracite coal in the United States are not unlimited, and that within a reasonable distance of time the demand will exceed the supply.

On the other hand evidence was adduced to the effect that the bituminous coal fields of the United States are capable of supplying all the fuel needs of central Canada for a great many years. The inference to be drawn is that under normal conditions as to the working of bituminous collieries in the United States, the public of central Canada need never fear a coal famine provided they are prepared, as they should be, at any and all times to use bituminous instead of anthracite coal. To a certain extent anthracite coal may be regarded as a luxury, and the sooner the consuming public realize this fact, the less danger there will be of being haunted by the nightmare of a coal famine.

Your Committee gave some consideration to the suggestion of the possibility in the not distant future of an embargo being placed on coal entering Canada from the United States. Your Committee from the evidence placed before it is convinced that this is not at all likely except to a limited extent during emergency periods when the coal supplies of the United States are materially reduced owing to the shutting down of mines or lack of transportation. For many years central Canada owing to its climate has afforded an excellent and steady market for United States producers. It is probable that these producers as well as the transportation interests involved would strenuously oppose any effort made either to cut off this market or have it supplied from other coal fields in Canada or elsewhere.

ANTHRACITE COAL FROM GREAT BRITAIN

During the recent emergency period considerable anthracite coal was imported from Wales and Scotland and is still being brought in. The Fuel Controller of Ontario gave evidence to the effect that this coal is of the highest quality and is worth at least \$3 per ton more than the ordinary grades of United States anthracite. To the extent that this British coal is imported, our dependence on United States anthracite is lessened, and ocean tonnage for our exports is increased.

THE NATIONAL ECONOMIC PROBLEM

As regards the duty of the State as represented by Federal, Provincial and Municipal Governments, your Committee has no hesitation in recommending that every possible effort should be made by those in authority to encourage the public to obtain their supplies of coal or other fuel from Canadian sources. The fact that we imported for consumption last year 13,017,025 tons of coal at an approximate cost of \$61,112,428 from the United States and other countries should impress everybody with the necessity of utilizing our own fuel resources to the fullest extent.

Your Committee is convinced that the general national interest demands further and continuous study of the problem from this angle if substantial practical results are to be attained and we recommend that the Dominion Fuel Board be given the fullest powers, with sufficient funds, to vigorously prosecute its investigations in the direction indicated. It is further suggested that during the next two or three sessions of Parliament a Joint Committee of the two Houses be appointed early in each session to inquire further into the subject.

PUBLICITY

We recommend that the Dominion Fuel Board be placed in a position to bring before the public the facts about grades and kinds of fuel, economies in methods of firing, etc., and secure for this information the widest dissemination even if such publicity has, to some extent, to be paid for.

PROVINCIAL FUEL COMMISSIONS

We further suggest to the Provincial Governments, in view of the excellent results of their Fuel Commissions, that these Governments continue those organizations which have proved their value.

FUEL ECONOMIES, COAL SUBSTITUTES, ETC.

Much of the time of your Committee was engaged in inquiring into problems relating to fuel economies, coal substitutes, water-power developments, and the use of electricity and other kindred subjects, for the purpose if possible of ascertaining practical means whereby our enormous coal importations might be reduced. While we feel that our inquiry has resulted in some progress being made, we are convinced that the problems involved are such as to require further careful study by experts. In this report it is proposed to indicate but briefly our views regarding some of these questions and to suggest in a general way the scope and character of the investigations to be carried on.

(1) *Fuel Economies.*—From the evidence adduced it would appear there is an appalling waste in the consumption of coal by domestic users due to improper firing and care of furnaces, dirty stove pipes, faulty chimneys, lost radiation and other like causes. There is no doubt that many thousands of tons of coal would be saved if householders were properly instructed in this regard. Your Committee recommends that the Dominion Fuel Board should be authorized to study this phase of our fuel problem, and that their suggestions and recommendations should be transmitted to every provincial government with a view to having the local authorities carry on a campaign of education respecting the means to be adopted in every household to save fuel.

(2) *Manufacture and use of Peat.*—An examination of the evidence relating to peat will show that the Dominion possesses peat bogs of great potential value. This is particularly true of the bogs located in central Canada, owing to the absence of coal beds in this area. There can be no doubt as to the desirability of producing peat fuel from these bogs to the fullest extent possible.

Within the past five years the Dominion and Ontario Governments have expended no less than \$310,000 in an effort to produce commercial peat at Alfred in the Ottawa valley. While there may be some doubt as to the results achieved your Committee is of the opinion that the moneys expended were justified, and that the Governments interested should consider the advisability of making still further efforts to more fully demonstrate the feasibility or non-feasibility of producing a suitable peat fuel for domestic or industrial purposes, which will compete successfully with other fuels now in use.

(3) *Central Heating Plants.*—From the brief but interesting evidence submitted, your Committee is of the opinion that the possibility of installing and operating central heating plants in urban communities for the purpose of reducing coal consumption is deserving of the most careful study and inquiry by competent experts. In Brandon, Manitoba, and North Battleford, Saskatchewan, plants of this character have been in operation successfully for a number of years, and your Committee is of the view that a very great saving in fuel is possible if it can be demonstrated that central heating plants for both residential and business sections of our large towns and cities are practical and economical. The necessary investigation along this line is now being arranged for by the Dominion Fuel Board.

(4) *Coke.*—Your Committee made an exhaustive examination of this phase of our fuel problem. We found that coke made as a by-product of gas finds a ready sale. We also found that plants in which a harder coke with higher

heating value, which produced gas and other by-products were in successful operation in several cities in the United States. As this process materially reduces waste in the utilization of bituminous coal, and as every ton of such coke when made from Canadian coal, lessens our dependence on anthracite, we are hopeful that this process will be utilized in Canada. We approve of the action of the Dominion Fuel Board in having a survey made of the possibilities in our principal Canadian cities. The suggestion was made to your Committee that the Federal Government should subsidize coke producing plants to the extent of fifty cents per ton for every ton of Canadian coal used in producing coke; but your Committee has no recommendation to make in that regard as it involves a question of national policy that should be determined by the Government itself.

There is, however, another phase of the question worthy of early consideration and decision. Under the existing tariff coke is admitted to Canada free of duty. On the other hand coal imported into Canada and used for the production of gas and coke is subject to a duty of 53 cents per ton. While your Committee fully realize that all tariff questions have a good many angles that must be carefully scrutinized before any decision is reached, we cannot help but feel that an anomaly exists in this respect.

(5) *Water Power Development.*—Within recent years the development of water powers throughout Canada and more particularly in Quebec and Ontario has resulted in an enormous saving of coal. Had it not been for the development of these powers the fuel situation would undoubtedly have been far more acute. What is true of the past may be equally true of the future. In other words, your Committee strongly recommends that every legitimate encouragement should be given to the further development of water powers throughout Canada. Lately there has been a great deal of discussion respecting the advisability of proceeding with the development of such powers on the St. Lawrence River. From the evidence placed before your Committee it would appear that if this work is proceeded with as an international undertaking there would be available for Canadian consumption approximately 3,000,000 horse power per annum, which is equivalent to 30,000,000 tons of coal. Owing to the existing financial situation, your Committee hesitates to suggest the early development of these powers, but it recommends that the Government through its expert officers should continue to keep in touch with the whole situation, with a view to determining the time when the work should be undertaken to improve navigation, to supply power for industrial purposes and to provide electricity for farms, lighting and household uses.

(6) *Electricity for Heating Purposes.*—Within certain limitations electrical energy developed from water power may be utilized for domestic heating purposes, and your Committee are of the view that advantage should be taken of this whenever feasible. In all areas where water power has been developed in excess of industrial requirements, the evidence submitted indicates the advisability of using such excess power for the production of electricity for household heating. Your Committee had not an opportunity to prosecute its inquiries into this phase of our fuel problem as fully as is desirable, and it therefore suggests that the Dominion Fuel Board should give the matter further and fuller consideration.

(7) *Local Distribution of Coal.*—Your Committee is convinced that a material saving in the cost of coal to the consumer can be effected if steps are taken in large urban communities to regulate and provide better facilities for the storage, handling and distribution of coal. This phase of the question involves (a) the stock of coal to be kept on hand, (b) the location of coal yards, (c) the type of warehouses or sheds to be adopted, (d) the methods of delivery to be used, and (e) the zones within which coal should be distributed. Your

Committee recommend that the Dominion Fuel Board should make a study of the conditions now existing in this regard in two of the larger cities with a view to reaching general conclusions as to the principles that should govern in an attempt to effect economies in these directions. Such conclusions should be transmitted to the municipal authorities throughout Canada with the suggestion that an effort be made to improve local conditions in this respect.

In conclusion your Committee desire to point out that many of the problems involved in the question of fuel supply are of such a highly complicated and technical character as to require the employment of competent experts to carry on the necessary research work if practical results are to be attained in the near future. Your Committee has been favourably impressed with the character and scope of the work already undertaken by the Dominion Fuel Board, and unhesitatingly recommends not only that the Board be continued, but that it be supplied with sufficient funds to energetically prosecute its work.

We are of opinion that the Board would be assisted in carrying on their work if they consulted men of large business and industrial affairs as to the practical working out of their suggestions.

We extend to all witnesses and correspondents our thanks for the assistance given us in our endeavours to carry out the purposes for which the Committee was appointed.

Your Committee recommend that three thousand copies of the report, with appendix, be printed for general distribution, and that Rule 100 be suspended in so far as it relates to the said printing.

All which is respectfully submitted.

J. S. McLENNAN,
Chairman.

APPENDIX "A"

EVIDENCE OF WITNESSES

SENATE OF CANADA,

COMMITTEE ROOM 368,

THURSDAY, March 15, 1923.

The Special Committee of the Senate on the Fuel Supply of Canada met at 11 o'clock a.m., Hon. Mr. McLennan in the Chair. Present: Hon. Messrs. McLennan, Hardy, DeVeber, Laird, and Webster (Stadacona).

The CHAIRMAN: The first witness that we are calling is Dr. Camsell, the Deputy Minister of Mines, and the head of the recently appointed Dominion Fuel Board. Perhaps Dr. Camsell might begin by telling us what steps have been taken to deal with this question from the time the principal stringency began during the war, when Mr. McGrath was Fuel Controller, and how that has grown up into the present organization.

Dr. CHARLES CAMSELL, called and examined.

The present organization arises really out of the report of Mr. McGrath, the Fuel Controller, issued in 1919. His report for that year contains a recommendation to the Government that an organization be created for the purpose of keeping in touch with the fuel situation. His recommendation in that report is: "That there should be an officer of the Government appointed for the purpose of keeping in close touch with the fuel situation in Canada. He should have authority, also, to inquire into all phases of the fuel situation, and to select such experts as he may deem necessary to carry on the work entrusted to him." That was the recommendation made in 1919. No action was taken by the Government until November last, when I was instructed by the Minister of Mines to organize a committee of departmental officers that would take up this question of studying the fuel problems of Canada, and that would keep closely in touch with the fuel situation. The board was then created, but its function was not to conflict with the committee already in existence, which was known as the Dominion Advisory Fuel Committee, which had to deal with the present fuel shortage. The Dominion Fuel Board which I was to organize was to study the fundamental problems underlying the shortages that have occurred, at intervals, throughout this country. Following those instructions a report was made to council, a copy of which has been distributed and which is in the hands of all members of the committee. As a result of that report an Order in Council was passed creating this Dominion Fuel Board.

By the Chairman:

Q. By this committee you mean the special committee called to consider the situation?—A. Yes.

Q. Who is the head of that committee?—A. I was. The Order in Council was then passed on the 25th November, 1922, creating the board; it reads as follows: "That there be created a Dominion Fuel Board charged with the duty of investigating and reporting upon this matter. That this board be authorized to secure all the available data, consult and co-operate with such individuals and bodies as they may deem specially qualified to advise upon any particular phase or phases of this work, and with the approval of the Minister to employ such technical assistance as may be found necessary."

Q. Would you give us, in outline, some indication of the lines on which you have been working?—A. The first thing that I did at that time—really before the board was created—was to take a trip through western Canada to look into the general fuel situation in Manitoba, Saskatchewan, Alberta and British Columbia. I was gone a month on that trip, and learned something about the fuel situation out there.

By Hon. Mr. Laird:

Q. What was your idea in going west? In what particular regard did you want to investigate the fuel situation there?—A. We had nothing to do with the present shortage, nothing whatsoever, but we were authorized and instructed to study the general fuel problems of Canada, and we found that there were problems in western Canada, in Manitoba, Alberta and British Columbia which we considered of much importance.

Q. Labour problems, do you mean?—A. Problems in Alberta, for example, of a market for the output that they are capable of producing; problems in British Columbia of competition with fuel oils which are having an adverse effect on the mining of coal in British Columbia; problems connected with the competition that is going on in Manitoba, for example, between Canadian coals and American coals. Those are some of the problems we ran across out there. But after all, the fundamental problem, as I see it, is the supply of fuel for central Canada—Ontario and Quebec—where there are no coal fields, and the fundamental question of supplying fuel to those provinces; and back of that again, the question of where those fuels are to be obtained. On my return from the west the Board was organized and began to collect all the information available, particularly regarding the fuel problem of central Canada. The Board has been working in that direction, and at the present time has collected together pretty nearly all the information that they think is available, which is being put together in the form of a report to be presented to the Minister.

By the Chairman:

Q. That is indicated pretty well in this preliminary report—the lines of information that you have collected?—A. Yes.

Q. I think we may say that what we are all agreed on is that the desirable thing is, first of all, to use as much Canadian fuel as is at all possible; secondly, where we cannot use Canadian fuel, to import others that will make a reciprocal trade; and thirdly, to help the situation by all forms of economy in the use of fuel so as to make the outgo from the country as little as possible. Now, to get towards something concrete, Dr. Camsell, so far as you have gone, what has struck you as the most promising line of investigation towards accomplishing those objects?—A. The result we want to obtain is a supply of fuel for the coalless area of Canada. After that, and also in connection with that, where are we going to get that fuel? Now, to answer your question as to the line of investigation that I think should be followed, I don't know exactly how to state it because the problem is so mixed up between domestic fuel and industrial fuel. If you look at the question of domestic fuel alone, all that domestic fuel is obtained from the United States, and we are equipped in this country with a certain type of furnace which is built expressly to handle anthracite. Now, if you want to replace American anthracite by a fuel that we can burn in that equipment, it seems to me that the most satisfactory fuel that may be developed is a coke made from bituminous coal. It was that direction that we considered one of the most important in which the Board might work—investigating the question of coking bituminous coal, irrespective of where they came from. But we feel that the supplies of anthracite will ultimately, and within the near future, be cut off from us.

By Hon. Mr. Laird:

Q. What makes you think that?—A. On account of the agitation that has been going on all winter in the United States for an embargo on the export of anthracite. There have been three bills, I think, before Congress providing for an embargo on anthracite. There was a bill, before Congress adjourned, to make it possible for the President to declare an embargo on any kind of coal for a period of six months, at any time that he thought necessary to do so. Those bills, of course, did not get through Congress, but they indicate the feeling in the United States against the export of anthracite coal to Canada.

By the Chairman:

Q. But the President wrote to Congress that he would not consider that kind of thing, though he considered that the growing demand for anthracite at home would make an agitation that would ultimately have an effect on the Government of the United States?—A. Yes.

By Hon. Mr. Webster:

Q. There is always an uncertainty, is there not, as regards the fuel supply from across the line?—A. There is, because the anthracite supply of the United States is so much more limited than the supplies of bituminous coal, and that supply is being exhausted at a very rapid rate; so that my information from the Bureau of Mines in Washington, as far back as two years ago, was that Canada within a very short time would have to work out her own solution for replacing the anthracite which she now imports from the United States.

Q. Our importation is two or three per cent of the American output of anthracite coal, is it not?—A. Their output is about ninety million tons a year, and our importation is about four millions.

By Hon. Mr. Laird:

Q. Have you found statistics of the amount of our western coal that goes into the United States via the Crow's Nest? Is it a material factor to supply coal to the western United States?—A. No; exports to the United States last year, our total exports, were about 1,821,000 tons.

By the Chairman:

Q. From the whole of Canada?—A. From the whole of Canada to the United States.

Q. Have you the districts from which that goes?—A. Well, it goes through points in British Columbia, but a good deal of it is Alberta coal.

Q. The quantities you gave us would not include Nova Scotia coal going into New England?—A. Yes, it does include Nova Scotia coal, of which 622,000 tons were exported.

By Hon. Mr. Laird:

Q. And the balance would be Alberta coal?—A. Alberta and British Columbia coal.

Q. If the supply of anthracite coal for Canada was shut off I suppose the coal they get from us would be a factor in some parts of the United States?—A. It would, yes; but it is not a very serious factor.

By Hon. Mr. Hardy:

Q. Do the Maritime Provinces import anthracite from the United States?—A. Yes, they do.

Q. How much?—A. Nova Scotia, last year, 23,000 tons; these are preliminary estimates; New Brunswick, 43,000 tons.

Q. A matter of about 70,000 tons out of the 4,000,000?—A. Yes. Prince Edward Island about 6,000 tons.

The CHAIRMAN: With my knowledge of the Maritime Provinces, you might call all that a luxury consumption; that is, it is by people well enough off to want to burn the most comfortable and the pleasantest fuel.

The WITNESS: This map will, I think, indicate pretty clearly the reason why the supplies of anthracite are liable to be cut off and are gradually being depleted.

The CHAIRMAN: This is a map that Dr. Camsell was good enough to prepare for us, showing on a very small scale, it is true, the different coal areas of the United States and Canada. The anthracite coal is marked to scale, approximately. The map shows the whole of the anthracite fields of North America.

The WITNESS: Covering about 480 square miles.

The CHAIRMAN: That is the reason we will have to look forward to increasing difficulty in getting anthracite coal, apart from anything the Government may do.

Hon. Mr. LAIRD: Or adapting ourselves to some other kind of coal.

The CHAIRMAN: Yes. Dr. Camsell might go on, then, in describing the process of adapting the bituminous coal to take the place of anthracite.

The WITNESS: Well, I am a little bit out of my element in that, and what I can give you will only be a superficial statement. Perhaps I had better give you an illustration I am familiar with, where coke has replaced anthracite. This is the case of St. Paul and Minneapolis, cities which I visited in November.

By Hon. Mr. Laird:

Q. Did you visit them for investigation purposes?—A. In order to study this situation—the replacement of anthracite by coke. In St. Paul and Minneapolis they had been using almost entirely anthracite for domestic purposes, but the Minnesota Coal and By-products Company, who had the contract for supplying gas for those two cities, were making coke also and piling it up. Some few years ago they started in to make what is known as Koppers coke, which is reported to be an excellent substitute for anthracite. They now produce something like 250,000 tons of this coke per year in that plant, and distribute it between the two cities; and in order to push this coke and create a market for it they have engaged some fifteen or twenty young men whom they had trained to handle coke for domestic purposes and other uses, and wherever they make a sale of coke they send these young engineers in order to explain to the purchaser how to handle it. The result is that they have now almost entirely replaced the use of anthracite in those two cities. The coke is selling at exactly the same price as anthracite; \$16.50 were the figures that I had at the time.

By the Chairman:

Q. That was last autumn?—A. Last November. They made altogether about 250,000 tons of this coke, I believe, and I understand they shipped about 25,000 tons of it to Winnipeg, where it was used also as a substitute for anthracite.

By Hon. Mr. Hardy:

Q. How does it serve as compared with coal, as to heating units, and in the matter of economy? You say that it sold for exactly the same price?—A. The heating value of the coke is about 11,300 to 11,900 B.T.U. (British Thermal Units), which is somewhere about the fuel value of the anthracite coal now being shipped to Canada.

Q. Do you know if any way has ever been attempted of pressing coke so as to make it ship in less bulk than at present?—A. I don't know about that. That Koppers coke is a pretty condensed coke; it is heavier coke than we get from the gas house here.

By the Chairman:

Q. And of course a much better fuel?—A. Yes, more heat in it.

By Hon. Mr. Laird:

Q. Did you find that they were using a special kind of grate in Minneapolis for the use of that coke?—A. I understand they had some complaints about grates, but it was not very important.

Q. Using ordinary grates as used for anthracite?—A. Yes. For example, I understood in the majority of cases in those two cities they did not replace their burning equipment; they did not change their furnaces; it is not necessary to change the furnaces to burn coke.

By the Chairman:

Q. Do you think that that shipment to Winnipeg would indicate in any way that they were falling down a little on the local market, or just that they found that it was profitable?—A. I don't know why, but they have been advertising that coke all over the country in order to extend their market.

Q. I take it that the gas that comes from the carbonizing is utilized through the city?—A. Yes.

Q. They might have a condition that when they got enough gas they would say, "Well, we won't push this thing any more; we won't make any coke for the sake of selling coke, unless we can dispose of it to advantage?"—A. Yes, exactly. The gas in that case was the product that they were after first of all, so that I presume the demand for gas would determine the output of the plant.

By Hon. Mr. Webster:

Q. The coke was a by-product of their plant?—A. Yes.

Q. Under normal conditions would the cities of St. Paul and Minneapolis have used coke in preference to anthracite coal, or was it used on account of the scarcity of anthracite, and they thus found a ready sale for the coke?—A. I could not tell you what was the cause of its use.

Q. At the same price as anthracite, it would hardly be expected that the consuming public would use coke in preference to American anthracite?—A. Well, that was the case there; anthracite was selling at exactly the same price as this coke.

Q. But they could not get anthracite anywhere last year?—A. But I mean this is not a condition that is peculiar to this year. That has been in operation for some years.

By the Chairman:

Q. How long has that plant been established?—A. I don't believe I have that date.

By Hon. Mr. Webster:

Q. Do I understand you to say they sold the coke at the same price as anthracite?—A. Yes, \$16.50 to the consumer.

Q. The competition was with anthracite, was it?—A. Yes.

By Hon. Mr. Laird:

Q. Did you hear of any complaints there with regard to the extreme heat of coke burning out the grates?—A. I did not hear it there, but I have heard that criticism elsewhere.

Q. It cuts the inside of stoves?—A. I have heard some complaints but these objections can be overcome.

Q. You have no evidence to give on that?—A. No. I find also that they are making and selling between 250,000 and 300,000 tons of similar coke in Detroit.

By the Chairman:

Q. Is that a by-product—hard coke?—A. Yes.

By Hon. Mr. Webster:

Q. What quality do they turn out in Montreal?—A. I don't know, but I believe the ordinary town gas coke.

By Hon. Mr. Hardy:

Q. What are our gas companies in Canada doing in regard to making their gas out of coal? What are they doing with their coke?—A. They sell it as a fuel for domestic consumption.

By Hon. Mr. Laird:

Q. In any case, the total output of this coke that was made as a by-product in the production of gas would be a negligible quantity when you consider the total amount of coal that is required for consumption in central Canada?—A. Yes, of course; there is practically no coke of that character being made in Canada, except at Sydney.

Q. I understand you are making suggestions as to how the supply of anthracite from the United States can be replaced by something in Canada?—A. Yes.

Q. And this is one of the suggestions you made?—A. Yes.

Q. In any case the quantity we could expect from that source would naturally be very small; is that correct?—A. The coking industry might be developed to such an extent that it would replace all our anthracite requirements. That would depend altogether, I should say, on the market for the by-product that is produced.

By Hon. Mr. Webster:

Q. Do you know the cost of producing coke?—A. I have some figures, but, as I say, I prefer that you would call some other witness who is more expert on that question. My knowledge is rather superficial.

Q. That would mean that you would require to import American coal, say to Ontario, produce coke, and then sell the coke in competition with the anthracite coal wherever anthracite coal is available?—A. Yes.

Q. I just wondered if you had any figures as to what that might involve in cost, or whether it is a really practical solution of the anthracite situation?—A. It is practical in the cities of St. Paul and Minneapolis, and I do not see why it should not be practical here.

By the Chairman:

Q. You get a smokeless fuel?—A. You get a smokeless fuel.

Q. Instead of making a dirty soot by burning soft coal; is that part of the situation?—A. Yes, and you obtain four main by-products—gas, sulphate of ammonia, tar and benzol; and I am led to understand that the value of those by-products is equal to if not more than the cost of converting the coal into coke.

By Hon. Mr. Webster:

Q. But only to a gas company, or some corporation which has a franchise from a city?—A. Naturally.

Q. It would not be a profitable venture for a private individual, or even for a government, to erect coke ovens?—A. Its success would depend on a number of conditions.

Q. As I understand it, it requires to be worked in conjunction with a gas company?—A. Yes, preferably.

The CHAIRMAN: With the distribution of gas.

By Hon. Mr. Laird:

Q. If it is not commercially feasible to produce this coke except in gas plants as a by-product from the manufacture of gas, would not that necessarily mean that the supply from that source of fuel would be limited in comparison

with the enormous demands of the country?—A. Well, that is a question which I think we will have to investigate, to find out what is the market for the by-products that are produced in this process. That is to say, if you could sell all your gas to cities and sell all your sulphate of ammonia for fertilizer, and your tar for other purposes, and your benzol for motor spirit, if you have a sufficient market for all those things, then I think your coking plant would be a successful undertaking.

Hon. Mr. WEBSTER: The Quebec Gas Company has been turning out coke for 15 years to my knowledge, but that has not solved the anthracite problem.

The WITNESS: Yes, but that is a different class of coke.

Hon. Mr. WEBSTER: It is a by-product. It has been found satisfactory with the bakers.

The CHAIRMAN: Oh, it has its place.

Hon. Mr. WEBSTER: It may not be quite so strong as this coke Dr. Camsell refers to.

The WITNESS: The gas coke you get here is not an entirely satisfactory substitute for anthracite, but the coke they make at Sydney and in Chicago and Detroit and Minneapolis is a satisfactory substitute.

By the Chairman:

Q. Have you any means of ascertaining how far that has displaced anthracite in the twin cities of St. Paul and Minneapolis?—A. I have not the exact figures, no.

By Hon. Mr. Webster:

Q. The suggestion put before us is well known to the Toronto Gas Company, the Montreal Gas Company and the Quebec Gas Company, and they could readily produce coke if it were the solution of the trouble. It is not a new idea?—A. No, but the process is being improved continually. For instance, in Minneapolis they are making coke in 19 hours—That, I think, is the time it takes to make their coke—but the same company can now put up ovens that will make the coke in 10 hours, thereby materially reducing the cost of the operation.

Q. If they had not the sale for gas they would not make the coke?—A. That is right.

Hon. Mr. LAIRD: That is the point I was trying to make a few moments ago, that the supply of coke would be limited.

By the Chairman:

Q. Of course, it is probable that in every place the market for gas might be considerably increased?—A. There is not any one solution that I can see; that is to say, there is no single thing that will solve the problem. It has got to be a combination. The reason I have made the suggestion which I have is because there are very large quantities of bituminous coal available for coking purposes.

By Hon. Mr. Webster:

Q. From whom could we get figures as to the cost of manufacturing?—A. I presume from the Koppers Company of Pittsburg.

By Hon. Mr. Laird:

Q. Is there any firm manufacturing that coke in Canada?—A. Yes, the British Empire Steel Corporation.

By the Chairman:

Q. It is being made in Sydney?—A. They have the same type of oven that they have in St. Paul.

By Hon. Mr. De Veber:

Q. I do not see here any returns in regard to the amount of coke shipped to the United States. I know that every mine in the Crow's Nest Pass has a very large coking plant?—A. There is not much being produced now.

By Hon. Mr. Laird:

Q. In the course of your investigation in Minneapolis did you find that the use of this coke as a fuel in furnaces and stoves required a much greater draft than is necessary in the case of ordinary coal? I have heard that one of the difficulties is that the coke will not burn, that the fire will die out unless there is a forced draft, or unless the coke is mixed with coal?—A. It requires a little different treatment to anthracite. That is why these people engaged young fuel engineers, to teach the people how to handle the fuel. That method would practically have to be followed in this country if the coke were being introduced.

By the Chairman:

Q. Would it not be very desirable to have demonstrators introducing any new fuel?—A. Yes.

Q. To show how it could be used to the greatest advantage, and how the difficulties could be overcome. There was a time when anthracite coal was not saleable?—A. The Alberta people in introducing their coals into Manitoba had to adopt the same practice. A demonstration office was established to demonstrate to the people how to burn the different kinds of coal.

By Hon. Mr. Hardy:

Q. Would it pay to produce coke just for the use of the coke itself, without regard to the by-products that might be shipped away, not including gas?—A. I should think there would have to be special conditions.

By the Chairman:

Q. On the assumption that you could afford to waste the gas?—A. Yes.

By Hon. Mr. Hardy:

Q. Have you any approximate idea of the amount of coke produced in Canada today?—A. No, I have not that figure.

Q. Is there any method of getting that?—A. Yes, but I have not got it with me.

Q. It would be a comparatively small amount compared with our needs.

Hon. Mr. WEBSTER: Yes, very small.

The CHAIRMAN: Leaving out the gas house coke, the hard coke is nearly all used in metallurgical work. Practically all the Sydney coke is used in their own plant, and the gas is a by-product.

By Hon. Mr. Hardy:

Q. Your Committee was composed of departmental officials?—A. Yes.

Q. Do the names appear in any of the reports?—A. No. The Committee consists of seven.

Q. I suppose the question of transportation did not come within your province?—A. We have not got a specialist who could advise us; we were simply in communication with the railway companies, and Mr. Magrath the Fuel Controller had collected a great deal of information in regard to the rates that are actually being applied.

By Hon. Mr. Laird:

Q. Have you any information as to how much coke a ton of bituminous coal will make?—A. About 1,300 pounds or 1,350 pounds.

The CHAIRMAN: Would not that be good practice?

Hon. Mr. WEBSTER: Seventy-five per cent of coke is the output of a ton of coal, I think.

The WITNESS: That is specially good practice.

Q. In the old days we used to get a chaldron of coke from a ton of coal. Of course, it was very bulky and light?—A. The question of the supply of fuel for this acute fuel area, as we call it, no doubt may be considered as a transportation problem. There are four possible fields from which coal can be drawn to supply Ontario and Quebec. First of all, there is the Nova Scotia field, including New Brunswick; then there is the American field; there is the Alberta field, and there is the British field. If you consider freight rates alone, and take Montreal as your central point of consumption of anthracite or fuel for domestic purposes—Montreal consuming in the neighbourhood of 1,000,000 tons of anthracite in a year—the freight rate from Nova Scotia during the summer months would be, I presume, under one dollar, wouldn't it?

The CHAIRMAN: I should think distinctly under that.

Hon. Mr. WEBSTER: I do not know.

The WITNESS: Well, from the point of view of freight rates alone, that field is the natural source of supply for Montreal. The next field would be the British field. Freight rates are in the neighbourhood of \$2 a ton from Swansea to Montreal. The next point would be the Pennsylvania field, from which the freight rates are \$4 and upwards. The last field would be the Alberta field, from which the freight rates quoted by the railway companies to Ontario points are about \$12.50.

By Hon. Mr. Hardy:

Q. You mean, Dr. Camsell, the Welsh coal could be laid down at a freight charge of \$2 a ton in Montreal?—A. Yes, from Swansea.

Q. Could they give us a good supply from Wales?—A. Oh, yes. That is to say, they have very large reserves.

By Hon. Mr. Laird:

Q. Have you anything else to suggest to replace the supply of coal?—A. Yes, I have. As far as I can see there are only two fuels in provinces of Ontario and Quebec that are native to the provinces, that is, wood and peat. These are the only fuels we can count on; the only fuels we have got.

By the Chairman:

Q. What about oil?—A. Apart from oil. But the production of oil is relatively small, and the fields are gradually being exhausted. I think if the peat industry in Ontario could be developed to the same extent that it is developed in Europe, it would replace for domestic requirements a considerable quantity of the domestic fuel that we now import—domestic anthracite. There is no doubt a very strong prejudice against peat in this country, and it is a very hard thing to get anybody interested in the manufacture of peat.

Q. From what does that prejudice arise?—A. From the failures and from the money that has been lost in the peat industry in the past.

Q. I was told that there was some local prejudice against it in the way of an impression that too much money was being made out of it by the people who were handling it?—A. There is no prejudice on the part of people who have used peat this year. That I can say very safely, because a questionnaire was sent out to practically everybody who bought peat for his opinion of its value.

By Hon. Mr. Webster:

Q. But they used the peat only as a substitute?—A. Exactly.

Q. It can never be recognized as a standard fuel?—A. It can never meet all our fuel requirements.

Q. Has it ever been practically demonstrated as a satisfactory fuel?—A. They use 20,000,000 tons of peat a year in Europe.

Q. Europe is quite a big place, and has a big population?—A. Yes. They use about 7,000,000 tons in Ireland alone.

Q. Ireland has used it for 300 years, and it is not used much more successfully to-day than when they started?—A. But the point is that there is a consumption.

Q. But isn't that by force majeure—that they require to use it?—A. Isn't that the same condition we have here.

Q. Except that our climates and living conditions are not the same as those of Ireland. I know of some cases in Montreal, in which peat was delivered last fall, and which the purchasers won't use it and have ordered it out of the house?—A. That is last year, or 1921?

Q. Last year. So long as our public can get anthracite coal, or a quantity of coal equal to anthracite, they will pay the money to get it?—A. That is quite true; but we are considering the time when they cannot get anthracite, and we have to consider that time.

The CHAIRMAN: Or the people who have not got the money.

Hon. Mr. WEBSTER: The working people are the best customers for anthracite coal.

By the Chairman:

Q. You sent out a questionnaire?—A. The Peat Committee sent out a questionnaire.

Q. Who are the Peat Committee?—A. It was a committee appointed by the late Government—a joint committee of the Federal Government and the Ontario Government—with the object of developing machinery for the manufacture of peat. The object was not to manufacture peat on a commercial scale, but to develop machinery for its manufacture.

By Hon. Mr. Webster:

Q. What, in your experience, is the greatest objection to peat?—A. Its bulkiness. It has to be manufactured within a very short distance of where it is going to be consumed.

By the Chairman:

Q. Is that because it will not stand handling?—A. It won't stand a long haul. Freight would be too high on it. Then, it is more or less friable, it cannot stand many handlings.

By Hon. Mr. Webster:

Q. Is the moisture content in peat not the chief objection?—A. It depends on what extent you reduce the moisture.

Q. Has machinery been invented that can extract the moisture?—A. No.

Q. To a proper point?—A. To my knowledge no machinery has ever been invented that can extract the moisture from peat. The method is to sun dry it.

Q. Haven't they a climate in Ireland which permits of the peat being better dried?—A. I think they have a worse climate than we have for that purpose.

By the Chairman:

Q. Who is the chairman of the Peat Board?—A. Arthur A. Cole, the engineer for the Temiskaming and Northern Ontario Railway Commission. He lives in Cobalt.

Q. Is there anybody in Ottawa who could speak of the preparation?—
A. The member of that committee representing the Federal Government was Mr. Haanel.

Q. Do you know anybody who has used peat in his house?—A. I have used it myself every time I could get it, and I know probably fifteen or twenty others who have used it also.

By Hon. Mr. Laird:

Q. In furnaces or stoves?—A. I use it in the kitchen range, and will use it whenever I can get it for that purpose. I use it in the grate, and will use it for that purpose whenever I can get it. I have used it in the furnace in the spring and the fall when I simply wanted to make a fire in the morning and the evening; but it is exceedingly difficult to keep a continuous fire in the furnace for the whole night.

Q. It would not do for steam purposes?—A. It is used for steam purposes.

Q. Is it efficient for steam purposes for a big plant?—A. I was told when I was in Cologne that there was one plant in Germany developing 20,000 horse-power and using peat alone.

Q. Why don't other plants use it?—A. It is used very largely in Germany. I have not seen the figures lately, but the production amounts to several million tons a year.

Q. Would it be the same kind of peat we have in this country?—A. To a very large extent it is machine-made peat.

By Hon. Mr. Hardy:

Q. Are their peat beds of the same class as ours?—A. Yes, very much.

By Hon. Mr. Webster:

Q. The same moisture?—A. Yes. All peat has practically the same moisture. That has to be reduced to 25 per cent to make a proper fuel.

By the Chairman:

Q. Could you give the names of any people who have used it? Unofficial people?—A. Unbiased people?

Q. Unbiased people who are using it for economy or convenience, and whom we could get to come before us?—A. Dr. Porter of McGill University has used it.

By Hon. Mr. Laird:

Q. Do you know of anyone using it in a large way?—A. There is no large production, so nobody can use it in a large way.

By Hon. Mr. Webster:

Q. So far, has its use not been confined to grates in private houses?—A. Grates, and kitchen fires. I think there are three or four men in the Department of Mines who have used it regularly, and they tell me that they use it in their furnaces for about six weeks or two months in the fall or early winter, and then go to coal for the hard winter months, and then use peat again in March and April.

Q. I have experimented with peat myself, in my grate.—A. How do you like it?

Q. It gives a cheerful glow, but it is not liked as well as wood?—A. Of course the technique of peat manufacture has got to be developed, and there are going to be a good many complaints for some considerable time until there is developed a sort of skilled labour in the manufacture of peat.

Q. One complaint is that the ashes are so light that they blow all over the room and soil things to such an extent. Many are prejudiced against the use of it even in grates. Wood does not cause the same complaint.

Q. I was going to ask you, doctor, whether this fuel question should not be taken up more in detail, perhaps by provinces. I gathered from your remarks that each province was peculiarly and differently situated, and that the problems in one province were not identical with those in another. It might be better for the Committee to consider the advisability of dealing with each province or district?—A. Your Committee is to deal with the fuel supply?

Q. Yes, under two heads, I presume for manufacturing and for domestic use?—A. As I said before, the question in the West is rather different. In Alberta it is purely a question of securing a market for the fuel.

Q. There is no question of the supply in Canada?—A. No question of the supply.

Q. What about the quality?—A. The quality and quantity are all right. The CHAIRMAN: You are getting down to distribution.

Hon. Mr. WEBSTER: And price.

By Hon. Mr. Laird:

Q. In your investigations, did you find anything other than peat that would produce a supply of fuel in this country?

By Hon. Mr. Webster:

Q. What is the comparison of cordwood with peat?—A. You mean the value?

Q. Yes, and for general use, as a substitute?—A. I have not the figures for the heat units in a cord of hardwood, so I cannot answer that question, I am afraid.

Q. Do you think peat could be manufactured economically and scientifically so that it would displace cordwood for heating purposes?—A. It will do so in certain places where cordwood is not available. Take the case of Alfred, where the Peat Committee has been working. That town has lived almost entirely on peat.

Q. But in Ontario and Quebec where we have such a great supply of timber in our forests, is it advisable to emphasize peat as a fuel to the consuming public? Why use peat if it is not a practical commercial success?—A. It looks to me as if it might be the proper thing from a national point of view. It seems a wasteful thing to burn wood when it might be used for other purposes, although I believe a great deal more of it should be used for fuel purposes.

By Hon. Mr. Laird:

Q. In your researches did you consider the use of electricity for heating as to how far that could be applied?—A. Yes, we made some investigations there, and I think it would be perhaps advisable for the committee to call another member of the Fuel Board, who was appointed for the purpose of advising us on the question of electricity.

By the Chairman:

Q. Who is that, doctor?—A. Mr. Challies, the head of the Dominion Water Powers Branch.

The CHAIRMAN: Are there any further questions?

By Hon. Mr. Webster:

Q. Was any consideration given to briquetting or the use of Canadian slack by some method that would suit for domestic purposes?—A. Not that I know of.

Q. If the slack is of a quality difficult to sell, and there is an over-abundance of it at all our mines—A. In the West.

Q. In the West. And also in the East. In Nova Scotia there are many mines that have difficulty selling their slack and do not know what to do with it. In the old days they used to make the roadbed for the railway tracks out of the slack. You remember that?—A. Yes.

The CHAIRMAN: Oh, yes, and sell it for 15 cents a ton.

By Hon. Mr. Webster:

Q. Has there been any thought, or is there any suggestion, that the committee might consider the use of that slack for domestic and heating purposes generally, or for steam purposes?—A. We have not taken any steps to make any investigations there.

Q. Might not that be a cheaper method of heating than the method of converting block coal into coke?—A. Well, I should think you would have the same objectionable features in a briquetted coal made out of bituminous coal as you would have in burning straight bituminous coal.

By Hon. Mr. Laird:

Q. This brings up that question of the briquetting plant in Saskatchewan. Did you look into that matter? The country has spent about \$950,000 on that, and apparently it is not a success. There is any amount of coal there, but they do not seem to have been successful.

The CHAIRMAN: In getting ready for this committee, I have found a remarkable reluctance on the part of everybody to claim responsibility. I have spoken to this gentleman, that gentleman and the other gentleman, and nobody seems to want to take any responsibility for the briquetting plant.

Hon. Mr. LAIRD: There is a commission in charge of that briquetting.

By Hon. Mr. Webster:

Q. There are many thousands of tons of Welsh slack exported as briquettes and it was also exported to Canada last year, in the form of Ovoids and Stovoids. They were nothing else than Welsh slack. Wherever they have been used they have given pretty general satisfaction?—A. Yes.

Q. Is that due to the method and to the binder and the form in which these ovoids have been prepared?—A. The satisfaction that they give in the domestic furnace is, I think, due very largely, in the first place, to the character of the coal of which these briquettes are made.

Q. Surely?—A. They are made out of either anthracite or very dry steam coal of low volatile content in the first place. The addition of 5 or 7 per cent of binder does not add a great deal of volatile content, so as to make it a very objectionable fuel. But where you have bituminous coal containing 25 or 30 per cent of volatile material in the first place, to add a binder to that would make it still more smoky than it was in the first place. The Welsh anthracite situation is one that I looked into myself pretty carefully in July of last year, and I found that they had a very excellent grade of anthracite, probably the best anthracite in the world; the cleanest. They were producing something like 3,000,000 to 5,000,000 tons of anthracite annually, and their principal markets were in France, Italy, the Netherlands and the Scandinavian countries,—a market which absorbed, I think, 50 per cent of their total output of anthracite; but I found that for a certain period of the year—the spring and early summer months—they were working at very much reduced capacity. I suggested to some of the Welsh producers over there that they might look into the Canadian market for their output during those periods, and a number of them have done so. But to what extent they are going to follow that up and supply us with anthracite for domestic purposes, I do not know.

By the Chairman:

Q. We could take their whole output?—A. Yes, we could take their whole output. A letter which I had from one of them the other day gave me to understand that they would have available for export to Canada somewhere between a quarter of a million and 400,000 tons of this anthracite.

By Hon. Mr. Webster:

Q. Is that large vein? How is it described?—A. It is not described particularly; it is simply described as anthracite.

Q. Do they indicate the price?—A. No.

Q. It is very essential?—A. Yes, very essential.

By Hon. Mr. De Veber:

Q. In regard to briquetting of coals outside of those in Saskatchewan, there was a certain amount of fine anthracite briquetted up near Banff, at the anthracite mines there. I do not know whether it is a success financially or not, but as a product it is very satisfactory.—A. That plant has been closed down.

Q. I know; because the anthracite is about played out.—A. Not because the anthracite is played out.

Q. But there is one thing that I would like to have explained, so that we may talk intelligently upon the matter. There are a number of different kinds of coals, some of them suited for one purpose, and some for another. For instance, as I understand, anthracite is a perfect coal for use in factories and is also a perfect household coal, but bituminous is not a household coal.

Hon. Mr. LAIRD: No, it is a steam coal.

Hon. Mr. DE VEBER: It is a steam coal. It is used on the railways and in factories.

The CHAIRMAN: All the Maritime Provinces use bituminous coal, and a large number of people in England use bituminous coal—

Hon. Mr. DE VEBER: For household purposes?

The CHAIRMAN: For household purposes.

Hon. Mr. LAIRD: We use it in furnaces out West, but it is screened.

The CHAIRMAN: As a matter of fact, I have heated my house for twenty years with a Daisy furnace specially designed for anthracite coal, but I burned soft coal.

Hon. Mr. DE VEBER: When I was a young fellow living in St. John my father ordered some of that coal and we put it into the grates, and when the fire got going it just melted and it made a surface over the top, and bubbled and bubbled and bubbled, and we had to keep poking the stuff to make it burn. To make that a good household fuel, for common use, I should judge it would have to be made into coke.

The CHAIRMAN: That is the plan.

Hon. Mr. DE VEBER: If you make it into coke it is all right. Then there is the other coal, the lignite, which is a perfect household coal. It is used all over the West. Mr. Pearce, I think, will tell you that there is no hard coal or no bituminous coal in household use in the West at all. There is none that I know of.

Hon. Mr. LAIRD: They use it screened.

Hon. Mr. DE VEBER: But the coal from the Lethbridge fields is the lignite, and, as I think Mr. Pearce will tell you, it is the best furnace lignite that can be got anywhere. That is used altogether in Alberta, Saskatchewan and part of Manitoba, as far as you can compete. You cannot compete to Winnipeg. You can compete to Brandon. It is used also in British Columbia. Nelson and all those places get our coal for household use. I want to point out that in talking over this matter we should not get the kinds of coal mixed.

WILLIAM PEARCE, called and examined.

By the Chairman:

Q. What is your position?—A. I am connected at present with the Development and Settlement Branch of the C.P.R.

Q. You have heard Dr. Camsell's evidence. Can you supplement at all what he said about these coking plants? There is no use repeating what he said, as the time is short, but are there any other points?—A. I have spent the greater part of the last four years studying coal questions, and in doing so I have visited the larger by-product oven-coking plants; those at Sydney, Sault Ste. Marie, St. Paul, Chicago, Terre Haute, Pittsburgh and Syracuse, where the Semet-Solvay people's headquarters are. The conclusion I came to is that the solution of our coal problem, so as to make Canada as independent as may be reasonably possible by the use of her own coals, is to take our bituminous coals and convert them into coke; not necessarily through the ordinary by-product oven, because such modifications are being made in that every day that it is hard to tell what a very short time in the future is going to develop. For instance, the Koppers people, who are to-day supplying 70 per cent of all the by-product ovens that go into use in the United States, have reduced the time of coking. Not very long ago it took twenty-four hours. When they got it down to sixteen they thought they had reached the minimum time. Now they have got it down to ten hours, just by changing the designs of the ovens. That of course reduces the cost very materially.

What the doctor has said about the introduction of coke in St. Paul and Minneapolis is correct. I was there just a short time ago, and I was there also three years ago, when they first introduced coke. They are making a metalliferous coke, leaving very little volatile in it. At one time they left only one per cent volatile and less than one per cent moisture. To-day they are leaving from 3 to 5 per cent volatile—

Q. They are leaving more volatile in it?—A. Yes; from 3 to 5 per cent volatile; and they are increasing the moisture content by dousing it. So I think that perhaps their coke to-day would run, as I said, from 3 to 5 per cent volatile and about 2 per cent moisture. It is possible to make a domestic coke by changing the design of the oven so that it will run from 8 to 12 per cent volatile, which will make it a free-burning fuel. Of course you do not want to leave any more moisture in it than you can help. That will make it a firm enough coke, so that it will stand shipping without any more abrasion than the metalliferous coke, if as much. Metalliferous coke comes out in different shape, and and the very dryness and hardness of it cause a considerable loss in abrasion. With the use of by-product ovens you have a supply of the best coal-tar binder that is made at the minimum of cost. Taking it all around, it is the best binder that is made. So you can take your breeze or any of your coals which are not coking coals—as we have in every district a certain amount of such coals—and from the very fact of their not being coking coals, they may become, like some of our deposits in the Rocky Mountains, very low in moisture, they are very low in ash and have very little volatile in them either. The result is you have a very high fixed carbon content, which would make it an A-1 fuel, having a maximum value as a briquette. If you found in making your briquettes that they were smoky, that difficulty could be removed by baking, and it is quite probable that that smoky content that comes from the binder can be recovered. But even if you did not recover it and you used, say, as high as 10 per cent binder, your cost would not be very much.

By Hon. Mr. Webster:

Q. From where do you get your binder?—A. You get your binder in coking the bituminous coals. That is one of the by-products. It comes out of the tars; it is a distillation from the tars in bituminous coal.

Q. Would you get enough binder to make your briquettes?—A. Oh, yes. You get out of a ton of coal, in coking it, enough binder to briquette a ton.

By the Chairman:

Q. How much binder are you counting on using?—A. I count on using 10 per cent—8 per cent.

Q. Eight per cent?—A. Eight per cent binder. That is plenty. You can probably reduce it. Now, the chief cost of that binder where it has been used in one briquetting plant we had in the West, at Bankhead, has been the freight charges. The first binder they ever used came from Glasgow.

Q. Mr. Pearce, might I interrupt you for a moment? It might be inferred from your statement, which was possibly inadequate, that it was pitch that came off in the process of distillation. Is it not tar, which is not a suitable binder? You need pitch.—A. It is pitch taken from the tar.

Q. Then you distill the tar and get pitch and volatile benzole.—A. Well, those are separate. You first get gas. That comes off first. Then you get your sulphate of ammonia. Then you get your benzoles. The rest goes as coal tars, and out of those tars there is a certain percentage, 5 per cent, that will go to make creosote oils for timber preserving, and so on. When those tars were formerly barrelled and shipped in barrels, they were made hard; but now they are in a semi-fluid state and shipped in tank cars. To unload those cars you have to use superheated steam in order to get the tars to flow. The cars used are the same as are used for carrying oil. The question has been raised, "Can you burn coke?" There is no doubt whatever about that. It is only a question of very little education and a certain amount of intelligence in order to do it.

By Hon. Mr. Laird:

Q. Without forced draught, Mr. Pearce?—A. Yes; the same draught that you have ordinarily. You hear people condemn coke for two reasons. One reason is, they say, that it will not burn; and the other is that it burns out the stove. Those are two conditions that are pretty hard to reconcile. I think they both exist, but they are easily met. There are to-day two schools of carbonization. I think that within very few months you will see a combination of them. There is what is known as the low temperature carbonization, and there is the high temperature carbonization. In one case a heat of about 1,900 centigrades is obtained, and it sometimes goes up to 2,500; in the other it is not over 700. The result of the low temperature carbonization is that you do not get very much gas, but you get a great deal more tars, and they are more valuable. For instance, as the result of low temperature carbonization you have creosote oils of 4 to 5 per cent more in volume than you have under high temperature. But so far there is a question of fractionizing and getting that creosote oil out; and then an objection has been raised by the high temperature carbonization school that when you get it out it is not as good as the creosote that they get out by their process. That remains to be proved. The low temperature men scout that idea. But the question will be solved within a few months. It is being solved. That particular feature about the tars is being solved by an institute in St. Louis which took some of the tars last July for the purpose of determining this question. Van Schenck is the name of the man who runs it. He is supposed to be the highest authority in that kind of investigation on this continent. The low temperature advocates say there is no doubt as to what the results will be, and if he pronounces as they claim he will, the difficulty will be overcome.

By the Chairman:

Q. Is it a different kind of apparatus?—A. Altogether different.

Q. Is the low temperature method still in the laboratory or experimental stage?—A. Well, there have been small experimental plants in this country. It has been carried out in England for some years, with, as the advocates claim,

success; but the other school disputes that. I was discussing this particular matter with Mr. Blauveldt at Terre Haute. He was for many years the chief chemist for the Semet-Solvay people, at Detroit.

Q. At Syracuse?—A. No, he was at Detroit. They had a very large plant there at one time making coke for metallurgical purposes, and also producing gas for power purposes and for lighting and heating; and I think they used gas for steam purposes there. They have largely gone out of the Detroit agency for gas, but they still keep up the coking plant, and they are shipping—I do not know how much, but I have seen, last winter and this, Semet-Solvay coke from Detroit advertised in Toronto. In passing I may say that when I was there in January they were charging 50 cents a ton more for it than for anthracite, and they said they could sell all they could get; the trouble was they were not getting as much as they would like to get.

By Hon. Mr. Webster:

Q. Was that due to its quality, or was it due to the scarcity of anthracite?—A. They said the people thought there was that much more value than there was in anthracite.

Q. They had been selling coke at \$18 and \$20 at Quebec because there was no anthracite.—A. But they were getting anthracite there to some extent. A year ago, when there was no scarcity of anthracite, they were selling coke.

By the Chairman:

Q. At the same difference, do you think?—A. No, I think a year ago it was slightly lower than anthracite.

By Hon. Mr. Webster:

Q. It usually has been lower, I think.

Mr. PEARCE: Now, the question whether you can make coke where you have not a market for your gas resolves itself down to two things: first, what class of coal you are using—what per cent of volatile it has in it; and secondly, what class of coke you make. If you take a coal that is not running over 25 per cent volatile and if you make a domestic coke that is running 12 per cent volatile, you will not produce any more gas from it than you will utilize in operating the plant. We had for many years a production of coke in the Crow's Nest Pass. It was made by beehive ovens, which waste all of the by-products. Mr. Wilson, Manager of the Crow's Nest Pass Coal and Coke Company, this last year started to make a class of coke which he claimed would carry about 10 or 12 per cent volatile. So far as people have used it, I understand it has given satisfaction. It has been used in Calgary to heat the street railway cars, because they could not get the anthracite coal from Bankhead which they formerly used; and they pronounced it A-1.

By the Chairman:

Q. They have a small heater in the car?—A. Yes, a small heater in the car.

I want to state one thing. It has been stated that the Bankhead plant is closed. The mining part is closed; the briquetting part is still running, using up some old culm piles. Their market for that briquette is the Canmore Coal Company. The Canmore Coal Company have what the C.P.R. pronounced, for locomotive purposes, as having the most heat units, the best value of any coal they have on their whole system, but it is so badly crushed that, using the ordinary firing apparatus all the time, they have to put something in that will loosen it up, so they put in about 15 per cent to 20 per cent briquettes so as to let the air through. They could design a boiler to use it, but the C.P.R. have adopted this system in connection with their locomotives, that they must all be interchangeable, and if they would adopt a boiler for that district of that class

they could not utilize it in any other district. As to the cost of coke for domestic purposes, I think you will get at least 75 per cent to 80 per cent of coke out of your coal.

By the Chairman:

Q. That would be out of good coking coal?—A. Out of good coking coal, yes, but although it may be a good coking coal it may be a very high ash coal, and that all goes into coke. But if you are making metallurgical coke with a high temperature, with the usual process, you will get from 65 per cent to 70 per cent; they claim at St. Paul they are getting 74 per cent to 75 per cent of coke out of theirs. As I say, they are leaving more of the volatile elements in it, and they are not burning it so hard, and putting more moisture in it. When I visited that big plant in Chicago the other day they claimed they were getting 77 per cent coke out of the mixture they were using, and to a slight extent Illinois coal, which is now high, and they were using also some Tennessee and Pennsylvania and West Virginia coals, and probably a little from Indiana. The St. Paul plants were using five different coals; they all entailed a considerable railway haul.

Q. Would those be the Illinois field?—A. No, they used a very small proportion of Illinois, although they told me at the plant that they kept a reserve stock of Illinois coal on hand, but they did not want to use it any more than they had to. They were getting their supplies from that big Pittsburg field, from the Pocahontas field in Western Virginia, a slight amount from Indiana, a considerable amount from Tennessee, and the balance was Illinois. The St. Paul plant was originally installed by people who are largely interested in the Koppers company, and they thought naturally that the main thing was gas, and that coke was going to be subsidiary, and they thought they could turn out gas so that they could get a large amount of fuel supply in St. Paul and Minneapolis taken in the shape of gas, but they were disappointed in that. Their first customer for coke was the Algoma Steel Company, but when that company installed their own coke plant, in which they were coking, when I was there, 25,000 tons a day and getting 68 per cent coke out of it, of course the market for the St. Paul plant was cut off, and they had to find a market, and they found it as Dr. Camsell has related to you. When I was there two years ago last fall they were getting a market for all the coke they could make, and it was rather a surprise to me to find a year later that they were trying to shove their coke into Winnipeg. Up to the 10th of March a year ago they and the Duluth plant together had shipped into Winnipeg from the autumn before—at least it had been taken by two firms—35,000 tons of coke, and it was sold retail in the Winnipeg market.

Q. In competition with anthracite?—A. Yes, in competition with anthracite. There is no doubt whatever that within a certain radius we have the best grades of lignites. The best grade is about the Lethbridge field, the next is Tabor, and the next Drumheller, and the next Pembico, near Edmonton, and the next just east of Edmonton, Clover Bar. For certain seasons of the year when you can ship them in there is no good in trying to compete with them by any coal that we have. Owing to their calorific value there is little that you can ship in competition, so that it will be advisable to turn our fuels into the highest quality we reasonably can, which I claim is coke and briquettes. You can ship them all the year round; you can store them in quantities; no danger of damage from heating or from internal combustion; you keep your miners engaged all the year round; and by that means you ought to get the minimum cost both in production and in transportation. But there is no coal in the world that I have ever seen that is a nicer burning coal than our better grade of lignite if it is properly mined and screened and shipped; but they will break down.

By Hon. Mr. Laird:

Q. Would that coke go down into the eastern markets?—A. You had better get transportation men on that question, but my own opinion is that the eastern limit of Alberta coals will not extend past Fort William, and I am not certain that it will extend east of a point about midway between Fort William and Winnipeg. I am speaking of domestic purposes, and possibly also for manufacturing purposes, we certainly ought to be able to drive out any American coals for fuel purposes, and I think our bituminous miners that are now sending a certain percentage for steam purposes as far east as Winnipeg would probably, if they had facilities for coking, send their product in the shape of coke. I don't think there is any doubt whatever that within the very near future we are going to be able to profitably take the ash out of coals. That is one of the weak points of Alberta coal. I don't know how your Nova Scotia coals are; I have not looked up that point.

By the Chairman:

Q. They are light in ash?—A. Ours will run about 15 per cent.

The CHAIRMAN: Nova Scotia will run 5, 6, or 7 per cent.

The WITNESS: On the other hand, in Alberta we are void of sulphur. I don't know whether sulphur is an evil for domestic purposes, but it certainly is for foundry and metallurgical purposes.

By Hon. Mr. Laird:

Q. Your suggestion would not relieve the position in Quebec and Ontario?—A. Yes; Quebec you would supply from Nova Scotia coal brought up by barge, also turned into coke.

Q. Have you any suggestion to make to relieve the position in Ontario?—A. I have an idea that you could possibly shove Nova Scotia coals as far west as the west end of Lake Ontario, and certainly you could bring them up as far as Montreal.

By Hon. Mr. Webster:

Q. In competition with American coal, can you put Canadian coal into the western part of Ontario?—A. From Nova Scotia, if you could barge it to where it was wanted. You first have got to take this into consideration—

Q. The cost would be against you?—A. It may be.

Q. You can buy American coal for \$2 where your Sydney coal costs you \$5 at the mine?—A. But how long will that \$2 last?

Q. It is a quotation that is on the market to-day, at the mine?—A. What is the freight on that to Toronto?

Hon. Mr. WEBSTER: It is about \$4.50. From the Clearfield district \$3.32 to Toronto, is the rate given here.

The CHAIRMAN: That would be \$5.85?

Hon. Mr. WEBSTER: Yes.

The CHAIRMAN: What is Dominion coal selling at in Montreal?

Hon. Mr. WEBSTER: \$6.50.

The WITNESS: Whether you use Nova Scotia coals or American bituminous coals, the proper way to use them is to have by-product ovens at all the populous centres, take your gas off and sell it for fuel, and sell the coke as a substitute for anthracite.

By Hon. Mr. Webster:

Q. The Americans do not ship very much coke into Canada?—A. No; we used to ship it in to them.

Q. But, with their mines and the possibilities of converting their coal into coke, why don't they convert it into coke and ship that into Canada, or out into Winnipeg, rather than their bituminous products?—A. They are trying to shove it in.

Q. I understood you to say a while ago that it was the American steam coal that was the competition in Winnipeg?—A. Yes, against our steam coal.

Q. They could readily ship their coke in if it was profitable to do so?—A. They would have a longer haul than we would for their coke—a good deal longer.

Q. Have you any figures as to the cost of producing the coke, or the additional cost added to the main price, for producing your coke?—A. I would not do that; the by-products would more than pay for that.

Q. If you have a market for the by-products?—A. There would not be any trouble about a market for the by-products.

By the Chairman:

Q. Sulphate of ammonia is rather a drug on the market?—A. It is coming up.

By Hon. Mr. Webster:

Q. Would the by-products, exclusive of gas, compensate you for the process?—A. Yes, I think so, because we could get other things in the shape of gas. We would be selling a certain portion of that.

Q. Distribution would be much higher on the coke?—A. It is only ten per cent in freight.

Q. On ten dollar coal that is only one dollar more?—A. On ten dollar freight—ten per cent of the freight rate.

By the Chairman:

Q. Why should that be?—A. It is a little more bulky. But if you once create a market for an amount of coke equal to the quantity of coal which you now have I have no doubt that the railways will meet you with an equal rate.

By Hon. Mr. Webster:

Q. Have the railways ever considered using coke entirely in the Western divisions?—A. No, they have not. We have never had any coke supplied, except Beehive Oven coke, which is expensive. Then the petroleum interests came in. There were two things that made them grab up petroleum. One was freedom from forest fires, and the other was cleanliness. Both those conditions you meet in coke. I do not think there is any doubt that you could make coke of such spheroidal shape that you could make it feed automatically, make it run down.

Q. I don't follow you?—A. Now you have to shovel it in. All you would have to do would be to raise the spout.

By the Chairman:

Q. How would you make it spheroidal?—A. I think when you are running it in plastic shape you could run it over rolls.

Q. That is not done?—A. No, it has never been tried. Of course, they have been making this coke so that it will semi-flow, by mixing it with oil.

Q. That makes a pretty rotten coke?—A. I should not have said coke. I should have said coal. It is the Trent process.

By Hon. Mr. Webster:

Q. The Trent Amalgam process?—A. Yes.

By the Chairman:

Q. Is there anything in the use of powdered coal?—A. I think it has a big future. There is no doubt whatever that under certain circumstances it has a

big future. Probably if you had standard boilers, so that you could raise them high enough to have a good drop for your ashes to drop into water, you would have no trouble; but if you haven't you are going to have clinkers. That will depend somewhat on your coal.

By Hon. Mr. Webster:

Q. On the drafts?—A. No, on the coal.

Q. The drafts will make a clinker too?—A. When you have slate in fine particles it makes pretty bad clinkers.

By the Chairman:

Q. A pasty clinker?—A. If you could drop that from high enough it would not stick when it struck the bottom.

Q. Is there any other special point, Mr. Pierce, that you would like to tell us about?—A. No. If I got talking on coal I would keep you here all night.

By Hon. Mr. De Veber:

Q. It has been stated that there is practically no anthracite in Canada. Do you know anything about the Burns area west of Okotoks?—A. Yes, I know it pretty well, and I know that district. I do not think there is any doubt whatever that there is an immense amount of anthracite coal there, and the same conditions extends as far as the Bow river, and perhaps beyond.

Q. Do you know the area of the Burns claim?—A. I think his claim is twenty thousand acres. I am subject to correction.

By the Chairman:

Q. That is anthracite coal?—A. It is an anthracite coal in immense volume.

Q. Is that of the same quality as the Canmore coal?—A. No, the Canmore coal is a good deal higher in volume. It will coke in by-product ovens; it would not coke in the beehive. Below Canmore at what is called the Gap, we have a very high quality.

By Hon. Mr. De Veber:

Q. How many miles west of Okotoks is that on the Crows Nest line?—A. From Okotoks to where?

Q. To where the Burns claim is?—A. The Burns line laid down from Calgary is fifty-seven miles. It comes down to about due west from Okotoks, and then strikes up the north fork of Sheep Creek, and then to the south fork.

By the Chairman:

Q. What plant is there at Terre Haute?—A. They have a big plant there. It is the Indiana Coke and Gas Company, Blauvelt is the manager, and is probably as good authority on by-product ovens as there is in America. Mr. Blauvelt has a nephew, also a Blauvelt, who was with the Cement Solvay people at Syracuse until last spring. He has now started as a consulting engineer on by-product ovens in New York.

By Hon. Mr. De Veber:

Q. I have had it continually thrown in my teeth that Alberta coal goes to pieces as soon as it is mined, and that you cannot burn it in railway engines?—A. They do burn it in railway engines.

Q. That alludes entirely to the Edmonton coal which is near the surface?—A. Of course, none of the engines use lignites except in the winter when there is snow on the ground. The Railway Commission won't allow it.

Q. The Golt coal at Lethbridge does not spark and does not go to pieces?—A. The Lethbridge field is the best lignite we have. It is what the Alberta Government calls the domestic coal.

The committee adjourned at 1 p.m.

FRIDAY, March 16, 1923.

The Special Committee of the Senate on the Fuel Supply of Canada met at 11 o'clock, a.m., Hon. Mr. McLennan in the Chair.

The CHAIRMAN: We have called Mr. Benjamin F. C. Haanel, Chief Engineer, Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, and member of the Dominion Fuel Board. Mr. Haanel is peculiarly qualified to speak on the peat question, and we want to ask him to go over the whole ground. He has recently treated the question in a paper read before the Canadian Institute of Mining and Metallurgy in Montreal, and we would ask him to supplement or modify that in any particular way that he may think desirable, and especially to explain to us why peat, which according to all reports has so many virtues, makes such slow progress in getting into the market.

Mr. HAANEL: I suppose the Committee are aware of the fact, Mr. Chairman, that an investigation was started in 1908 by the Department of Mines, to determine the feasibility of manufacturing peat fuel as a substitute for anthracite to certain extent in Canada, and that as a result of that investigation which was conducted for two years it was demonstrated that peat fuel could be placed on the market at a cost which would permit it to compete with anthracite coal.

By the Chairman:

Q. Was that in a practical test?—A. That was in a practical test. Perhaps I had better describe that a little in detail.

Q. No, I think not.

By Hon. Mr. Laird:

Q. Briefly, just what was the nature of the test?—A. We purchased a commercial manufacturing plant similar to the thousand plants which were at that time employed in European countries, and erected that plant on the bog at Alfred.

Q. Where is Alfred?—A. Forty miles from Ottawa, in Prescott county. This was done for the purpose of demonstrating to those interested an economic process for manufacturing this fuel. We recognized at that time, of course, that a very large quantity of the fuel used by the poorer classes in European countries, and also by certain of the industries, was peat fuel. We knew also that in Sweden power plants were being operated by peat, and that the Swedish State Railways were being operated by the burning of powdered peat. We considered that in order to develop Canada's Peat Resources it was only necessary to demonstrate an economic process, so that people could have the advantage of seeing how peat was manufactured—that various stages through which it passed, how they could drain their bogs and utilize them in such a manner that they would be suitable for agricultural purposes afterwards. But the interest at that time was not as great as it is at present on account of the comparatively low price of coal and the ease with which it could be procured. The coal shortage prior to 1909-10 had not impressed itself very forcibly on the public, and they felt that there would always be an assured supply of coal. One private company did take up the work where the Government left off, and constructed

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machinery which embodied many of the improvements which the Department recommended. This company was in a fair way of commencing commercial operations subsequent to certain experimental work when the war broke out in 1914, and those who had contributed money or promised to support this venture financially, withdrew their support, and the plant which was already on the bog was disposed of at auction at a very low figure, and nothing was done until 1918 when the country faced a very serious fuel shortage.

At that time the Government of the province of Ontario and the Reconstruction and Development Committee of Parliament almost simultaneously thought something should be done to utilize our peat fuel resources as a fuel for domestic purposes, and as a partial substitute for fuel industrially. The Department of Mines was approached with a view to gaining their opinion as to the feasibility of undertaking a new investigation, and how that investigation should be carried on. The Department of Mines of Ontario at the same time were preparing to investigate the matter independently.

We soon found out that our objectives were the same, and that it would be foolish to attempt to conduct such an undertaking independently, and consequently the two governments decided to unite. In March 1918, a Peat Committee was appointed, composed of Arthur A. Cole, Mining Adviser of the T. & N. O., R. C. Harris, Commissioner of Works for the city of Toronto, representing the Government of Ontario, R. A. Ross, Consulting Engineer, Montreal and myself representing the Federal Government.

We recommended, since conditions had changed so materially since the work was carried on previously by the Government, viz: the increase in the cost of labour, the very remarkable increase in the cost of machinery, and the increase in the cost of freight—that the whole problem should be attacked from a different standpoint. That is, we would have to see how economies could be introduced into the manufacture of peat fuel which would permit of a comparatively low value fuel like peat being placed on the market at a low price. We recommended that two peat machines of different type be constructed and erected on the bog at Alfred, and that those two machines be tried out one against the other in order to ascertain which one possessed the features which would best enable it to be employed commercially. One of those machines was of the well known Anrep type employed in Sweden, and was equipped with automatic excavators and other labour saving devices.

By Hon. Mr. Laird:

Q. Do you remember how much that cost?—A. If you will let me proceed, I will give the cost later on. The other machine which was recommended by the Federal Government was known as the Moore Peat machine.

By the Chairman:

Q. Was that also a European machine?—A. No, a Canadian machine, the Moore. That machine had not yet been constructed, but merely existed on paper; but it possessed so many apparent advantages over the other types of machines, that the Federal Government felt warranted in going to the expense of trying it out.

While the Peat Committee was appointed in 1918 it was not until late in 1919 that the machinery was shipped to the bog and erected. This was owing to the difficulty of getting machinery constructed at that time because of the war. So it was not until 1920 that any real work was done in demonstrating the value of those two machines. In 1920 each of these machines was given a thorough mechanical try-out, and in 1921 they were operated as continuously

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as possible throughout the working season. I think those dates are right. At the conclusion of this time it was found that neither of these machines was suitable for commercial operation, but that both possessed particular individual advantages, which, if combined in a new machine, would produce a type of machine which would be the best adapted for commercial operations under conditions existing in Canada. We then obtained the authority of the two Governments and the necessary appropriation to design and construct this new plant which would combine the best features of the other plants, the idea being to eliminate manual labour to the greatest possible extent in the performance of the operations in the manufacture of peat fuel. I think at this point I had better describe the stages through which raw peat is put, unless you understand it.

By the Chairman:

Q. Perhaps you had better give us a short description?—A. Peat, as it exists in the bogs of Canada and other bogs is composed—

By Hon. Mr. Laird:

Q. Excuse me. Where are these bogs located? I come from the west and do not know?—A. Of course, the people of the west are not vitally interested in peat bogs. The peat areas are located practically all through Canada in the Northwest Territories, all through Ontario, Manitoba, Quebec, New Brunswick, Nova Scotia and Prince Edward Island. I have here a list of all the bogs which have been examined, and their location.

By Hon. Mr. Hardy:

Q. From what you say, then, wherever we have coal we have peat?—A. Not necessarily. Peat, I may say, is the father of coal.

Q. I was wondering why, when we have so much peat in Ontario, we should not have coal too?—A. The peat in Ontario is of recent formation. Peat is formed from the slow decomposition in the presence of moisture of vegetable matter composed mostly of aquatic plants. As these plants grow on the surface of the water and become heavy and partially decompose, they drop down under the water, and new vegetation takes its place. This goes on through a geological age, or for many thousands of years, until that basin is completely filled with this partially decomposed vegetable matter; and the weight of the superimposed layers presses down and makes it comparatively heavy. This goes on until the peat is what may be called humified. That is, the plants lose all semblance to vegetation and are now on the way to be formed into coal. Unfortunately in Ontario and Quebec they have stopped at that stage, the peat stage.

By the Chairman:

Q. In other words, if there were pressure and heat for a sufficiently long time, all these peat bogs would be coal measures?—A. Yes. But the peat bogs which we have in Canada and elsewhere are composed of various layers. The lowest layer being the oldest and being the most decomposed, hence forms the best fuel peat. Each superimposed layer is less decomposed until you come to the top of the bog, which is composed mostly of moss which is valueless for fuel purposes.

Q. Is that sphagnum moss?—A. Yes, hypnum and sphagnum. These have a value for packing purposes, stable litter, and during the war sphagnum was used for surgical dressings. It has a very high absorbent value.

The heating value of the contents of a peat bog depends upon the vegetable material from which the bog is formed, and the age of the bog—that is the degree to which humefaction has been allowed to proceed. The older

the bog the greater the heating value. The heating value of the peat contained in our Canadian bogs compares very favourably with the heating value of the peat of European countries, but it is not so high as that of Ireland. Ireland may be said to possess the best peat bogs, which have yet come to our attention. They are very old and very deep. The heating value of our peat is in the vicinity of 9,000 B. T. U's per pound in the dry state.

Q. Is that chemically dry or commercially dry?—A. Chemically dry—what we call bone dry. The ash content, as I think I stated in my paper, varies in the different bogs; for Ontario we may say the average bog suitable for peat fuel does not have an ash content above 8 per cent; while in Quebec in all the bogs so far examined, the heating value was greater, almost approaching that of the Irish peat bogs, and the ash content is remarkably low, being in the vicinity of 2 or 3 per cent.

Now, in regard to the location of the peat bogs which have so far been investigated in detail. It would almost seem as though they had been placed there by Providence, or else that the cities and centres of population had been placed within easy access of those bogs, because all the big bogs so far examined are adjacent to large centres of the population and transportation facilities, either by water or by rail. We, of course, started out to investigate only those bogs so located, but we found that all the big bogs were located in that way.

Up to the present time we have some 113 or 114 bogs in the acute fuel area—Ontario and Quebec—which have a total fuel content of 114 million tons of peat, which represents an enormous amount of heat energy when we consider that the annual fuel consumption of the whole of Canada is in the vicinity of 30,000,000 tons of coal, and that the requirements of Ontario and Quebec are perhaps 16,000,000 to 17,000,000 tons. About 4,000,000 tons are used for domestic purposes in the acute fuel area. It is this quantity which we hope to replace by the use of peat and other coal substitutes.

By Hon. Mr. Laird:

Q. Does this peat reproduce itself?—A. No. This peat is reproducing in certain of the bogs at a very low rate. Certain of these bogs, for instance, are so completely filled with decomposed peat that there is not sufficient water left on the surface in which the proper plants can grow, so we can say that the reproduction is proceeding very slowly. The age for the formation of peat bogs seems to have passed, as has the age for the formation of coal.

By the Chairman:

Q. Suppose you excavated that bog at Alfred and it filled up with water, would the same process go on?—A. To a certain extent, but conditions have changed. Climatic conditions have changed for the formation of peat bogs, which deprives the aquatic plants of the very humid atmosphere which is required for their luxuriant growth. In the summer the water evaporates, leaving the basin dry. The basin must be full of water throughout the whole year. While peat might form in a basin to a certain extent after it has been worked out, that is if the drainage was plugged up and water allowed to accumulate, still the formation would be so slow that it would not be of value to anybody, and we prefer to leave that depleted peat bog in such condition that it will be available for agricultural purposes. That is what they do in European countries.

Q. I think you might tell us a little more about that. When a peat bog is worked out, wouldn't it depend on what the bottom was whether it would simply become a swamp again?—A. That is quite interesting, and also very important. In Germany, where we have investigated the conditions, and where they manufacture a great deal of peat fuel, and in Holland and Sweden, the bog is worked out with the main object of converting it into agricultural land which can

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be colonized for farmers, because, compared to Canada, they are short of land. One of the principal objects is to make the land available for agricultural purposes; and in the process of converting that useless land into land favourable for agriculture they have taken advantage of the fuel properties of the peat and have converted it into a fuel first. So they have lost nothing. The way that is done is to drain the bog properly, draw off the water to such an extent that it will not interfere with manufacturing operations. For manufacturing you must have water in the bog. Then the peat is worked out, with the exception of one foot which is left on the bottom of the basin, and that is used for conditioning the soil.

Q. It is humous?—A. Yes, that is right. The floor of the average Canadian peat bog is composed either of clay or clay mixed with marl. Neither of these soils by itself is fit for agricultural purposes, but when this peat is worked into it it separates and becomes porous and suitable for agricultural purposes. Most of our bogs which we have investigated have to be drained to a certain extent before peat operations can be commenced, and after the bog is depleted that drainage only has to be carried on a little further to completely drain the bog, and most of them can be drained. The bog at Alfred has an area of 7,000 acres, most of which is not now suitable for agricultural purposes. Yet this land is held by farmers who are attempting to grow something on it, and who have attempted each year to burn off the surface of the peat with the idea that the ash will have a certain amount of fertilizer in it. But it does not work. We have another bog within six miles of Ottawa, called the Mer Bleu Peat Bog, which has an area of 6,000 acres, which is covered by water most of the year. It is drainable, but is not drained at the present time. It would be more expensive to drain than some of the other bogs. Near Toronto there is a very large bog called the Holland River Bog that covers 17,000 acres—this is at Newmarket. The Holland river flows into lake Simcoe. That bog is partially covered with water in the springtime. It could be drained very cheaply if a dam were constructed and lake Simcoe held back, and the water pumped out. The Peat Committee were able to have a survey made of this bog and estimates for draining prepared by the Hydro-Electric Commission of Ontario. It is a perfectly feasible proposition. In fact, if the whole of the 17,000 acres were drained in that way the cost would be less than the cost per acre to drain an ordinary bog. It is a most remarkable bog in that it has no trees on it. Most of the other bogs have an overgrowth of tamarack and other trees of smaller diameter which have to be cut down when the bog is being prepared for operations. All these bogs that I have cited, after the peat has been taken out, will leave behind land which can be rendered suitable for agricultural purposes, thereby increasing the arable land in the inhabited districts. I consider that a very important point. That land might be given a value of \$50 or \$60 an acre. Ontario alone has an area overlain by peat which is estimated at 12,500 square miles, of which a little over 500 square miles is situated in the settled parts. Does that, Mr. Chairman, answer your question about the arable land?

Q. Perfectly. Would you tell us what you know about—A. The Peat machines?

Q. Not so much the machines as where the peat machine does that work.—A. Will you permit me to go on a little further. The Peat Committee, then, in 1921, designed and erected this improved plant, which comprised the best elements of the two plants previously described, and by which manual labour was reduced to a remarkable extent. Where we had to employ fifteen men to perform operations, we now employ only seven. As I was saying before, the various stages in the manufacture of the fuel are the following: the excavation

of the raw peat from the bog; the passing of this excavated peat through what we call a pugging mill or a macerator, which served the purpose of mixing the various layers of the peat bog together to make a homogeneous mass, pulverizing the fibres and distributing through the whole mass a gelatinous substance which is found in peat bogs and which serves as a binder.

Q. You add that to it?—A. We do not add that to it. It is in the peat.

Q. But stirring it up, mixing it, puts it into shape?—A. The older layers from the peat bog contain the greatest amount of this hydro-cellulose, as it is called.

Q. It is a natural binder?—A. A natural hydro-carbon compound which serves as a binder. And this pugging or maceration uniformly distributes this natural binder throughout the peat mass. It then passes, after being pugged or macerated, onto a belt conveyor, which carries it to the drying field, and there it is automatically distributed on the field in a layer 750 feet long, 13 feet wide and 5 inches deep. The drying field is adjacent to the ditch or excavation trench. This sheet of peat of which I have given you the dimensions, and which now contains 90 per cent water, is cut automatically transversely and longitudinally into blocks about the size of the ordinary building brick; rather, that is the size they have when dried. There the peat is allowed to dry, i.e., give up its moisture by virtue of the heat of the sun.

By Hon. Mr. Laird:

Q. How long is the drying period?—A. The drying period varies between thirty and forty days. Sometimes it is shorter, but we do not care to have it dry too rapidly, because the physical properties deteriorate with too rapid drying.

By Hon. Mr. Hardy:

Q. We are confined, then, to summer operations only, in the air drying?—A. In the air drying you have only a period of 100 days.

By the Chairman:

Q. Roughly, what are those days? Between June and—A. We can start work on the bog, generally speaking, about the middle of April, or at any rate the 1st day of May, and continue operations until about the middle of August, which gives a period of about 100 days. Of course there may be rainy days during that period, on which we shall not be able to work; but the average working season is 100 days. This peat, after it is dried sufficiently on one side to become set, so that you can handle it, is turned over so that the other side may be exposed to the sun and dried. That is done by hand labour, and at a fixed sum per ton.

By Hon. Mr. Laird:

Q. It is very much like the process of making clay bricks?—A. Very much the same thing.

By the Chairman:

Q. Except that you do not use any drying racks.—A. There are no drying racks. That is done on the bare ground, or rather the ground covered with moss. That, in short, is the process of manufacturing peat fuel. It is very simple.

Q. What would be the output?—A. The machine which we have on the bog at the present moment—our last machine, which has been thoroughly tried out and operated on a commercial scale for a period of at least one month, has a capacity of 65 tons per 10 hours. The capacity of that machine can be easily increased to 100 tons of saleable peat fuel per 10 hours—that is ten tons an

hour—by the introduction of a new power plant. You see, the machinery we have out there was improvised. We could not spend the money to buy a complete new plant, and we did not have the time; so we did the best we could with the material on hand, and we had a power plant which was inadequate to drive this new plant—this re-designed plant.

Q. Again, on that point: you speak of the capacity. Would that mean that in a month, or in any particular time, you averaged that capacity?—A. We averaged, Mr. Chairman, during the period which we operated continuously, that is, for one month, very nearly 65 tons of saleable fuel.

Eighty?—A. Sixty-five a day. That is 6.5 tons per hour. But we were forcing our machinery in doing this. That is to say, our power plant was entirely insufficient.

Now, the Peat Committee, as a result of this investigation which is now concluded, have come to the conclusion that a peat plant such as we have demonstrated finally and is in place at Alfred now, cannot be economically operated unless it has a capacity of ten tons of saleable peat fuel per hour for 1,000 hours; that is to say, 10,000 tons of peat fuel which can be put on the market during the operating season. It must produce that, and this machinery was designed and constructed with that end in view. Its capacity when equipped with the proper power plant is in excess of that amount. So the average of ten tons per hour will be maintained when rainy days, breakdowns or other troubles are taken into consideration. The hourly average may be twenty tons, but the commercial average is ten.

By Hon. Mr. Laird:

Q. Deal, will you, with the estimated cost of that plant?—A. I do not know whether this Committee has the Interim Report of the Peat Committee.

The CHAIRMAN: No.

Mr. HAANEL: I will send some copies over.

By the Chairman:

Q. Will you give us that briefly?—A. This is the Interim Report of the Peat Committee, which was presented to the two Governments, inasmuch as they were anxious to know what results we had arrived at.

By Hon. Mr. Laird:

Q. Just give us briefly the cost of that plant?—A. I am going to do that. You want the cost of the plant?

Q. Yes. You spoke about this machine that will produce so much.—A. The capital cost of replacing this plant, that is to say, building an entirely new plant, is as follows. The total is \$90,000. This includes a power plant, \$25,000. The peat manufacturing plant—

Q. In which they use peat for fuel, do they?—A. No. We recommend the use of low grade oil there. It is cheaper than peat, as I will tell you later if you have time. The peat manufacturing plant, that is, excavator, macerater and conveying system, \$35,000. Harvesting equipment, including rails, cars, locomotives for hauling the small cars and automatic loading devices in the field and loading and storage equipment at railway siding, \$25,000. Buildings, equipment and miscellaneous, \$5,000. That makes a total of \$90,000. That is the replacement value of this plant, based on estimates which have been obtained from various responsible firms.

Q. That plant would have a capacity of how much? Ten thousand tons in a season?—A. This plant would have a capacity of 10,000 tons for ten hours a day operation, or 20,000 tons for 20 hours a day operation.

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By the Chairman:

Q. That would be double shifting.—A. We recommend the operation of this plant continuously for 20 hours, the season being thereby extended to 200 days instead of 100. On this basis we have figured out our overhead charges on the investment, and our fuel costs are as follows: Production costs for 20-hours-a-day operation, \$2 per ton, and overhead charges, \$1.50; making a total of \$3.50 per ton for 20-hours-a-day operation. That \$3.50 is the cost of the fuel put on cars.

By Hon. Mr. Laird:

Q. What would it be for ten hours?—A. For ten hours it would be \$4.48.

By Hon. Mr. Hardy:

Q. Does that provide for the cost of the bog?—A. That takes into consideration all of the costs. The production cost of the peat, \$2 a ton, which does not vary for ten-hours-a-day or twenty-hours-a-day operation, includes a royalty of five cents per ton for the peat, the raw peat in the bog; it includes ten cents for draining and clearing the bog, and also five cents for unforeseen expenses. It is too high. It might be interesting to the Committee if I tell you that a well-drained peat bog, in which the moisture is reduced from 90 per cent down to 88 per cent, will yield 200 tons of air-dried machine peat for each foot acre; and for a bog such as Alfred, which is ten feet deep, that 2,000 tons per acre when the bog is completely worked out. That, at 15 cents, is allowing over \$300 per acre for these purposes. Now, no bog is worth that much. We paid for that bog some years ago \$6 per acre, but we had to drain it. In our opinion, a drained bog should sell in the vicinity of—or it is not worth more, I might say, than possibly \$15 to \$20 at the most. But we have provided for \$300. So we have demonstrated that peat fuel containing 30 per cent moisture, which we consider the proper moisture content in the fuel, because it burns better with that quantity of moisture, can be placed on the cars for \$3.50. That is actual demonstration. That is not guess-work. I will put this report in your hands, Mr. Chairman.

By the Chairman:

Q. That would be \$3.50 per ton for peat loaded on railway cars?—
A. Loaded on railway cars, ready for shipment.

By Hon. Mr. Laird:

Q. What is the depth of this peat, by the way?—A. The depth of the Alfred peat bog varies from between four feet at its shallowest portion, to twelve feet at the deepest; but we are operating in that portion of the bog which is ten feet deep.

Q. You take it all out except one foot?—A. One foot of the bog. I have forgotten your question, Mr. Chairman.

By the Chairman:

Q. That \$3.50 is on cars?—A. Ready for shipment. But I want it understood, though, that this is based on twenty-hours-a-day operation. That is a very important point, you see.

Q. After that peat is made and collected for shipment, would it deteriorate through rain, etc.?—A. No. That is another point which I think should be explained in detail. The method of manufacturing peat fuel such as we are employing, and which to-day is the only economical process known, depends, for the waterproof properties of the peat, on the uniform distribution of this gelatinous substance, this hydro-carbon compound, through and over the peat

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mass. When the brick is cut up and starts to dry there is a thin skin formed over the whole surface of that brick. That is formed of this gelatinous substance, which is a true colloid. It has the same characteristics and properties as gelatine, with which everybody is familiar.

Q. It is very much like new skin.—A. Very much like new skin, and has a tremendous power for absorption of moisture. Now, when the brick with this skin over it is exposed to the sun the moisture is continuously being evaporated from this skin, and one of the physical properties of this gelatinous substance is to remain at the point of maximum saturation; so in order to keep up to that point it draws water from the interior of the brick. Thus it acts as a vehicle for transferring water from the interior of the peat mass to the surface, and there it is evaporated by the sun. The reverse takes place in a rain storm. When it starts to rain,—that is to say, after drying has been started; you have to have the peat partially dry before this happens—when a rain storm takes place this skin absorbs moisture up to saturation and then will take no more; it will not transfer any into the peat. Now, peat is waterproof. You can leave peat out in the open for a long time after it has been completely dried and it will not absorb any more water or it will not deteriorate.

Q. That you know from actual experience at Alfred?—A. And Europe.

Q. And Europe?—A. Yes. That is a well known fact. But there are a certain amount of fines which are produced in the manufacture of peat fuel, through the re-handling of the peat from the field into the cars, and from the cars into other cars, and in order to supply clean fuel to customers we have been in the habit of screening this fuel, passing it over screens, which I do not think it is necessary to do, because fines are very valuable for household purposes. A great many people have asked for screenings in order to start a fire, or flash up the fire.

Q. Oh, it will flash up a fire? That is just the reverse, then, of coal slack.—A. If you have a coal fire and there is just one spot which appears to have a little fire in it which would hardly ignite wood, you can throw this dust on that and it will immediately start burning and you will have a very hot fire in a short time. In that way you can save coal.

Q. There is another point. Have you considered the question of delivery? It seems to me, offhand, that where the bogs which will be operated first are in the vicinity of cities or large towns, it might be much more economical to make the one handling from the bog—from the stored peat at the bog directly to the consumer, instead of having it loaded onto a railway train, taken the poor distance of 14 miles—I mean poor with reference to cost of transportation—and then taken from there again to the customer's house. Could not that all be done in one handling with advantage?—A. That suggestion, Mr. Chairman, is a very important one and a very good one, and it has been under consideration. That could be taken advantage of where the bog is conveniently situated with respect to a city, such as our bog six miles from Ottawa.

Q. Alfred is fourteen miles?—A. Alfred is forty-one miles.

Q. Oh, I thought you said fourteen?—A. No; forty-one. It is a little over sixty miles to Montreal, but I think that most of our peat bogs on which we shall have to depend for fuel at some time or other are situated just about those distances from large cities. At the present time we are dependent upon railway transportation.

Q. Forty miles does make a difference, of course.—A. And the Peat Committee have approached the railways, both the Canadian National and the C.P.R., with a view to seeing whether certain freight rates could not be reduced. In 1910 the freight rate on a ton of peat from the peat bog at Alfred, forty-one

miles from Ottawa, was 90 cents. To-day that freight rate is \$1.40. They reduced it 10 cents to Ottawa, but they would not reduce it any further. I will give you a list of a few freight rates, if you desire.

Q. I do not think it is necessary.—A. You do not care for them? However, that is one of the stumbling blocs in the distribution of peat.

By Hon. Mr. Laird:

Q. What did you say was the freight rate?—A. It costs \$1.40 a ton to ship peat from Alfred to Ottawa, a distance of forty-one miles.

Q. That is near enough for comparative purposes.—A. Yes, that is near enough; but \$1.40 is a very high figure. We have been making all kinds of efforts to reduce the cost of peat, and it is difficult to do so if you pile on freight rates and then add again the cost of rehandling and distribution in Ottawa.

By the Chairman:

Q. At what price is the peat sold in Ottawa?—A. We only put the price, Mr. Chairman, on a ton of peat at the bog; that is to say, we put a price of \$5 f.o.b. Alfred. The Peat Committee considered that if peat could not be manufactured at such a cost as would permit it to be sold for \$5 f.o.b. bog siding, the manufacture of peat fuel could not be conducted commercially. So we arbitrarily fixed a price of \$5 at Alfred, f.o.b. cars. Now, we have not tried, nor did we have any authority, to regulate the selling price at Ottawa. It was sold in Ottawa for \$10 a ton to the consumer. That price might be reduced. But even at that figure it will serve as a very good auxiliary for other fuels.

Q. What would you consider its fuel value in relation to anthracite? At \$10 a ton it would compete with anthracite at what price—or would be the equivalent of anthracite at what price?—A. At ten dollars a ton it will compete with anthracite at the present price of \$16.50 a ton. But that is not in my opinion a proper way of comparing the two fuels. That is the way it is done, but it is not fair to peat to make the comparison in that way, because peat can be used far more efficiently for certain purposes than anthracite coal can. It has a lower heating value, it is true, but you can get a comparatively larger amount of heat out of peat, even though it has a lower heat value, than you can out of an equivalent amount of anthracite coal, with its higher heating value. That will be understood by people who have used domestic heaters. If you build a coal fire, e.g. in a kitchen range, you have to ignite a larger quantity of coal than is necessary for the purpose desired, and when the cooking, etc., has been finished, the fire is allowed to go out and a great deal of combustible material is lost in that way. Similarly in furnaces, there is a great deal of combustible matter in the form of carbon, mixed with the clinkers and with the ashes, that is thrown into ash barrels. You do not get what we call complete combustion. But in the case of peat you get every single heat unit; the only residue is a flocculent ash absolutely free from carbon. So for a certain purpose it is far more efficient. It has been stated by a great many people who have tried it out that one ton of peat for kitchen purposes, for the cooking range, goes further than one ton of anthracite coal. Now, for burning in the open grate it is a far more desirable fuel than cannel-coal. I am not making this statement because I am prejudiced, for I am not, but this is a statement which a great many people who have used peat have made. In the first place, it does not spark. It does not blow cinders over the floor and make soot the way cannel-coal does.

Q. Cannel-coal splits.—A. It explodes, so to speak. We burned cannel-coal in our house and we had a whole rug absolutely ruined with it; and it sooted up the chimney and the fireplace. It makes a filthy mess, as you know. When you burn peat in an open fireplace the heated surfaces are perfectly

[Mr. B. F. C. Haanel.]

clean; there are no ashes over the carpet; the peat burns quietly, with a very cheerful yellow flame, and then subsides into a red glow and that lasts for a long time.

By Hon. Mr. Laird:

Q. Does it not create a great deal of dust in the house?—A. No, it does not create any dust at all.

By the Chairman:

Q. I was under the impression that it was a light ash fuel, the dust from which would blow about. I have heard that stated.—A. If a wind should strike the ash pan or the ash pit when it is open it might scatter some of the ash. The nearest approach to peat ash is cigar ash. Ash from a cigar is very similar.

Q. There are some housewives who object to cigar ashes, as a rule.—A. Yes, but I think they object to the ashes being sprinkled on the floor. But when the ashes are being taken out, unless you have the windows open, there is not a particle of them which leaves the shovel. There is no trouble at all. That is the general consensus of opinion.

Q. Will you tell us some of the disadvantages of peat?—A. It has many disadvantages. One disadvantage is its low density; that is to say, the mass of the peat per unit-volume. Therefore a ton of peat occupies much larger volume than a ton of anthracite, which is a very heavy, dense fuel. That is one disadvantage. You have to have as much storage space as is required for four tons of anthracite in order to store the quantity of peat equivalent in heating value to one ton of coal. I mean, that is the equivalent on the actual heat unit basis. I do not like to make the comparison on that basis, because it is erroneous; nevertheless it shows the bulkiness of peat.

Q. It is four to one?—A. Four to one on the heat unit basis. But it has another disadvantage—

By Hon. Mr. Laird:

Q. Just in that respect,—how will it compare with coke? Coke is much bulkier than coal.—A. I may say coke compares very favourably as regards density with peat such as we have manufactured. This year we succeeded in increasing—

By the Chairman:

Q. You mean, in regard to storage?—A. It is very nearly the same thing. I was going to make this remark, that we have increased the density of our peat through improvements in our operations and improvements in the method of macerating, from something like $\frac{8}{10}$ up to almost 1. We have increased the weight by over 20 per cent; that is to say, its weight per unit-volume. That is remarkable, and now it is a very good fuel. But even now it occupies a very large volume in comparison with anthracite. When compared with coke there is very little difference between the two; there is some, but not a very marked difference. There is one of the disadvantages, and this disadvantage, of course, is all the more important when you come to transportation. But there again it is no worse than coke. On the other hand, it has a much lower heating value per pound than coke has, which means that you would have to ship a much larger volume in order to get the same heating value, if you want to buy it that way. It has another disadvantage: It can be made only during 100 days in the year. There are 200 days when that machinery is lying idle. But even under these adverse circumstances, peat fuel is produced commercially in very large quantities and is used with entire satisfaction in foreign countries.

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By Hon. Mr. Laird:

Q. In Germany and other European countries does the machinery lie idle—can they operate only 100 days?—A. The conditions in Germany and those northern European countries are exactly the same as ours, or there is very little difference. Sweden and Canada compare very favourably as regards the length of the manufacturing season, and so does Germany.

By the Chairman:

Q. Any extensive use of peat, then, would require considerable storage? I mean, the time that you are making the peat is the time when it would be used the least. It is going to be used in the winter. You would have to be ahead.—A. You mean at the plant?

Q. At the plant, or in the town.—A. Or at the point of consumption. Yes, you would require considerable storage space. You would require more than is needed for coal, but the peat would not have to be under cover.

Q. Even in winter?—A. Not even in winter.

Q. It will retain its consistency?—A. Yes, it will retain its consistency, and it is not liable to spontaneous combustion. Therefore it can be stored in large heaps. As a matter of fact, over in Germany, at a certain power plant which I have seen myself, they have stored as much as 30,000 tons of peat fuel in the open and left it there.

Q. That must amount to considerable volume, to use that much fuel.—A. In the power plant?

Q. Yes.—A. Yes. This power plant which I visited was of 5,000 horse-power capacity and was equipped with steam boilers specially designed for burning peat fuel.

Q. Would that be with a large grate area?—A. A very large grate area and special heat-conserving devices, and the peat was manufactured by the Government and sold to this concern at \$1.25 a ton, the plant being right there at the power-house. At that time the very best Welsh steam coal was selling in Germany, at that point, for \$3.25 a ton, and yet they preferred to use this peat fuel instead of Welsh anthracite at that price. They claimed it was far more economical. During the war—

By the Chairman:

Q. What year was that?—A. 1912.

Q. You might give us the name of that plant you refer to?—A. This power plant in Germany is owned by the Siemens Schuckert Company. The plant is situated on the Weismoor, and supplied power for the naval base at Wilhelmshaven. During the war the plant was increased to 20,000 horse-power, and is still burning peat. But we do not advocate or recommend the use of peat for steam-raising purposes.

By Hon. Mr. Laird:

Q. Is there any depreciation in the shipments of these bricks by breaking and crumbling?—A. There is not much more depreciation in shipping peat than there is with anthracite, and the little abrasion which does occur, producing a certain amount of fines, does not detract from the value of the peat, because it is necessary to have some of these, and people ask as a matter of fact to have a little of the fines shipped with the peat.

Q. Where this peat is stored outside is it liable to catch fire from a cigarette or match thrown on it, or anything like that?—A. Peat in brick form, as we manufacture it and as it is delivered, in big pieces, does not readily catch fire by a cigarette being thrown against it, but I would not recommend even throwing a lighted cigarette in a coal bin, as far as that is concerned; but it would take more than that to ignite it.

Q. You have no trouble on that score?—A. No, I don't think so; but that does not say that people should not be very careful.

Q. If peat were stored inside of a building, would it increase the insurance rate?—A. Not a bit. There are over a thousand houses in Ottawa which had peat in their cellars. I have peat in my cellar now, and a great many people have two or three, four or five tons of it.

Q. The insurance people do not raise any question?—A. Oh, no; it is not nearly as inflammable in that way as kindling wood and papers in the cellar.

By Hon. Mr. Hardy:

Q. Then as far back as 1912, or farther back, they have been perfectly successful in manufacturing this fuel in Germany?—A. They have been manufacturing this fuel as far back as a hundred years.

Q. Are their bogs substantially of the same nature as ours—the material that you get out, I mean?—A. Some of the bogs are probably the equal of ours; some may be a little bit better; but most of our bogs are superior to German bogs, so far as I have been able to find out.

Q. Then we have spent a very large amount of money which has been lost in Canada in experimentation?—A. In comparison with the amounts of money which other governments have spent, we have spent scarcely anything at all. Altogether we have spent this \$360,000, which will be the total amount of money spent on Peat Committee work up till the 31st of this month.

Q. But I am speaking of private companies that have been formed?—A. I beg your pardon; but the private companies have wasted their money. That money was not spent on intelligent work.

Q. The thing that has always puzzled me is why we did not import exactly the German or other continental methods of manufacture over here, to carry on just from the point which they had reached, and make a success of it?—A. That has been a question which has been puzzling a great many people.

By Hon. Mr. Laird:

Q. As a matter of fact we have not?—A. Nobody had attempted to do that until 1909, and it was taken up by the Government at that time.

By the Chairman:

Q. Of course there is one very great difference—the extremely low cost of manual labour in Europe as compared with this country?—A. The manual labour in European countries at that time was comparatively low as compared with our labour wages here, but we must remember that in any attempts to manufacture peat fuel which had been made prior to 1908, they had to produce a fuel which would compete with a very low-priced coal, and therefore they would have to introduce all kinds of economies other than labour. But that is not the point I wanted to make. I think the point which Senator Hardy made was that the people who had attempted in past years to work a successful peat industry did not pay any attention to the failures which had been made, along the line that they were operating on, by European investigators. Everything which the Canadians, who spent a lot of money on the various ventures, and on the various processes which they were trying to perfect, were trying to do had been worked on and investigated from top to bottom for years over there, and had been discarded, and the people over here did not take advantage of the experience of the Europeans.

By Hon. Mr. Laird:

Q. I would like to ask you a question—of course it is hypothetical; with the knowledge and information you have would you object to put your own hard

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savings into a peat fuel proposition?—A. Well, of course I am very much interested in this question; I have been secretary of the Committee, and I have been investigating the possibilities of peat as a source of fuel for a great many years, but it is only one of my lines. I am a fuel engineer, and I might say right off that if I had the money to-day to put into the thing, my own money, to go on with this work, which should have been carried along by the two governments, as we recommended in our report, but which the governments did not see fit to carry out, for certain reasons—I would put my own money into that plant, and I think any man who could put money into such a venture without crippling himself would confer a great benefit on the country by investing money in that way.

Q. Do you consider it would be a profitable investment?—A. I don't see any reason why the investors, if the thing is honestly done, cannot make at least 10 to 15 per cent on their investment.

By Hon. Mr. Hardy:

Q. How much did you sell from the Alfred bogs last year?—A. Last year, altogether, a little over 3,000 tons. But I want to make this point clear, that we were not manufacturing there on a commercial scale. This was entirely experimental, and the peat that was produced was produced in the course of experimentation. Some people think we were manufacturing peat commercially. We were not, and the machine we have put there now was only placed on a commercial basis for a month after the experiments had been completed.

Q. What reports have your customers made as to the stuff you sold?—A. We have sent out questionnaires to practically all the purchasers of peat, and we have replies from practically every one of them, and I would say that about 98 per cent of them are favourable replies, very enthusiastic.

By the Chairman:

Q. Could you let us have those questions and answers, or a condensation of them?—A. Yes, I will try and get those for you. We are trying to get them condensed now for our report.

By Hon. Mr. Hardy:

Q. What class of customers did you sell to, for the substantial part of that output?—A. We sold to the general householder in Ottawa, for example. We sold peat in Montreal for domestic purposes; we sold peat for industrial purposes, for lime-burning, and we had repeat orders and could not supply them. We had an offer for our entire production from one industry alone. We sold the peat in Toronto, and Haileybury and Peterborough and Belleville and various places like that, and they have sent in repeat orders. Now I have a letter from Belleville—they pay a very large freight down there—asking me if I could guarantee that we could ship him a large quantity of peat this summer. Of course we have no peat to ship; we are not manufacturing; but he said it gave entire satisfaction in Belleville, and people all wanted it. I have that letter, which came the other day; it gives a little idea of what success we have met with.

By the Chairman:

Q. \$360,000 have been spent?—A. By the Joint Peat Committee in this investigation work.

Q. You believe that with an expenditure of say \$100,000 you could begin the commercial manufacture of peat, producing how much?—A. Producing 20,000 tons.

Q. Double shift?—A. Double shift for 100 days.

[Mr. B. F. C. Haanel.]

By Hon. Mr. Laird:

Q. And carried on as a successful commercial enterprise?—A. As a commercial enterprise, with no difficulty whatever in disposing of the fuel. The Peat Committee has on several occasions during the course of their work had offers presented to them by private individuals for their entire output, but we could not consider that at all, because one of our objectives was to introduce this to householders so that we could get their opinion as to its value for their purposes.

Q. This committee is considering the various avenues for fuel supply which would assist in replacing American anthracite; what would be the total volume of peat per year that you think could be made available within a reasonable time to take the place of anthracite?—A. In a year's time from now, if we started to work this year, this summer, to prepare bogs for operation next year—that would be one year—and also let the contracts for building the machinery, I think that within one year we or somebody else could place perhaps as many as twenty units on bogs capable of producing anywhere from 400,000 up to 500,000 tons of fuel.

Q. That is a very material factor?—A. Yes; and in another two years, or perhaps four years, that might be easily increased to 1,000,000 tons. I estimate that with the bogs that we have, and of which we have all the required information—that within five or six years 1,000,000 or 2,000,000 tons of peat fuel could be placed on the market in Ontario alone.

Q. And that could be kept up for how many years?—A. With the peat we have, for about 70 years, with the bogs we have already examined; but we have only examined a small portion of the bogs. We have not completely exhausted all the peat area in these two provinces.

By the Chairman:

Q. Still, those are the obvious ones, so to speak—those that would be near centres of consumption?—A. I would like to have this committee understand that the Departments of Mines, under whose directions the work of investigating peat bogs has been conducted, have only had since 1910 one man who has been in charge and conducting these investigations, while they have had a very large number of parties in the field engaged in other geological investigations. Considering that we have investigated some 250,000 acres of peat bogs, I think the work for one man with one or more parties is pretty good; that is a pretty fair showing. We might hasten that work very considerably if more parties were put in the field, but I do not think it is necessary to put more parties in the field until occasion warrants. We have enough peat to go on with for a long time. We could supply peat to Toronto, Hamilton, New London, places like Brockville, Ottawa, Perth, Peterborough, and we could supply peat to Montreal very readily from several bogs in the immediate vicinity—bogs which do not require very much preparation.

By Hon. Mr. Laird:

Q. Of course your evidence now is all on the basis of comparison with coal at present prices; if the present coal prices go down then there would be a difference?—A. If the present price of anthracite coal goes down it would very materially affect the industry, but I always hold that peat has a special field of its own, even when the price of coal is low. But the price of anthracite coal is never going to drop to pre-war prices.

Q. The freight rate will militate against it?—A. I have been discussing this question with the operators in the anthracite field, and they don't give you any encouragement of any decrease; in fact, it is going to increase.

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The CHAIRMAN: There will be a natural increase in the cost of production. There is one thing in my mind. Prof. Haanel has made a very impressive statement on this matter, but I would like to hear the Devils Advocate—I mean somebody who would give us more of the objections; I do not mean to controvert him.

The WITNESS: If you could state some of the questions you would like to have answered, I might answer them all.

By the Chairman:

Q. How does our Canadian peat compare with other peat?—A. To-day we are manufacturing peat, I think, better than any other place in the world, and we can continue manufacturing peat in that way. Our peat last year and this year has met with general approval. There have been one or two people who have not liked the peat, or had some objection to it, because they used the peat for a purpose for which it is not intended. Now, we do not recommend the use of peat for burning in a hot water heater through the winter months, but we recommend it as an auxiliary fuel, and when used as an auxiliary fuel it will help out the situation.

By Hon. Mr. Laird:

Q. What could you say about the attitude of the coal dealers to-day?—A. Well, I don't know that. We have tried to get a line on what the coal dealers' attitude would be. In Ottawa the coal dealers were willing to handle peat fuel if they could get the right to handle it entirely themselves, that is to say, one coal dealer, but several dealers would not do it because they said they had to change their carts and trucks to handle the peat, and had to provide storage, for which they were not prepared at that time, but if they were assured of a continuous supply of peat they would go into it.

By the Chairman:

Q. Without having the exclusive agency?—A. Without the exclusive agency; but there are many coal dealers who are very closely linked up with the anthracite coal operators in the States.

Q. You would agree as to the value of demonstration with new customers, as to how to burn it?—A. Oh, yes. Might I make a remark in connection with Dr. Camsell's testimony yesterday? Dr. Camsell read in the paper this morning that he was quoted as saying before this Committee that he deplored the use of wood as a fuel, as it was too valuable for other purposes, etc. He did not want to be understood that way. He did not deplore the use of wood as a fuel, and he recommended the use of wood to as great an extent as possible when it did not interfere with the stripping of our forests, for instance. What he intended to convey to the Committee was that he did not like to see the use of wood advocated when there were so many peat bogs lying idle. He thought the development of our peat bogs should proceed. That is the idea which he wanted to make clear, but he thinks that wood should be used to as great an extent as possible.

The CHAIRMAN: We are extremely obliged to you, Mr. Haanel.

Hon. Mr. LAIRD: Your evidence has been very illuminating.

The WITNESS: Thank you. I will send you copies of our interim report.

The Committee adjourned at 12.30 p.m.

[Mr. B. F. C. Haanel.]

WEDNESDAY, MARCH 21, 1923.

The Special Committee of the Senate on the Fuel Supply of Canada met this morning at 10.30 o'clock, Hon. Senator McLennan in the Chair.

Sir HENRY THORNTON, called and examined.

By the Chairman:

Q. Sir Henry, although you have not been long in the country you know the situation and the problem that confronts us—plenty of coal in the west, plenty of coal at the east, various railroads, and the active consuming districts in the centre of Canada?—A. Yes.

Q. More than one person has told us, and it seems pretty obvious, that transportation is the important feature in the problem; what light can you throw on that, sir?—A. Well, of course the question that this Committee is investigating is not only a very important one, but it is likewise so complicated, and involves so many factors, that a solution is by no means easy. We all start, it seems to me, with the recognition of this principle—that the Dominion should not be dependent upon a neighbouring state, no matter how friendly the relations may be, for its supply of a key-commodity like coal. I think that is so obvious that it hardly needs amplification. Then if we accept that principle we look around within the Dominion to see how we can make ourselves independent of the United States with respect to our coal; or, at least if we do not make ourselves independent, we are in such a position that we could never be seriously embarrassed by the withdrawal of supplies from the United States. Perhaps one might say, by way of parenthesis, that thus far, certainly, those who are charged with the administration of fuel affairs in the United States have been more than kind and hospitable and pleasant to us here on this side of the border, and have stretched points in their efforts not only to be fair but even to be generous. But, quite apart from that, there may at any time come such coal famine in the United States due to conditions entirely beyond the control of the authorities there, that they must stop or materially reduce shipments to Canada; that there would be nothing else to do. If they get to such a point—and they got very near it recently—that their own people were freezing, and perhaps even dying, there would be such pressure brought to bear that no matter how kindly the authorities felt, they would be forced to very materially restrict if not stop our coal supply. So, surely as a matter of common sense, it is obvious that we ought to make ourselves as independent as possible with respect to our fuel supply in this country. So we canvass the field, and we see where our coal is. As the Chairman has pointed out, there is a coal supply in Nova Scotia, in the Maritime provinces. Then we search the country without result for coal until we come to Alberta, as there seems to be in that great central district, which is also a most populous and important manufacturing district, no supply of coal. That being so, the only possible solution is to see whether we can lay down in Ontario coal from Nova Scotia or coal from Alberta at such a price as will permit its use by the people who live in the central region. I do not know that we need absolutely to meet the American price. It might be that the people who live in our central regions would say, "Well, we will have to pay a little extra for the disability under which we exist," and they might say that they could afford to pay a little more for Canadian coal for that reason. But, anyway, our object should be, from the transportation point of view, to see whether we cannot lay our coal down from either the east or the west into this central region at a price which will

[Sir Henry Thornton.]

compete with American coal. Now, I have had that under consideration. I have been thinking about it for about two weeks, and I do not quite know yet what I can do in that respect. But it is a problem that naturally engages one's attention from a patriotic point of view. From a commercial point of view it has many difficulties. I believe we can find the solution to them. I have been told, comparing our western coal with anthracite, that it will not go so far as hard coal in producing calorific units. That is to say, I have no first-hand knowledge of the subject, so you must not take this as a final statement. When I come here to talk I take it that we are putting the cards on the table and that I don't have to protect myself on every question, because otherwise I should have to be more reticent.

Q. You are speaking of coal for domestic heating?—A. I am speaking of coal for domestic purposes, because I do not suppose that anthracite is used for commercial purposes in the province of Ontario. I am speaking only from a domestic point of view.

By Hon. Mr. De Veber:

Q. Perhaps you are not aware that there is a very large area of anthracite coal west of Okotoks?—A. I have heard of that, but I don't know. If there is some of that there, so much the better.

Q. It is owned by Pat Burns?—A. Well, I hope it is there; and if it is there, that is one of the things that we ought to try to develop. Is that along the Elk river?

Q. No, I think it is on the eastern base of the mountain; Mr. Pierce, who gave evidence here the other day, says there is an immense area there of anthracite coal, 54 miles southwest of Calgary, and I think 32 miles west of Okotoks?—A. There is a coal field just southwest of Calgary that I happen to know something about, which lies along the Elk river, and that is said to be a very fine bituminous coal, but it is not anthracite.

Q. That would be open to the market, but Pat Burns says he is not going to build a railroad 54 miles unless he has a chance of selling the coal?—A. Quite true.

By Hon. Mr. Laird:

Q. Have you any knowledge of the deposits covered in these Hoppe leases?—A. No, I should not like to speak with any authority with respect to those, because I do not know enough about them.

Q. You know the claim is that there are enormous deposits?—A. Yes, I know what the claims are, but I could not give you any positive information regarding it. Certainly if there do exist anthracite fields of such a character as to justify exploitation, that is one of the things that ought to be done. In so far as the bituminous coal is concerned—and that of course we already know about—that probably could not compete in Ontario with the anthracite from the United States. We on the railway would regard ourselves as responsible for the rates, but Providence is responsible for the quality of the coal. We could only deal with the question of rates; but at any rate, as far as the railway position is concerned, what we must do are two things—first, to see if we cannot establish such rates as will enable our own coal to compete in this central region with the foreign coal, and at a rate, at a price, and under conditions which would not result in a loss to the railway company, for obviously you do not want to increase your deficit, you do not want to ask the railway company to haul business unprofitably.

By the Chairman:

Q. You would include in that, of course, the development of the Manitoba market?—A. I understand that there is some American coal that is going up

[Sir Henry Thornton.]

into Manitoba. Of course if our Alberta coal could compete in Ontario, still more should it be able to compete successfully with American coal in Manitoba. If we solve the Ontario problem I should think the Manitoba problem would be relatively simple.

By Hon. Mr. Laird:

Q. I notice that your argument is based on competition with American anthracite coal, whereas our information is that the time is coming when American anthracite will be eliminated as a competing factor?—A. Well, I have heard that; but I have been hearing it for a good many years. I remember that 10 years ago, when I went to England, I heard that argument, and although I have not gone into the details of it I think you will find that the American anthracite will be produced in sufficient quantities for some time. Even if it is 20 years, that is a considerable period in the life of any of us, and we may not worry much about that length of time hence. Anyway, if that is the case, it is all to the good; it helps us just that much.

By the Chairman:

Q. Apart from the all-year-round development of the coal trade from the west to Manitoba and central Canada, there would be a possibility that you might give a still better rate for the seasons in which your motive power and cars are not fully occupied, namely, from the spring until midsummer?—A. I think if anything of that kind were done we ought to name the minimum rate that could be applied during the spring; and then, certainly, when the wheat crop is moving we could not undertake to move coal simultaneously with the wheat. I would rather name the minimum rate, the lowest rate we could name, and have that apply before the grain crop moves; then stop the coal movement and devote our attention to the grain—and we are generally short of cars even for that.

Q. Speaking generally, when would that slack period cover?—A. Well, April, May, June, July—something like that.

Q. Could not that begin earlier in the winter?—A. Yes, it could begin earlier in the winter, excepting this, we are trying now to find a way to move this coal as cheaply as possible, in order to make the rate as low as possible. I can move coal much cheaper in the month of May in the West than I can in the month of February, because on account of the cold weather our train-load is cut in half. It costs, I should think, easily twice as much to move a ton of freight in the western country in winter time as it does in the spring or summer. So, if possible, I think it would be preferable, and I would prefer to move the coal at that season when the weather is not against us.

By Hon. Mr. Casgrain:

Q. Under most favourable circumstances, what would a ton of coal cost per mile?—A. I cannot answer that question off-hand. I could give you an answer to that a little later, with a little figuring, but of course a great deal depends on what you bring into the cost.

Q. A lot of senators are answering that for themselves?—A. Yes; that is one nice thing about transportation costs; I can give you—and prove—any transportation cost you want at any time for any purpose, and so can anyone else. It all depends upon how you look at it. Take, for instance, such a traffic as we are discussing. Now, it would not be fair to charge against that traffic a lot of general office expenses and things of that kind, because those expenses will go on just the same whether this coal moves or whether it does not. It would not be fair to charge against this traffic all of the maintenance-of-way expenses, because whether this traffic moves or not the railroad will have to be

[Sir Henry Thornton.]

kept up, and it will cost just about so much. That is the reason why, when you ask a railroad man, "What does it cost to move a ton of freight from A to B?" he can give you, quite correctly, any kind of an answer you want, or that he wants himself. It all depends on how you are going to look at it. In other words, you have got to lay down your theory, your specifications for your answer, before you try to answer. I can give you an answer to that question later on, but I would not like to give it off the bat, because there are certain expenses that ought to be eliminated from consideration.

By Hon. Mr. Laird:

Q. Is that same method of railway cost of transportation extended into all other classes of freight as well?—A. Oh, it is the most difficult question—to be really quite honest, and not try to fool anyone—it is the most difficult question in the world to answer. For example, take a train; you can haul 18 cars of freight from A to B just as cheaply as you can haul 15 cars; I defy anyone to find in the expenses the additional cost of adding two cars to the average train, almost anywhere. The same thing is true of a passenger train; it does not cost one penny more to haul a passenger train full of people than it does to haul it empty. With your freight, the only point where it tells is when you get to the engine load; if your engine will haul only 20 cars and you put on 21 cars or 25 cars, it means that you have one train of 20 cars, right up to the capacity of the engine, and then you have got to run another train of five cars, which is only a fourth of the capacity of the next engine. So when you begin to discuss the question of what it costs to move traffic, you can be led into all sorts of highways and byways, and get all mixed up. It is really more of a common-sense business proposition than anything else.

Q. So that the railway statistics idea that it would cost so much per ton per mile is largely a myth?—A. I should say that they were valuable mostly for comparative purposes. That is to say, let us take my railway; say I have a railway, and that I have worked out year after year on a certain basis the cost of moving traffic. Now, I can compare one year with another, but I cannot take that cost and go and compare it with another railroad's cost unless I know how the other railroad has prepared their statistics.

By Hon. Mr. Gordon:

Q. As this question is intensely national, and is going to affect Canada for many years to come, would it be possible on our National Railway System to devise cars and locomotives for coal haulage, figuring on getting the cost of the equipment back before it wears out, and a small charge for maintenance of way, and not taking into account any large overhead or cost of construction of the road? Would not something of that kind be in the interests of the country?—A. I think it would be in the interests of the country to see what we could do. As a matter of fact, I am working on that now; I started about a week ago, but I had so much to do that I could not do it all at once—to see what kind of a price we could name for bringing Alberta coal into Ontario without cutting the throat of the railroad company—and it looks fairly hopeful. When you get to the question of cars I do not know of any more satisfactory form of coal car than what is called the self-clearing car, 50 tons capacity; that is almost a standard car in the coal trade, and I do not know of anything better that you could get, and it exists already. As to a special kind of locomotive, I do not think you could do anything along those lines, because as it stands to-day the locomotive is as good a machine as you can get of its kind. You would not require any special kind of locomotive to handle a coal train; so I think if you went into these questions you would find they had already been answered by the state of the art. Our locomotives are satisfactory; of course we want as heavy locomotives with as great tractive power as possible. Our cars of the self-clearing type are satisfactory.

[Sir Henry Thornton.]

Q. Should not the question of distribution be coupled up with transportation? Is not that a material point?—A. What do I understand by distribution?

Q. Bringing it to points, or unloading it at points in a way by which it could be relayed to the different places where it would go at a minimum cost?—A. Then what you would probably mean would be erecting coal trestles, or something of that kind.

Q. I do not know what it would involve.—A. Of course anything of that kind would contribute to a reduction of cost to the ultimate consumer. Obviously, if the coal were run out of a car on a trestle it is much better than shovelling it out by hand, and the ultimate consumer always pays the cost; so any improved method of unloading or handling the coal ought to tend to reduce the cost to the ultimate consumer. Sometimes it does not; sometimes your methods are improved, and the vendor collars the profit. That is human nature, of course.

By Hon. Mr. Laird:

Q. He collars it if he can?—A. If he can get away with it.

By Hon. Mr. Gordon:

Q. The idea I have in view is that our National road should do something that you would not want to compel another road to do; it may pay nationally, and not pay them, because the National Railway belongs to the country?—A. I do not know whether I agree with you or not. I should say this, and I think this is axiomatic, that there never can be any difference in theory between the interests of a railroad company and the community that it serves. If there are differences, they are usually due to short-sightedness, or something of that sort; but, broadly speaking, no railroad company can prosper unless the community which it serves prosper simultaneously, and the more a railroad can contribute to the prosperity of its patrons, the more money it gets itself in the long run. Now, railway business is not the business of making a maximum amount of money in any one year; it is the business of making a maximum amount of money for a maximum number of years. You do not want to rob the public one year and then leave the corpse to rot for the next 50 years. The policy to pursue is to build up a constantly increasing business which year by year increases, so creating prosperity in which the public itself shares. Now, unfortunately, in many cases railway administrators have not always taken that point of view; neither have men who have been in charge of an industry taken that point of view. But we are coming now to the time when, I think, the people will look at things rather more broadly. So, insofar as this problem is concerned, I think we should certainly want to carry with us in our opinions, not only what the Canadian National Railways might do, but also the Canadian Pacific Railway, which is interested in the same way. As a matter of fact, the Canadian Pacific Railway Company has, or ought to have, just as much interest in the development of our National Railway system as they have in their own system, because if we cannot prosper they cannot prosper.

Q. What I meant with regard to distribution was this. I understand from what you say that the most economical time, and the time most advantageous to the company, to bring this coal down here, would be when the wheat would not be moving.—A. Before they move the wheat.

Q. Say, from April or May to August or September.—A. Yes.

Q. Now, if this market here were being supplied with the coal which it requires, many trains would have to be used for that purpose.—A. Yes.

[Sir Henry Thornton.]

Q. It would mean a continuous operation of train loads during all these months?—A. Yes.

Q. I imagine it would, to bring that coal down here?—A. Yes.

Q. Well, the trains coming down here with these big loads would naturally have to unload in many places where that coal would not be consumed.—A. Yes.

Q. It would have to reach its final market after that?—A. Yes.

Q. It was with regard to that point that I thought distribution should be coupled up with transportation.—A. The answer to your question is yes; that you must give consideration to the question of distribution, and storage.

By The Chairman:

Q. It is very much like elevators for the grain trade.—A. That is a very good simile.

Q. There is another point, Sir Henry. In working this out from West to East, there is a problem very much the same,—whether the district from Quebec to Cochrane and then down into that range of Northern Ontario, could not be supplied with coal from Nova Scotia, shipped by water to Quebec, and from there by rail?—A. That might be. Obviously—I may not have said it, but if I did not I want to say it now—whatever you do for Alberta coal you must, in the same proportion, do for Nova Scotia coal.

Q. Yes.—A. You cannot favour one source of supply as against another.

By Hon. Mr. Laird:

Q. There is only this difference: you have water transportation part of the way for Nova Scotia coal.—A. It is probably, Senator, that Nova Scotia coal would always take advantage of the water route as far as possible.

By The Chairman:

Q. It is so much cheaper?—A. Oh, yes.

Q. As far as Quebec and Montreal. Then there is a possibility, beyond that, of distribution West.—A. Yes. There is a line somewhere—I do not know just where it would be, but somewhere there is a line beyond which Nova Scotia coal would not go West and Western coal would not go East.

Q. We used to supply the Grand Trunk at Brockville about twenty years ago. That was the limit to which Cape Breton coal could go.—A. I understand that that is approximately the line now, Brockville-Ottawa, or somewhere through there. That is about where the dividing line is.

By Hon. Mr. Casgrain:

Q. Suppose there is a distance of 2,000 miles from the Alberta coal fields to Toronto, we will say. Do you know of any place on God's earth where coal is carried 2,000 miles?—A. No, I don't think I do, Senator. Coal may be carried 2,000 miles, but I do not believe I know of any place.

The CHAIRMAN: You mean by rail.

Hon. Mr. CASGRAIN: Yes.

Sir HENRY THORNTON: By rail. The Senator is right in that. This of course is a special problem and requires special study and a special answer. I am not saying that it can or cannot be done; I am simply saying that it is of sufficient importance to justify all the intelligence that we can bring to bear upon it with a desire, not of finding ways how it cannot be done, but of finding out how it can be done.

[Sir Henry Thornton.]

By Hon. Mr. Laird:

Q. Where does your system get its supplies in Western Canada now?—A. Generally the Alberta fields. I cannot give you the names of the places.

Q. How far east on your system do you use that?—A. I think that coal comes as far east as the head of the Lakes. I am speaking at just a little disadvantage, because there are a good many of these detail points that I do not know about offhand.

By the Chairman:

Q. I understand the C.P.R. takes its coal at Winnipeg from the West. They use Western coal as far as Winnipeg?—A. Yes. It may be. I do not know.

Q. Presumably you would do at least the same?—A. Oh, certainly, up to Winnipeg. I know we use Western coal as far east as Winnipeg.

Hon. Mr. CASGRAIN: Not so many years ago, at Sault Ste. Marie they were paying \$2 a ton for coal delivered there for the Algoma works.

Hon. Mr. GORDON: Years ago some of us were working for 50 cents a day. Now we are working for more.

Sir HENRY THORNTON: Yes, and probably not making as much.

Hon. Mr. HARDY: Mr. Chairman, has Sir Henry been asked to supply the Committee with a table of estimates of costs?

The CHAIRMAN: No. We did not ask Sir Henry that, because he explained that he had the matter under consideration with a view to pushing the distribution and supply of Western coal—and of Eastern coal as well—just as far as could possibly be done on what he called a bargain sale rate. Is not that about it?

Sir HENRY THORNTON: Yes, that is about what it comes to.

By the Chairman:

Q. Sir Henry, how do you meet this argument? Suppose this trade should develop, as we all hope it will. Others may say to you, "Why should not we have the same rate on our things as you are giving on coal?"—A. That is quite true. They will say, "If you can manage to move this coal at such a rate, why can't you move wheat and everything else?"

Q. "And dry goods and everything else?"—A. I should say to any one who asked me that question, "Does your wife ever go to a remnant sale?" Let us take for instance a man who is conducting a department store. Every now and then there are certain commodities which for a certain period he can sell at ridiculously low price. Again take your man who has a department store. He must always sell pins. People come to his shop and they expect to buy pins, and they are irritated if they do not get pins. It may be that he has to sell pins at such a price that he does not make any money on them; he may even lose on pins; but what he loses on his pins he will make on his high-class silks or something of that kind. In other words, there is no difference at all between the sale of transportation and the sale of anything else, and sometimes you are justified in making a very low price. Let us take this coal proposition. We might be justified in making a very, very low price on coal in order to foster industry in the central regions, and then we would make enough out of the products of the industries, out of the increase in population, out of the general prosperity of the community, to compensate us for handling the coal at a low price.

By Hon. Mr. Laird:

Q. In your experience so far, Sir Henry, have you any recollection of a bargain day in freight rates?—A. Yes, there were days when there were a good

[Sir Henry Thornton.]

many bargains knocking about. But of course the legislatures in their virtue rose up and prohibited a good many of these bargains, and quite justly so. If you ask me to justify the theory that governed our freight rates in the past and the way in which the thing has been done, I could ask you to excuse me, because there are many things that I would not like to justify.

Q. If you gave special bargain rates, would not you as a railway man consider that it would be difficult at any future time to raise the rates back to what they were originally?—A. There again you get up against one of the foolish precedents which have more or less troubled the railway business. In other words, for some reason or other the railways have not been able, or have not had sufficient courage—put it any way you like—to handle their rates as the man who runs a store would handle his business. I should say that if we put in a rate of this sort, and it has served its purpose, and there is no reason why it should not be raised, it ought to go up. I should put it up and I should fight that right through. In other words, if we are going to be fair with the public in putting rates down, and have courage enough to do that and enough faith in the condition of the country to do that, we should be a very poor lot if we did not have sufficient courage to put the rates up when the time for an increase comes.

Q. How then would you expect an industry to be established on the basis of your freight rates, if the people concerned had no idea that the freight rates were going to be continued?—A. You asked me the question, how could we put freight rates up, if we ever came to the time when we thought it should be done? I answered it by saying that if conditions justified it, or if it were thought necessary or desirable from the economic point of view to put freight rates up, we would put them up. Then you asked, "How could you expect an industry to establish itself without a guarantee of freight rates?" If an industry established itself under a guarantee that certain coal rates were to exist, we could not raise those rates. That would not fall within the scope of your question as I see it. Perhaps I do not quite understand, but that is the way I should look at it.

By Hon. Mr. Gordon:

Q. Can you imagine any other commodity, Sir Henry, that would be so deserving as coal of being in a class by itself as to low rates, providing that the situation you spoke of a while ago maintained, not to-day, but twenty years hence, more or less, and the time came when the fires in all our industrial plants in the two central provinces were extinguished? On the other hand, that trade might develop and you might be able to transport the coal profitably from the West, in sufficient quantity to build up that country and put it in a position such as it does not enjoy to-day, and enable it to retain its population. Can you imagine that under conditions of that kind there is any other commodity that might be put in the same class with coal? Do you not think there is a great, special reason why coal should be put into a class by itself and transported more cheaply than any other commodity?—A. I should rather answer your question in this way, Senator. I do not know that I should like to single out coal and say that that is always entitled to more consideration than, let us say, wheat or something else; because some of the circumstances that you have outlined with respect to coal might apply to wheat or some other commodity at some time. But I will answer your question by saying that certainly coal is the very breath of industry and that we are justified in doing almost anything to put ourselves in possession of a reasonably cheap fuel supply not only of coal, but also of substitutes for it, like electricity. In principle I agree with what you have meant to say in your question.

[Sir Henry Thornton.]

Q. If a situation developed in which you are able to transport this coal, it would mean, with regard to wheat, that immense quantities of that very commodity would be used right out in the locality.—A. What you mean to say is that coal is our most important commodity from the industrial and perhaps the domestic point of view and that we are justified in leaving nothing undone to favour coal and increase its consumable radius.

Q. Yes.—A. Certainly.

Q. Because if you increase your population out West to the extent of 100,000 or 200,000 people, it means that people out there who are now growing wheat might find it more profitable to go into mixed farming and have the consumption right on the ground.—A. Of course that is what they ought to do in any case. To my mind it is perfectly ridiculous for a farmer to be going to town to buy butter yet I am told there are cases of that sort. My feeble intellect simply breaks down altogether when I contemplate it.

By Hon. Mr. Bennett:

Q. In the summer months the Canadian railways have not much business from the West because the grain crop transportation is practically over. If trains of coal were carried to the head of the lakes and then shipped from Fort William to Midland at the rate of about 50 cents, and if it were then unloaded on the docks at Midland and from there distributed to Toronto, Hamilton and all the towns in those vicinities, how would that figure out? The long haul of cars from Fort William down to Toronto would be avoided.—A. On principle one would say that would probably be the cheapest way to get the coal into Ontario, because you are taking advantage of the cheap water rates. Against that you would have to see what would be the cost of transferring from cars to vessels and of unloading at this end. But in principle I would say that presumably that would be the cheapest way of getting the coal into Ontario.

Q. I have seen the method of operation on the lakes, at Port McNicol. All the coal there is taken out of the vessels and placed on carrier ships. A three thousand ton boat would be unloaded in very few hours. Then, as the cars were there for orders, say, ten cars would go to Toronto, and twenty to another place. They in turn would be unloaded right from the derricks into the vessel—or perhaps from the carrier itself. I do not think it would be done from the carrier; but it could be done out of the derricks.—A. Yes, that is quite feasible.

Q. As there is a large amount of space at Midland belonging to the company, I would ask that you would kindly consider that.—A. Yes, I shall be very glad to do so. I do not know enough about the details of the position at Midland to go into the matter specifically at the moment, but I shall be very glad to do that.

By Hon. Mr. Laird:

Q. That same method of transferring coal exists at Fort William to-day, on the coal docks, all the coal is transferred and is carried in store there.—A. Yes.

Hon. Mr. CASGRAIN: But lake boats would take coal from Lake Erie ports away up to Duluth for 30 cents.

Hon. Mr. BENNETT: I said 50 cents.

Hon. Mr. CASGRAIN: So you would have coal coming east and coal going west. You might just as well turn back half way.

Sir HENRY THORNTON: We all know there is a very large coal movement from Cleveland, Ashtabula, Toledo and such points to Duluth on Lake Superior.

[Sir Henry Thornton.]

Ore vessels coming down loaded with ore take back coal, and they probably name a very low rate, because those vessels have to go back for their next load of ore in any case. When in charge of the terminals which the Pennsylvania had at Ashtabula, I have myself brought 10,000 tons of ore into Ashtabula at eight o'clock in the morning and sent that same boat out at eight o'clock in the evening with 10,000 tons of coal in it. We unloaded the 10,000 tons of ore and placed the 10,000 tons of coal in twelve hours.

By Hon. Mr. Laird:

Q. Sir Henry, that would vary from the conditions that exist in Canada, because when you get the coal unloaded, say, at Fort William, the railway haul to the West commences there; whereas at American ports there is simply the freight rate to where the boats bring the coal.—A. My remark was merely by the way, in answer to that question which was asked in regard to these carriers, etc.

By Hon. Mr. Gordon:

Q. What would be the maximum train load, with the locomotives which you have now, from Alberta over the National Transcontinental?—A. I cannot answer that. I could tell you this afternoon. It would be a very simple thing to look the matter up. But I cannot answer that offhand.

Q. Do you think it would be 4,000 or 5,000 tons?—A. Making a running jump estimate, I should say certainly thirty fifty-ton cars. That would be 1,500 tons.

Q. Not more than that?—A. I am only giving a safe answer. It may be fifty cars. The average engine can haul on a .4 grade about fifty fifty-ton steel hopper cars. Fifty times fifty would be 2,500 tons.

Q. That is, without considering the weight of the equipment?—A. Oh, yes.

Q. That is 2,500 tons?—A. On a .4 grade. One of our average heavy freight locomotives will handle fifty fifty-ton cars loaded. That means 2,500 tons of revenue loading.

Q. Some of them take about 4,000 tons?—A. Oh, you may if you get a sufficiently powerful locomotive and if you use pushers at certain points where the grade may exceed .4. I do not happen to know offhand just where these .4 grades come in. If I had a profile before me I could tell you.

Hon. Mr. CASGRAIN: It is all .4 from Quebec.

Sir HENRY THORNTON: A good deal depends on the season of the year.

Hon. Mr. CASGRAIN: M. J. Butler said locomotives were drawing a good many more cars in Virginia, but that is because the grade is all down hill.

Sir Henry THORNTON: In Virginia the trains will pretty nearly run by gravity down to Newport News.

By Hon. Mr. De Veber:

Q. What is the price of American coal loaded on the car?—A. Now, at the mines?

Q. Yes.—A. I do not know. I should think it would be something like \$2 a ton. This information is very easy to get.

Q. In Alberta at the present time the mines work only six months in the year. They have to close down in summer, and of course we have to pay a great many men to keep up the mines, where otherwise you would not be able

[Sir Henry Thornton.]

to get at them again when you went to work next fall. On account of the lack of continuous work the men claim practically a double wage. I am assured by the union up there that if they could have continuous work they would stand for quite a large reduction of wages. At present we can put coal on the cars for \$4, but if we had continuous work we could put it on at—A. Two dollars?

Q. At \$2.50 anyhow.—A. Yes? Well, that would seem to be reasonable.

Q. So it makes a wonderful difference.—A. Yes.

Q. In figuring out what you said you would do, to let us know what was minimum you could charge for hauling coal, you might take that point into consideration, so that we might be able to ascertain at what figure we could land coal here.—A. Of course you must always remember that I want to make a little something for the railroad at the same time.

Q. Yes, yes; but what we are here for is to find out what is the lowest price at which we can put coal into Ontario.

Hon. Mr. GORDON: But there are mines in Alberta where there is no miners' problem at all—where coal is loaded with a steam shovel, as I understand.

Hon. Mr. CASGRAIN: That is lignite.

Hon. Mr. DE VEBER: That coal all goes to pieces. A railway engine cannot use that coal, because it sparks.

Hon. Mr. GORDON: They are using it on the National road.

Sir Henry THORNTON: We use it in the winter time, and we are experimenting to get such spark arresters that we can use it all the year around.

By Hon. Mr. Laird:

Q. What field would that come from?—A. Stirling—a place out of Stirling.

By Hon. Mr. Gordon:

Q. Is not that pretty good coal?—A. It is good coal of its kind. You see the biggest bill of the Canadian National Railway system is coal bill. That is the thing I have to attack harder than anything else, because if I could reduce our coal bill by even a small percentage it would mean some millions of dollars. So we are constantly trying to find some way of getting our coal more cheaply. This is one of the things we have been working on. Our coal bill is almost enough to make you weep.

Q. It runs into the millions?—A. Yes, it is the biggest thing we have.

Hon. Mr. CASGRAIN: And the wages.

By Hon. Mr. De Veber:

Q. Have you ever tried coke?—A. They have tried a lot of things. I do not know whether they have tried coke on this railway or not. You see, the total purchases of the Canadian National Railway exceed one hundred millions a year—just the things we buy, and you have only to make a reduction of ten per cent to get \$10,000,000 into your pocket.

By Hon. Mr. Laird:

Q. Rather to make \$10,000,000 less out of pocket?—A. Well, what goes into our pocket, of course, relieves the payment from your pocket to just that extent.

By Hon. Mr. De Veber:

Q. Mr. Pearce, when he was here, gave us a lecture on coke. He had been at all the coking places that he told us about. I think he said it was the Koppers concern, in St. Paul, who are making coke for which they are getting 50 cents a ton more than can be got for anthracite.—A. Well, I think that is true.

[Sir Henry Thornton.]

Q. I think he said that some of it was being shipped to Winnipeg. That is made specially, not as a by-product. It is a good coke.—A. I understand there has been a certain amount of experimenting with it. We might advantageously do something—I say might—do something in the way of concentrating some of this western coal before it is moved east. That is a scientific question that I have not had an opportunity of going into, but there may be something in it.

By Hon. Mr. Casgrain:

Q. That was tried at Bienfait, Saskatchewan.—A. I have been told it was tried and was not successful; but I do not know that I should abandon consideration of it because perhaps one experiment had not been successful.

Q. The C.P.R. tried that twenty-five years ago without success.

By the Chairman:

Q. I understand, Sir Henry, that you have expressed yourself in the most sympathetic way toward utilizing your railway to extend the field of Canadian coal; that you are considering the matter, and that shortly you will have definite figures as to what you can do.—A. Yes.

Q. Would you let us have those when you are ready?—A. Yes, when I am in a position to do so. Perhaps the best way would be to write you a letter.

Q. Yes, sir.—A. May I just, in conclusion, say this one thing. It is very difficult to express sympathy with one thing without perhaps injustice to another aspect of the question. I am entirely in sympathy with what you are trying to get at, and the best evidence of that is that I got at it myself before I had any intimation that you wanted me to come here. But I must always keep this in mind—and I know that you will all at least look at it sympathetically from my point of view—that I must try to get this deficit down, but in getting it down I must try to do so in such a way that I am increasing traffic and the railway is serving the community. Of course it would be a very simple thing for me to name coal rates and grain rates, or anything you like, which would cause the whole Dominion, from one end to the other, to throw up their hats and cheer; but they would find at the end of the year that the deficit was even greater than before. So what I am really trying to do for the Dominion is to have our cake and eat it too, if such a thing can be accomplished. I am trying to handle our rate situation in such a way as to create new traffic, stimulate progress, and at the same time not unduly damage our financial position. Of course, that is a pretty difficult thing to accomplish, and after all, all of us are confronted with difficult things to accomplish. So when I express sympathy with this I do not want anybody outside this Committee to think I am abandoning and throwing away entirely any consideration of our financial position qua our deficit.

By Hon. Mr. Bennett:

Q. If there were a local coal distribution from Midland or Parry Sound, or wherever it may be, and this were being allotted in car distribution to towns, say to Toronto, would not there be a chance for return freight or package freight that could be loaded on freighters going back?—A. I think there might be. In principle, I would say yes.

Q. And the haul of 90 miles would be better than the haul to Sarnia where you now handle package freight?—A. Yes, I think that would be true in principle.

The CHAIRMAN: We are very much obliged to Sir Henry, and hope that his efforts will be crowned with success.

The Committee adjourned at 11.40 a.m.

THURSDAY, March 22nd, 1923.

The Special Committee of the Senate on the Fuel Supply of Canada met at 11 a.m. in Room 368. Honourable Mr. McLennan in the Chair.

The CHAIRMAN: We have with us this morning Mr. J. A. Ellis, the Fuel Controller of Ontario, who has been good enough to come down.

Mr. ELLIS: Mr. Chairman, it is very rarely that I prepare anything in writing, but I thought in this case it was better to read it to the Committee. It is not too long. Part of it, perhaps two-thirds, deals with what has happened so far as Ontario is concerned, in a general way, and one-third with my own personal views, as to what might be done in the future, the conclusions I have arrived at from my experience of this winter. Of course, I need not tell you that I will be very glad to answer any questions that I can that you may ask me.

I think Ontario is the only province which has a Fuel Supply Act. That is the Act under which I was appointed. The Dominion had an Order in Council under the War Measures Act, but that has expired, I understand, and there is no Dominion legislation now. Our Act is not a very elaborate one, but it has given me some powers that have been very useful.

I was appointed Fuel Controller for Ontario on 11th August, 1922.

POWERS OF FUEL CONTROLLER

These powers are set out in chapter 13, of the Statutes of 1918, being the Fuel Supply Act, 1918. Amongst other powers are the following:—

The Controller may, subject to the approval of the Lieutenant Governor in Council, make orders from time to time regulating the quantity of fuel which may be used, held or stored by any person, and directing that any amount in excess of such quantity shall be taken over from such person upon such terms as the Minister may approve and sold, distributed and otherwise disposed of. The Controller may provide penalties for the contravention of any order so made.

The Controller may also, subject to the same approval, make orders fixing the price at which wood, peat or other fuel may be sold or disposed of. The Controller can also subject to the same approval, make regulations respecting the use of fuel and restricting the same as to seasons and hours of use and the mode in which the same may be used.

The Act also provides that the Lieutenant Governor in Council may make regulations, amongst others, as follows:—

Prescribing the duties of the Controller and conferring upon him such powers as may be deemed proper for carrying out the objects of the Act.

Imposing penalties for the violation of any regulation or order made by the Controller or by the Lieutenant Governor in Council.

Fixing the salaries, scale of remuneration and expenses to be paid to officers and other persons employed under the Act.

ORDERS MADE BY FUEL CONTROLLER FIXING PRICES

Under the above provisions I made orders on the 27th of September, 1922, as follows:—

1. Providing that no person, not being a dealer in coal should hold or store more than one month's supply of American anthracite.

2. Providing that no retail coal dealer in Ontario should deliver at any one time more than one month's supply of American anthracite to any person, and that no such coal should be delivered to any person who already held or had stored two week's supply or more of such coal.

[Mr. J. A. Ellis.]

Here I may just observe that I deliberately refrained from making any regulation with regard to the quantity of substitutes for American anthracite which anybody could hold, the idea being to encourage as much as possible the use of such substitutes.

Another order of the 27th September was for the purpose of providing that a municipal council might appoint a local fuel administrator to carry out the provisions of any order or regulation made under the provisions of the Fuel Supply Act. The salary and expenses of such local fuel administrator to be borne by the municipal council appointing him.

I made an order providing that the retail price of American anthracite in the city of Toronto should be \$15.50 per ton. I also made the following orders fixing the retail price of American anthracite:—

In Ottawa	\$16 50
“ Kingston	16 50
“ Guelph	16 00
“ Niagara Falls	15 50
“ Gananoque	16 50
“ Oshawa	16 00
“ Lindsay	16 50

Except in the case of Toronto, the above orders were made after a resolution had been passed by the municipal council concerned requesting that I fix the price and after I had heard representatives of such municipal council and representative coal dealers from the same place. The price fixed by me in every case was upon the basis of that fixed for the city of Toronto, which corresponded with that in the city of New York and in many other places in the States, taking into account the difference in freight, etc. These prices in no case exceed the prices charged elsewhere in the same localities last winter.

A number of resolutions requesting me to fix prices were also made by other municipal councils, but in many cases when the representatives of the municipal councils and the coal dealers came before me, they agreed upon the price to be charged and it thus became unnecessary for me to make any order.

The cities of Brantford and St. Thomas also passed resolutions asking me to fix the price. In the case of Brantford I heard the parties and took the matter into consideration for a few days. Before, however, I had made any order, the Brantford city council passed another resolution requesting me not to fix any price. In the case of Brantford, the city bought five thousand tons of first-class Welsh anthracite. I think they have about three thousand tons of it still left. But the curious thing is that Brantford, of all places in Ontario, has had a fairly reasonable supply of American anthracite all winter.

In the case of St. Thomas, after hearing the parties, I was requested not to fix the price until further advised by the city council, and the matter has remained in this position ever since.

The fact of my fixing prices in the places mentioned has had a steadying effect upon prices throughout the province, even in those places where I did not fix any price.

Another strong reason for fixing prices was the following: In September the Federal Advisory Fuel Committee (composed of the Minister and Deputy Minister of Railways, Mr. C. A. Magrath and Mr. Fred McCourt) made an arrangement with the United States authorities whereby it was agreed that Canada, treated as a unit, would get the same allotment of coal as the various states in the union. This allotment was estimated to be equal to about sixty per cent of the usual supply. It was, however, impressed upon the Federal Advisory Fuel Committee that Canadian dealers should not go to the States and pay large prices for coal, because this would only result in prices being

increased all round both in the States and in Canada and would not probably give us any more coal in excess of our allotment. Through the Ontario Retail Dealers' Bulletin I warned the coal dealers of Ontario to refrain from paying extortionate prices for coal to the United States' brokers. As a matter of fact, some Ontario dealers however at once began to offer large prices for coal in the States, and in September the United States authorities threatened to place an embargo on coal coming to Canada if this practice was continued. By fixing the retail price as I did, I was enabled to answer the United States authorities by stating that I had taken the most effective step that could be taken to prevent the practice they complained of being continued, and the threat to impose an embargo then was abandoned.

PENALTIES FOR VIOLATION OF ORDERS

Under Orders in Council penalties have been provided for violation of my order fixing the price for coal in Kingston, Niagara Falls, and Guelph. These Orders in Council were passed at the request of the municipal councils of the places mentioned, and in other municipalities where the price had been fixed the municipal councils were advised that a similar order would be made if requested by them. Information for the recovery of penalties can only be laid by Local Fuel Administrators. I might mention that there have been no prosecutions.

No penalty has been provided in Toronto because the city council never asked for one. The matter has, however, worked out in this way. Probably 80 per cent of the coal which comes to Toronto is old line company coal and about 20 per cent is independent or brokers' coal. The old line company coal has been sold at \$15.50 but the independent or brokers' coal has been sold at about \$18.00. The result, however, is that about 80 per cent of the coal has been sold as stated at \$15.50.

If I had not made any orders anywhere fixing the price of coal, I have not the slightest doubt that the prices generally throughout the Province would have been considerably greater than they have been.

THE USE OF SUBSTITUTES

It was clearly apparent, early in September last, that if at the best we could only get sixty per cent of our usual supply of American anthracite, we would have to use a considerable amount of substitutes, such as Welsh coal, American bituminous coal, peat, coke, wood, etc., to make up the difference. One of my first official acts, therefore, was to call a meeting in Toronto of the various municipal authorities and coal dealers throughout the Province and to strongly urge upon them the necessity for co-operation between the municipal councils and the coal dealers, and the necessity for bringing in substitutes to the amount of at least forty per cent of the usual supply of anthracite. A considerable amount of substitutes were provided but unfortunately not every place followed my advice. What I said at the meeting above referred to was communicated by me by circular to all the cities, towns and larger villages in Ontario. I strongly advised that substitutes should be used until at least the middle of December and the anthracite conserved for the severe winter months. Whilst this was done to some extent it is scarcely necessary for me to say that a large number of the general public absolutely refused to believe that there would be any shortage whatever in the supply of American anthracite and insisted upon using the latter coal whenever they could obtain it. The result has been what I expected, viz., that people have simply been compelled to use some substitutes in the severe winter months.

[Mr. J. A. Ellis.]

PROPOSED EMBARGO ON COAL BY THE UNITED STATES

Probably the greatest difficulty with which I have to contend has been an agitation carried on all winter in the States by the Hearst newspapers and some politicians. These newspapers and politicians have constantly urged that an embargo should be placed on all anthracite coming into Canada. In the early fall and again in the beginning of January Representative Rogers, Republican of Massachusetts, in the House of Representatives, requested that such an embargo be imposed. Every possible scrap of information which could be obtained in Canada has been used by these propagandists in the United States. Chance remarks made by the Mayor of a large Ontario city that that city had an ample supply of coal (which was not correct) was so used. Advertisements of coal for sale which have appeared in the ordinary course have also been used as evidence that Canada had an ample supply of anthracite, whilst it was alleged some places in the States had none. Some small advertisements which appeared in Toronto newspapers advertising American bituminous coal were also used as evidence that Toronto had lots of anthracite. A coal dealer in Toronto wrote a letter offering to supply anthracite to a city in Massachusetts. This was also used as evidence that Canadians had lots of coal and that they were endeavouring to sell it in the States. An advertisement in St. John, New Brunswick, advertising anthracite for sale was also used in the same way.

A statement also appeared in a certain newspaper published in Ontario that Montreal had already received one hundred per cent of its usual supply of American anthracite. This statement was not correct, but it did not help us in the States. It is quite true that Montreal has been in better shape so far as regards its coal supply than Toronto but this is because Montreal imported a fairly large quantity of Welsh coal, whereas very little came into Toronto.

Another statement also appeared in Ontario newspapers to the effect that some localities had lots of coal whilst some particular locality, such as Toronto, had not a sufficient supply. This again was taken as evidence in the States that Ontario was not badly off for coal.

Both myself and the Federal Advisory Fuel Committee have found ourselves in a very difficult position all through the winter. If we said there was no cause for alarm with regard to the fuel situation, this would immediately have been quoted in the States as a reason by the Hearst newspapers and the politicians above mentioned why we should get no more coal. If, on the other hand, we said we were in dire need of coal people here would have got panicky, and what small supplies there were would have been at once taken up, perhaps by people who already had some supply on hand. The fact is that the only way in which the situation has been met in Ontario at all has been by the great majority of dealers as a whole co-operating with me and delivering at any one time to any one person just sufficient coal to keep things going.

It is much to be regretted that this agitation was carried on in the States, and it is more to be regretted that indiscreet things were done in Canada which only afforded ammunition for the agitators in the States.

SUPPLY OF COAL

Ontario's yearly supply of American anthracite is about 2,800,000 tons. That is taking an average for five or six years. I do not mind giving these figures now. I would have hesitated sometime ago. From 1st April, 1922, to 28th February, 1923, Central Ontario has received 1,464,182 tons, exclusive of dust, or a little over fifty per cent of our usual yearly supply. I expect that by 1st April next Central Ontario will have received a little over 60 per cent of

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our usual yearly supply; and that in this way we shall have received the same treatment as the various States in the Union. We have nothing to complain about so far as the officials of the United States are concerned.

In view of the anticipated coal shortage there was imported into Ontario about 150,000 tons of Welsh coal before the close of navigation which has helped the situation to some extent. A number of municipalities and coal dealers purchased this Welsh coal and a large number of the smaller municipalities purchased considerable supplies of wood. The Province purchased 10,000 tons of American bituminous coal which has been stored at Guelph for emergency purposes. This has helped the situation to some extent. We sold one car, and that is all, with the exception of what the Institution has used. The rest is still there.

CAR SHORTAGE IN THE STATES

Another difficulty with which we have had to contend has been the car shortage in the States. We however, through the kindness of the Canadian Railways managed to borrow from the Canadian Pacific Railway, the Grand Trunk, and the Canadian National a considerable number of cars, which were used exclusively to carry coal from the States and which helped to relieve the situation. Assistance was given Port Arthur and Fort William in securing some supplies of American anthracite before the close of navigation, and also in securing vessels to carry the coal.

PRESENT EMERGENCY AS COMPARED WITH FORMER EMERGENCIES

I have had to deal with an entirely different situation to that which confronted the former Fuel Controllers. In 1917-18 there was no shortage in the production of American anthracite. The difficulty then was that a large amount of this coal was required for the manufacture of war supplies. The United States at that time took the position that Canada was an Ally of the United States in the Great War and should be treated in every way on an equal footing with the States with regard to the supply of coal. At that time when there was a shortage of coal in any locality in Canada it was only a matter of getting some coal diverted, and the United States authorities were always willing to do this. In the present emergency there was a real shortage in the production of coal and it has been impossible to divert coal from one place to another, because every place was short. It has therefore been largely a question during this winter of doing our best to get the United States authorities and the mine operators to forward coal to Ontario and Canada. In this direction, I must say that the Federal Advisory Fuel Committee, and especially Mr. C. A. Magrath have been of invaluable assistance to me. This Committee has done all the work necessary in the States in conjunction with the Dominion Agents who are stationed there, and especially Mr. Mahoney the Dominion Agent at Washington. With this assistance I have found it unnecessary for me to enter into direct negotiations with the United States authorities and mine operators.

Under former Fuel Administrators a staff of Inspectors was employed to check up the cars entering Canada at the Suspension Bridge and Bridgeburg. This, of course, is the main channel through which coal comes to central Ontario, and it is controlled by the Grand Trunk Railway. We got the Grand Trunk Railway without any expense to the Province to put on extra men at these points to facilitate in every way possible the forwarding of coal to points in Ontario the moment it arrived at this side. In this way the expense of Inspectors under myself was obviated, and I feel sure that we have got better results in the way I have mentioned than if I had employed such inspectors.

[Mr. J. A. Ellis.]

As to the future—and perhaps this is the most important thing I have to say—I cannot advise people too strongly to get their next winter's supply of coal in in the Spring. The agreement between the anthracite mine operators and the men, which terminated the strike of last year expires in August next. There may or may not be another strike next September. I am inclined to think there will not. However, it will be only prudence on the part of the general public to lay in their coal in the Spring.

I think it is much to be regretted that Ontario should be so absolutely dependent upon the United States for its supply of anthracite. I have heard various propositions put forward to obviate this, but I did not see how the problem can be effectively overcome. One of the propositions is that we should use Western Canada coal. The difficulty there is that freight on such coal to Central Ontario is about \$13 per ton. Another proposition is that we should use Nova Scotia soft coal turned into Coke. The difficulty there again is the long freight haul from Nova Scotia. It must be remembered that Toronto is only about four hundred miles from the Pennsylvania Mines.

Another proposition, and to my mind the most feasible one, is the importation of Welsh anthracite coal. I do not think there will ever be any difficulty about getting considerable quantities of American bituminous coal because there is generally a considerable over production of this. Unfortunately the coal which Wales could send us would be largely bituminous coal. Wales produces about 250,000,000 of bituminous coal and only about 5,000,000 tons of anthracite. There is already a market for a very considerable amount of this anthracite, and when it is remembered that Canada uses nearly five million tons of anthracite each year, it is too much to hope that Wales could let us have all the anthracite we need. In addition when there is a full supply of American anthracite it would be difficult for the Welsh coal to compete with it in price. Even if it did, I am inclined to think that the large mine owners in the States would cut the price of American anthracite in order to keep out the Welsh coal. Welsh anthracite is more brittle than American, and the loss from breakage and screening will add to the retail price of this coal.

In my opinion, and I have used it in my own house, Welsh anthracite is better than American anthracite. It has much less ash and a greater heating quality. It is practically free from stone and slate. During this winter the quality of American anthracite has been pretty poor. There have been much larger quantities of slate and stone this year. In some cases so called American anthracite purchased from brokers, unseen and cash in advance, has been absolutely worthless, being composed entirely of stone and slate and in some cases bone. In my opinion, Welsh anthracite is worth at least \$3 per ton more than American anthracite.

Another substitute for American anthracite is coke. I have heard the proposition put forward that a coking plant should be established in Montreal and another one in Toronto. If such a plant is established in Montreal, Maritime Province coal would probably be used there. For a plant in Toronto this coal might be used to some extent, but I think the main reliance would have to be upon American bituminous coal. I do not anticipate that there will for a long period in any event be any shortage in the supply of the latter coal. If there was we would have to fall back on Maritime Province coal.

The real trouble though about any substitute for American anthracite is the reluctance of the general public to use anything to which they are not accustomed. The present generation has been brought up on American anthracite and so long as this is available I doubt if they will use anything else except to a comparatively limited extent. I found the greatest possible difficulty in

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getting people to use substitutes for American anthracite during this winter and it was practically only when they could not get the latter coal that they took substitutes.

I do not think the procuring of substitutes, especially in large quantities, would in any event accomplish much unless the wholesale and retail coal dealers would handle them and push them as they should be pushed. These coal dealers have large organized established businesses with complete facilities for handling coal, and it would be a matter of considerable time and expense for other persons to obtain these facilities and compete with them.

I have not much confidence in peat ever becoming a substitute for coal in Ontario. I do not think peat is of much value except in reasonably mild weather. In the severe winter months I would not like to have to depend upon it.

American bituminous coal could be used to a much greater extent to what it has heretofore been used, but there is a prejudice against using it in houses which I am afraid it is difficult if not impossible to overcome. In Nova Scotia and New Brunswick bituminous coal is very largely used in houses and quite satisfactorily.

The only conclusion to which I can come is that every encouragement possible should be given to the importation of Welsh coal and the use of coke, but whatever is done in this direction I doubt if they will ever completely take the place of American anthracite so long as it is available. I am satisfied, however, that the mine operators in the States would not like to lose any of their Canadian market and the importation of Welsh coal even to a limited extent, would I think assist in assuring us of a reasonable supply of American anthracite for some time at all events.

The real problem connected with the fuel situation is, as before stated, getting people to use some fuel other than American anthracite. Unfortunately in order to have a large amount of substitutes available whenever there is again a shortage of American anthracite entails a great deal of preliminary work a considerable time in advance. Then if preparations were made by importing Welsh coal, manufacturing coke, and in other ways, I doubt if much would be accomplished so long as American anthracite continued to be available.

In short I think the essential thing to be done now is to educate the public to use substitutes or in any case to be in readiness to use substitutes if the necessity arises. This would probably involve some change in the construction of furnaces and the building of chimneys, etc. It see no reason, however, why in the construction of new houses and furnaces, provision should not be made whereby substitutes could readily be used. The most frequent complaint I have heard all winter was that people's furnaces, etc., were only adapted for American anthracite, but I do not think this is true except to a limited extent.

There will be no real solution so far as Canada is concerned until people are sufficiently educated to be willing to use substitutes for American anthracite. I have found that almost everybody is satisfied to let other people use substitutes but the great majority of people demur about using substitutes themselves.

By the Chairman:

Q. The railway companies, of course, looked after their own supply of coal?
—A. Yes.

Q. That did not come under you?—A. No.

By Hon. Mr. Webster:

Q. You dealt largely with anthracite for domestic purposes, did you?—A. Yes. There is no doubt that sixty per cent of the fuel used in Ontario for

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domestic purposes was anthracite; the other forty per cent was substitutes.

Q. What would you give as the reason why people will not use substitutes?
—A. The only reason I can give, to put it plainly, it is just like a man who has used a certain breakfast food for certain years; you cannot convince him that anything else is just as good. He says: "This is what I have had all my life."

The dealers in Ottawa imported fifteen thousand tons of Welsh coal. They had ordered more, but on account of the prejudice against it, and to some extent because of the price, they had to cancel some of their orders, and the people got less than they ought to have got. People would not take it, and the only way the dealers could handle the situation was to say: "You will take half a ton of Welsh anthracite with your order, or you can't get any."

By the Chairman:

Q. Was it good Welsh anthracite?—A. Yes, excellent.

By Hon. Mr. Webster:

Q. Was it well screened?—A. No. That was the big grievance against it. I got three loads, and my first load was fifty per cent slack.

By Hon. Mr. Calder:

Q. You said early in your remarks that in your opinion Welsh anthracite was worth three dollars a ton more than American anthracite?—A. Yes.

Q. Was that true of the Welsh anthracite that came in last year?—A. Yes. Good screened Welsh anthracite would be worth more. The slack can be burned.

Q. How did the prices compare?—A. There was that difference in the price.

Q. That exact difference?—A. Yes.

By the Chairman:

Q. And it was worth it?—A. Yes.

By Hon. Mr. Laird:

Q. Do you get screened Welsh anthracite?—A. If you give me screened Welsh anthracite at five dollars a ton more than American anthracite, I want the Welsh.

Q. Can it be got?—A. Yes.

Q. Why don't they get it?—A. Because it increases the price. Welsh anthracite is brittle, as I have said, and you can ship it entire and complete, but it breaks upon the way, and no matter what you do you get a percentage of slack.

Q. Does it break up by reason of the moisture content?—A. No.

Q. Or is it just breakage in shipping?—A. Just breakage in shipping.

By the Chairman:

Q. Suppose a cargo of Welsh anthracite came to Montreal and was screened there, would the journey to Toronto produce a slack?—A. Oh, no, that would not mean anything; it would be largely on the voyage.

Q. It would be on the way from the mine, on the steamer, and so on?—A. Yes.

By Hon. Mr. Webster:

Q. Isn't it the fact that the merchants who imported these cargoes of Welsh coal had no means of disposing of their slack other than to deliver it with the regular coal?—A. That is correct. Perhaps I might refer back further than last year. I had something to do with municipal affairs in this city some years ago. That was when the strike was on in 1902. There was a shortage then, and

I was instrumental in importing about eight thousand tons of Welsh anthracite for the city. But we screened it, and everybody was satisfied with it. But we had twenty-five to thirty-five per cent of screenings for which we got only about five dollars a ton.

Q. The cost of screening requires to be added to the price of the coal.—A. Yes. It just comes down to a matter of price. If you screen it you have to add your loss on screening to the cost.

By Hon. Mr. Calder:

Q. Prior to the war, Mr. Ellis, did you have periods in Ontario when there was a fuel shortage?—A. No, except in 1902, when there was a strike.

Q. From 1902 to 1914 you got your normal supply?—A. Yes.

By Hon. Mr. Webster:

Q. Was there not some difficulty in 1908 as well?—A. Yes.

By the Chairman:

Q. I think there was in 1908, and then there was one before 1902.—A. Well, that is about as far as I can remember.

By Hon. Mr. Webster:

Q. Have you had much experience with the semi-anthracite Welsh coal? Or were you speaking entirely of the large vein Welsh coal?—A. Entirely of the large vein.

Q. Anthracite?—A. Yes. There is another difference again; the red vein is a little inferior.

Q. But was there much of the semi-anthracite used in Ontario?—A. There was; but the trouble about that was this, that people would persist in selling semi-anthracite as the best Welsh anthracite, and I have had to warn people time and time again not to misrepresent it.

Q. But it was still used as a substitute?—A. Oh, yes.

Q. With what result? When there was no misrepresentation what was your experience of the result?—A. Pretty satisfactory.

Q. And it would be \$1.50 to \$2 a ton less, probably?—A. More than that.

Q. Three dollars a ton less?—A. During the shortage prices were high of course. Yes, I think it would be at least \$3 a ton less.

Q. At \$3 it would be a reasonable substitute for American anthracite?—A. Yes. I think even the semi-anthracite would be.

Q. It is of the semi-anthracite I am speaking.—A. It would be just as good as the American anthracite.

By Hon. Mr. Calder:

Q. Is not this true, Mr. Ellis? I think you stated it in your paper. According to what you state there were two or three periods prior to the war, and fairly far apart, during which there was a shortage in Ontario.—A. Yes.

Q. Then along came the war, and, particularly in the years 1917 and 1918, very large quantities of coal were used for war purposes?—A. Yes.

Q. There was another shortage?—A. Yes.

Q. Then came this strike, which caused the recent situation?—A. Yes.

Q. Now, is it not possible that, say, during the next two or three years we shall get back to normal conditions?—A. I am only speculating, but my impression is this. It is hard to tell, but I would say that we shall have our usual supply perhaps for two or three years.

Q. From now on?—A. Yes.

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Q. We shall have our usual supply?—A. Yes, for the next two or three years.

Q. If we again get into that condition in which we have our usual supply and we import this Welsh coal, the American dealers will bring in their coal.—
A. Most assuredly.

By the Chairman:

Q. That will at all events reduce the price.—A. It would probably have that effect. I threw in a reference to that incident about Brantford purposely. The very fact that they had Welsh coal and could supply the people insured Brantford having enough American anthracite.

By Hon. Mr. Calder:

Q. The American dealers and brokers saw that Brantford had all the coal it needed?—A. Exactly.

By Hon. Mr. Webster:

Q. If our consumption here is only 2 per cent of the whole, do you think the fact of a few hundred thousand tons of Welsh coal coming in would cause the American producer to reduce his price of anthracite seriously?—A. No, I do not think it would reduce his price at all if only a few hundred thousand tons came in.

Q. He would be called upon to give the same price at home, and that would affect his whole profit.—A. That would be only if he saw an immense quantity coming. But I am very strongly of opinion that if some quantity of Welsh anthracite could be imported it should be imported. I do not know of anything that will benefit more.

By Hon. Mr. Calder:

Q. That would be for the purpose of steadying the market?—A. Yes. It is only for that purpose.

By the Chairman:

Q. And it helps the shipping of the country.—A. Toronto bought 12,000 tons of genuine anthracite, nut size and pea. Of course the pea did not go as well. Everybody in Toronto was using that coal. People have used it in Ottawa. They would be perfectly willing to buy it again, especially if they got it screened.

By Hon. Mr. Calder:

Q. Who should do the importing, in your judgment?—A. That is the problem. You see, it is quite easy to import, but the difficulty is in handling the coal.

By the Chairman:

Q. The distribution.—A. The dealers have their own facilities, and they have the sheds at the railway places. It is a difficult thing to break in. Men in the business would be afraid to import Welsh coal. This is my honest opinion; unless they could be assured of a constant supply, it would be difficult to get them to import Welsh coal, because I am pretty sure anybody who handled it would not get American anthracite.

By Hon. Mr. Calder:

Q. That is a matter that should be handled provincially or municipally rather than federally?—A. Oh, yes.

By Hon. Mr. Webster:

Q. Your view, Mr. Ellis, is that it should be handled at an ocean port?—
A. Yes.

Q. Is there any way that you can suggest by which an importer at an ocean port could co-operate with either the Dominion or provincial Government in regard to any loss that might be sustained in bringing out a large quantity of Welsh coal for the benefit of the people of Canada?—A. The main point that I can see is this. Who would handle it in each locality? I have not come to any conclusion about it. There is the real difficulty that I can see about it. Unless you can get independent dealers, outside the dealers who deal in American anthracite, I see nothing for it except the municipalities.

Q. But these importers would handle it provided they were protected in some way—if it would be a fair suggestion that there might be some allowance made in case of losses only.—A. Yes.

Q. Would it be possible to arrange for that with any of the municipalities or with the province?—A. It might. This is the way the thing has been run last winter. There have been, as you know, the Federal Fuel Advisory Committee, and then myself and other provincial fuel controllers, but we got down to the municipalities as much as possible. Frankly, I have endeavoured to put as much responsibility as I could upon municipal councils. I think it is certainly well worth considering whether somebody who is willing to do it should not be encouraged to bring in Welsh anthracite.

By Hon. Mr. Calder:

Q. On the other hand, Mr. Ellis, if there is a likelihood that during the course of the next two or three years you are going to get back to normal conditions, or conditions approaching normal, so far as the Ontario fuel supply from the United States is concerned, is it not very doubtful that any person would undertake to import Welsh anthracite?—A. I do not think they would continue it.

Q. A great deal will hinge on whether or not you are going to have strikes in the United States mines in the next two or three years.—A. Yes. I do not think you will have. I doubt very much that there will be another strike for two or three years.

Q. Another question just there. We are speaking of the Ontario supply.—
A. Yes.

Q. Evidently the consumption of coal, both in Ontario and in the United States, has been increasing enormously during the last twenty years.—A. Oh, tremendously.

Q. Is that increase likely to continue, from your knowledge of the situation and of the use of coal in this country?—A. Yes.

Q. It is likely to increase?—A. Yes.

Q. Then you come down to this question: Are the American mines going to be able to supply that ever-increasing demand?—A. So long as they have coal they can do it.

Q. So long as the coal is there—so long as the mines are not worked out?—
A. Perhaps I should not speculate, but I think one of the reasons for the strike was over-production.

By Hon. Mr. Webster:

Q. But not in anthracite?—A. In anthracite. They had very large stocks last April.

By Hon. Mr. Calder:

Q. Have you any knowledge as to the length of time those mines will last?—A. No.

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Hon. Mr. CALDER: I suppose there are statistics on that.

The CHAIRMAN: Yes. The estimate varies from 50 to 100 years.

By the Chairman:

Q. Mr. Ellis, can you give us roughly the tendency of prices of anthracite in twenty years?—A. No. I remember that twenty-five years since, I used to buy coal myself, retail in Ottawa, for about \$6 a ton. Now it is \$16.50. It is \$8 at the mines, and it is \$4.50 freight to Toronto. You see, there is \$12.50.

By Hon. Mr. Calder:

Q. It is \$8 at the mine mouth now?—A. Yes. It ran last winter between \$8 and \$8.50 for the cheapest coal; and the brokers' coal has gone up to \$16 and more, at the mines.

Q. Take ten or fifteen years ago. What was the price at the pit mouth then?—A. I do not know; but twenty-five years since I used to get coal delivered in my cellar for \$6.

Hon. Mr. WEBSTER: It was about \$3.

By Hon. Mr. Calder:

Q. About \$3—A. Yes, I should imagine, about \$3 at the most.

By Hon. Mr. Webster:

Q. I was going to touch on the question of coke. Would you please indicate how that might be handled? You suggest that Nova Scotia coal might be converted into coke at Montreal.—A. Yes.

Q. And the coke used in Ontario for domestic purposes?—A. Yes. This last winter in Ontario, and especially in Toronto, a considerable quantity of coke has been used, of necessity. Of course they could not get anything else. It was either that or soft coal in a good many cases.

By the Chairman:

Q. You mean hard coke? You do not mean gas-house coke?—A. I mean coke prepared for domestic use.

Q. Imported?—A. Yes, imported. There has been a very much larger quantity of it used, and rather to the surprise of the people who have used it, it has not been altogether unsatisfactory. I would put Welsh anthracite absolutely first; I would put American anthracite next, and coke third. That is about the way I would class them myself. But coke makes a very good substitute for American anthracite. It has to be fired a little differently, though, and people have to learn that. We issued instructions, and so did the Federal Fuel Advisory Committee, as to how to use different substitutes. But you have the same difficulty with regard to coke that there is with regard to handling Welsh anthracite. I am speaking of handling alone. I doubt if you could get the dealers to handle it; that is, the dealers who are at present handling American anthracite. My expectation is that those dealers, where there is the usual supply of American anthracite, will have to handle American anthracite almost exclusively, or they will not get it.

Q. That is, the anthracite mine operators will favour a steady customer?—A. Yes.

Q. Against the man who comes in just to supplement his supply?—A. Yes.

By Hon. Mr. Webster:

Q. Would you go further and say that they would boycott the dealer who handled substitutes?—A. Oh, they never boycott him.

Q. They never boycott him?—A. No. Something goes wrong with his cars.

Q. Have you any suggestions for the Committee as to how, or by whom, the suggested coke plant should be operated at Montreal? Should that be Government operation, or should there be a subsidy granted to the concern who will erect such coal ovens? I understand the cost of erection of coal ovens might go from \$4,000,000 to \$8,000,000.—A. Yes.

Q. And that it is not a suggestion that could be carried out by very many private individuals.—A. No. That is quite true.

Q. What would your suggestion to the Committee be if Canadian coal is to be turned into coke?—A. I suggested that, of course, as an alternative. My main point is that Welsh anthracite can compete with and beat American anthracite, and the more it is used the more it will be used; but, outside of that, to use coke, for example, you have first, I think, to stop American anthracite.

Q. From where will you get the coal? That is what I am trying to get at.—A. So far as regards Montreal, I should say the Maritime provinces. So far as regards Toronto, you might bring some down by water; not a great deal; but you have all the bituminous coal in the United States available.

Q. Where would it be manufactured into coke?—A. In Toronto.

Q. By whom?—A. I am not sure by whom. If you are going to get your American anthracite, then I do not think that you can get very far by putting up expensive coking plants, because you will not sell the coke.

Q. Have you any idea of the price at which that coke could be turned out?—A. No.

Q. Have you any figures?—A. No, I have not.

Q. You cannot tell us what it would cost?—A. No. I am not expert on that. It has been selling this winter at about the same as the American anthracite, or a little bit over—about \$1 over.

Q. But the fact is, the people take it as a substitute because they cannot get anthracite, but if anthracite is available, your impression is, they will pay something more to get American anthracite again?—A. That is my opinion.

By Hon. Mr. Calder:

Q. If coal can be brought from Wales and landed in Toronto to compete with anthracite, why cannot coal be brought from Nova Scotia?—A. It can, but what you are bringing from Nova Scotia is soft coal.

Q. It is not anthracite?—A. It is soft coal—bituminous, that is the trouble. The last thing people want is soft coal, in my experience.

Q. From what you have stated, Mr. Ellis, there is apparently an unlimited supply of bituminous coal in the United States?—A. Yes.

Q. And all that is necessary is to educate the people of Ontario to use bituminous coal, and your problem will be solved?—A. Yes. There is no doubt about that.

By the Chairman:

Q. But you get a very dirty fuel?—A. Oh, that is absolutely the last thing they will use.

HON. MR. CALDER: Throughout the Western provinces we use practically nothing but bituminous coal.

By Hon. Mr. Laird:

Q. So that this talk about people freezing is mostly "bunk", providing they are prepared to use substitutes?—A. Exactly.

Q. Well, people in other parts of Canada use substitutes. Why cannot the people down here do it? Is it simply because they have been accustomed to using anthracite?—A. The Ontario Government on my recommendation purchased 10,000 tons of American soft coal of very good quality, and we stored

it at the Prison Farm at Guelph. I sent out notices to all the small municipalities, telling them that if they were willing to pay for it we would let them have this soft coal. We sold one car. I had people from Guelph coming down to Toronto and telling me they were freezing, and there were 10,000 tons of soft coal there waiting for them. I said, "For goodness sake why don't you go and take some of that soft coal?"

Q. All this discussion in Parliament and the appointment of this Committee have arisen from the fear that this anthracite supply was going to be cut off. Now, as I understand your statement, we are probably assured of a supply of anthracite for some years to come.—A. I think that is correct.

Q. And if at any time that supply should fail, we always have ample supplies of bituminous coal to fall back on?—A. Yes; from the States.

Q. As a matter of fact, we people in western Canada particularly use nothing but bituminous, and we keep warm.—A. It is used also in the Maritime provinces.

Q. So notwithstanding the reports, there is no possibility of people in Ontario or Quebec freezing to death or suffering any privation?—A. Some people say they are going to freeze, because they cannot get what they want, just as some people might say they are going to starve to death because they do not get everything they want to eat.

By Hon. Mr. Calder:

Q. Another question arises in connection with that. You touch on it in your memorandum. That is, the different construction of their furnaces and all that sort of thing?—A. Yes.

Q. In your judgment is it necessary that all the furnaces should be reconstructed in order to use soft coal?—A. No.

By the Chairman:

Q. You can of course use soft coal in a hard coal furnace?—A. Yes.

Q. By keeping it clean. I have done it myself. But there is the question there, whether a reciprocal trade might not be established—whether, through this coking process, which yields gas and chemical by-products, we cannot supply a cheaper or more satisfactory fuel and get the by-products, instead of burning bituminous coal directly. It is a matter worth considering?—A. It has to be taken into account. I would not recommend bituminous coal. Your fuel problem, after all, is really confined to Quebec and Ontario. The West and the Maritime provinces have practically no fuel problem. And the West has extended down to cover Manitoba. Apparently they do not want any anthracite any more. I am very glad of it.

By Hon. Mr. Calder:

Q. They use bituminous coal up to near Montreal, and down as far as Port Arthur?—A. Yes. The problem extends really from Montreal to Port Arthur. That is about all.

By the Chairman:

Q. That is where the fuel problem is?—A. That is where the fuel problem is.

By Hon. Mr. Calder:

Q. And the problem exists there because people are accustomed to using anthracite, and only anthracite, and they will have nothing else?—A. Exactly. You have it exactly. I was going to say, too, with regard to the use of soft coal in furnaces, I would not recommend that so long as you can turn that soft coal into coke, which is much more satisfactory, especially in hot air furnaces. Of course you can use soft coal, and you will not freeze, but it is not a desirable condition. There is no doubt about that.

By the Chairman:

Q. This is a more or less technical question, Mr. Ellis. Can you give us the name of anybody connected with the Toronto Gas Company who might throw light on the coking problem?—A. No.

Q. Whom would you say we ought to hear?—A. I really do not know who are the chief officials. I should suppose that whoever is the general manager there could give you information.

I might mention just another point. The Consumers Gas Company imported—I am not sure of the exact figures, but, I think, about 40,000 tons of Welsh steam coal. I might say, too, that at the time Weston imported 4,000 tons of Welsh steam coal. I am told it is pretty satisfactory. The only grades of American steam coal that come up to Welsh steam coal are Pocahontas and New River.

By Hon. Mr. Webster:

Q. You mentioned some place in Ontario that imported coal and still had it on hand?—A. Brantford.

Q. Why would the people of Brantford not use that coal?—A. They were prejudiced against it.

By Hon. Mr. Calder:

Q. And because American dealers shoved in anthracite?—A. And because they could get all the anthracite they wanted. The last I heard of it, they were selling it for, I think, \$17, and as a matter of fact it cost them \$22 laid down at Brantford; and even at that they could not sell it.

By Hon. Mr. Webster:

Q. On the price you fixed, \$15.50, for the merchants, did they make any profit?—A. Yes, they made just as good a profit as they ever made. To be candid about it, I had to be a little reasonable, for this reason, that I was afraid to cut it down too hard. As a general principle I am not particularly impressed with price-fixing. It is a thing to be used only in very extreme cases and very judiciously. As a matter of fact, while \$15.50 was the price and 80 per cent of the old-line dealers charged that price, 20 per cent of the coal has undoubtedly been sold at \$18, and I have not stopped that, and have not tried to stop it. In the price of \$15.50 that I fixed I allowed a liberal margin, quite sufficient, for the reason I was afraid that if I cut anything down to less than corresponded with United States retail prices, the mine owners in the States might say, "Well, we will send our coal where there is more money in it, and we are not even going to let our dealers be shut down too tight."

Q. Did the American government make any effort to control the brokers whom you describe as middlemen?—A. No. They cannot. The difficulty is this, you see. The State Fuel Commission of Pennsylvania, in which state, of course, all the anthracite coal is produced, have really done excellent work. They have done their very best, and have been absolutely fair to Canada and to Ontario, even against a great deal of agitation in the States. They have been absolutely fair, but, on account of their laws, it is difficult for them to control brokers. They can control the state of Pennsylvania, but the difficulty is this, that Mr. Mine Owner would sell his entire output. The old-line companies did not do it; it was the small, independent mines. You would go down and say, "I want some coal," and you would be told, "I haven't any; it is all sold." If you asked where, you might be referred to somebody in New York State. How could you control that?

Q. You suggested that the price of anthracite might be cheaper this coming spring?—A. Not a chance. That is my candid opinion.

(Mr. J. A. Ellis.)

Q. I thought you mentioned it in your report.—A. No.

Q. Where you urged the public to take in their supply.—A. No, I did not mention that it would be cheaper. I have no hope of it being cheaper—if you do not mind my saying something on that. That is only my own opinion about it. I do not think there will be a strike for two or three years, and there may not be one then. I am pretty sure there will not be one next fall, for the simple reason that the mine owners and the men have got all they can possibly hope to get. There is no reason on earth why they should strike. There will be a strike when there is some tendency for prices to go lower, but so long as prices remain as they are there is no reason for any strike. There is nobody hurt except the public. Why should anybody strike?

By Hon. Mr. Calder:

Q. You mentioned something about car shortage. In your opinion, have our own railway companies sufficient cars to handle the coal business in Ontario?—A. Our own companies? So long as you bring coal from the States, yes; but the minute you go into bringing coal from the Maritime Provinces or from Western Canada, no—absolutely no.

Q. But for Ontario business—A. Coming from the States?

Q.—coming from the States, there is no shortage of equipment on our own railway?—A. I do not think so.

Q. So far as you know?—A. I do not think so. As a matter of fact, the different railway companies lent us 500 cars. Of course they put themselves out a little to do it, and they got nothing for it except just the freight over their own lines, which they would have got anyway.

J. B. CHALLIES, C. E., Director Dominion Water Power Branch, Department of the Interior, Canada, called and examined.

By the Chairman:

Q. Mr. Challies, you know our object, and we would like to hear from you how far water-power or electricity may be used as a substitute for coal; what has been done, and what do you see in the future?—A. Mr. Chairman, after the brief chat I had with you following your first meeting, in which you indicated in a general way what you would like to secure with regard to water-power, I conferred with Mr. Kensitt, one of our engineers, who has had a great deal of experience in studying water-power and cognate fuel problems, as to just how we could best help you; and I have attempted to gather together some material which we had prepared for the House of Commons Committee on the Fuel Situation on previous occasions, and which we think would be pertinent to your problem, and be of most help to you. I have had this prepared in the form of a memorandum, of which I have four copies. I suggest that I submit this to your Committee, and possibly briefly indicate what it contains.

(Witness files with Secretary four copies of printed memorandum entitled "The Relation of Water Power and Coal."—Information prepared by the Dominion Water Power Branch for the Special Committee of the Senate appointed to consider the question of the Fuel Supply of Canada, Ottawa, March 21, 1923).

By Hon. Mr. Laird:

Q. You might give us a digest of your memorandum?—A. I have attempted to indicate to you what has been accomplished to date about power in Canada. I do not think there is any country in the world that has done as much in the case of her water-powers as Canada has done. At the present time there are approximately 7,000,000 horse-power installed throughout the Dominion.

[Mr. J. A. Ellis.]

By Hon. Mr. Calder:

Q. Is that in proportion to the population, or as regards the actual possibility of horse-power?—A. In proportion to population, there is only one other country, and that is Norway, that is at all comparable to Canada in power production. Of course that is due very largely to the tremendous use to which power in that country has been recently put.

Q. Your statement must be based on population?—A. Oh, yes.

Q. For example, in the United States their power development on the whole must be very much greater than ours?—A. Yes, but in proportion to population we very much exceed them.

Q. So that you would state this, based on population?—A. Yes. Now, the most fortunate feature about power development in Canada is that our most valuable and most economically feasible power sites are close to our commercial centres. Furthermore, in what has been termed the acute fuel area of the Dominion, that is, including the provinces of Ontario and Quebec, we have all the power that we need for all our anticipated requirements. On Table 3 there is indicated the production of coal and the consumption of coal in the various provinces, and also the amount of power developed, and the coal-equivalent of that power. Now, it is interesting to note that the total equivalent in coal value of our power development in Canada is just about the same as the total consumption of coal.

Q. That is, in the whole of Canada?—A. Yes.

Q. What is it for the province of Ontario?—A. In the province of Ontario the total equivalent coal value for our developed power is 11,693,000 horse-power, and the total coal consumption is 11,144,000 tons.

Q. The statement we got from Mr. Ellis was that the anthracite supply in Ontario was 2,800,000 tons?—A. That is just anthracite; but this is all coal.

Q. But the electric power now used in Ontario is equivalent to eleven million tons of coal?—A. 11,144,000 tons.

By the Chairman:

Q. In other words, as against coal they are about equally divided, taking heat, light and power?—A. Yes.

By Hon. Mr. Laird:

Q. Is that the amount of the power that is actually in use, or available power?—A. It is the amount actually in use at the present moment.

By Hon. Mr. Calder:

Q. In other words, if the water-powers of Ontario had not been developed it would be necessary to import in order to carry on manufacturing, and so on—A. Twice the amount we do now.

By Hon. Mr. Webster:

Q. How do you calculate the electric power in proportion to coal?

Mr. KENSITT: That is all based on the pounds of coal used per horse-power at the steam plants.

Mr. CHALLIES: Two pounds for a kilowatt hour, wasn't it?

Mr. KENSITT: It depends, of course, on the class of station. It ranges in the very largest and most modern stations from two pounds per horse-power hour up to about twenty in small factories.

Q. What would you say the average would be in tons?

Mr. KENSITT: The United States Super-power Survey took an even higher figure than that—11½ tons per horse-power year. We took 10 tons as a conservative figure.

[Mr. J. B. Challies.]

Q. Exporting 200,000 horse-power of electric energy, we might expect in return from the United States, on a basis of ten to one, about 2,000,000 tons of coal?—A. Yes, roughly. We set that out in part of this memorandum. We submit an analysis of the value of our electricity exported as power with the importation of our coal. The total equivalent of exported electricity is 2,100,000 tons of coal.

By Hon. Mr. Calder:

Q. Do we import any electricity from the United States?—A. No. There is a map at the back of this memorandum which indicates the location of the trend of the exportation of electricity.

By Hon. Mr. Webster:

Q. We export how much electricity, in horse-power?—A. We are exporting in kilowatt hours, and that is equal to about 1,050,000,000. That is equal to a peak load of about 280,000 horse-power.

By Hon. Mr. Calder:

Q. Do you say sufficient horse-power has been developed in this area, Ontario and Quebec, to take care of the requirements for some years to come?—A. That is so, and it is not so, at various centres. At the present time, at Niagara for instance, there is sufficient installation to cover another year or two; but the load is increasing so rapidly in western Ontario that it is only a matter of a very short while until the maximum capacity of the Queenston-Chippewa Canal will be used; and it is the same in the Montreal situation.

Q. But there are other powers than can take up the load?—A. Yes.

By Hon. Mr. Webster:

Q. And as a rule, as it is developed it is sold or used?—A. Yes, but it is very seldom developed very much in advance of the requirements.

By Hon. Mr. Calder:

Q. Is it true that the horse-power developed recently at Chippewa will all be taken within a year or two?—A. The ultimate capacity of that plant is 550,000 horse-power, and I am told that the Ontario Hydro-Electric Power Commission have entered into contracts to purchase the necessary installation, and within four or five years they will have that plant fully equipped, and of course they are doing that to meet the needs as they see the curve rising.

Q. The chances are that the power developed there will be taken up as fast as the development goes on?—A. Yes, that is always the tendency.

By Hon. Mr. Webster:

Q. How far from the Falls is that power distributed?—A. From Niagara it goes on up through western Ontario as far as Windsor.

Q. How many miles can it be carried commercially at a reasonable rate?—A. In California they are transmitting power over 300 miles.

Q. That is a high voltage?—A. Yes. It is considered an economical proposition to transmit Niagara power to New York City.

By Hon. Mr. Calder:

Q. If they carried it as far as they do in California they could almost reach Ottawa commercially?—A. Yes.

Q. What is the next big power to be developed in Ontario in order to meet the needs as conditions now exist?—A. Of course the next is the St. Lawrence River water-powers. I have a map here which will probably indicate that.

[Mr. J. B. Chalkies.]

By Hon. Mr. Webster:

Q. Is there much loss at 300 miles?—A. Oh yes, there is. It is calculated generally at 10 per cent loss at maximum load. Of course at lighter loads you get much less loss. In figuring out the copper for your transmission line you generally count on a maximum loss of 10 per cent. The average loss, of course, is much less, because the extra load will only occur occasionally. The average loss, including transformers, etc., would probably be from 5 to 7 per cent.

By Hon. Mr. Laird:

Q. Does that loss increase in distance?

Mr. KENSITT: Oh, yes, certainly.

Q. More than 10 per cent on long distance?

Mr. KENSITT: You would put in more copper, you see. It is a question of balancing the loss in the value of the energy against the extra capital you have got to put into copper or aluminum.

By the Chairman:

Q. That is, you put in thicker wires for the greater distance?

Mr. KENSITT: Unless you increase your voltage. With higher pressure, of course, you can transmit a great deal more power at the higher voltage through the same wire.

Q. At a less loss?

Mr. KENSITT: Yes, a loss in proportion to the square of the current.

Mr. CHALLIES: This map will give you a birds-eye view of the whole power situation in the Dominion. (Introducing large map). The circle centering from the middle of St. Lawrence River, a four-hundred mile circle, includes New York City. Down here are the anthracite and bituminous coal fields of Pennsylvania. The red is an articulation system, the transmission system of the Hydro-Electric Power Commission of Ontario now existing, radiating from Niagara. These different coloured transmission lines are those that circulate out from Montreal. The blue line indicates what has been termed the Super-Power Area of the United States. This includes the New England States, and it was Secretary Lane's idea that there should be evolved a Super-power scheme linking up the steam stand-by plants and the Hydro-electric developments and the undeveloped sites, to relieve the shortage of this area. A very elaborate survey has been made of that area, and the general conclusion, as far as we are concerned, is that the only method of relieving the acute power shortage in the New England States is from power from the St. Lawrence River.

By the Chairman:

Q. Of course most of that power in New England is now produced by steam?—A. A very large percentage of it.

By Hon. Mr. Webster:

Q. You say from the St. Lawrence River; what part of the St. Lawrence? Between Montreal and Toronto, or any part?—A. Anywhere at all. There are no large power developments undeveloped in this area, hydro-electric developments, that are economically feasible.

Q. I thought you had reference to the locality around Morrisburg, or some place around there?—A. That is the location they had in mind.

By Hon. Mr. Calder:

Q. As a matter of fact that map has been prepared showing what the situation is in relation to the rapids at Morrisburg?—A. At the St. Lawrence River.

[Mr. J. B. Challies.]

By the Chairman:

Q. And of course that refers to the possible developments on the St. Lawrence, not those that now actually exist?—A. Yes. In addition to that map I can show you the curve which indicates the trend of power development in Canada. We have plotted here the actual power development of different years, and continue that into the future.

By Hon. Mr. Calder:

Q. It is a pretty rapid curve?—A. Yes; this curve has taken a sudden vertical shoot because of the big development at the Queenston-Chippewa plant at Niagara. Now, if you project that curve conservatively into the future you get this conclusion—that by 1940 there will be over 4,000,000 horse-power developed in the central portion of the Dominion, within 300 miles of the St. Lawrence River.

Q. If the same development is kept up proportionately until 1940?—A. Yes. We know not only will that development be kept up as it has been, but the tendency is to increase very, very rapidly. Our surveys show that there is lots of power in Canada to meet that need.

By Hon. Mr. Webster:

Q. And especially in the provinces of Ontario and Quebec?—A. Yes. This only has to do for the district within 300 miles of the St. Lawrence River at Cornwall.

By Hon. Mr. Calder:

Q. Would you answer this question—which is the cheaper, coal or electrical power? Is it possible to answer that off-hand?—A. Yes; I would say undoubtedly that hydro power is infinitely to be preferred, both from the cost standpoint and for other reasons, the preferable power. Of course power from coal is always subject to the ever-present menace of labour difficulties. To answer your question directly, in general it is cheaper to develop power from water than from coal, especially in the acute fuel area of Canada, including these two provinces, Ontario and Quebec.

Q. So long as you can develop a reasonable horse-power in proportion to the capital expenditure there is no danger of any loss, if the power is required?—A. Yes.

By Hon. Mr. Webster:

Q. Of course it is also true that you require heat in manufacturing and in buildings, and another question arises there, if you could use the same furnaces for heating as well as for manufacturing purposes, then coal would be cheaper?—A. Yes, there are, of course, individual cases.

Q. You cannot say that as a general rule?—A. No; there are, of course, individual cases.

Q. I mean as related to manufacturing plants?—A. Yes.

Q. They require to be heated all winter?—A. Yes.

Q. So that electricity cannot displace them exactly?—A. Not for heating.

By Hon. Mr. Calder:

Q. Why cannot the city of Ottawa here be heated by electricity instead of coal?—A. It would take all the power within 60 miles of Ottawa to heat the city of Ottawa. If you wanted, for instance, to heat Toronto entirely by electricity you would have to give up Niagara for that purpose alone, and then in summertime you would have no load. I have covered that point in that memorandum. I think, as I say on page 12 of this memorandum, that Mr.

[Mr. J. B. Challies.]

Keelin, Chief Engineer of the Shawinigan Power Company, who is undoubtedly one of the greatest authorities on the use of electricity for heating in industry, could give your Committee better information on that subject than probably anybody in Canada.

By Hon. Mr. Laird:

Q. I see that you have experimented, at least you submit data on the subject of electrically heating houses?—A. Yes.

Q. Apparently you do not think it is very practicable?—A. I do not think it is practicable, and I do not think it should be permitted. It should be discouraged as far as possible. Of course there is a certain amount of supplementary heating such as I do in my own home in the fall months and spring months when there is not a peak load on the power. Then there is heating; but as to heating my home by electricity in Ottawa, I think I should not be permitted to attempt it.

By Hon. Mr. Calder:

Q. What would you say about a prairie town where they had to manufacture electricity from coal?—A. In Winnipeg at the present moment there is a considerable over-plus of power available from the municipal plant.

Q. That is, from water-power?—A. Yes.

Q. But I am speaking of an interior town where they have to use coal to manufacture their electricity?—A. Well, they can use that coal in the regular heating.

Q. They use it for heating, in domestic stoves, etc., and in their ranges; it is quite common?—A. Yes, I know.

Q. Could they do that commercially?—A. Well, of course heating for cooking is a load that might be used within reason. That takes up a certain amount of power at a certain hour which probably does not conflict with the power that is needed for more important purposes.

Q. For example, if they developed this power, and you have any quantity, 300,000 to 400,000 horse-power, that would be available for use in Canada, could they send out their lines there and allow the people in towns and villages to use that power in their cooking stoves?—A. They could, yes.

Q. At a reasonable cost?—A. Yes; they are doing that to-day in Dundas County. You will find farmers and people in those small villages using power that comes from a little development on the St. Lawrence River. They are using power there for cooking.

Q. You would not recommend that it should be used for heating, though?—A. No.

Q. But if that development took place, and there was a surplus of power not available for manufacturing purposes, it could be used profitably for cooking purposes?—A. Yes, and here is a case in the city of Winnipeg I want to mention. They have a very large over-plus, for the moment, of power available at the municipal plant in that city, and their engineers are considering a central heating system to heat the City Hall and one or two other buildings there, using the surplus power; but that will only be until they need that power for manufacturing.

Q. It is going to waste at the present time?—A. That is it.

By the Chairman:

Q. I suppose that might happen in case of a very large power plant whose normal consumption was not used up; they might be able to sell that for heating?—A. Yes.

[Mr. J. B. Challies.]

Q. Although it would not ultimately be available for that?—Is that the right idea?—A. That is correct.

Q. Would you like to speak on the question whether we could find a substitute for coal in electricity by effecting the electrification of our railways?—A. I refer to that, so far as I feel qualified or able to do so, in this memorandum. The question of electrification of railways is an economic question—a question, so far as my information is concerned, not for the immediate future of Canada.

Q. I understand it is a question of the density of traffic?—A. Yes.

Q. And that even in our densest traffic it has not yet become dense enough to justify electrification?—A. Yes. There is only one road where it has been seriously considered, and that is, I understand, from Toronto through Hamilton to Buffalo; and even there it has not yet been proven that it is a good business proposition.

The CHAIRMAN: I think we should thank Mr. Challies for the information he has given us, and that we should study it and then possibly ask him to appear again. In the meantime, Mr. Challies, could you give us 10 copies of this memorandum and this map?

Mr. CHALLIES: Yes.

The Committee adjourned at 12.30 p.m.

COMMITTEE ROOM 534,

OTTAWA, THURSDAY, April 12, 1923.

The Special Committee of the Senate met at 11 a.m., Hon. Mr. McLennan in the Chair.

The CHAIRMAN: The first witness we have this morning is Mr. F. L. Wanklyn, of the Canadian Pacific Railway, and he has kindly given us a memorandum of what he said at the Committee of the Commons. I think we might just run over this, and ask Mr. Wanklyn whether he has anything to add to it, as we have several other gentlemen here from the West. Mr. Wanklyn tells us that he was one of the representatives of the province of Quebec on the Federal Advisory Fuel Committee, being in Montreal. His experience indicated clearly the paramount importance of finding a practical solution of the fuel question, especially as to fuel required for domestic heating that will tend, to some extent, to make consumers less dependent on sources of supply from the United States. He thinks it is also manifest that the average citizen cannot afford to pay the ruling prices for American hard coal, which have ranged from \$16.50 to \$19.50 per short ton, and more when bagged, as many people require to have it. His answer to the question how the situation can be improved is as follows:—

1. Encourage the use of screened Canadian bituminous coal for cooking and heating where stoves are used.

2. Develop the vast peat areas adjacent to large cities and towns to produce air-dried peat fuel at low cost and educate the public as to its fuel value for cooking and burning in stoves and open grates.

3. Advocate the installation of central heating plants, especially in the smaller towns where the municipalities own and operate steam-driven plants for electric lighting and now waste the exhaust steam from the engines. For raising steam for the operation of plants of this type, the cheapest grades of bituminous coal can be advantageously utilized, smoke nuisance can be abated by use of properly designed furnaces and mechanical stokers. At North Battleford, Sask.,

a plant of this type is being successfully operated with attractive economic results. Central heating has also been in use for a long time in connection with groups of isolated buildings at our large hospitals and universities.

4. For house-heating where hot water furnaces of the ordinary type are installed, now fired with American anthracite coal, metallurgical coke, the product of modern by-product ovens, can be used with result equal if not superior to those now obtained from anthracite coal. Coke is free from poisonous gases, contains less ash and is smokeless. In producing coke of this description the resultant gases and by-products have a great commercial value tending to reduce the price of the coke fuel to practically the same cost as the delivered raw bituminous coal.

5. Encourage importation of high-grade anthracite coal from Wales, having superior analysis to any American anthracite sold in this country, properly manufactured "briquettes," "stovoids," or "ovoids" made from Welsh anthracite coal dust and brise—all of which should be delivered to consumers at a lower price per ton than is now charged for American hard coal, and can be satisfactorily used in ordinary house furnaces.

6. An exhaustive study as to the economic possibility of bringing N.W. coal further east than at present should be made and experiments in briquetting lignites should be continued.

7. Consumers should be instructed in the economic method of firing house furnaces—in many instances 75 per cent of the caloric value of the fuel is wasted by improper firing; this by following proper method can be reduced to 25 per cent. See report on the subject from American Society of Mechanical Engineers who have made it a special study.

F. L. WANKLYN, Provincial Fuel Commissioner of the province of Quebec, called and examined.

The CHAIRMAN: That is Mr. Wanklyn's very clear and concise statement of his views, and the Committee may like to ask questions on some phase of it, or Mr. Wanklyn may wish to volunteer a further statement.

By Hon. Mr. Calder:

Q. You say that 75 per cent of the value of the coal is lost by improper firing?—A. Yes. I have a report from the American Society of Mechanical Engineers, who appointed a Special Committee to make an exhaustive study of the coal situation in a number of districts, as to experience in the United States in getting an adequate supply, and they sent me also a wood-cut entitled "How to save coal and dollars." It has two diagrams of furnaces, one showing the right way and another the wrong way of firing; it is a section of an ordinary Daisy furnace, and in the notes attached to the diagrams they say that out of ten tons of coal, seven and a half tons were wasted; that the heat of coal which actually went into rooms was only 28 per cent of the total heat. They add that dirty flues caused 15 per cent of the loss, or one and a half tons of coal; the fact that the furnace and pipes were not covered caused 15 per cent loss, or one and a half tons; and also that the firing was wasteful; the pit being left full of ashes caused the burning and warping of the grates, and shaking the grate until live coals fall through causes the dropping of unburned coal into the ash pit, which often amounts to a loss of 5 per cent, or half a ton. That is the bad way of firing.

Q. Could we get copies of that report?—A. I am trying very hard to persuade some newspaper friends to publish this broadcast, because I think it is very important. The report shows that with a good way of firing, a proper way, only two and a half tons out of ten tons of coal were lost, and 75 per cent of the total heat actually went into the rooms; the cleaning of the flues reduced the loss by 5 per cent, or less than half a ton, and the fact of having

[Mr. F. L. Wanklyn.]

the pipes covered reduced the loss still further by two and a half per cent or a quarter of a ton. They show that keeping the ash pit clean lengthens the life of the grates and that proper shaking reduces the loss $2\frac{1}{4}$ per cent, or less than a quarter of a ton, and they advise consumers to stop shaking live coals into the pit. If the whole of us could save 50 per cent of the coal we burn it would materially reduce our coal bills, and there would be less howling. There is a great deal to be done in instructing the people not only in the use of anthracite coal, but also in the proper use of coke, considered as a fuel for household heating. As I look upon it, we need an educational campaign, broadcasting as far as possible all the information we can get from reliable sources. This would be of immense benefit to all our citizens. Some weeks ago I had this article published in the *Montreal Star*, but a pamphlet, very much enlarged and printed in colours, such as has been issued by the Alberta Government.

By the Chairman:

Q. You would strongly favour introducing these substitutes by giving people demonstrations on the proper way of using them?—A. Absolutely. The demonstrations on the use of coke in St. Paul and Minneapolis show the great value of that fuel, and its cheapness on account of the sale of by-products which are made during the coking process. One of the excuses given for bad results in the use of coke is that it burns out the furnace bars; but that can easily be corrected if consumers will take the trouble of removing the ashes from the under side of the grate and not allowing them to touch the bottom side. With a hot fire such as is produced by coke, if the ashes are allowed to come up to the grate on the under side, with a hot bed of coke on the upper side, the furnace is practically like a foundry man's cupola, and melts the bars between the two zones of heat. That would be corrected by removing the ashes from the ash pit, it can be made fool-proof, having the ash pits made water-tight, and by keeping two or three inches of water in the ash pit so that it would always keep the grate bars cool. Following that method, according to my own experiences, there would be no trouble whatever in using coke as a satisfactory fuel for domestic heating, without smoke, without deleterious gases, without accumulation of soot or smoke on the furnace sections, and thus the life of the furnace would be prolonged. I have had an experience in two large institutions in Montreal—one the Royal Victoria Hospital, the other the Alexandra Hospital, where for several winters we heated the large Nurses' Home with coke. My friend, Sir Herbert Holt, as president of the Montreal Gas Company and also the Montreal Light, Heat and Power Company, has heated his house for 15 years with nothing but gas-house coke, the product of Canadian or American bituminous coal, whenever it was available.

By Hon. Mr. Mitchell:

Q. What coal would you recommend for making this coke?—A. Our Nova Scotia coals are the only ones I have had experience with. I should think 90 per cent of them well adapted for coking purposes, for fuel. The whole of the coke delivered by the Steel Company is the product of the mines in Glace Bay.

Q. So that the coal from the Nova Scotia mines is absolutely suitable?—A. Absolutely suitable.

By Hon. Mr. Laird:

Q. Upon what do you base your opinion that screened Canadian bituminous coal is good for cooking and heating where stoves are used?—A. Well, I could preface that by saying that I spent the whole of my boyhood in England, and in my mother's house and the houses of all my friends they never cooked with anything else but bituminous coal in an ordinary cooking range. We also kept the houses warm there by burning bituminous coal in grates.

[Mr. F. L. Wanklyn.]

Q. Has your experience extended to the actual use of this class of coal in stoves and cooking ranges in Canada?—A. Yes, sir, I have lived several winters in Cape Breton, and stayed at friends' houses where I have seen nothing else used for cooking but bituminous run-of-mine coal delivered at the door, and also the same coal used in the same furnace as I have in my house in Montreal, and found it satisfactory for heating the house.

Q. The reason I ask that is that as far as I know the general experience of western Canada is that it is not satisfactory in stoves or cooking ranges?—A. Well, my experience does not lead me to agree with that opinion.

Q. Have you any information as to central heating plant in operation in Brandon, Manitoba?—A. No sir.

Q. Are you able to give any information as to the cost of installing central heating plants?—A. I have a letter from my friend Mr. Fred Paul, of the *Saturday Night* newspaper in Toronto, who has been very much interested in this question, and has been collecting information. He sent me a letter dated March 21st from Mr. M. D. Caldwell, Superintendent of Utilities of the city of North Battleford, Saskatchewan, and I think it would be illuminating and instructive if your secretary would read that letter.

The Secretary read the letter telling the experience of North Battleford, which had already solved its heating problem, the heating medium being a by-product of the municipal light and power plant. The fuel, which is used primarily for producing electrical energy, costs only 40 cents per ton f.o.b. the mine and \$3.30 delivered at the power house. Since the inception of the plant the heating rates have been already reduced, and since the entire cost of the installation will be repaid by revenue from the project at the end of the present heating system a further reduction in rates will become effective before the close of the present season.

The WITNESS: You asked about the cost of that plant. I would ask your Secretary to read an article which appeared in the *Sanitary & Heating Journal* on December 28th, 1921, headed "Central Heating Plant a Success."

The Secretary read the article, telling that the service was laid in 1916 from the power plant to the new public library located on Main Street, 150 feet distant, after a very exhaustive research was conducted by Mr. Caldwell, the Superintendent of Utilities, running over four years, relative to the merits of central heating and its adaption to local conditions prevailing in North Battleford. In the summer of 1920 it was decided that the proposed installation would be profitable to the community, and the city Council signified its willingness to proceed at once with the installation, provided the patrons should finance the cost. Rates were agreed to on a unit basis, and a portion of the installation was made in the fall of 1920. Less than 10 consumers obtained the service during the season of 1920-21, but meanwhile materials were received from time to time, and in the spring of the present year all requisite supplies had been obtained, and at the end of September last 30 consumers were receiving the same service, and installation of the distribution system was completed. The ever increasing demand for steam necessitated the installation of a new and larger steam main, supplementing the original one, and this installation has laterly been completed and has been operated since November 26th last. The complete installation now comprises over 5,000 lineal feet of piping. The total cost of the system as installed approximates \$35,000 has been financed by the patrons of the plant in addition to certain lines of credit arranged with two firms who supplied material. There are now upwards of 40 consumers, and there will be 50 in the near future. During the recent inclement weather upwards of 75 tons, or 150,000 pounds of steam were delivered to the patrons every 24 hours. The exhaust steam from the generating units at the power plant is used as the source of heat. The city of North Battleford now owns and operates a comprehensive and ideal central

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heating plant, the first municipally-owned plant in Canada to-day, and it has not cost the ratepayers a single farthing, and is gradually augmenting the revenue from the Public utilities.

Hon Mr. LAIRD: You might get some further information in regard to the same system in Brandon.

The CHAIRMAN: We will write to Brandon.

The WITNESS: Of course the economic value of a system of this sort is chiefly in the utilization of waste steam that is exhausted by the steam engines. I have had to do with the installation of a central heating plant at the Royal Victoria Hospital in Montreal, and had something to do with the installation of the plant at McGill University, and at both those places they have economic results far ahead of those originally obtained by furnaces burning anthracite coal, usually of household size. At the Royal Victoria they use practically slack coal, and at the McGill plant they use what they call buckwheat or birds-eye coal, and they have efficient heating.

By Hon. Mr. Calder:

Q. What sort of coal would they use at Battleford which cost 40 cents a ton?—A. I think it would probably be slack coal.

By Hon. Mr. Laird:

Q. Have you any information as to how long Ontario and Quebec can reasonably expect a supply of anthracite coal from the United States?—A. I can only repeat what I have seen in the newspapers. I have no personal knowledge.

Q. Supposing that supply should become depleted, as I understand it, there is no question about the practically unlimited supply of bituminous coal in the United States?—A. I should say you are perfectly correct in that.

Q. Then would not the logical conclusion be that this scare about the possibility of the people in these provinces being frozen to death would be largely exaggerated, as long as they can get an unlimited supply of bituminous coal?—A. As far as the freezing is concerned, if you get coal from any source it is going to fill the bill; but I go further than that. In my opinion Canada is in a very lamentable situation when a nation as big as ours has to depend upon some other nation for its most vital necessity. The sooner we study our own fuel problem and try to make ourselves independent of anybody else the better, seeing that we have 17 per cent of the whole world's supply of fuel; Great Britain has something less than 3 per cent. This is a question of more than the ordinary question of keeping from freezing; it is a question of our national life being in jeopardy when we put ourselves in a position so that a neighbour to the south controls all our industries, our railways, and our domestic heating. In five minutes they could put an embargo on the export of coal to Canada, and we would freeze or stop.

Q. But is there any possibility or probability of such a thing as that happening with regard to bituminous coal?—A. My dear sir, it might happen to any coal if by misfortune we should have some difference of opinion with our friends to the south of us. It is only a question of defence, in my humble opinion. The first line of defence is to put ourselves into a position of not being frozen out.

Q. The alarm within recent times has largely been caused by the fear that we will not be able to get any other anthracite supplies; is not that the case?—A. Yes, sir, the situation arises from the fact that at the very best all we could get was the same treatment that the United States accorded to their own citizens, and in the early part of the winter we were led to suppose that we would get 60 per cent of our normal supply of anthracite coal, that is, for domestic heating.

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Q. The alarm was raised in these two provinces largely because it was said that in the course of time we would be shut off from a supply of anthracite; and an embargo might be put up against it, as we threatened; is not that the case?—
A. To a very great extent that was the primary cause, as everybody had been in the habit of using anthracite coal for domestic heating. They did not know the possibilities of using so-called substitute fuels—which should properly be called equivalent fuels—of a different description. When the people found they could not get anthracite coal at even regular prices, and had to pay exorbitant prices for it, they became alarmed, and then they were told that there was less anthracite than 60 per cent, and then they had to use something else, which naturally caused an alarm.

Q. Would not that alarm naturally be dissipated if the public were aware that they could get unlimited supplies of bituminous coal from the United States—aside from the general question of the desirability of getting it from Canada if we can?—
A. I should say, in answer to that, that there would be no alarm if you educate the public into the use of bituminous coal or its constituents in coke, and assure them a sufficient supply of that material to keep themselves warm and run our industries and railways.

Q. Of course it is the subject of this alarm on which we are trying to satisfy the people?—
A. The alarm is owing, first of all, to the fact that we have no assurance that we are going to have a continuous fuel supply of anthracite, and that we may have conditions in the United States that will upset the delivery of bituminous coal, not only on account of the attitude of the miners and coal producers, but owing a good deal to the fact that there had been a strike among the shopmen and mechanics in the United States so that a great deal of the rolling stock was remaining on sidings, and they had not cars with which to send it forward.

By Hon. Mr. Calder:

Q. It is not true that if a condition arose whereby an embargo was placed upon American bituminous coal, our people would be able to get the coal in Canada?—
A. Why, most decidedly, if they paid for it, because we have 17 per cent of the world's supply.

Q. Then, even if you assume the most extraordinary condition under which an absolute embargo would be put on any coal coming into Canada, we could get the coal, and it is only a question of paying for it?—
A. Most decidedly; you have the stuff here, and all we have to do is to encourage our people to believe in their own country and utilize what the Lord has given us here in Canada. I was connected with the Dominion Coal Company for over five years and we used to sell bituminous coal, produced at Sydney, Cape Breton, in the city of Ottawa, not only to the Eddy Company but to the Canada Atlantic Railway, and at the same time Canadian Pacific were using Sydney coal for their locomotives in Brockville, 125 miles west of the head of navigation.

By the Chairman:

Q. And the Grand Trunk?—
A. And the Grand Trunk also. That shows how far Nova Scotia coal has been pushed into the west, and that was in competition with American coal.

By Hon. Mr. Calder:

Q. The problem apparently resolves itself into a question of transportation?—
A. To a very large extent. There are experts who will deal with that.

Q. You suggest that further experiments should be carried on in connection with the bricketting of our lignite coals; have you any knowledge of that?—
A. I have not, except the reports I have seen, and to some extent they are

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encouraging. It would make an easily handled and desirable domestic fuel. The thing that struck me most last winter was the absolute necessity of providing a cheaper fuel for domestic heating for the poorer people. Honestly, I have come across cases of the most acute suffering, where people have not had money enough to buy coal at \$25 a ton delivered in little lots, and were absolutely suffering. They said, "What in the name of God can you do for us?" I said, "Leave it alone, I will get you something," and the coal merchants of Montreal played the game and assisted all they could with substitute coal; they were up against it, and they could not get supplies, but they did assist.

Q. Do you know if the C.P.R. has carried on any experiments in bricketting lignite?—A. They have closed their plant near Banff.

Q. That is an anthracite coal?—A. It was a sort of semi-anthracite coal.

Q. They have not carried on any experiments in the lignite field?—A. I don't think so. What I am impressed with is the necessity of cheaper fuel for the working classes, for the small shop keepers, and most of us, I may say, myself included. Now, I have great faith in the possibilities of peat as a fuel for 75 per cent of the year at least, because I have used it, my friends have used it. The other day in Toronto a gentleman told his experience about peat for domestic heating in an ordinary furnace to the Mining and Metallurgical Institute. He said that he and some other friends had bought two car-loads of sun-dried peat, that is, containing about 25 per cent moisture, from the experimental plant at Alfred. They paid \$5 a ton for it there, and it cost \$10 a ton in Toronto, if I remember rightly. He said he fired his furnace the whole winter on nothing else but that peat, and he did not freeze. He said he had to get up occasionally on a cold night and put in an extra supply; but we all had to do that when we burned wood. That man's experience shows there is a commercial and caloric value in peat that is not properly appreciated. We know perfectly well that all the people in Ireland, the people in Norway and Sweden, and the people in the northern part of Prussia depend to a very large extent on peat; yet the analysis of the peat in Canada is superior to that of European peat, and we have more days in which to dry it than in Europe, yet I do not suppose that one-tenth of one per cent of our population has ever tried it. We have enormous deposits within 50 miles of Montreal and enormous deposits near Ottawa and near Toronto. If that question were gone into scientifically and on a large scale you could develop a series of depots in those large towns where poor men could go with wheel-barrows or little hand-sleighs and get twenty-five or fifty cents worth of the stuff—a man that has been in the habit of using wood before.

By Hon. Mr. Hardy:

Q. Would you care to express an opinion whether the American operators want our market for either anthracite or bituminous coal?—A. I could not give you any first-hand information on that. Anything that I have is simply hearsay, but what I do hear is that they look upon Canada as a very desirable market because it is a stable, continuous market, irrespective of the season. There is always a certain demand that has to be filled in a northern country. They tell me that when the production exceeds a certain amount and the winters are mild towards Washington and Baltimore, they don't get the demand for the coal they expect, and therefore it is on their hands, but in Canada they have an absolutely regular demand for a regular quantity, and they can depend on selling it every year.

Q. In order to get a supply of Canadian coal, I take it that we would have to put in a very large amount of capital in equipment such as loading plant and storage plant, perhaps rolling stock also; if we should do that at a cost of a good many million dollars, and the American operators decided that they

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wanted our Canadian market, they could lay it in at cut prices and put us out of business?—A. Then you would accomplish one desirable result—of getting fuel to your consumers at a cheaper rate, and then you would be patted on the back. Since our good government provides cold storage plants at their harbours and elevators, it is not a flight of imagination to imagine that they might also provide unloading and discharging plants for coal, and they have railway facilities in connection with most of their harbours where this coal could be delivered where it is required. It is only one more adjunct to the accessories of a modern harbour, and as far as coking is concerned I have the assurance of the President of one of the largest companies in Montreal that if he received the slightest encouragement from the Government he would instal a coking plant able to utilize gas and by-products for the purpose of providing a cheaper fuel to the householder. Also, Mr. McGrath told me I was at liberty to state here that Mr. Hobson, of Hamilton, said that if the duty were taken off bituminous coal he would instal works in Hamilton that would produce from 200 to 300 tons of coke per day to supply the city of Hamilton.

The CHAIRMAN: Mr. Strutchbury is Trade Commissioner for Alberta, and as such has a thorough knowledge of the whole coal situation as regards production and chartered there, and we will ask him now to begin by speaking on that subject.

HOWARD STUTCHBURY, called and examined.

By the Chairman:

Q. We want a supply of coal in this section of Canada peculiarly. We want to get it in our own country if it is at all possible; we have had no definite statement yet as to what possibilities the existing mines of Alberta—which is the nearest point in Canada, except what we know of Nova Scotia—produce; we have had a promise from the railroads that they would give us a statement of the minimum rates which they can make, either seasonal or otherwise, to promote the traffic from Alberta eastward; now, supposing that rate is brought down to the quick, will you tell us what Alberta can do to fill it?—A. There is no question as to Alberta's ability to supply all the coal that Canada needs, either bituminous or domestic.

Q. By domestic you mean lignite?—A. Well, it is really not a true lignite. There are no true lignites in Alberta.

By Hon. Mr. Laird:

Q. That is what we call soft coal out west?—A. Yes, soft coal, or domestic coal. I have brought samples here of both kinds, and I will show you this coal burning in the Chairman's grate. These samples came from a couple of cars, just ordinary cars, without any special selection. The *Ottawa Journal* was very much interested, and asked us to arrange for a car of coal.

By the Chairman:

Q. What ash would there be in these coals?—A. One is about four and the other about seven per cent.

Q. What about soot?—A. None.

Q. That is a very important point, that the coal is not sooty?—A. No, it is practically a sootless and smokeless coal if burned under proper conditions. I think perhaps the experience of Winnipeg would be of more value to this Committee than anything else. Up to 1918 there was practically nothing in Winnipeg but American anthracite being used for domestic purposes; a small amount was brought from Lethbridge, but perhaps 90 per cent of the coal consumption in Winnipeg was American anthracite. When the anthracite situation became acute in 1918 the Manitoba people, through the Fuel Controller, were

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told that they must use a certain amount of western soft coal if they were to get any anthracite. I remember very well that a large delegation came from Winnipeg to see the Government here, and protested that if they had to use western coal the city would freeze and there would be most intense suffering. However, they were compelled to use it, perhaps unfortunately for us, because we had to overcome a special prejudice. But the situation to-day is this, that 90 per cent of the total fuel requirements of the city of Winnipeg and the province of Manitoba now come from the province of Alberta.

Q. Coal of this class?—A. Yes. May I add that in Winnipeg this year anthracite coal was being advertised by the one or two dealers who had it, and it was not sold.

By Hon. Mr. Laird:

Q. Of course it was very expensive; that was one of the reasons?—A. Not much more expensive than here.

Q. But compared to the western coal it was much more expensive?—A. Yes, it was much more expensive. That was perhaps one factor, but anthracite was actually shipped from the city of Winnipeg to eastern Canada because it was not capable of being sold.

Q. After being brought up from Fort William?—A. Yes.

By Hon. Mr. Calder:

Q. Did the Winnipeg people have to make many changes in their grates?—A. No changes at all. The stoves and furnaces and all that sort of thing that we use in the west are all manufactured either in Hamilton or some part of Ontario and shipped west. We are using the exact same equipment you use in the east. I have been using a Hecla furnace built by Clare Bros., I think in Brockville, for the last 17 years—just an ordinary Hecla furnace that I had installed in my house—and we get considerably colder weather out there than you do here.

Q. They do not store the coal in Winnipeg?—A. No.

Q. How long will this class of coal stand storing?—A. In your basement, an unlimited time. I have purposely had coal in my basement now, to see how long it would last, and it has been in there since 1916.

By Hon. Mr. Laird:

Q. Some of these softer coals will not keep in your basement as long as this?—A. My experience has been this, that I use the local coal, that is the Edmonton coal, which is a much higher moisture coal than these; and even that coal has been in my basement now for six years.

By the Chairman:

Q. Without perceptible deterioration?—A. Yes.

Q. How would it stand on a dump in the open air?—A. It would not stand at all.

By Hon. Mr. Calder:

Q. If they brought coal in large quantities from the West, say in train-load lots, they would have to provide proper storage for it?—A. That is a matter, it seems to me, that the railway ought to be studying. Our experience in Winnipeg is this, that people are now getting into the habit of buying their coal as they use it; there is comparatively little storage of Alberta coal in Winnipeg. The dealers like it for that reason, that they don't have to stock a very great deal.

By Hon. Mr. Laird:

Q. Of course you are talking now about the semi-bituminous or soft coal?—A. Yes.

Q. Don't let us confuse this with bituminous coal, because bituminous coal will keep indefinitely?—A. That I am refraining entirely from speaking of bituminous, because that is only for steam-raising purposes. Might I interject there, though, that you were asking me about the coal they are using in North Battleford. That is the Edmonton lignite slack; that is a waste product. By the building of a little arch in the boilers of the power plant out there, they can use a very great deal of that low-priced coal.

By the Chairman:

Q. You mean an arch in the fire-box?—A. Yes, making a larger combustion chamber, and burning the gases. The city of Saskatoon uses nothing else but domestic slack for all their power-raising purposes, and they have a very, very low cost of production. The city of Calgary, in fact nearly all power plants in the West now, are using lignite slack, or what are generally known as lignite slacks.

Q. Do we understand that from Winnipeg west the whole country is supplied from Alberta for all its power purposes?—A. Oh, yes.

Q. And coal of this grade for domestic heating?—A. Yes, this coal for domestic heating.

Q. And from nothing it has risen within a few years to 90 per cent of the domestic heating of Winnipeg?—A. Yes.

Q. And it has this disadvantage, of not being able to be stored in the open air?—A. No, it cannot be stored in the open air. The Saunders Creek coal will store fairly well in the open air.

Q. Will it come through the winter?—A. No, you get your rains and warm weather and all that sort of thing, and it will disintegrate, but not in basements and sheds. It can be stored in an ordinary shed.

Q. It would store as long as it was covered from the weather?—A. Oh, yes.

Q. In a shed?—A. Just an ordinary dealer's shed or stored by a coal man.

By Hon. Mr. De Veber:

Q. With a roof to keep the rain off?—A. Yes.

By the Chairman:

Q. That briefly covers the domestic situation?—A. Yes.

Q. Now, as to steam coal?—A. Steam would not be profitable, even with a rate, to bring to Eastern Canada.

By Hon. Mr. Laird:

Q. You mean the bituminous coal?—A. Yes. Our cost of production is considerably higher than that of American operators, and there is this to be said about the American bituminous production—

By the Chairman:

Q. What type of coal do you call steam coal?—A. That is the straight bituminous coal, the same as your Nova Scotia coal. We are going as far as Winnipeg, but we are having a very heavy fight in Winnipeg on that.

Q. We got a communication from a Mr. Saunders, who sold coal in Winnipeg, who said that he was competing between that coal and Pocahontas, which of course is the very highest grade of American coal, and competing more or less successfully?—A. Yes; it is a question of price. The head of the lakes is a beautiful dump market for American bituminous operators. When they have a surplus stock, as they very often have, they send it to the head of the lakes, and they can afford to sell at almost any price.

[Mr. Howard Stutchbury.]

Q. They have all the facilities there for economical handling, discharge and loading into cars again?—A. Yes, they have a wonderful plant there. It is a most efficient system for handling that business, with a good many million dollars investment.

By Hon. Mr. Calder:

Q. Why is the cost of production higher in the West than in the States?—A. Because of our intermittent operations. Our operation in Alberta is practically five months in the year.

Q. You had not the market?—A. No. We have facilities now to turn out 14,000,000 tons a year, and our market is approximately 6,000,000.

By the Chairman:

Q. You are like all other coal districts that I know of—you are over-developed for the market of the day?—A. Too many mines.

By Hon. Mr. Laird:

Q. I understand you don't hold out much hope for a market for bituminous coal in Canada?—A. Not in Ontario. Frankly speaking, I think that so far as Ontario is concerned, for its steam coals that is a Nova Scotian and New Brunswick problem, and I see no reason why the eastern coals should not hold this market over the American coals for steam use.

Q. Is it not a fact that a large percentage of coal in Alberta is bituminous?—A. No, sir, not the present production.

By the Chairman:

Q. As a general rule, where are the bituminous coals?—A. In the Crow's Nest district, the Brule coal district, what we call the Mountain Park branch and the Brazeau district.

By Hon. Mr. Calder:

Q. All mountain coals?—A. Yes, they are in the mountains.

By the Chairman:

Q. Will you tell us about the anthracite or semi-anthracite coal?—A. The semi-anthracite coals are at Canmore and Bankhead just west of Calgary. Mr. Burns has a property south of Calgary. Then there are the coals west of Brule, or what is known as Sheep Creek.

Q. As I understand it, the Canmore coal is pretty badly crushed?—A. Yes, it comes out in very small sizes.

Q. Do you know about the Burns coal?—A. Yes, a little.

Q. That is not open?—A. That is not open.

By Hon. Mr. Laird:

Q. That is semi-anthracite?—A. That is semi-anthracite.

Q. To get back to this bituminous situation, it seems to me that is a very striking admission for you, representing Alberta, to make here; it is no doubt correct, but it shatters some of our ideals in the hope of bringing some of this coal down from Alberta—that we cannot bring bituminous coal down there?—A. May I say this, that we don't see the advantage to Ontario in shipping our bituminous coal for domestic use when we have domestic fuels which are more fool-proof, if I may say so, for the ordinary consumer. Bituminous coals are more difficult to handle in the domestic furnace than our domestic coals.

By the Chairman:

Q. That is, you are more likely to get a good market for your domestics?—

A. Yes, and there would be no particular advantage in developing the domestic market for our bituminous coal.

By Hon. Mr. Calder:

Q. Assuming you developed a market in Ontario for your domestic coal, do you anticipate any difficulty in transportation, outside of the question of cost?—A. None; it is simply a question of cost.

By Hon. Mr. Laird:

Q. Cost in competition with the American fields?—A. With the American, and I may say this, that at the meeting of the Canadian Mining and Metallurgical Institute in Montreal the American interests made a very frank statement, which I will read if permitted. There was a discussion as to the opposition we had from the American coal interests in Winnipeg by Mr. Saunders. An endorsement of his attitude came from Mr. J. H. Cushing representing the American coal interests, who frankly declared that America was not going to surrender the 22,000,000 tons of coal now sold Canada without a fight. If Alberta cut her price twenty-five cents America would cut hers fifty cents, and if the British dealer cut his price a dollar the American would cut his two dollars. There was no question of embargo. America had enough coal to last for a hundred years, and would not give up Canada without a fight for it. So that settles your question of embargo, and it also perhaps settles this—that we have been giving a little more credit to the coal interests for their kindness in shipping us coal than they deserve, if they can profitably cut their price two dollars a ton.

Q. They are charging all the traffic will bear, evidently?—A. Yes.

Q. Could you state any points as to the relative merits of bituminous coal of Alberta as compared with the bituminous coal of the United States?—A. They are practically the same.

By Hon. Mr. Calder:

Q. Would you not anticipate difficulty in bringing coal forward to the east in large quantities, say in August, September, October, November, December, on account of the grain movement?—A. Oh, yes. Now, our suggestion to the Canadian National and the other railroads was this—that at the present time there are three factors that appeal to us in the transportation question. One is the fact that our domestic mines are now closed; the market is over for the year. The other is that the Canadian National and the other lines have thousands of cars lying idle in Alberta and through the west. They have all kinds of equipment that would be necessary for transportation; and the people of Ontario, we are informed have more or less the practice of buying in the early spring and summer so as to be assured of supply.

By the Chairman:

Q. The more provident people do?—A. Well, I think after the experience of the last few years they will be more inclined to do that. We felt that those three factors would have a very important bearing on the situation. Of course there is the further factor that American anthracite is not improving in quality, nor can it improve in quality materially, nor can it be produced at a less cost than it is now. It is becoming more costly to produce each year.

By Hon. Mr. Hardy:

Q. From what you said a moment ago, do you mean that the consumer buys in the spring and summer?—A. Yes.

[Mr. Howard Stutchbury.]

Q. I think you said that in Montreal to the Committee there?—A. Yes, that is what we understood was largely the practice.

Q. Following up your statement in Montreal I got figures as to the coal actually sold to consumers in Ottawa; it was weighed here at the city scale. In March last year it amounted to nearly 19,000 tons, whereas in April it fell to 9,000, in May to 4,000, in June to 3,800, in July to 5,300; then in August it began to go up to 10,000, and it was not till October that there was any appreciable jump; it goes back to 17,000, and in November it ran to 20,000, in December 31,000; in January, 1923, it was 34,000, in February 36,000, in March 32,000. Of course, that is only one city.

The CHAIRMAN: I think the figures bear that out elsewhere.

By Hon. Mr. Hardy:

Q. I live in a small town of 10,000 with good coaling facilities, but I know it is quite difficult for the merchants to get people to buy in the spring and summer; they are pushing them all the time.—A. My information was obtained from the Fuel Controller of Ontario, Mr. Ellis.

Q. Then he must have very general information?—A. Yes. We thought that in view of the situation for the past two or three years we were more or less safe in saying that people would be more fore-handed than they had been.

By Hon. Mr. Calder:

Q. Your suggestion is that coal should be moved forward in January, February, March, April and May when there is so much rolling stock available?—A. Yes, between the grain movement.

Q. If the consumer did not purchase during those months it would mean shortage?—A. It would be a matter of storage. I imagine it would be a matter of education along two lines—one as to providence in buying early, and another as to the best method of use.

By the Chairman:

Q. Taking the first, somebody would have to absorb the cost of carrying that coal from the time it is delivered in May, June or July, over to the time that it is being consumed?—A. Yes.

By Hon. Mr. Laird:

Q. Have you any recommendation as to who should perform the duty of storage?—A. I would imagine that to be the function of the dealer who is selling coal, just as any other commodity.

Q. This coal (referring to samples shown) is about the ordinary weight in storage?—A. Yes, a little less than anthracite.

Q. Did you ever think of applying to coal the principle that the railway companies apply to the storage of grain—that the charges remain a charge against the coal while in storage, and they can be paid at any time; for instance, freight charges on grain are never paid when the cars are delivered, but they remain a charge against the grain until it is disposed of?—A. If such an arrangement as that could be made it would help. We have not had to deal with that problem, but that might be a fruitful point for consideration.

Q. The freight charges on that coal would amount to a very large proportion of the cost of the coal?—A. Yes. At present the railway companies hold those railway charges in abeyance until the whole of the grain is delivered, and there is no reason why that should not apply to coal.

By the Chairman:

Q. The provision for coal would not mean more than the provision of elevators for grain?—A. It would not be anything like as large.

[Mr. Howard Stutchbury.]

Q. But if there is justification for one, there would be a justification for the other if the trade proved likely to be a permanent one?—A. Yes. Of course all over the United States they have gone into the matter of storage very much more fully than we have in Canada.

Q. Who provides the storage at the head of the lakes?—A. I think it is a combination of railway companies and the coal interests.

By Hon. Mr. Calder:

Q. What is the purpose of that little pamphlet you got up?—A. That pamphlet is purely educational.

Q. It was issued by the Alberta Government?—A. Yes.

Q. To what extent have you circulated it in Alberta among your own people?—A. Not at all. May I say this—that we use coal more wastefully in Alberta than they do in Manitoba or Saskatchewan.

By Hon. Mr. Laird:

Q. You don't pay the same freight on it?—A. Not only that, but we are not very much concerned about how much they use there, because they can get it more easily, and the more they burn the more business there is; but in Saskatchewan and Manitoba, where we are in a competitive market, we endeavour to see that the customers get out all the value there is in the coal, because after all it is not the amount of heat units that are in the coal, but it is the amount you get out.

By the Chairman:

Q. We have not touched yet on the semi-anthracite or anthracite coal that you could supply, because if there is that coal of course it would compete with the American anthracite?—A. Oh, yes; it is superior coal to the American anthracite.

Q. That is the coal that lies north?—A. Yes.

By Hon. Mr. Laird:

Q. What is your experience with the railway companies? Have you made any endeavours to get special rates?—A. Yes. In the discussion with Sir Henry Thornton the other night the Ontario Government were good enough to ask me to join in the delegation.

Q. What are the rates to-day?—A. The rate to-day from Edmonton or Drumheller or Lethbridge to Toronto is \$12.70; to Ottawa it is about \$13.20; that is all-rail.

Q. What would it be lake-and-rail?—A. I don't think lake-and-rail would be a feasible proposition for our domestic coals; it would break it up too much; the same is true of the Welsh anthracite.

By Hon. Mr. Hardy:

Q. Can it be broken up into different sizes economically?—A. Yes, if we had this Ontario market we would ship our sized coal—that is the coal you have been used to buy—stove, nut and pea coal.

Q. You would size the coal out there?—A. Yes.

By Hon. Mr. Laird:

Q. Go ahead with what you were saying about Sir Henry Thornton?—A. In discussing the matter with Sir Henry Thornton I pointed out the three factors I have mentioned, and he quite agreed. He said that their present position was this, that they are making nothing out of those cars, they are making nothing out of their equipment between the grain-hauling seasons, and they were prepared to cut freight rates to the bone; in fact, prepared to haul coal without a profit. He said, "We would be no worse off, anyway, so long as it would take care of the cost."

[Mr. Howard Stutchbury.]

By the Chairman:

Q. Both roads are to give us figures?—A. Yes.

By Hon. Mr. Laird:

Q. Did you get down to brass tacks as to what rate he could make?—A. We have been asking for a six dollar rate per ton; that is, taking all the fields of Alberta, with Toronto as the basic point.

By Hon. Mr. Calder:

Q. What is the average cost of production of this class of coal at the pit-mouth?—A. What we call the double-screened lump is \$5. That is not the coal that we would ship down here. May I say this, that in Winnipeg and Alberta and Saskatchewan they have become accustomed to burning what they call double-screened lump, and they became very finicky—quite as finicky as we used to be down here with anthracite, and if they don't get a load that is dusted off with a feather duster they are not satisfied; it must not have any dust on it; it must be such as this (showing example) without any dust or anything, and if the consumer got any portion "fines" he would ship it back to the dealer.

Q. What is that class of coal you are speaking of?—A. That is sold f.o.b. the cars at \$5 a ton.

Q. What is your rate from Drumheller, say, to Winnipeg?—A. \$4.90.

By Hon. Mr. Hardy:

Q. Is there any chance of that being reduced?—A. We are hoping so.

Q. The standard wages are very high now; if you had more continuous employment for the men, about how economical would the production be?—A. The operators tell me it would be possible to reduce the cost of production by almost \$1.50 a ton by continuous operation.

Hon. Mr. DE VEBER: If the mines of Alberta were assured of continuous work during the year the unions would be willing to have wages reduced to a considerable extent; that would lessen the cost of coal to a large amount.

The WITNESS: Very much.

Hon. Mr. DE VEBER: The mines in Alberta work only five months in the year, in the winter; in the summer they are closed down, but that does not mean that they are closed as you would close a room, for you must have a lot of men there to keep the mines in shape; and I am speaking as a stockholder in one of the mines when I say that everything that we make in the winter goes out to keep the mine in shape for the one next winter; we don't make a damn cent. The only coal mine out there that has declared a dividend is the Bellevue Mines, and that is because the C.P.R. take nearly all the coal for their engines. If you could get those two things I would be willing to state that we could put coal on the cars at \$2.

The WITNESS: I have not any doubt about that.

By the Chairman:

Q. The position would be more favourable if the public felt that the western operators would do their very best to make the price a factor, so that it would not simply be asking the railways to cut to the quick in order that they may get a full round price?—A. I think I may say quite frankly that the operators would be more than willing to meet you half way. It is simply a question of the present cost of production, which is high because it is intermittent.

By Hon. Mr. Hardy:

Q. What are the highest wages paid there per day?—A. These are the wages paid in Alberta and Nova Scotia and Vancouver:—Contract miners, \$9.57 per

[Mr. Howard Stutchbury.]

day of eight hours; machine miners, \$8.02; hand miners, \$7.05; drivers, \$7.21; labourers' service, \$6.58; machinists, \$8.14; carpenters, \$8.14; blacksmiths, \$8.14. Those are the rates we are paying now. In Nova Scotia the rate is 25 per cent to 35 per cent lower; and in Vancouver Island about 20 per cent lower.

By Hon. Mr. De Veber:

Q. When you speak of contract labour, that means that men work by the piece?—A. Yes, on a tonnage basis.

Q. That \$9.50 is their average, is it?—A. That is the average.

Q. I could show you on our books where the first-class miners in a room have been getting from \$14 to \$17 a day?—A. Yes, and they come higher than that.

By Hon. Mr. Hardy:

Q. I was speaking only a few days ago to a man interested in a mine in a part of Alberta where they pay as high as \$30 to \$33 a day; is that not true?—A. Men will earn that.

Q. I do not mean that that is paid for one or two; he says, "We are paying them \$33 a day out there, and we cannot mine at that rate:" was he referring to some one or two particular men?—A. Oh, yes.

By the Chairman:

Q. They get so much a year, or so much a ton, and you get some very hard working and skilful men who earn prodigious wages?—A. Yes, men who are on pillar coal.

Hon. Mr. DE VEBER: I know an old man out there who has been working in the mines for many years, and he has two young boys. He applied for a loan to buy a ranch, and the party to whom he applied investigated and found him living in a little two-roomed shack, yet the old man and his two sons had been paid for their work the year before \$7,000.

Mr. STUCHBURY: I have arranged with the Fuel Board, through the kindness of the Fuel Board and the Minister, to put on a demonstration of the burning qualities of Alberta coal out at the Fuel Board plant, where they have a small household boiler, and they are setting up a hot air furnace and a kitchen range to show the flexibility of this coal, because we do not look upon it as a substitute for anthracite, but as a genuine coal. The Senators are invited to see this in operation.

The total production of domestic and sub-bituminous coals in Alberta for 1922, was 3,721,742 tons.

Average number of men employed, 5,601.

Average number of days worked, 200.

Approximate daily tonnage, 18,688.

The production for October 1922 (the Peak Month) was, 630,000 tons.

Average number of men employed, 8,537.

Average number of days' worked, 20.3.

Approximate daily tonnage, 31,450.

Continuous operation in the domestic and sub-bituminous fields on the basis of October would increase the production to 7,500,000 tons, and would increase the average number of days worked from 200 to 240. Providing for all holidays and possible necessary shut downs it would be possible to work continuously for 275 days, which at the same rate of production would give an output of 8,648,750.

[Mr. Howard Stutchbury.]

The field which produce coal of a quality which could be successfully shipped to Ontario, for domestic use, namely, Lethbridge, Drumheller, Three Hills, Carbon, Wabamun, Pembina, Saunders, and Yellowhead, produced during 1922 2,595,945 tons, or an average daily tonnage of 11,177 tons, employing an average of 3,729 men, and working an average of 223 days, or an average production per day per man employed of approximately 3 tons.

During the month of October these fields produced an output of 451,360, employing 6,164 men, and working 22·75 days.

Applying these figures to the 12-month period the production would be 5,416,320 tons, with the same number of men employed.

The shipments of anthracite for 1921 (a reasonably normal year) into Ontario were 3,070,217, into Quebec, 1,311,712; or a total of 4,381,929.

Adding this tonnage to the present production of the mines producing a quality of coal capable of replacing the present shipments of anthracite into Ontario and Quebec 2,595,945, would require a tonnage of 6,977,874 tons. If this additional tonnage were produced from the mines in the districts previously specified it would require the services of approximately 8,000 men working 275 days as against an average of 3,729 men working 223 days.

Due to the present seasonal operation of mines in Alberta a very large number of miners are either unemployed during the slack season or are engaged in other industries.

Continuous operation of the mines for 12 months would absorb all miners in their proper occupation with the result that additional labour would be required to take their places in other industries. There would be also the possibility of still greater production of coal through increased efficiency as a result of continuous employment of miners in their regular avocation.

This increase of market would further tend to reduce the present condition of instability of labour caused largely through lack of continuous operation and would also take care of mine idleness which is a serious expense, the extent of which is not generally known by the public; as such items as overhead charges, rental, taxes, operating of pumping and ventilating machinery, necessary timbering due to slacking of roof and continuous ground movement must be taken care of for 12 months whether or not the production of coal is being carried on.

As a result of the purchasing of anthracite coal for domestic use by the people of Ontario and Quebec there was sent to the United States in 1921 approximately \$52,000,000 made up as follows:—

Value of coal at mine, \$38,780,071. Plus freight of \$3 over U.S. Rlys. of approximately \$13,145,787. Total, \$51,925,858.65.

COMMITTEE ROOM 534,

OTTAWA, Friday, April 13, 1923.

The Special Committee of the Senate met at 11 a.m., Hon. Mr. McLennan in the Chair.

The CHAIRMAN: We have with us a number of gentlemen from the Drumheller District in Alberta, which is the source of the domestic fuel which is coming on and will, they trust, be shipped here in larger volume in future. Mr. Macauley will speak for them.

DONALD A. MACAULAY, of the Newcastle Coal Company, Drumheller, Alberta, called and examined.

[Mr. Howard Stutchbury.]

By the Chairman:

Q. You also had experience in the east?—A. Yes, I worked in the Cape Breton mines when a boy, and later on with the Dominion Coal Company.

Q. We heard yesterday about your field, and its success in getting into the market in Manitoba, and we would be very glad to have you supplement that information by anything you think will enlighten us further?—A. Well, in getting into Manitoba, we found the situation somewhat the same as it is in Ontario today. It started back in 1917, when the Dominion Government felt that there should be an embargo put on domestic coal going into western Canada, due to war conditions, and they wished all the domestic coal possible to come into Ontario and Quebec that they could get from the United States. We came down at the invitation of the Dominion Government on a deputation, of which I happened to be one, and there were also many of the dealers from Winnipeg at the same Conference. The dealers claimed that they could not get along without anthracite coal, which was an absolute necessity to keep themselves warm, and their office buildings warm in such a cold climate as prevails in Manitoba and Winnipeg. At that time the coal from Alberta had very little market whatever in Winnipeg. As recently as 1919, 478,000 tons of anthracite was sent into western Canada; but in 1922, from the best available statistics we could get, not over 50,000 tons went into western Canada. All that tonnage has been replaced in that time by coal from Alberta, chiefly from the Drumheller district. Now, we feel that if we can keep people in Winnipeg warm, where they live in the same kind of houses and do their business in the same kind of office buildings, and be able practically to put anthracite coal off that market, with a freight rate that will allow us to come in and compete with anthracite in this province, we can also satisfy the people here that we have a product that is something that they did not realize was in this country. Since coming to Ontario I find that the people know only two kinds of coal—the soft coal as it comes across the line, and they put it in their furnace or kitchen stove, and get their stoves and chimneys all sooted up, and they have put it into the tubular boiler, which gets sooted up in a very short time. This coal that we have is practically smokeless—very little smoke; no soot; burns freely; stays in all night; and can be used in kitchen ranges and furnaces. Our furnaces that we use out there for burning this coal are practically all made in Ontario or Quebec. We use Quebec heaters, McClary range, Hecla furnace, and so on, all built in Ontario.

By Hon. Mr. Hardy:

Q. Are you referring to Drumheller coal particularly there, or Alberta coal?—A. Alberta domestic coal, in distinction from Alberta steam coal. There are fields outside of the Drumheller fields that are supplying the same class of trade, but the Drumheller has the greatest tonnage of that class of trade for any one field in Alberta.

Q. What other fields supply that trade?—A. Lethbridge, Saunders' Creek, and Pembina.

Q. This is Saunders coal here shown?—A. The large junk is Saunders coal (referring to samples).

Q. When you speak of Drumheller coal, that is not confined just to the product of one Drumheller mine?—A. That whole district, the Drumheller field—Rosedale and Wayne; it covers probably 20 miles.

Q. I suppose that coal differs a little in its heating capacity?—A. We are operating two seams there. One lies 70 feet above the other in stratification, but the others are utilized for domestic coal, there is very little difference between the two seams.

[Mr. Donald A. Macaulay.]

By the Chairman:

Q. And the seams are pretty uniform?—A. Pretty uniform, so far as the mining is concerned. We find that out in the western country where people have been educated to the proper firing of this coal, know how to handle it, know how to bank their furnaces at night, and so on, that during the season when the weather starts to get cold, until the spring opens up, an ordinary house with the ceilings not too high, say 7 or 8 or 10 rooms,—not including the kitchen coal—can be heated with a ton and a quarter per room to a ton and a half for the season.

Q. That would be from October or November to April?—A. In some Octobers they have to start their furnaces, but sometimes it is later on; say around the 15th October a man would have to start his furnace, and at the end of March there are some days you might want the furnace, and some days you don't.

Q. A man with a ten roomed house would lay in about 12 or 13 tons?—A. For his furnace. If he is using it in his kitchen range he would lay in enough also to carry on the kitchen.

By Hon. Mr. Laird:

Q. Is your estimate based on hot air heating, or hot water?—A. Hot-water heating. Hot-air takes a little more, because the hot-air furnace is not so efficient, as a rule, as a hot-water furnace; it is up and down.

By the Chairman:

Q. That is on practical tests, I mean that is not any one particular house?—A. No, that is what the dealers in the cities who have investigated and kept track, and experimented with this coal, tell the mine operators—that that is what they figure on.

Q. They gauge their requirements of their customers on that basis?—A. Yes; if a customer comes in the fall and wants to know how much coal he should put in his basement it is figured on that basis.

Q. How is the coal for ash?—A. It runs from 6 to 8 per cent.

By Hon. Mr. Hardy:

Q. What is the ash from the American anthracite?—A. I can only give you that from information I got since I came to Ontario. Everybody we talked to since we came into the province says that, as received this year, the ash content is very high. Of course American anthracite in the early days here was sent in clean, and the ash content was not extraordinary, but from our information it is extraordinary at the present time as received on the market.

By the Chairman:

Q. Of course any place that has a great pressure on them will drop down a little in cleaning and preparation of their coal?—A. Yes.

By Hon. Mr. Laird:

Q. Deal with the question of keeping qualities and shipping qualities?—A. Our coal carries a certain percentage of moisture. We will say now that if this coal comes into Ontario it will have to be handled in a different manner from the way the present domestic fuel is handled in Ontario.

By Hon. Mr. Webster:

Q. You mean the anthracite coal?—A. Yes, different from the way anthracite is handled by the dealers. Our coal will fall out on exposure to the atmosphere for a certain length of time.

Q. How long?—A. I would not say how long in Ontario; your climate is not nearly as dry as ours out in the west. It would be more favourable to this product in Ontario than it would be in the west, but in that country what we do is this—the dealer who stores this coal must have a good shed or get it into the basement of the consumers. I have stored this coal in my own basement for as long as 18 months, and at the end of 18 months burned the coal successfully in the furnace. But that coal won't last 18 months outside; it won't last six months out in the open, or if it is left in any place where the moisture would be all absorbed; then it will disintegrate and lose some of its fuel value. But when handled properly it can be gotten into the peoples' basement and stored there for an indefinite amount of time, for any length of time that he would likely have coal exposed.

By Hon. Mr. Hardy:

Q. Will it "slack" if it is exposed?—A. It will slack if it is exposed to the sun. I would not say how long in Ontario it would slack if left out to the weather.

Hon. Mr. DE VEBER: I have had it in my basement for 3 years, and it is just as good after 3 years. I get my coal supply in for my grates once in 3 years; I use oil for heating the house.

By the Chairman:

Q. Would your remark mean that the possibility of a market would only be the people that could store it in advance, or have you thought of any system by which the coal could be stored and then distributed at the time of real consumption?—A. Well, the same system that is followed in the west could be adopted in the east to a certain extent. The people in that country have coal bins beside the elevators, and early in the fall they fill those up; they keep coal coming along, and dealers sell off the cars as well. In Ontario I understand a great many people are educated to getting their coal early in the year, whereas we would have to get dealers down here that would handle our coal in the same way that it is handled out west.

By Hon. Mr. Webster:

Q. What is your daily output?—A. 10,000 tons from the Drumheller field. This could be increased to—

Q. Any quantity?—A. To any quantity if the trade demanded it.

Q. From your experience with the Cape Breton product how does your coal compare with the eastern coal for domestic uses?—A. It is ever so much nicer.

Q. What does "nicer" mean?—A. Well, it burns freer; it will stay in better; the fire does not cake so that you have to poke it with a poker to open it up. We have coal like Cape Breton coal, but it is used for locomotives and steaming coal.

By the Chairman:

Q. You did not mention a very important thing—about soot; Mr. Stutchbury yesterday was very positive that there is no deposit of soot from this coal?—A. No; we have no use for chimney-sweeps in that country at all; we don't need them. When they use this coal the chimney never gets cluttered up.

By Hon. Mr. Webster:

Q. You are speaking of your product largely for domestic purposes?—A. Absolutely.

Q. Not touching on the steam qualities?—A. No.

[Mr. Donald A. Macaulay.]

Q. What is the haul from your mines to Winnipeg?—A. Approximately 800 miles.

Q. And the freight would be what, roughly?—A. \$4.70 to Winnipeg.

Q. Have you a big market anywhere between your mines and Winnipeg?—A. We have the whole of the market between Winnipeg and the mines, including eastern British Columbia.

Q. You don't come this side of Winnipeg?—A. Yes, as far as Port Arthur and Fort William, but not to the extent that we do to Winnipeg; but we send coal into Port Arthur and Fort William, where the coal is landed in the summer time at the head of the lake.

By Hon. Mr. Webster:

Q. How would your price compare at Winnipeg with the American anthracite, allowing you a fair profit for your money?—A. Dealers sold our coal in Winnipeg last year around \$13.

Q. Last year was hardly a normal year, but as a calculation over years to come what would the comparison be with American anthracite? I think you will admit that last year almost any price could be got for coal at certain times?—A. Not in the west. There was absolutely no shortage in the west.

Q. There was no surplus anthracite last year?—A. They were not asking for it; they did not need it; they had the western coal; we have practically replaced it to the extent of 90 per cent. There are still some people that don't like changing; we had to educate a lot of them to make the change in the first place, and there are still a few that need some more education before we will have the entire market.

Q. But there will still be a quantity of American anthracite imported into Manitoba this year?—A. In talking to some of the large dealers on our way down, while we were in Winnipeg, they assured us that they did not think that more than 30,000 tons would be imported into western Canada for 1923.

By Hon. Mr. Laird:

Q. I was told by a Regina dealer the other day that there were only six cars brought into the city of Regina last year, though there are 40,000 people?—A. No doubt that is true. It is not more than 10 years ago that anthracite was sold to a little extent within 150 miles of where this coal is produced to-day.

By the Chairman:

Q. Of course this coal apparently is not like what we understand in the east as bituminous coal; I mean, it is not sooty?—A. No, it is not sooty.

Q. And it does not cake; it is, of course, distinctly different, and with great advantages?—A. We find that in Ontario it takes such a long time to explain to everybody that this is not the same class of coal as what they know as soft coal.

By Hon. Mr. Webster:

Q. You ship it at various sizes?—A. Yes, we make stove, nut, lump, and so on.

Q. It goes through a breaker at your plant?—A. Through screens as it comes from the mine, and is screened to certain sizes.

Q. What is the comparison of prices of your coal at Winnipeg with anthracite?—A. Anthracite is \$18.50 last winter, delivered in the cellars. Our coal was \$13.75, and some sizes at \$14.50.

By Hon. Mr. Hardy:

Q. Was any Canadian anthracite or semi-anthracite sent into Winnipeg?—A. There is no semi-anthracite. Fifty thousand tons is all that went to western Canada.

Q. I am speaking of Canadian anthracite?—A. No; the only mine that was producing Canadian anthracite was the Canadian Pacific Mine at Bankhead, and it was closed last year. While there is anthracite coal out in that country, it is not being operated at the present time.

By Hon. Mr. Webster:

Q. Then your product can be laid down \$4 or \$5 a ton less than the American?—A. Well, we competed in Winnipeg closer than \$18 and \$14. The anthracite coal as received in Winnipeg to-day, with as high content of ash, we can compete ton for ton and give the consumer equal value for his money.

Q. At \$5 a ton less?—A. Equal value for his money, ton for ton.

Q. I understood you to say that your coal could be laid down for \$14.75?—A. Yes.

Q. As against \$18.50 for American coal?—A. It used to be considered that one and a quarter or one and a third tons of our coal was equal to a ton of the anthracite, but as the anthracite received to-day runs so high in ash it counteracts its high heating qualities to a great extent, so that a ton of Alberta coal is now on a par with a ton of anthracite.

By the Chairman:

Q. So that, say at \$10 a ton, there is as good fuel value in your coal as in America anthracite as at present received?—A. There is better fuel value for the difference in money,

Q. If the price were even the same, you could convince a man, by experiment, that yours was better or as good money value as American anthracite, as now received?—A. As now received—that is the distinction. We don't wish to put forward anything that we cannot substantiate. Five years ago a ton of our coal was not as good as a ton of anthracite which was properly prepared; but the stuff that they are getting in Canada to-day, we find that the content of our coal will go just as far as the content of the anthracite.

By Hon. Mr. Webster:

Q. Are you basing your calculation on last year's shipments, or will not the anthracite coal be properly prepared as soon as normal conditions return?—A. Anthracite coal may get better; we are not professing to say whether it will get better or get worse; we know they have very little competition in their own country, and their market has widened all the time, in fact they have no coal to compete with their own coal down there.

By Hon. Mr. Hardy:

Q. Would you say there is any difference between those two kinds of coal behind you (referring to samples); are they equal in quality?—They are both Alberta coal?—A. The moisture content of this Saunders coal is a little less than that of the other.

Q. I just tested half a ton of that coal in my own furnace, and it lasted exactly 48 hours?—A. Somebody better be sent to your furnace to educate the furnace man.

Q. I have a good furnace man; there was not more than a scuttle-full of ash left, but it burned very quickly; there was very intense heat, but we took our time, and it just took 48 hours, which makes it pretty expensive heating; do you think if that had been fired properly, according to your way of firing that coal, we could have done better with it?—A. We have no doubt at all, yes; we have been up against that proposition so often.

Hon. Mr. HARDY: Of course we have a very large house.

[Mr. Donald A. Macaulay.]

By Hon. Mr. Webster:

Q. Do you think the citizens of Winnipeg will use your product at the same price as American anthracite?—A. I think they will now, since they know what it is and know how to handle it.

Q. Then there is no fuel problem as far as the western provinces are concerned?—A. No; in fact I don't think there is any fuel problem as far as Canada is concerned; it is a transportation problem; we have the fuel.

By Hon. Mr. Laird:

Q. Is it not a fact that Ontario people living out west have no trouble in educating themselves to use this coal?—A. Absolutely no trouble whatever. They are surprised to know they have a fuel that will take the place of anthracite and be equally satisfactory.

By the Chairman:

Q. As to the storage of your coal, from what you said I got in my mind a picture that the dealers had at various places something like a locomotive coaling shed?—A. No, not quite that.

Q. What could be done in Ontario along that line?—A. Coal in western Canada for domestic purposes is almost entirely handled in ordinary box cars that handle grain or anything else. These are loaded with machines at the mine. It comes to the dealer, and he unloads this coal into the shed, or he unloads it to his customer out of the car, and they take it to their basement. This shed is built on the ground—no elevated trestle-work going up like what you see in the bins of this country.

By Hon. Mr. Laird:

Q. Just a mere shell?—A. Just a mere shell. They have shovels on the hills where they shovel in the coal, and they shoot this up, and mix it with an apparatus, and throw it as little as possible. Then they store that coal there early in the fall. Our season starts with a rush in August—August, September, October, November. They store most of the coal they receive in August and September. There is very little coal asked for until it starts getting chilly.

By Hon. Mr. Webster:

Q. Why should those shipments not be made weekly? Why must they store it in August and September?—A. There are certain seasons when the mines are pretty busy in the fall, and the dealers like to get a few carloads ahead so that if the regular shipments happen to get held up they are not out of coal.

Q. I suppose a small proportion might be taken in that way for safety and protection?—A. Yes, that is what they do.

Q. But there is no reason why you should not ship them fresh mined coal weekly, is there?—A. No.

By Hon. Mr. Laird:

Q. It disintegrates by exposure and time?—A. We continue to ship them right along, but should anything happen on the railroad or anything like that the dealers like to have a little supply ahead.

Q. During the cold spells they use more coal than at other times, and then they draw on the stock in the shed?—A. Yes.

Q. Is it not a fact that the dealers try as far as possible to deliver coal out of the cars, and try to save extra handling?—A. Yes, they save handling from the cars into the shed when they can.

Hon. Mr. DE VEBER: The mine up there in which I am interested made an offer to our dealers to ship the coal in the summer and they need not pay until

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it was sold, but they would not do it, because they said it might be a fine winter, and they would not sell half of it.

Hon. Mr. LAIRD: But they would have the extra cost of handling.

By the Chairman:

Q. If you are going to ship from the Rocky Mountains into Ontario you will have to make provision for cars as is done with American coal going up to head of the lakes?—A. Yes.

By Hon. Mr. Gordon:

Q. Would not shipping coal in box cars increase the cost of unloading?—A. It would not cost any more to unload it into a wagon out of a box car than it would out of your dump cars that you use in carrying coal in Ontario, but it would cost a little more if you had to load it first into the box cars, and then unload into the shed, and then load it into a wagon to take to the consumer. Out West they claim that it costs about two bits to unload it—that is, 25 cents in Ontario—to unload it into the shed; 25 cents a ton. If you unload a box car into a wagon and take it straight to the consumer without it going into the shed or on the ground, then the difference between loading it out of the box car into the wagon and taking it up off the ground, as you do here, would be very little.

Q. Could you not load an ordinary coal car cheaper than a box car?—A. We are equipped with machinery to load the box cars, and one man loads cars.

By Hon. Mr. Webster:

Q. Your price is the same, whether shipped in an open car or box-car?—A. Yes. We would have to have one man loading open cars, and one man loading box cars with the machine.

By the Chairman:

Q. Your best way is to utilize the cars which the railroads have idle at certain times, not asking them to make special provision of coal cars?—A. Yes. I might say that this Committee started out in Alberta at the invitation of the Premier of Ontario to go with him and see Sir Henry Thornton and put the proposition before him of reduction in freight rates by using the idle cars in the summer, and using the mines that are idle in summer, and supplying the needs of the people of Ontario with coal run in train-loads, starting out from Alberta with a solid train of probably 50 cars, containing from 2,000 to 2,300 tons, and landing at some divisional point in Ontario, and from there to be distributed. Of course that is a railroad proposition.

By Hon. Mr. Webster:

Q. And the merchants would require to store that coal from the time you shipped it in the summer months until it is delivered into the consumers' cellars?—A. If they did not sell it to the consumer immediately of course it would have to be unloaded at the car and stored.

Q. But it would be a situation that would have to be taken care of by the local dealers?—A. It would be more or less a change in the regular order of business. It would be an evolution, like many other things that have started and evolved until they got down to a regular course where they did business on different lines.

By the Chairman:

Q. As far as American coal is concerned of course you will have to build up a system to compete with the very perfectly organized one now?—Yes. We expect that in the large centers in Ontario, suppose we do get a freight rate that

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is favourable, we expect to have some amount of competition from the people who are handling American coal, as we had in Winnipeg, where dealers like the Pittsburg Coal Company had their offices and sold anthracite coal, and many other concerns. Naturally it was a change and a revolution in their business, and they fought as long as they could until we had educated the consumer, and the consumer made them put in our coal.

Q. You have about a dozen or so different mines in the Drumheller District?

—A. Yes; they are all separate mines.

Q. Have you considered how you would handle this new territory which we hope will open up for you? Each man for himself, and the devil take the hindmost?—A. We hope to be able to pool the product that comes into Ontario. Of course it has not been gone into very far, because we have no definite assurance as yet that we are going to get the freight rate that will let it in here.

Q. But the idea would be to have an association which would take the coal from the various people?—A. Yes; we must have some system, but you may be assured that the best products in Alberta will come, and that each car will be of a uniform size and quality.

Q. And in the same way you will have a joint distribution and education of the public here.—A. Yes. We are assured by the Provincial Government of Alberta that when we get a satisfactory freight rate they will put on a campaign of education in Ontario similar to the one we put on in Manitoba.

By Hon. Mr. Laird:

Q. The eastern members of the Committee have not probably seen the way coal is stored in the west; please elucidate the question of storage a little further; have you any estimate of the cost of those coal sheds, those mere shells that you speak of, say 100 feet along the track? What would the cost of construction of them be?—A. I would say a shed 100 feet by 12 or 14 wide would cost \$1,500 to \$2,000 probably.

Q. How much coal would it hold?—A. At 40 cubic feet to the ton, that would be about 350 tons.

Q. So that storage facilities for 400 or 500 tons could be furnished by the local dealer in Ontario for about \$1,500?—A. Yes.

By Hon. Mr. De Veber:

Q. Provided a freight rate was given of say \$6 a ton, and you were assured of working all the year around, which would lessen the wages considerably, for as they work now only five months a year they must have double wages, what could you put coal on the car for? Could you put it on for \$2?—A. No, we could not do that.

Q. What does it cost now on the car?—A. We have coal that runs from \$3.50 to \$5 on the car at Drumheller.

Q. That is sized coal, merchantable coal?—A. Yes.

Q. But if you worked all the year, and did not have the expense of keeping your mine open in the summer, you could lessen that considerably?—A. I may say that we could not expect an immediate reduction of wages. We have already signed an agreement that will not expire until the end of March, 1924, the same as they have done in the United States. But in the event of negotiating a new agreement, this question of the amount of days the miner has opportunity to work, if they were greater when we got the market in Ontario, than they are now, it certainly would be a very large factor in getting the miners to take a reduction in wages.

Q. I have been assured by leaders in the Unions that if they could work continuously they would be perfectly willing to take quite a large reduction in wages?—A. That is the argument they always put up—that they have only so many days work, and they must live.

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By Hon. Mr. Laird:

Q. What reduction do you think that might effect?—A. Well, that is a very large prophecy.

By Hon. Mr. Webster:

Q. You would not care to commit yourself on that question?—A. No, I would be only prophesying.

By Hon. Mr. Hardy:

Q. How many months a year are you working now?—A. Our regular season lasts September, October, November, December, January; February it starts to get a little slack; March is slack; and in April, May, June and July there is hardly anything doing; nobody wants to do anything.

Q. Between five and six months?—A. Yes.

Q. What freight is ruling to-day to Toronto?—A. I believe it is \$12.70.

By Hon. Mr. Webster:

Q. If you figure at \$4.25 as an average between \$3.50 and \$5, and you have that freight rate cut in half, or in the vicinity of \$6 as you are asking, that would bring it up to \$10.25; is that the net ton or the gross ton?—A. 2,000 pounds.

Q. That would be all the net ton?—A. Yes.

Q. What competition then would you have from the American anthracite operators, in price?—A. Well, of course we don't know what they would do. No doubt if they wanted to hold this market, there is no doubt they are so well entrenched that they could afford to reduce their price in coal.

Q. But for the very small percentage of anthracite coal that is used in Canada—only 2 or 3 per cent of their development—they are not going to cut their price down unprofitably for the small quantity they send to Canada, or do you think they would?—A. It would depend to a great extent. I should think, on the attitude of the mines agents up in Ontario.

Q. They are only servants; they take their instructions from New York?—A. Do you mean to tell me that people like those large coal companies in Toronto, for instance, are servants of the mines down there?

Q. Yes, they pay a price f. o. b. the same as any American concern has to pay under the same conditions?—A. I was under the impression that those were Canadian companies organized for the purpose of selling coal.

Q. No, they are independent—Rogers, Standard Fuel Company, McGill, and those firms in Toronto of that type; they are all on their own?—A. That is what I mean—that they are Canadian people that have no money interest in the mines of the United States.

Q. No?—A. Well, they are doing business in handling anthracite; now, if they are strongly enough entrenched and want to hold on to this anthracite business that they see us cutting in on, they may possibly reduce their profits and sell coal for a year or two for no profit in order to drive us off the market, or something like that. All those things may happen, but we hope they won't.

The CHAIRMAN: Would there be any probability, Senator Webster, of the American railroads reducing their rates?

Hon. Mr. WEBSTER: I think in time they will, but I wanted to get from Mr. Macauley just what the practical solution was as far as Ontario is concerned, and also what his figuring of rates would mean as a delivered price in Ontario as compared with anthracite that can come across the lake in 12 hours.

The WITNESS: We of course feel out there that we have something that we can compete with anthracite and give the people of Ontario value for their money with a \$6 freight rate. Of course if we got a reduction in wages we could reduce the price per ton that I gave—from \$3.50 to \$5 at the mine today.

[Mr. Donald A. Macauley.]

By the Chairman:

Q. Your longer time of working will also save your overhead?—A. Yes. We have to carry our own overhead now, during the summer. If we were working all summer we could sell our coal cheaper.

Q. Your rate to Winnipeg is \$4.70?—A. Yes.

Q. You said that was about 800 miles?—A. Roughly 800.

By Hon. Mr. Laird:

Q. Of course you would have to add to the \$4.25 average price at the mine, plus the \$6 freight rate if you get it, the local dealer's profit and distribution charges?—A. Yes.

By Hon. Mr. Webster:

Q. Have you any figures as to a comparison in price of your coal and high-grade bituminous coal in the United States, which is considerably cheaper?—A. I understand high-grade bituminous coal can be landed in Toronto at \$7.65.

Q. How will that compare with \$10.25 that you would suggest?—A. We have not any idea that we can compete with our bituminous coal against the American bituminous coal in Toronto.

By Hon. Mr. Gordon:

Q. In northern Ontario where they use large quantities of bituminous coal in their power plants, the distance would be in your favour?—A. Yes.

Q. I imagine some of these companies use from 40,000 to 50,000 tons a year?—A. I am not in a position to say what they have to pay for bituminous coal in northern Ontario.

Q. Those large plants are 400 miles north of Toronto, and that much nearer to you, which is in your favour?—A. Yes, I see that, but I have no figures that would show what it would be.

By Hon. Mr. De Veber:

Q. Do you know what the C.P.R. are paying the Hill Crest mines for bituminous coal for their engines?—A. I have an idea, but I don't know exactly.

Hon. Mr. WEBSTER: That is a trade secret.

The WITNESS: To give a little idea about what they call slack, it is used in stoking boilers in western Canada. The City of Saskatoon generates all their power for street railway, street lighting, and household use from the small coal from the Drumheller field. They use over 30,000 tons a year, and they sell power almost as cheap as the Hydro sells electric power in Ontario.

By Hon. Mr. Gordon:

Q. Is it not a fact that at least one mine near Edmonton loads that soft coal with steam shovels?—A. Yes.

Q. Is it not a fact that they could load coal for \$1 or \$1.50 on the cars?—A. I think they could, but that coal would not be suitable for domestic purposes. That coal is at Edson, or Mile 47, as they call it. During the five months' strike in western Canada and the United States last year the National Railways were getting about 2,500 tons a day of that open-cut.

Q. If that could be delivered for \$1 or \$2 on the cars, and they got soft coal, and they got the freight rate of \$5 or \$6 to northern Ontario, don't you think it could be handled there?—A. It is very probable that it could.

Q. They could bring that coal in in the fall, and it would keep?—A. Yes; very probably it could be worked out that way.

By the Chairman:

Q. What is the quality of that open-cut coal?—A. I am not prepared to say. I have been in the open-cut and seen the steam shovel working, but I

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have not investigated the quality. It does not come in contact with our field at all in the market.

By Hon. Mr. Webster:

Q. Have you any figures as to the quantity of American coal that is going into Fort William to-day from Lake Erie ports?—A. I may say that from Government reports here in 1919, 478,784 tons went into the western provinces. That is the way it shows in the report—western provinces, all landed at Fort William. It is anthracite; this is domestic coal alone.

Q. I was referring to soft coal?—A. I believe that runs around two million tons.

Q. Why could you not get some of that business at Fort William?—A. Well, you see the railroads like to have this coal to haul back from the head of the lakes as it gives them a return load, so they bring Alberta and British Columbia coal to Winnipeg, but they don't bring it east; they bring the American coal up to where it meets the western coal.

Q. But if you are talking of displacing American coal, the Fort William section would be nearer your mines than the Ontario points?—A. Yes, but Senator Gordon talked of displacing it in northern Ontario in stationary boiler work at a cheap freight rate. It would be the cheap freight rate that would make the difference if it could be worked out.

Q. But you could get a cheaper freight rate to Fort William than you will to northern Ontario points?—A. But suppose we get a cheap freight rate into Ontario, it probably will not apply to Fort William. Mr. Thayer, do you know the freight rate to Fort William?

Mr. THAYER: \$5.40.

By Hon. Mr. Webster:

Q. Here are 2,000,000 tons going into Fort William from American ports for many years; why not meet that coal at Fort William on the lower freight rate, and meet it at Ontario ports with considerable more chance of success; that is my thought?—A. Senator Gordon mentions a coal that can be loaded very cheaply, but that coal is not as good for locomotive work as this coal that is landed at Fort William, whereas it might do in northern Ontario for a stationary steam plant like a paper mill or something like that, and be very satisfactory.

Q. But the paper mills buy on analysis; they want a good quality of fuel?—A. When they are paying the top price they naturally would, but supposing the price was an inducement, and that coal would do the work, they would naturally put in the coal.

By Hon. Mr. De Veber:

Q. What do you do with your slack?—A. A lot of our slack is sold for stationery boiler work in the cities. Cities like Regina, Saskatoon, and the C.P. Railroad use it in their stationary boiler work at the divisional points.

Q. And what you don't sell you dump out on the prairie and set fire to it, and let it gradually burn away?—A. Yes.

Q. What do you expect to get for your slack at the mine if you ship it?—A. We have been selling that stuff, when it is a drug on the market. At certain seasons of the year there is a big demand; at other seasons it is a drug. We have been selling it as low as 25 cents a ton.

By Hon. Mr. Gordon:

Q. What is the trouble with that? Is it slaty?—A. No; you see, when the production in the other grades is high the production in this grade is also high, and there is not market enough to consume it. When the production in the

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other grades is low, naturally the production in this small grade is low, and as this small grade is used for developing power the demand for that goes up. At the present time the city of Calgary power house is offering \$1.75 to \$2 a ton for that grade of coal, and cannot get it.

By Hon. Mr. Webster:

Q. Do the Canadian National Railways take in a large quantity of coal at Fort William for their own use?—A. I think they do.

Q. Why should not that be Canadian coal?—A. There is not any reason why it should not be, but from their point of view, the same as the C.P.R., they like to have something to haul west instead of empty cars when they bring grain down to the head of the lake.

Q. Would it not be a business proposition if you could put your coal at an equivalent or cheaper rate?—A. We think so, but it is difficult to talk to the railway. We think that the additional industry that would be caused by the continuous operation, and the further development and fostering of the coal and resources of Alberta, would compensate the railroads in many other ways by bringing increased population and increased traffic to look after that population, for what they might lose in hauling back a few empty cars from the head of the lakes.

Q. Do you know any reason why they don't use your coal at those points?—A. Only it is a question of economical hauling. There is a certain point that they figure that one coal equals another, on the haul, in price, and at that point it divides, and they use American coal east and Canadian coal west.

By the Chairman:

Q. I understand that point has been moving eastward, has it not? It once was at Brandon?—A. Since I left home I have noticed in the daily press that they are using it east of Winnipeg. That is something. It is going east the same way as the warm weather is going north.

Q. There is no question about lignite; how much lignite is mined in Alberta and Saskatchewan?—A. Saskatchewan mines about 350,000 tons a year; that is chiefly brown lignite. That is down at Estevan.

Q. I understand that lignite would be put on the free list in the United States automatically if Canada would put lignite on, and that it would be a distinct benefit to our Canadian producers, because the quality of our lignite is better than the American?—A. That is a very important point with us out in the western country. We feel that because of the fact that Canada does not import any coal of the quality that we produce, we should not be taxed according to the Fordney tariff with 53 cents on our coal going into the United States, because we don't import from the United States any coal that is the equivalent of the coal produced in those fields in Alberta or Saskatchewan.

Q. What coal is it at Lethbridge?—A. The same quality of coal as this Drumheller (referring to samples).

Q. The lignite is not a true coal?—A. No.

Q. Your impression would be that if the Government here took up that matter of lignite it would be an advantage?—A. Yes. I might say that this year the Drumheller mines shipped quite a large tonnage—I am not prepared to say exactly how much, but large compared with other years—into North Dakota, and had to pay the 53 cents duty. Had that duty been removed we would naturally have obtained more of the market there. We also think that there is an opportunity of sending some of our coal into Spokane and Washington, but the duty just seems to be enough to keep us out of that market.

Q. The Vancouver Island mines ship along that coast?—A. But Spokane is quite inland. Vancouver goes down to Seattle and San Francisco.

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By Hon. Mr. Laird:

Q. But Vancouver coal is not the same quality of coal that you produce, and not used for the same purpose?—A. No.

By Hon. Mr. Webster:

Q. There is no fuel supply trouble in British Columbia?—A. No. We supply the domestic requirements of eastern British Columbia on this side of the slopes of the Rockies.

REGINALD M. THAYER, Coal Mine Operator and Coal Merchant, Saskatoon, called and examined.

By the Chairman:

Q. Will you tell us anything that will be of help to us from the standpoint of the distributor and the consumer for domestic coal?—A. The question was brought up here to-day regarding the storing of coal. I think that is an important question; it seemed to strike every one of you gentlemen. We have handled these coals very largely from the Drumheller field for years, from the very first coal that was shipped from that territory. We have found, as stated before, that the coal will not store in the open; it is a physical impossibility, for the moisture contained in the coal.

By Hon. Mr. Laird:

Q. Beyond what period—a month, or two months?—A. All depends on the weather conditions. If we have a heavy rain and a hot sun after it the coal will break down in a very short time.

Q. But you don't have rain in that country in the winter?—A. No, but we do in the summer. That is the storing season.

By Hon. Mr. Gordon:

Q. How would that affect it for transportation in open cars?—A. I don't think it is the intention of western operators to ship coal in open cars. I don't think it is a physical possibility to ship that coal and get it down here in proper shape in an open car. Except in the coldest weather in the winter time, we never ask a man or never allow a man to ship in an open car. The point comes up, then, regarding the shipment of coal in cars. During the summer season—the season that we intend to ship coal down to Ontario—it is the only time that we can ship economically from a railroad point of view—the railroad sidings in western Canada are absolutely filled with empty box-cars. There is no reason why the railroad could not deliver box-cars to the mines for the loading of coal. Those box-cars would bring the coal down here in the ordinary time that the shipment could be made from that point to an Ontario point, and the coal would not deteriorate one particle.

By Hon. Mr. De Veber:

Q. Seven days?—This coal came down here in seven days?—A. That is probably special delivery, a special service. The point I am making is that we can bring the coal down in the box-cars, and land it here in first-class condition under ordinary time for shipment—it might be ten days—a few days don't make any difference in the shipment of that coal. We get it down here. The point then comes up, what percentage of that coal would be delivered from the car to the cellar? In the coal that could be delivered from the car to the cellar there would be no deterioration at all; it would go into a man's cellar in just as good shape as when it left the mine. In the cellar there would

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be no depreciation, no less from deterioration or breaking up of the coal at all. That coal will stay in a man's cellar for 18 months, 2 years, and longer; I have seen coal come out of the cellar in good shape that has been in the cellar for two years.

By the Chairman:

Q. Is there any danger from spontaneous combustion?—A. Absolutely none in prepared coal.

Q. What do you mean by prepared coals?—A. Sized coals. The only possible danger is in the slack, and I will come to that point a little later. The coal, then, that is delivered into a man's cellar, there is absolutely no depreciation, there is no deterioration. Supposing a local agent or coal dealer has to have a little coal that he has not sold, has to put it in bins, he can put that into a bin that is composed of ordinary lumber siding, with the proper studding, properly sealed, properly roofed, with ordinary coal doors; and that coal will not depreciate any more than 50 cents a ton.

Q. In how long?—A. In six months. We have gone through that process.

Q. That depreciates in the size?—A. Yes, size only. Of course the proper method in this country is to deliver coal as much as possible, and from what I understand of the coal trade of this country—my partner was in the coal trade in Toronto with the Conger Coal Company in past years—he tells me that a big percentage of coal in Ontario is delivered during the April, May, June and July months. That is domestic coal; I am not talking of steam, and I want that clearly understood, that the steams are a different proposition altogether. If that is so, it would naturally follow that our coal would get the same handling as the American anthracite coal has had. In that case it would be an ideal condition for the dealer. Now, in the matter of unloading our coal, it is an utter impossibility for us to unload our coal on the docks that the dealers in this country have erected to handle American anthracite. Our coal would not stand the rough handling, the falling from great heights, as the anthracite will. That is one of the reasons why we find that we cannot handle those open cars of every sort on the unloading dock. We have bins. The great door is on a level with the door of the bin, and incidentally I may say that we can unload that coal considerably cheaper out of the box-cars than you can out of the open car—I mean under our conditions, and under the dock conditions. Further, in regard to the storing of coal down here, I personally believe that there would be very little depreciation under any condition with our small coals. There would be some depreciation with our large coals. I could probably give you an illustration of stacking coal even in the open. We have tried an experiment for years. In referring to this point I am referring to a case where there is a big shortage such as in a city, and the city decide to bring in a lot of coal; they could bring in our prepared coal and pile it in a big pile, and it will automatically seal itself after a certain period, in this way—the coal on the outside will depreciate, get in small places and form a slack. That is just as good as any shipment that ever happened; the only difference is that there may be an increase, again, on the amount of slack formed when you deliver that out for domestic coal.

Q. Have you any idea what percentage of slack would be formed in the dump?—A. I would say that you would have 15 to 18 per cent. Some coal will depreciate in heat value, if stored one year in the open, approximately from 4 to 5 per cent; that is a loss of volatiles, chiefly. Of course, gentlemen, we are down here on domestic coal.

[Mr. Reginald M. Thayer.]

By Hon. Mr. Laird:

Q. Do you endorse the figures as to the cost of storing given by Mr. Macaulay, the last witness?—A. The cost of buildings, I think they are high; I would say \$800 or \$900, perhaps \$1,000, depending on the cost of lumber, and I don't know what that is here.

By Hon. Mr. Webster:

Q. Did you suffer from a scarcity of box-cars for your coal trade?—A. We have not suffered in the past year or two; we did before that.

By the Chairman:

Q. The railway does not object to loading coal in wheat cars, in box-cars?—A. No, absolutely not our coal; that is, domestic coal. Steam coal is a different proposition; they load it mostly in open cars. It does not deteriorate at all.

By Hon. Mr. Webster:

Q. Then you have no problem, no difficulties; you are happy?—A. I have always been happy in the coal business.

By Hon. Mr. Gordon:

Q. What about your customers? Are they always happy?—A. Yes. There is another point that seems very salient as to reducing freight rates, and that is, that if the freight rates are reduced and bring us into competition with American anthracite coal, and they decide that they want to hold this market, and reduce that price on their coal, irrespective of whether we bring in coal into this country or not from Alberta for domestic trade, we have done a wonderful thing for Ontario and Quebec, and we will get the benefit of it whether we bring any down or not.

By the Chairman:

Q. There is another point that might be brought out—to enlarge a little on that matter of handling the coal. It will make a much more sympathetic reception in the east here if you make it absolutely clear, and emphasize perhaps more than Mr. Macaulay did, that the producers in the west are going to do everything that they can to push this coal?—A. Well, we have been informed, and I think Mr. Macaulay stated, that the Alberta Government are prepared to start an advertising propaganda in regard to our coal, and are further prepared to put men down here who fully understand our coal, to demonstrate the feasibility of burning it, and showing the people how to burn it. A gentleman here made the statement that he burned half a ton of coal in two days; I don't know the size of his house.

Q. It is a large house?—A. It must be a large house. Irrespective of the size of the house, I think probably his fireman has not burned that coal right. We are experimenting all the time; we never neglect that part of the business; if we did we are going to lag behind in the race, and we find the statement Mr. Macaulay made regarding the tonnage is an absolute fact.

Q. That is, you would base on that your bringing in of coal?—A. Absolutely our supply on those figures—a ton and a quarter to a ton and a half.

By Hon. Mr. Gordon:

Q. In burning your coal in furnaces do you find any difficulty owing to clinkers? We have a great deal of trouble in that respect with anthracite here?—A. I will say, first of all, that we don't have but very little trouble with clinkers. Our coal runs to a very fine, clean ash. A clinker is only caused by the mineral content in the coal melting at a given heat-point. Some coals—anthracite for instance—while you might have a clinker, you may find in different anthracite coals you get here there are small clinkers; that is caused by the fusing point

of the ash content or mineral content in the coal. In answer to your question, we find that there is very little clinker in our western domestic coals.

By Hon. Mr. De Veber:

Q. It depends altogether on how you burn it; if you put on an immense fire you will get the clinkers, but if you burn it at a lower degree you get no clinkers at all?—A. Yes, there is that point, too. Of course, that depends altogether on your fire and heat. The fusing point of this coal is 2,800, and if you force that up to 3,200 you of course fuse your mineral content and create clinkers, but there is no necessity to have that.

By the Chairman:

Q. But after anybody had been trained by one of your demonstrators they would not have trouble with clinkers?—A. Oh, no.

By Hon. Mr. Laird:

Q. Do you think it is necessary for the public to be properly trained in the use of this coal? Those of us who came from Ontario, where we used anthracite coal, got in the habit of using this coal out west, and we never had any demonstration, or anybody to show us; we just went ahead and used it?—A. The only reason I would back up the Alberta Government on the demonstrating is that we are up against competition, and we want to burn that coal to the best possible advantage. Out west we have no competition, after 1915, on American coal. It was not necessary to inform the public so thoroughly, and issue such propaganda there. We did not have competition. With our domestic coals you don't have to learn how to fire it; it will practically fire itself. It is much easier, even, than anthracite coal is; it is easier to handle.

By Hon. Mr. Webster:

Q. Does it require more attention?—A. No, sir; it does not. I don't think it requires as much.

Q. Will it stay in all night without attention?—A. In our experiments we have had a nice fire stay in 48 hours.

Q. In what kind of a furnace?—A. In a hot-air furnace, Canadian-made. We get very few American furnaces in the west, outside of the steam, and very few Daisies.

Q. Are the boiler tubes perpendicular, or horizontal?—A. We have several types—horizontal and water-tube boiler, and we have the Gurney sectional boiler, the Daisy.

Q. You get equally good results in all those furnaces?—A. With the Gurney sectional boiler we get dandy results.

By the Chairman:

Q. You would corroborate Mr. Macaulay in what he told us as against anthracite, as to heat value?—A. I will tell you this much, Sir, that on an equal basis, under given conditions—I think you have those conditions here—that I would be prepared to state definitely that I would consider one ton of our coal equal to one ton of American anthracite as received to-day; and I am not giving that just for the right of saying it; I am giving it from actual experiment.

Q. That is the result of your experience in the trade?—A. Yes.

Q. Are there any other points?—A. There was one point I wanted to bring out in connection with steam coal. Western steam coal is coming east as far as Soo Lookout, that is the second division east of Winnipeg on the Canadian National.

Q. That is in the normal way of business? It is no special thing?—A. No.

Q. And on the basis of the present freight rate?—A. Yes.

Committee adjourned at 12.45, to meet at the call of the Chair.

[Mr. Reginald M. Thayer.]

COMMITTEE ROOM 534,

OTTAWA, Wednesday, April 18, 1923.

The Special Committee of the Senate met at 11 a.m., Hon. Mr. McLennan in the chair.

The CHAIRMAN: As we have had a statement from the peat standpoint that the remaining foot of soil, after the peat was taken, formed a valuable agricultural soil, we have called Mr. Gray, of the Experimental Farm, to speak on this point.

DANIEL D. GRAY, Farm Superintendent, the Experimental Farm, Ottawa, called and examined.

By the Chairman:

Q. You are familiar with the peat bogs at Alfred?—A. Somewhat; I came from the same county as the peat bog in Alfred.

Q. It would be a great advantage if the last foot of the bog, which is absolutely useless from the agricultural standpoint, could be turned into arable land by the mixture of the peat in the bottom with the sub-soil; what can you tell us about that?—A. Well, of course, speaking only from experience, and localizing that experience in the Alfred bog, one of the great difficulties has been to get drainage. If you take off from 4 to 8 feet of the soil, as it is in places, you are up against a greater difficulty than already exists, because of drainage. It would be very difficult to drain that particular section. One of the great advantages of peat-bog or muck land is the advantage that comes from draining, and it must be extra-well drained. The only draining that is at the Alfred bog is open ditches, which does somewhat in the way of draining, but not nearly as effectively as if it were under-drained. Land which has been robbed, as it were, of its surface soil either by carting away or being burned, that has the sub-soil mixed with a certain proportion of the surface soil or muck, is worth something as agricultural land, but it will take anywhere from 2 to 5 years to bring it back in a condition to properly raise crops. It is physically unfit in the raw state. If you could get it to grow grass, and have it pastured for a year or two, you could get a certain amount of roots back into it, and that humus would help materially. In northern Ontario, where we have an Experimental station, we started 2 years ago some experimental work there on soil which is somewhat the same, though not having as much muck as at Alfred, but with very poor results so far. The sub-soil there is so very stiff, being a sort of gumbo. Last year we had quite a bit of crop, but very uneven and unsatisfactory. I think such a statement as that you would get good agricultural land after you took off 8 or 9 feet of the Alfred bog, is not fair.

Q. It was not stated that it would be good agricultural land, but that the mixture of the humus and the sub-soil would be valuable for agriculture?—

A. Yes, and it will grow crops, but it will take from 3 to 5 years to change the physical condition of that sub-soil so that it will be valuable for growing crops.

By Hon. Mr. Laird:

Q. It would have to be acclimatized?—A. Yes, by frost and by the air.

By Hon. Mr. Calder:

Q. Why would the drainage cost so much in that particular section, the Alfred bog?—A. You have a long piece to go for an outlet. Then drainage

[Mr. Daniel D. Gray.]

always costs a lot, especially if you are draining gumbo and such soils. Your laterals would have to be not more than 75 feet apart; it would be better if they were closer. That would cost anywhere from \$25 to \$50 an acre to drain it alone with agricultural tile, and then reckon on the extra cost of your outlet.

By the Chairman:

Q. I think we were informed that you had to drain it in order to get the peat out, so that the greater part of that drainage cost might be charged against the fuel?—A. Yes, it could be charged against the fuel. Of course the drainage for the land would be different from the drainage for the fuel because in taking the open water you get the peat, then the other would come below that, which would be any place around 10 feet below the soil.

Q. In other words, it ought to be tile-drained?—A. Yes.

Q. Then if it is a clay soil you would get a strong soil by the mixture?—A. Yes.

By Hon. Mr. Hardy:

Q. What system takes the present drainage of the Alfred bog?—A. It is a creek that runs down by way of Caledonia there, and into the Ottawa river.

Q. Would the level of that creek be 12 or 14 feet below the present level of the Alfred bog?—A. I don't know. I know they have great difficulty in draining now, because I was on the construction work when the C.P.R. came through there, and that was all done with a wheel-barrow.

By Hon. Mr. Calder:

Q. What is good farming land within 25 miles of Alfred worth, without buildings?—A. Possibly \$50 an acre.

Q. And you say it would cost \$50 an acre to drain it?—A. Yes, but when you get the land drained it is worth more—it is worth twice as much.

Q. I mean good land?—A. But good land is not as good as land after it is drained.

Q. It might cost you \$25 an acre to drain your good land, to put it in proper shape?—A. But it would cost about as much whether good or bad. The worse the land is, the more it costs to drain it, often. Some of our best agricultural land in Ontario has cost \$50 or \$60 an acre to drain it.

Q. And it has given a return?—A. Oh, yes.

Q. Is there any scarcity of land in that neighbourhood?—A. No, I would not say there was any scarcity of land. There is a lot of bad farming, I know.

By Hon. Mr. Hardy:

Q. Don't you think we have too much land now in possession of farmers in eastern Ontario?—A. There is a lot of land. A lot of that land was used by men living farther east as hay land, and they have robbed it, and it is pretty well invested with weers, and sow thistles and scutch grass.

By the Chairman:

Q. We are told that there are bogs all over this country which will give peat fuel, and a great many of them are near large cities, if you could for \$25 or \$50 an acre get really good land in the vicinity of large cities in Ontario and Quebec you would be making an increase in the wealth of the country?—A. Well, it will grow crops if you handle it.

Q. It has got to be handled?—A. Yes, and very difficult to handle.

By Hon. Mr. Hardy:

Q. If a certain amount of peat were left on this supposed arable land, that would go to add humus to the soil, and assist, in the matter of time?—A. Yes,

and more important is the changing of the physical condition of that sub-soil. You see, there is no air ever gets into that, and it needs air, and it needs frost or something in this part of the country to bring it back to arable land, because a lot of it is just like gumbo.

Q. What is gumbo?—A. A stiff clay, or a clay with very little sand in it, just as tough as it can be.

Q. Would any of those peat bogs have hard-pan in them?—A. I don't know; I never was down. I know that down about 3 or 4 miles east of the bog there is a hard-pan bog about 12 feet down. Likely the same formation would apply there as well.

LOUIS SIMPSON, called and examined.

By the Chairman:

Q. You are a consulting engineer, and you have given some attention to peat, and you think you can supplement what we have had?—A. Yes, I have been an industrial engineer for 50 years, and have had a great many research problems through my fingers. I have been in Canada 40 years. I planned and constructed the first hydro-electric power house built in Canada, and in doing that I invented the direct-drive electric generator, which is to-day standard all over the world. I also was the originator of the electric smelter. In the course of my experience I investigated many mechanical improvements, and new chemical processes. I maintain that the manufacture of peat is really the work of an industrial engineer, and not that of mining engineers, yet the Chairman of the Joint Fuel Board is a precious metal mining engineer, who was appointed by the government.

Q. We are not here to investigate the wisdom or unwisdom of what the Government or any of its Departments have done?—A. I mention this merely to show that I think I have a right to ask you to listen to what I have to say. As I understand it, you are seeking after the truth, and after I read the evidence of Mr. Camsell and Mr. Haanel I felt it was only right to offer my evidence.

(Witness then reviewed statements made by Mr. Camsell. He quoted from page 16 of Mr. Camsell's evidence—"Take the case of Alfred, where the Peat Committee has been working. That town has lived almost entirely on peat." Witness stated that there was not even an organized village at Alfred, as shown by a return he had obtained from the Bureau of Statistics. He also referred to Mr. Camsell's evidence on page 14—"To my knowledge no machinery has ever been invented that can extract the moisture from peat. The method is to sun-dry it." Witness produced a printed copy of a paper presented to the Society of Chemical Industry, London, England, at the Chemical Industry Club, one of the most scientific clubs in England, on November 10th, 1922, in which the writer, Prof. J. W. Hinchley, an eminent English engineer, explained and illustrated by photographs of existing machinery, the subject, "The De-watering of Peat by Pressure.")

By the Chairman:

Q. But no peat is being de-hydrated commercially, is it?—A. No, and there is no peat being sun-dried, commercially, so that it is all on a par. But I am calling attention to this because, as far as I can see, the only possible commercial way in which peat fuel can be produced is by de-watering. It comes to be, then, a fight as between experts. I have a letter from Mr. Alfred McIntyre, who is the chemical expert for the Explosives Branch, who is correspondent of the Society of Chemical Industry in Canada, and he endorses Prof. Hinchley's capacity for such work. It is evident from the letter that Prof. Hinchley is far above any-

[Mr. Louis Simpson.]

body who has been experimenting with peat in Canada. In this paper he makes statements which show, to my mind, that the troubles at Alfred are explainable, and he has explained them. Another matter, a small one, which throws light on the way in which this matter has been treated by the Joint Peat Board, is that Mr. Camsell in his evidence speaks of 25 per cent moisture, while Mr. Haanel talks about 30 per cent moisture of the peat. The quality of peat they claimed they were producing up to 1922 was 25 per cent moisture, but without a word they lowered the quality by 5 per cent. This is only in line with many things which I have found. I have here a text-book from the United States which says, "Moisture reduces efficiency more than the same percentage of ash." At my request a member of the House of Commons asked some questions in regard to the quantity of peat manufactured at Alfred, and the reply was that in 1922 there were 2,802 tons of merchantable peat manufactured and sold. As it takes 2 tons of peat of 30 per cent moisture to equal one ton of hard coal, it brings down the production to 1,400 tons, which I think is hardly commercial.

Q. But be fair, Mr. Simpson; we were told that this plant was just emerging from the experimental stage, and that they made better peat in 1922 than they ever did?—A. I admit that.

Q. And we certainly have had a great many letters, and our information is that the peat that was made was satisfactory; one of the largest dealers in Montreal told me that they had had some, and that they would have taken more, and we got the same evidence from places in Ontario?—A. I admit that. In those answers to the member of the House of Commons the expenditure at Alfred in 5 years was given as \$348,287.77, and before that there had been spent \$52,738.70, making over \$400,000 already spent. Mr. E. B. Moore, Engineer, was paid in 5 years \$30,000 in salary, and \$14,849 for expenses, nearly 50 per cent of the salary. I give you these statements to show that you have had before you members of the Civil Service who have been telling you fairy tales—at least I consider them fairy tales. I may say there is a dispute going on in the newspapers between myself and Mr. Haanel as to the relative value of peat. According to the B.T.U., making allowance for the extra moisture, it requires 2 tons of peat to equal one ton of good quality anthracite coal. Mr. Haanel and his chemists have claimed that it only takes one and a half tons, but proof of this statement has never been given.

By Hon. Mr. Calder:

Q. What is the authority for the statement that it takes two tons?—A. That is according to the content B.T.U., making allowance for the extra moisture. In hard coal there is only about 3 or 4 per cent of moisture, whereas now they admit that in peat fuel there is 30 per cent, and you have to make allowance for that.

Q. It should not be very difficult to determine whether it takes 2 or one and a half tons?—A. I have done my level best to bring them down to proof, but they will do nothing; like Achilles, they sulk in their tents. This has been a very live question in Ottawa during the coal scarcity. You must understand I am a believer in peat. I want a method to be found by which peat can be manufactured in Canada, but I do not want the public to be deceived into thinking that they have a method of making peat fuel, when it is not practical. Mr. Haanel speaks of the machines at Alfred having been given a thoroughly mechanical trial, but to an industrial engineer that would mean that the machine was in a condition to work commercially. Mr. Haanel has pointed out that they could not obtain good satisfactory commercial peat from the peat taken off the face of the bog. Prof. Hinchley shows the reason

[Mr. Louis Simpson.]

why—and this has never been done before; he states that in peat exposed to a very low temperature or a very high temperature the colloidal matter in the peat becomes decomposed.

Q. What is the colloidal matter?—A. It is what binds the peat together. To my knowledge it has never been ascertained really what it is composed of, but Mr. Haanel mentions it, and claims that the presence of this matter water-proofs the peat by the sun-dried process. Now, of course, if that colloidal matter is decomposed when the face of the bog thaws out, the colloidal runs off into the water, and you can understand thus the enormous quantity of non-commercial peat that has been made down at Alfred, which has been running from twelve and a half per cent to twenty per cent.

By the Chairman:

Q. That is when you resume work in the spring you have to waste a certain amount on the face of the excavation before you get into what you might call the true peat bog?—A. That is right. Now, by the combined machines which Mr. Haanel has devised he has to have an enormous frontage, as they only take one cutting off the whole face around, and they have to suffer from the colloidal matter being decomposed. I have read his reports through carefully many times, and I cannot see how he can justify his contention that he can make a commercial peat under the conditions that he has outlined for that combined machine. If Prof. Hinchley is correct—and I would sooner trust him on a matter of this sort than I would Mr. Haanel—then Mr. Haanel's method is simply impossible. I am not interested personally in peat, but it seems to me it would have been the Peat Board's place to have corresponded with Prof. Hinchley, even to have paid him for his opinion, but instead of that they don't seem to be even aware of his paper, which was printed in the December Journal of the Society of Chemical Industry, and there has been ample time to receive it at the Library of the Department. I freely admit that the peat that was made last year was superior in quality to what they made before, but till last year they never confessed that they made any bad peat; yet I can take you down Wellington Street behind the Commercial Museum and show you some peat that was made two years ago, which is still lying there, as the Department will not burn it. It has all crumbled, and disintegrated.

(Witness then referred to one of what he called Mr. Haanel's wrong claims, in estimating that the Alfred bog was 10 feet deep and that therefore there were 200 tons per acre, yet Mr. Haanel had said that the top foot was no good, and that he intended to leave the bottom foot in to make farm land; hence he should have multiplied by 8 instead of by 10, which would make a difference of 20 per cent. That sort of thing, witness stated, had been going through all the reports; in one part of Mr. Haanel's report he would make a statement, and later on another quite contrary, so that it required a man of very considerable experience in such matters to follow them. That was the reason he claimed that the Committee had been told a good many fairy tales.)

Q. What do you say about the value of the remaining bog for agricultural purposes?—A. I think I am justified in giving you an opinion on agriculture, as I happen to be one of the oldest members of the Province of Quebec Dairy Association, and I have turned a 30-acre bush into one of the best dairy farms in the province of Quebec. The present peat bog is in a hollow, you take out 9 feet of peat and you are further in a hollow. Then you have to drain it at least 2 or 3 feet under the surface, and by the time it is drained so that farmers

[Mr. Louis Simpson.]

could make a living off it, the land would cost in preparation as much as the land was worth, and land down in that country without buildings cannot be sold for \$50 an acre. I have land just outside the city of Valleyfield, better land than that down there, without buildings, but I would be very glad to sell it at less than \$100 an acre, yet I have not found a purchaser.

(Witness told of having met a local inventor, Graham, who had a de-watering process, but as it was in a purely experimental stage he could not speak positively as to what it could do.)

By Hon. Mr. Calder:

Q. Why is the sun-drying system successful elsewhere, and not in Canada?

—A. Because our conditions here are different. We have a very hot summer; the sun's heat gets up to about 100°, and that decomposes the binding matter. Mr. Haanel stated that they cannot make the peat in the summer so well, because it is too hot. He forgot that if he would turn the peat oftener he would overcome the difficulty, but they tell me that the peat costs 15 cents a ton every time you turn it. Then, on the other hand, you get 32 degrees below zero in winter, and that also decomposes this binding matter. In Ireland the weather is never at zero, and never hotter in summer than about 75 to 80 degrees. Those points have been overlooked. It is the local conditions that make the thing impossible here.

Q. It all turns on the presence of this colloidal matter?—A. Yes.

Q. And the extreme heat and extreme cold destroys that, and thus the binder is gone?—A. Yes; but there is a worse thing than that, that they cannot overcome, and that is the freightage. Peat is so much bulkier than coal that the railway companies insist on charging a very high rate of freight. They have been charging \$1.40 from Alfred, which is over 3 cents a ton per mile, the distance from Ottawa being 41 miles, and when you consider that it takes one and a half or two tons of peat to each ton of coal you can see the extra cost in freightage is important. They charge more to take a ton of peat from Alfred than they would ask for the freight of a ton of soft coal from Montreal.

By Hon. Mr. Laird:

Q. Is your conclusion, then, that it is not practicable to turn out this peat in Alfred by the sun-dried process?—A. Not at a reasonable cost.

Q. And your recommendation is that it should be put through the de-watering process?—A. Well, I would say, investigate the de-watering process. You understand, I have no brief for the process, only that I say the other one has fallen down, in my opinion; therefore, look for something else.

Q. You would say, then, from your researches, that the present system of extracting peat from these bogs by means of the air drying system is not practicable?—A. I do—not commercially practicable.

Q. So that under the present system we have nothing to look for from the peat source of supply to take the place of anthracite coal?—A. No; I don't think that any capitalist would be justified to-day in investing money in the manufacture of peat fuel by the air or sun-drying process.

Q. In your opinion the process would have to be confined to something new, and you recommend the process of de-watering as a solution of the trouble?—A. Yes.

By the Chairman:

Q. That is you would get a less bulky fuel?—A. Yes.

Q. This peat is made by pressure? (Referring to Montreal specimen)—A. Yes. If something more after this style were made it would be better, but Graham carbonizes it on the outside, which makes it better for combustion.

[Mr. Louis Simpson.]

By Hon. Mr. Laird:

Q. Have you any opinion to express as to the extra cost of the de-watering process?—A. As far as I have gone, I have not been able to get satisfactory data and costs on that, but I don't think it will cost, per thousand B.T.U., any more than it does with the air-drying; in fact, I think it would cost less. I think the test could be made without a very great expenditure, because Hinchley has already made his experiments. I may tell you that Armstrong-Whitworth are making the press and the die, and they are people that do not go into foolish things; they are one of the most conservative firms in the world, and anything they will take up is hall-marked. They are not likely to make a machine that would not be a success. Then I was going to point out the cost of distributing the peat. They were selling it at Alfred for \$5, the freight was \$1.40, yet the dealers here were asking \$10.50 until I made a row in the paper, and they brought it down to \$10. The cost of distribution is too high, especially when a ton of peat is not equal to a ton of coal. The spread upon coal is about \$3.50, but when you consider the difference in the heating values of coal and peat it meant about \$7 a ton for the retailing of fuel in the form of peat.

By the Chairman:

Q. To sum up, you believe peat ought to have its place in the fuel economy of Canada?—A. Certainly.

Q. You are in doubt as to the economic efficiency of the system of producing air-dried peat?—A. I have no doubt now.

Q. You are against it?—A. I decidedly say that under our conditions it is not economical.

Q. But you have hope that there will be developed a method of de-hydrating peat by mechanical means which will make a very much better fuel?—A. Yes.

Q. Do we understand that these processes are still in the experimental stage?—A. Yes.

Q. There is no plant at work to which we could go and see that successfully done?—A. No, that is quite right. The bricquetting of peat and the carbonizing, if it can be done at a reasonable cost, does away with all objections to the use of peat.

Q. Will you explain that just a little further? Suppose you had peat in this stage? (Referring to Montreal sample)—A. No, pardon me, this has not been carbonized; that is only briquetted. A peat in that form can be freighted at about the same price as coal. It can be retailed at the same cost as coal. It can be stored with equal convenience, and it can be used nearly all the year around, and it does not dust. Those are the advantages.

Q. I rather gathered from what you said that that would not stand exposure?—A. No. This might or might not. I would not store it outside; but then I would not put any coal outside if I could help it.

Q. By this process of which you are speaking hopefully you produce carbonized peat?—A. Yes, it is carbonized on the outside.

Q. That makes it stand better?—A. Yes, and brings the moisture down to only 4 per cent, which is a very reasonable moisture.

By Hon. Mr. Calder:

Q. To carbonize it must you add something?—A. No, you put it in a chamber with heat, the heat drives off with volatile matter; carbonized peat burns with less smoke.

Q. There is nothing added at all?—A. No; that is the inventor's claim, but I have been wanting to see it done, and I have been helping Graham, this

[Mr. Louis Simpson.]

local man, to get the use of a proper laboratory. My argument was this, that if he could demonstrate to you gentlemen, or to anybody, that it was possible to produce the peat fuel in the condition that he claimed, we could then set to work and find the means of producing the fuel commercially.

Q. Is there any foreign substance added to that?—A. None in this man's process. I don't know what there is in this Montreal sample, but I don't think there is; it is the pressure that gives it that polish; the peat is forced through a tube. Graham does not do his quite the same way.

By the Chairman:

Q. As to carbonizing, there is a process in existence which is used in connection with briquetting, of driving off the superficial volatiles?—A. Yes, but of course in the briquetting out west they have fallen down altogether, and that is the reason why I have my doubts whether this man's carbonizing process would be practical; but he was willing to demonstrate it.

Q. That would be a matter for the Industrial Research Council?—A. Yes. I wrote out a statement describing the Graham peat fuel, but without any guarantee on my part that it is correct, but this is just simply what I have been able to glean, and I will leave this with you if you like. (Handing to Chairman).

The CHAIRMAN: You can leave it with us for reference.

The WITNESS: Gentlemen, you must not take Mr. Haanel's estimates of the cost of plant without correction. I am prepared to show you that instead of costing \$90,000 for one of his plants, it will cost \$140,000 or more.

The CHAIRMAN: You can rest assured that, to the best of our ability, we will not take anybody's statement with absolute credulity. I think now we have got the main points of the problem, and we are very much obliged to you for the information you have given us.

JOSEPH ERRINGTON, Mining Engineer, Toronto, called and examined.

By the Chairman:

Q. What is your experience?—A. I am a mining engineer, and investigated the Smoky River hard coal areas and made my discovery in 1910, about two years before Dr. Hoppe made his first location.

Q. Where is your section?—A. We are operating in the section known as Grande Cache area. We have been operating here continuously since 1912. The Smoky River areas are about 85 miles north of Brule, a station on the main line of the Canadian National Railways, about 200 miles west of Edmonton, and on the proposed extension from Brule to Grande Prairie. I have here marked blue print and photographs.

Q. Where do you ship your coal?—A. The principal market for this coal will be Vancouver and Pacific coast states for domestic and vessel use. The present output of the Blue Diamond Mines at Brule is about 1,500 tons per day, and the total output is absorbed by the Canadian National Railway, who use it in their locomotives as far west as Vancouver and as far east as Winnipeg. All last summer and spring our coal was used in every shop of the Canadian National Railways right to the coast. We have our own sidings and locomotives, and put all the coal we mine on the main line. When the strike was on last year this coal came as far east as the Great Lakes.

Q. What is the quality of the coal?—A. The average analysis of coal in this area is from 76 per cent to 82 per cent fixed carbon, from 14 per cent to 16 per cent combined volatile, and from 5 per cent to 7 per cent ash, with a B.T.U. value of from 15,000 to 15,500.

[Mr. Joseph Errington.]

Q. Has it been analyzed by the Dominion Government?—A. Yes; Dr. D. B. Dowling, Director of the Geological Survey, and Mr. William McInnes, Directing Geologist of the Geological Survey of Canada, gave evidence before the Special Senate Committee some time ago in 1919, and Mr. McInnes said the Department had analyses showing that all these coals are of a very high quality of bituminous coal. Dr. Dowling said that the carbon content was up to 81 per cent, and that the coal was smokeless.

Q. The scheme is to run a railway from Brûlé and open up the Grande Prairie country?—A. Yes. There is no question of the quality or the quantity of the coal; it is all a question of transportation.

Supplementary statement by B. F. Haanel, Secretary, Peat Committee, in answer to questions re Peat Bog areas, asked by the Chairman.

Q. 1. In the surveys of bogs submitted by you to the Committee was any determination made of the character of the subsoil.

A. The character of the subsoil of the bogs investigated was ascertained. Clays predominate, but some bogs are underlaid with sands or marl.

Q. (a) If so, in how large a number of cases would these bogs after suitable treatment make arable land?

A. In a large number of instances the bogs are surrounded by occupied agricultural lands, the bottoms of the bogs are similar to the surrounding lands, and it is believed that most if not all of the bog areas investigated would be made available for agricultural purposes after removal of the peat, provided suitable drainage was provided.

Excepting in point of depth of covering of organic matter the bog lands bear the same relations to the surrounding country as the swamps which have in many cases been reclaimed on an extensive scale by drainage, and are now among our most fertile farm lands.

If peat to the depth of 6 inches to a foot is left in the bottom of a drained bog and ploughed into the subsoil, better land for agricultural purposes will be obtained than that of the areas about the bog. The drainage necessary for fuel manufacturing operations will tend to make easier the reclamation of shallow areas at the edges which are sometimes very extensive.

Q. (b) Are there examples in Canada or elsewhere of such reclamation?

A. It may be pointed out that the peat covering of bogs usually thins out from the centre towards the edges, and that it has been a common practice among farmers adjacent to bog areas to burn off the peat during the summer. In this way large areas about many of the bogs have been brought under cultivation, and are now in use for producing hay and other farm crops.

While there has been no organized effort in Canada looking to the reclamation of bog lands, extensive reclamations have been made in Germany and other European countries. Societies have been formed to carry on such reclamation, and many of these operations have been assisted by the Governments of the respective countries.

The laws of Holland with regard to the development of peat bogs require a certain depth of peat to be left for incorporation with the subsoil to improve the fertility of the land for agriculture after fuel manufacturing and other operations have been completed.

Q. 2. Information on the fertilizing value of:

(a) *Peat Dust.*

Dust from raw peat is acid in character and would have very little direct fertilizing value. Aeration destroys this acidity, and the addition of peat

[Mr. Joseph Errington.]

dust to certain soils which are deficient in organic matter or humus would no doubt have beneficial effects. However, the amounts required for this purpose would be such as to limit its application excepting under specially favourable circumstances.

Canadian peat has usually a fairly high nitrogen content but this is largely in a form not immediately available to plants.

Peat dust has been largely used in the United States as a carrier for chemical fertilizing agents in the manufacture of artificial fertilizers.

Considerable success has also been attained by the admixture with peat dust of blood, tankage, fish offal and other substances. Peat moss has also been extensively employed as a litter for stables. Owing to its high absorptive properties it is claimed to save large amounts of ammonia from the urine of animals, as well as providing a very efficient means of dealing with the solid excreta. The manure produced where peat litter is used is of high quality, and in excellent form for application to the soil. Peat dust is also a valuable substance for use in earth closets. Its use has been proposed as a carrier for bacteria to produce fertilizers of high efficiency. Prof. Bottomley has conducted experiments along this line in England, the results of which are recorded in a publication by Herbert Knox, entitled "The Life of the Soil".

Further information as to what has been done along this line and with regard to reclamation in the United States could no doubt be had by application to:

Prof. F. J. ALWAY,
Division of Soils, University of Minnesota,
Minneapolis, Minnesota, U.S.A.

Prof. H. C. THOMPSON,
U.S. Department of Agriculture,
Washington, D.C., U.S.A.

JOHN N. HOFF, Esq.,
President, Alphano Humus Co.,
No. 2 Rector Street,
New York City, U.S.A.

(b) *Peat Ash*

Peat ash has, as a general rule, very slight value as a fertilizer.

Q. 3. We have heard that the use of peat makes a hard deposit on pipes, flues, etc., stated to be difficult to remove. Have you any suggestions to make on this subject?

A. If peat is improperly burned by putting on a large quantity and closing off the draughts so as to cause distillation, peat tars will be formed on the pipes, but even then it will not be as bad as if soft coal were burned under similar conditions. If peat is burned properly there will be no deposit on the pipes.

COMMITTEE ROOM 534

OTTAWA, Thursday, April 19, 1923.

The Special Committee of the Senate met at 11 a.m., Hon. Mr. McLennan in the Chair.

The CHAIRMAN: We have a couple of gentlemen from the Montreal Light, Heat & Power Company this morning—Mr. Bagg, the Secretary-Treasurer, and Major Humphreys, the Engineer of Gas Manufacture.

CARDIN S. BAGG, Secretary-Treasurer, Montreal Light, Heat & Power Company, called and examined.

By the Chairman:

Q. We would like to have from you a general statement on the phase of this question of fuel supply which particularly concerns Montreal, and the utilization of coke and its by-products, as taking the place of anthracite or other coal?—A. We have been, as you know, supplying domestic gas coke for years in Montreal and vicinity. We market probably from 125,000 to 150,000 tons per annum. It is being more and more favourably and generally known, and is of equal merit with the best anthracite. People who have used it for some time and become familiar with how to fire it will tell you quite frankly that, all things being equal as to price, they would use coke, because it will burn more efficiently at different seasons of the year. Say we had a period of 6 months of heating, during those 6 months there are 3 months—the early fall and spring—when the heating is lighter, and coke lends itself much more readily to giving a uniform mild heat under control than anthracite does, taking into account that you will get complete combustion out of coke, and not so with anthracite.

Q. You are speaking now of gas-house coke?—A. Yes.

Q. When you say that the fire is more easily controllable with coke than anthracite, I suppose you mean it is more inflammable?—A. It does not require such a draft, and when you want to keep your fire under control in mild weather you have to check your drafts, and if you happen to have an inferior grade of anthracite you have to have a strong draft in order to get combustion. That is really the point in that particular case. There is no trick in firing coke; it is all a question of checking drafts and carrying a heavy fuel bed.

Q. A heavy incandescent bed?—A. Yes.

Q. Your increase of coke has been very considerable, I take it?—A. Yes, very much so during the past 10 years. Prior to that we marketed possibly 30,000 to 40,000 tons.

Q. So that it really increased 4 or 5 times?—A. Yes.

Q. Apart from the scarcity last winter?—A. All the time, yes.

Q. What have you done in the way of demonstration, to educate people to burn the coke?—A. We have not done very much in that respect, because our supply is limited, and we endeavor to control the market in order to take care of those who have been using coke. Otherwise, if we developed a greater demand than we could supply we would be in the unfortunate position of disappointing people who had become acquainted with it.

Q. Your company is supplying electricity, gas and coke?—A. Yes.

Q. What is the determining factor as to how much coke you produce? Is it the amount of gas you can sell?—A. Yes. We are purveyors of gas, and the amount of coke produced depends on the demands for gas.

Q. I think I understand from Sir Herbert Holt that your company would take all the gas that would be made in connection with any other coke ovens that might be put up?—A. If the price could be agreed upon, yes sir. It must be taken into account that in a by-product plant its operation is subject to great fluctuations, dependent upon the general market conditions, and where the by-product plant would reduce its production we would have to have a reserve gas manufacturing plant to take that up.

By Hon. Mr. Hardy:

Q. What would you do with the surplus gas then?—A. The plant would be idle.

[Mr. C. S. Bagg.]

Q. If you were asked to make more coke than you would require to make in order to meet the gas requirements, what would you do with the surplus gas?—A. We would not do that.

Q. That would go beyond your purview?—A. Yes.

Q. Why did you make a difference between the very cold weather and the milder weather in the use of coke?. Where would it be defective for very cold weather?—A. Oh, I did not want to create that impression. Coke throughout the heating season will compare favourably with anthracite. I wanted to point out, however, that during the milder seasons you can burn coke more efficiently than coal.

By the Chairman:

Q. That is, you could heat these buildings perfectly during the whole season?—A. Yes.

Q. And to greater advantage than when the fires have to be forced?—A. To greater advantage than anthracite, yes.

Q. How do you distribute that 125,000 to 150,000 tons? Does it go largely to consumers? I think we heard you supplied large institutions?—A. We supply large institutions, for instance, such as the Alexandria Hospital, that consumes about 1,000 tons per annum; apartment houses, probably 100 or so; and I might say that the janitors of the apartment houses are particularly disposed towards the use of coke because it is their duty to see that there is hot water for the tenants early in the morning, and when using coke they rise at six o'clock and open the drafts, and they have hot water at seven o'clock, whereas if they are using anthracite they probably find they have to attend to the furnace at five o'clock, and open the drafts. Coke responds more quickly. We also sell coke for electro-chemical purposes; the Canada Carbide Company at Shawinigan use considerable tonnage. That is in direct competition with the by-product coke manufactured in the United States.

Q. Hard coke—metallurgical coke?—A. Yes, and they also supply domestic coke not so hard, like the Semet-Solvay domestic coke. Then we have a large distribution through the medium of local dealers. There are in Montreal probably upwards of 150 dealers; they have their little zones, and we supply them with coke, and they in turn distribute to their customers in the same manner that they would distribute anthracite.

By Hon. Mr. Hardy:

Q. Do they find coke satisfactory in the small furnaces they use in the ordinary houses, as well as the large furnaces?—A. Yes.

By the Chairman:

Q. How does it do in Quebec heaters, and small stoves?—A. Well, as you know, coke is of greater volume than coal, and in a furnace beginning at No. 2 and upwards, under proper control, there is no difficulty whatever. If you get into a smaller furnace a little more care has to be given to it.

Q. How big is a No. 2 furnace?—A. No. 2 would probably be used in a six-roomed house. It has a 12- or 14-inch firebox.

Q. The situation in Montreal as regards coke is that you have to increase your consumption of gas to increase your coke available for the market?—A. Do you refer to that in the by-product plant, or as a gas company?

Q. I meant primarily as a gas company?—A. There is a certain flexibility with the gas company. We have two methods of generating gas—the carburretted water-gas plant and the coal-gas plant; and in some measure the supply of coke can be controlled by supplying the water-gas plant with coke.

[Mr. C. S. Bagg.]

Q. I don't quite follow that?—A. We just consume that ourselves, you see.

Q. And make gas of it?—A. Make gas of it in the carburetted water-gas plant.

By Hon. Mr. Hardy:

Q. You make both kinds of gas?—A. Yes.

Q. Both oil and coal gas?—A. Yes, we have two plants; one in the east and one in the west end. The west end plant is exclusively coal-gas; the east end plant is a combination one.

Q. Which is the better gas?—A. Both the same. The gas is supplied under Government standard, and has got to conform.

Q. By better I mean from the standpoint of yourselves in supplying, the cost of manufacturing, and various points of that kind?—A. That is rather a broad question, for the reason that it depends on the cost of supplies, and the availability of supplies. If coal is not available, in that particular case we have got to manufacture more carburetted water-gas; or if coal is very expensive, and oil cheap, it may then be an advantage to manufacture more oil-gas.

Q. Have you any one source of supply for your coal?—A. No; we buy from different operators.

Q. I mean, is your market the United States or Canada?—A. The United States.

Q. Yours is American coal?—A. Yes.

Q. When did you change from Cape Breton coal?—A. I think it was about 1908 or 1909.

Q. Might one ask why you changed?—A. In making several tests, working tests, of considerable tonnage, we found a preference in the use of the American coal.

By the Chairman:

Q. Previously for many years you had used Cape Breton coal?—A. Pretty nearly always.

Q. I remember from the eighties onward; as I understand it you found that it was low in yield as compared with the American?—A. Yes, sir.

Q. And how about illuminating power?—A. That answers the question, in the yield, because the yield is the measure of the illuminating, or the standard.

Q. That is, so many feet of such and such a candle-power?—A. So many feet of such a candle-power.

Q. How important a factor is the heating, the B.T.U., in gas, if you want to sell it?—A. The Government standard is 450 B.T.U., and therefore in manufacturing our gas we have to regulate the production, or enrich it so that when it goes out to the consumers it contains the requisite heating units prescribed by the Government.

Q. And candle-power, too—it must be by that?—A. Not now; it used to be; the old standard was a candle-power basis; the present one is on a B.T.U. standard.

Q. How large a proportion of your gas do you sell for heating? Is there a different price now?—A. No, sir. We have a large demand for what we term industrials, for instance, some bakers are using gas now, and candy makers use gas furnaces; railway shops use gas in some of their departments; but in proportion the domestic consumption is very much more, while I have not got the relation of one to the other.

Q. What do you charge for gas?—A. \$1.10 net, that is, with the discount off.

By Hon. Mr. Hardy:

Q. Have you ever considered whether a coking plant, just for the purpose of making coke for domestic or heating purposes, would pay?—A. The

matter has been given thought, but as a matter of policy as a public utility we do not consider that is within our province. The products from the by-product plant are competitive commodities, and we feel, so far as we are concerned, should be marketed by concerns outside of the public utilities. With us coke is a by-product—not a main product;

Q. In the manufacture of gas what do you get as by-products?—A. Coke, tar and ammonia.

Q. How do you utilize that?—A. We sell them.

By the Chairman:

Q. Is the statement correct that ammonia is very slack now in the market?—A. That is correct, the Fordney Bill imposes an import tax of a quarter of a cent a pound on the sulphate for consumption in the United States, and over 90 per cent of our production is sold for export, and outside of the United States it goes to Japan, West Indies, etc.

Q. Goes to Japan by the Canal, by steamer?—A. Yes, we ship to New York for transportation around by the Panama Canal and across.

Q. About how much do you sell?—A. We manufacture about 2,000 tons of sulphate per annum, and 1,500 tons or more goes to foreign export.

Q. The tar, does the Tar and Chemical Company buy that?—A. They buy our output, and then work it up.

Q. Of course no production of metallurgical coke for heating could be successful in Montreal unless you bought their gas—at least it would be very difficult?—A. I feel that the company that I represent would consider the purchase of gas, provided it could be sold at a price, which would have to be cheaper than we can produce it ourselves, because, as I have already stated, we would have to have a reserve plant idle to take care of any fluctuations in the operations of that by-product plant.

Q. But why should that by-product plant work irregularly?—A. There is a plant in the United States—the Sparrows Point, in Baltimore—that supplied nearly all the gas that was required by the Baltimore Gas and Electric Company at a time because the steel industry was very busy; and then when the slump came in the steel business the Sparrows Point went down, and then Baltimore gas had to depend upon its own resources to supply gas to the city; and a metallurgical plant is always subject to the ups and downs dependent upon the ups and downs of the steel industry.

Q. Yes, but such a plant as is contemplated in Montreal would not be dependent on the steel industry; it would be dependent primarily on the market for coke for domestic and fuel purposes?—A. You would have in mind that that plant would be a producer of domestic coke?

Q. Yes?—A. And on that basis that the plant should endeavour to regulate its tonnage of coke throughout the year?

Q. Yes?—A. In that way the supply of gas would be fairly uniform?

Q. Would be fairly uniform; in fact the Sparrows Point is a large steel making place, not far from Baltimore, along the Chesapeake; that is the reverse of St. Paul; as I understand, those people at St. Paul were making coke for the steel company over at Algoma, or Copper Mines, or some place, and they threw them up and put in their own plant, and the St. Paul-Minneapolis people then turned to make a domestic supply?—A. And they have developed a very stable market.

Q. That was given us in evidence; the ordinary objection such as Sparrows Point, would not apply to what we are now examining, namely, a plant to put up a supply of fuel to a certain district, and producing gas, etc.—

[Mr. C. S. Bagg.]

A. You would then have to take into account, Mr. Chairman, competition from anthracite.

Q. Yes?—A. That would have to be studied, because the anthracite interests, I would think, would not give up a market without making a fight for it, and they have a splendid market in Montreal and vicinity.

Q. Of course that would be the crux, the question that someone would have to determine, as to whether they would be justified in making a very considerable capital investment; I mean that it would run into millions to make any appreciable number of tons of coke?—A. That is one of the very important items that would have to be given careful study.

Q. In a place like Montreal or Toronto, or any of the larger places, you could scarcely expect them to lay down a second line of pipes for the supply, but they would have to work with the local gas company; that would be your view?—A. Yes, I think so.

Q. Your company would be willing to do that—to take the gas?—A. Yes.

Q. At a price?—A. At a price.

Q. Could you give the relation of that price to \$1.10?—A. I am sorry I cannot.

Q. Even approximately?—A. Before answering such a question one would have to study what the cost would be to maintain a reserve plant.

Q. Speaking purely as a layman, it seems to me that under those conditions the reserve plant would not have to be an important one?—A. Well, taking into account last summer, when bituminous coal was very difficult to obtain and we had to import considerable tonnage from England, if that coal had not been available, we would have had to supply through carburetted water-gas, and we would have to maintain that capacity in order to have that flexibility.

Q. Was bituminous difficult last year?—A. Very difficult. You see, during the strike our suppliers in the United States could not give us any coal at all, and we brought coal in from England. We have to trans-ship it in Montreal and send it up the canal for our west end plant.

Q. Your important plant is on the canal?—A. Yes, we have two.

Q. But I mean the coal gas plant?—A. The large coal gas plant is on the canal.

Q. And that is an advantage to American coal. There would be no trans-shipment. It would come down in the canal without breaking bulk?—A. That is right.

Q. And the ocean-borne coal would have to go up the canal in a barge?—A. Yes.

Q. There was handed to us by a Professor E. S. Moore, who I think is at Kingston, an estimate of the cost of coal. Would you or Mr. Humphreys go over that and tell us what you think of that as a practical basis?

Major HUMPHREYS: It will take more than a few minutes to do that, sir.

By Mr. Webster:

Q. Mr. Bagg, because of another Committee I did not hear your evidence when you started. What quantity of coke do you turn out, approximately, a year that could be used for domestic purposes?—A. We market at the present time between 125,000 and 150,000 tons.

Q. That quantity could be increased if coke was thought desirable for domestic purposes?—A. Do I understand you to ask if the Montreal market would absorb a larger quantity?

Q. No, if it did absorb it could you manufacture a larger quantity with your present plant?—A. Yes, we could have manufactured more than that last

[Mr. C. S. Bagg.]

year had we had the coal. We had to conserve the coal as much as possible, not knowing what the developments would be, so that at the east end plant the coal gas division was not working to its maximum.

Q. What is your experience with the general public, so far as using substitutes is concerned? Did you find a ready response?—A. We had no difficulty in disposing of our production. It is marketed largely for domestic purposes through the dealers, and last year at a meeting that we had of our dealers we asked them: "What is your opinion of the value of the coke?" And one man aptly replied: "When you don't allow us a margin of profit comparable with that of anthracite, we don't boost it; but when we have a fair margin we are quite prepared to market it." And they do so successfully.

By the Chairman:

Q. But with your narrow margin to them, they got away with the quantity you have mentioned?—A. With a narrow margin it burns the grates, but with a good margin it is a splendid fuel.

By Mr. Hardy:

Q. How does coke compare with anthracite for storage purposes? That is the B.T.U.'s per cubic foot of anthracite and coke? As I see it the storage of coke would be a great problem in most houses.—A. Anthracite coal can be stored in about sixty per cent of the space that coke can be stored in; but on the other hand there is a very large proportion of consumers who do not buy their fuel in the summer. Undoubtedly a lot of coal goes into the cellars in the summer; but in the flats where they have storage accommodation say for two tons of coal or probably a ton and a half of coke they have to replenish their supplies very frequently.

By the Chairman:

Q. That is, there must be large reservoirs in the hands of the dealers?—A. There are generally large supplies of fuel in Montreal to take care of that particular feature.

By Hon. Mr. Webster:

Q. In normal times when there is ample supply of anthracite, have you greater difficulty in marketing your coke?—A. When the supply of anthracite is adequate, the marketing is probably a little more difficult but not sufficiently so to inconvenience us in any way. Again, if we had probably double the production, there would be more intensive saturation, in which event we would have to have salesmen who would demonstrate the use of it; but we don't do that; there is no occasion.

By the Chairman:

Q. You have testified that your trade has grown in ten or twenty years from about thirty thousand tons?—A. Yes, up to 1914 our sales would not be much more than thirty thousand tons, whereas to-day they have multiplied by four.

Q. It has been represented to us, Mr. Bagg, that in the larger places that would make gas which, of course, would be used locally they would be in a position to supply outlying country. Toronto would have a better field than you?—A. That could be done, but the co-operation of the railways would be required. For instance, domestic coke from Detroit to Montreal takes a freight rate of four dollars a ton, for a distance of 560 miles. The rate per ton per mile is not quite three-quarters of a cent. Coke from Montreal to Ottawa, a distance of 100 miles takes a rate of \$2.50 or two and a half cents a mile. Then again, these by-product plants in the United States bring their coke into Canada duty

[Mr. C. S. Bagg.]

free. We, as a gas company, have no drawback privileges on the sale of domestic coke—drawback of duty—so in our coke the duty is 53 cents on coal, and on a 65 per cent production of coke production, there is practically 70 cents duty on that coke.

Q. That is, your coal pays—?—A. Our coal pays 53 cents, and we produce 65 per cent of coke. That would represent a duty of about 70 cents.

By Hon. Mr. Hardy:

Q. Did you tell us at what price your coke sold last year in Montreal?—A. Last year coke sold at \$17 a ton.

Q. And anthracite was how much, in Montreal?—A. About the same price.

By Hon. Mr. Webster:

Q. How would that compare with previous years?—A. That was a higher price than previous years.

Q. How much higher?—A. Say \$3.50.

By the Chairman:

Q. That is about \$14.50 delivered?—A. That is the delivered price.

By Hon. Mr. Webster:

Q. At equal prices, do you think the citizens would use coke in preference to anthracite? I ask that question as a guide; it is no question of price or interfering with your business.—A. It would be a matter of education. It would take some little time to educate the consumer to that on an even basis, and fuel supplies being normal, to have coke replace anthracite. In other words, I consider this one of the important features for any by-product plant that would propose to establish itself in Montreal—to decide what is involved in the competition of anthracite.

Q. You said a few minutes ago that you did not think the American anthracite operators would give up the Montreal market. In order to aid the Committee in any recommendation they might wish to make, it would be interesting for them to know whether they should consider any recommendation regarding the establishment of plants, or assistance to those already producing coke, as providing a supply of domestic fuel for the people of Canada?—A. Well, after all, anthracite and domestic coke are both competitive commodities, and if anthracite were excluded from Canada, the marketing of coke would be very much easier. There is no doubt about that.

By the Chairman:

Q. That is if a large duty was put on?—A. Yes.

By Hon. Mr. Hardy:

Q. What by-products do you get from your oil gas or water gas?—A. Just tar.

By the Chairman:

Q. Could you push the consumption of gas in Montreal if you wanted to? Suppose you had a considerable volume of gas given over by a new lot of coke ovens or by-product ovens could you push that trade?—A. The price of gas is regulated by the Public Utilities Commission, and we are on record before that Commission that at prices obtaining to-day we are not earning one cent on our investment in the Gas department.

By Hon. Mr. Hardy:

Q. What do they allow you as a profit on that?—A. We appeared before the Commission some time ago and recommended a change in the method of

rating the gas—a change of rates. The change we recommended was a reduction in the price. The Commission did not consider our application favourably, although it was generally admitted that at the prevailing price, based on the high cost of commodities, we were not receiving interest on our investment in that department.

Q. They do not offer you any inducement, then, to further coke production?

—A. There is no inducement to extend the demand for gas, although we make it a point to meet all demands that are made upon us.

By the Chairman:

Q. As I understand it, you made a proposition for a change in the standard?

—A. A change of rates.

Q. How do you mean? That you would lower the rate?—A. Yes. We asked for permission to inaugurate a service charge and to reduce the fixed rate.

Q. Just explain that a little more, Mr. Bagg.—A. We have a great number of consumers who use so little gas per annum that it does not defray the service charge not taking into account the supply of gas itself.

Q. That is the supervision of the meters and all that sort of thing?—A. The supervision of the meters, invoicing and inspecting the service, and so on.

By Hon. Mr. Webster:

Q. So it practically means that the large customers are carrying the little ones?—A. Yes.

By the Chairman:

Q. How much reduction did you propose?—A. We asked for a service charge of fifty cents per meter, per month, with a net rate of ninety cents to apply.

By Hon. Mr. Webster:

Q. Would that mean that there was a minimum charge to the small consumers?—A. Yes.

The CHAIRMAN: They would have to pay fifty cents per month anyway.

By Hon. Mr. Webster:

Q. For that charge they would have all the privileges and advantages of gas?—A. To-day, you see, we are like a taxi driver standing in front of a man's door for a week, and when a person comes out of the house and asks him to drive him across the street, the driver collects fifty cents, and he has been standing by waiting to serve him for a week.

Q. I presume some of your small consumers hardly pay you interest on the value of the meter?—A. Well, we have a meter charge, Senator.

Q. You do not consider that gas would be of any great help in solving the fuel situation as it exists in domestic houses?—A. Domestic heating with gas would be too expensive.

Q. Then, in your judgment it gets down to coke or anthracite and bituminous coal? Largely anthracite?—A. Yes.

Q. Our problem, I think, is more the domestic problem.—A. I think it is very important to consider the competition that would exist in normal times with anthracite.

Q. From your experience last year in Montreal, do you think there has been any real suffering from a want of anthracite or substitutes?—A. No.

Q. In the vicinity of Montreal, anywhere in the province that you have heard of?—A. Not that I know of.

Q. We have seen reports published, stating that people have suffered, and, in fact, in some cases have died for want of proper heating methods?—A. As far as Montreal is concerned, everybody could get fuel.

[Mr. C. S. Bagg.]

By the Chairman:

Q. It was expensive, and people were on the anxious seat?—A. Yes.

Q. But they could get fuel?—A. They could get fuel.

By Hon. Mr. Webster:

Q. And that is likely to be the position in the future?—A. Except, as the Chairman said, in the event of a crisis. If you had a strike in the anthracite fields combined with one in the bituminous coal fields, then it would be a problem that would have to be met at that time.

Q. We would be no worse off then than any other section?—A. No.

Major JAMES J. HUMPHREYS, Engineer and Gas Manufacturer, Montreal Light, Heat and Power Company, was called and examined.

By the Chairman:

Q. Major Humphreys, we understood from Sir Herbert Holt that you were especially qualified on gas? You have had experience with these coking plants?—A. I have followed them up.

Q. You know, then, what we have heard about St. Paul and Minneapolis.—A. May I add something to that while we are at it?

Q. Yes. I was just going to state what we had heard: That they had practically supplied St. Paul and Minneapolis with a substitute for anthracite, and had sent some considerable quantity to Winnipeg.—A. St. Paul and Minneapolis were never an anthracite coal market; they were always a soft coal market. They were like Kansas City and St. Louis and Cincinnati. They used a small amount of anthracite coal, but practically nothing to speak of. Everything west of Chicago is a soft coal market, and even Chicago itself.

Q. There is not much used then in Chicago?—A. No.

Q. As far as I can make out, Ontario and Quebec and the Northern States are the luxury fuel districts?—A. About ninety per cent of the world never heard of anthracite, but they have kept warm.

Q. We have heard of several of these plants through the Northwest. All those western by-product plants are really in a territory which was not an anthracite market. In that sense they have not replaced anthracite?—A. It is not an anthracite market. As everybody likes smokeless fuel, they developed a new market. There is a certain amount of smokeless fuel consumption, and they invade the anthracite market part way; they don't wipe it out, they invade it.

Q. We were told, I think, that they got about the same price as anthracite?—A. The St. Paul and Minneapolis coke oven plant is like every other coke oven plant, in that their primary product is not domestic coke; the primary product of every coke oven plant in the United States is metallurgical and industrial coke. But they do try to develop all the domestic trade they can.

Q. That is the Semet Solvay plant at Detroit?—A. It is every coke oven plant in the United States which sells coke.

Q. Naturally, where there are foundries round about they sell what domestic coke they can?—A. Yes.

Q. Would not the New England Gas and Coke Company of Boston be an exception?—A. That is the nearest to an exception that there is. They sell a larger percentage of domestic coke than any other coke company I know of. But their business is not too good down there, and they try to invade the Canadian market. They ship as far as Thetford Mines and compete with us there and at Sherbrooke.

[Mr. J. J. Humphreys.]

Q. Haven't they sent some domestic coke into Montreal?—A. I have not seen it. They may have done so.

Mr. BAGG: They have, sir.

By the Chairman:

Q. Then, you know of no plant of this kind that is primarily for domestic purposes?—A. There is only one plant that has been designed for such purposes, and that was built just outside Norfolk, aided by the United States Government,—the Low Temperature Carbonization Company.

Q. Is that a Koppers oven?—A. No. In that they carbonized the coal at a low temperature, made a very soft coke, reground it, then briquetted it. Then they carbonized it into a nice, shiny, little hard briquette of one size only. One size only is good for only five or six different sizes of furnace. That is, say, a two-inch oval.

Q. Let us see this wonderful thing?—A. But they lost so many millions of dollars the plant has never been fully developed. It was for taking care of the very thing you are taking care of; but the Government had it backed up and they never got their money out of it.

Q. We have here a statement from Professor Moore, which you have just looked over. How does that strike you, from a casual reading of it?—A. Right and wrong; there are spots right and spots wrong. On the second page there is fully a dollar missing from the total cost.

Q. His ten cents does not seem excessive for the value of the gas?—A. Oh, no. The standard price for which coke ovens sell their gas—the lowest I have ever heard of, except to an allied company, was ten cents unpurified; and the highest I know of is twenty-two cents.

Q. He shows the cost of cooking a ton to be \$1.54. Sixty cents is received from the gas, fifty-nine cents from ammonium sulphate, thirty-eight cents from tar, and twenty-six cents from crude benzol product. So there is a credit balance of thirty-nine cents?—A. He summarizes the whole thing on the second page, sir, but leaves off the selling and administration cost, amounting to about one dollar up to \$1.10.

Q. The cost of coal is \$5.50 per ton, conversion \$1.50. That would be \$7. The capital charges of \$1.10 are overhead?—A. No; they are just capital charges, not including executive and selling expenses at all.

Hon. Mr. WEBSTER: Is that an estimate, Mr. Chairman?

The CHAIRMAN: That is from Professor Moore.

Mr. CAMSELL: He was formerly Dean of the Science Faculty of the State College of Pennsylvania, for about fifteen years.

The CHAIRMAN: And is now at the University of Toronto.

By Hon. Mr. Webster:

Q. Have you any suggestions that you could offer for the solving of the domestic problem as far as the province of Quebec is concerned?

By the Chairman:

Q. Let us put it this way, Mr. Humphreys. What we want to do is to show, if possible, some practical way in which, first of all, as much as possible of the fuel supply of Canada can be provided in Canada; secondly, to make it British rather than American; and thirdly, to make it economical and to reduce the cost of fuel in the widest sense, because fuel is an expensive commodity.

Hon. Mr. WEBSTER: And we want to ascertain to what extent we may be self-contained.

[Mr. J. J. Humphreys.]

The WITNESS: There is no crisis in fuel, as far as the heating proposition goes.

The CHAIRMAN: We have abandoned that point.

The WITNESS: So the matter is now really brought down to the question of smokeless fuel. If Canada wants to pay the additional cost of making smokeless fuel and making the country use smokeless fuel only, that brings it down to semi-carbonized coke, coke, and anthracite coal. There is no anthracite coal in this part of the country except American coal; so the question is brought down, as your testimony so far has brought it down, practically to a coke basis. Now, primarily we are gas people and therefore we are not at all interested as a company in the production of coke except as a by-product.

By Hon. Mr. Webster:

Q. Does your observation lead you to say that we should eliminate peat entirely?—A. No; not to the extent you can get it.

The CHAIRMAN: Let us take that afterwards.

The WITNESS: All right. But it is merely a matter of smokeless fuel and that brings you right down to some kind of low volatile coal; and if you are trying to eliminate anthracite, that practically means that you would be taxing the rest of the country for the benefit of your own district.

By Hon. Mr. Webster:

Q. How could you eliminate it, Mr. Humphreys?—A. The only way you could eliminate it would be to tax it so heavily that it could not come in, and then you would make the place where it was economically right to bring it in pay for this part, of Quebec, where it is not right. It would not pay.

By the Chairman:

Q. Substantially it does not come in very much except to Ontario and Quebec?—A. No.

Q. If plants could be established to cover Ontario and Quebec, you would practically eliminate the anthracite trade of the country?—A. No, sir, you would not eliminate anthracite competition except by barring out anthracite, by loading it with taxes. The anthracite miner works about three to five days a week. There is no shortage of anthracite except as the mines run out, in time. Now, that shortage is no more imminent for us than it is for the United States. We are competitors in the field until the miner works seven days a week and there are no more fields to develop, so that until seven days will not get it out, there is going to be sufficient anthracite for Canada the same as for the United States, except for labour and railway crisis.

By Hon. Mr. Webster:

Q. For how many years?—A. That is for the professors to say.

Q. You offer no guess on that?—A. I offer no guess on that.

By the Chairman:

Q. We are not specially concerned with the people who can pay \$22 as well as they can \$18 or \$16 for the anthracite. What we want to do if possible is to get a desirable fuel which can be produced at less money than that and will thus take its place.—A. The thing that would happen if you started a coke oven plant at Montreal or any other centre would be that in time of anthracite crises with the price running high, you would make money, but those ovens cannot be let down after they once start, but must run about ten years before they can be let down without damage. That laps good times and bad times. The result would be that at some time in the life of those ovens, in

[Mr. J. J. Humphreys.]

the ten years, you would have a period when anthracite was very cheap—it would be so cheap that you could not sell your coke.

Q. I think that according to the evidence we have heard here the consensus of opinion is that anthracite is unlikely to become much if any cheaper; that is, as to the cost of production.

Hon. Mr. WEBSTER: Freight rates may be lower.

The CHAIRMAN: Of course a reduction in freight rates might well come about.

The WITNESS: The same thing applies to the soft coal from which coke would be made.

The CHAIRMAN: When I first had a house my coal cost, I think, \$5 a ton; anthracite, in Montreal.

By Hon. Mr. Webster:

Q. Would you say our Canadian coal is suitable for these coking plants that have already been described?—A. They make very good coke of washed Sydney coal at Sydney. When the coal is washed they make a very excellent coke down there.

Q. But if coke ovens were erected at Montreal would it mean that American coal, for the larger part, would require to be imported for the use of these plants? If so, we are really shifting from one leg to the other.—A. I would not say that was so at all, sir. You could make coke out of Sydney coal at Montreal just the same as you can at Sydney; or you could make coal into coke at Sydney and ship the coke up here.

By the Chairman:

Q. Coke does not ship to advantage by vessel.—A. It does not ship very well by vessel. But there is no reason why that could not be done, except that the high sulphur makes the matter difficult in winter. Of course, you can easily store the high sulphur coal without firing if it has previously been washed.

By Hon. Mr. Webster:

Q. Through washing could you eliminate some of the sulphur in order that our Canadian coal could be used for coking purposes?—A. Yes, it is done.

By the Chairman:

Q. Well, Mr. Humphreys, I take it you would not be inclined to invest your hard earned savings in a coke oven plant in Montreal?—A. Absolutely no, unless the Government guaranteed eight to ten per cent on my personal money to cover good times and bad. Maybe the Government would have to pay it once in a while. Sometimes I would make it myself. That is personal, not company opinion.

Q. Have you had any experience of utilizing Welsh coal?—A. Not utilizing it.

Q. You know about it?—A. I know about it.

Q. But you have not used it?—A. The point with the best Welsh coal as brought into Montreal, as Mr. Webster probably knows, is that it comes not prepared as to size, and Welsh coal is of a great many qualities. If they sent the best Welsh coal in, as they do now, the public would not like it; it comes from dust to spikes over two feet long, and the householder does not have a sledge hammer to break it up.

Q. Steps are being taken to overcome that.—A. Yes.

[Mr. J. J. Humphreys.]

Q. Unless you show us these exhibits of yours now, I do not know, Mr. Humphreys, that there is anything else. Which is the one that cost millions?—
A. This (indicating) is the one. This is the low temperature carbonization briquette fostered by the United States Government.

Q. That would be made out of Pocahontas?—A. That is from the Bluefield district, just above Pocahontas. That has been slowly carbonized and baked and mixed with tar and briquetted. That briquette is a nice briquette. But it is not like this one. This is the same briquette made into an ideal fuel after it is again carbonized.

Q. And the extra volatile driven off?—A. All the volatile possible driven off. Of course that is a perfect fuel.

Q. Did not your company at one time make some experiments on this?—
A. We made briquettes very similar to this.

Q. From?—A. From coke breeze.

Q. Yes, but you did not do that trick of driving off?—A. We drove off part of the volatile.

Q. Part of it? Is that driven off entirely?—A. So nearly entirely that it will ship any distance that anthracite will, and arrive with less breakage. But it costs too much money. It is a perfect fuel, but it is commercially impracticable.

By Hon. Mr. Webster:

Q. How much higher does it run in price than the anthracite?—A. It never sold commercially at a profit. They have lost millions of money already.

By the Chairman:

Q. It seems to resemble somewhat our lignite coke?—A. I have a lignite briquette here.

Hon. Mr. WEBSTER: Previous witnesses touched on that amalgum process. I wonder if Mr. Humphreys knows that.

The WITNESS: That is a soft coal process.

Hon. Mr. WEBSTER: The coal is mixed with oils.

The WITNESS: But it can be used with any kind of coal, really. It is merely a mixture of oil and powdered coal.

By Hon. Mr. Webster:

Q. Has it come into general use?—A. Not general. It is used, and it is perfectly successful.

The CHAIRMAN: That would make a smoky fuel.

Mr. CAMSELL: I saw that process in operation in Washington last week.

The WITNESS: It is perfectly successful, but it is not smokeless.

By the Chairman:

Q. Is it as good a fuel as the available?—A. The cost is high for ordinary purposes.

Q. That (referring to another sample) is what?—A. That is a lignite briquette.

Q. It is about as good looking as that?—A. That is a good briquette. That is just as good a briquette as the other, but that has to be carbonized and ground and so on.

Q. That is lignite carbonized?—A. Carbonized and ground and mixed with the binder.

Q. The carbonizing dries off the water, the excessive moisture?—A. Yes, and the volatile matter. This has had a second carbonization.

[Mr. J. J. Humphreys.]

Q. That is what? Gashouse coke?—A. No. This is by-product coke, which is compared with gashouse coke. The structure is practically identical.

(Mr. Humphreys showed specimens of peat, lignite briquettes, by-product coke, vertical oven coke, carbonized briquettes, and briquettes not carbonized.)

By the Chairman:

Q. These two cokes were substantially identical in structure?—A. Vertical retort and by-product except as to size.

Q. They are substantially identical in structure?—A. This is some of Dr. Haanel's peat. It is very fine.

Q. Can you tell us anything about peat?—A. Dr. Haanel and Mr. Moore know more about it than anybody else on the continent. I would not try to talk about it.

Q. You would be inclined to take their view?—A. On anything about peat. They are the best peat experts I know of.

The Committee adjourned at 12.45 p.m.

THE SENATE,

FRIDAY, April 20, 1923.

The Special Committee on the Fuel Supply of Canada met in Room 534. Hon. Mr. McLennan in the Chair.

ROBERT J. MERCUR, President of R. J. Mercur and Company, Limited, Montreal, appeared as a witness.

By the Chairman:

Q. Mr. Mercur, you are the head of a firm in Montreal, who I suppose might be described as coke merchants?—A. We are coke merchants and importers.

Q. What is the source of your supply?—A. A certain source of supply is the Detroit plant of the Semet Solvey Company, the Boston plant of the New England Coal and Coke Company, and various producers in the so-called Connellsville district, in Pennsylvania.

By the Chairman:

Q. To whom do you sell that coke?—A. The greater part of our business now is selling to various foundries throughout Canada. We are the Canadian agents for the Boston and the Detroit plants spoken of, and they allot us a certain tonnage for Canada, which we buy from them and sell to our Canadian customers. The amount which we have to have over and above the amount we can get from those two plants, we obtain from the Connellsville region, as required.

Q. The main part of your business, then, is for smelting, metallurgical purposes?—A. The main part of our business is the supply of coke for the smelting of iron in cupolas in cast-iron and steel plants, although we do sell a large quantity of coke to the various paint plants, brass works, and various other industrial plants.

Q. But all for heating for industrial purposes?—A. Yes:

Q. Would you mind telling us what was the total quantity imported into Canada? I do not mean necessarily by your firm.—A. I am not in a position to give exact figures. Our own importations are approximately twelve thou-

[Mr. Robert J. Mercur.]

sand tons a month. We have brought in as high as fifteen thousand tons a month, but twelve thousand tons would be about the average.

Q. What have you done towards supplying fuel for other purposes?—A. We have always been very much interested in the domestic market, because we have always felt from our knowledge of the situation that high-grade domestic coke is eventually bound to take the place of the yearly diminishing quantity of anthracite available. For that reason we have kept a current track of it, as you might say, and during the last year we have brought in a great many carloads and distributed to various customers and friends for domestic purposes.

Q. Would that be mainly from Boston or Detroit?—A. It would depend on the geographical location. Our trade is throughout Canada. We have, I think, over four hundred foundry customers, and the geographical location determines whether we ship from the Semet Solvay plant in Detroit or from the New England plant in Boston.

Q. What would you say as to the result of the use of that coke by the people of Montreal and elsewhere?—A. The people have had very satisfactory results. I asked the manager of our coke department, who has been supplying it to a great many of his friends this year by simply bringing in a carload and hiring a carting company and having it teamed, as we are not retailers, to get some data, and I have a very simple report that he has handed me.

Q. We would be glad if you would run over that and give some specific instances.—A. The first he gave me was a typical apartment house case. I may say in connection with this, that we have found, as has probably been brought forth in the course of the evidence given here, that the using of coke is largely a matter of education, and we have found it necessary, even when we have been giving our friends coke at cost, to send someone to tell them how to use it.

This first report is by one of our men. This is December of last year:—

Called at _____ apartment house and saw the janitor. This man seems to be quite an intelligent type of furnace man. He does not appear to experience any trouble with coke. He fully understood he would have to work it differently to coal. The only pointers I could give him were to dampen his coke and to check the bottom draft by shoving sheet asbestos in the draft door to fully check the draft. The man said that the 2½ tons of coke that we sent last Thursday lasted 5 days and a few hours, against 3 days on two tons of coal. He also said that he was enthusiastic about coke, and wanted nothing better than to show anybody at any time his installation and make them familiar with his results.

Q. Yes.—A. And here is a private consumer in Montreal:—

I beg to acknowledge yours of the 16th, and have much pleasure in informing you that the Semet Solvay coke you recently supplied me with for domestic purposes is giving entire satisfaction. It appears to have all the good but none of the bad qualities of anthracite, with the added and very great advantage of a quick response to variations of draft.

Another gentleman quotes practically the same and adds:—

I am quite sure by this time the furnace man knows how to handle it, although he does keep us rather warm.

This is merely to indicate that it is a matter of learning. Here is a very typical one:—

In reply to your letter of inquiry as to what satisfaction the coke you have been supplying me with has been giving, I am very pleased to state that it has been giving me entire satisfaction, although at first I had a

[Mr. Robert J. Mercier.]

little difficulty in knowing just how to use it; but after a few days' experience I was able to secure this knowledge, and now I am entirely satisfied with it. One thing I like very much is that there is so very little ash about it, and absolutely no clinkers.

These others are really about the same. There is often a question asked, Senators, as to the difference in the qualities of coke.

Q. Would you explain the difference to the Committee?—A. Particularly the difference between gas house coke and good metallurgical coke. To get a comparison—as I say, we are not retailers, we have been doing this in the general interests—I got the station agent near my house—I live in the country—who is supplied by his company with gas house coke to make a test. This is equally simple:—

Hereby report on the coke given me for test. It pleases me to report as follows:—

Ten pails of your coke lasted in waiting room heater from 7.30 February 7th until 9 p.m. February 8th.

Ten pails gas house coke lasted from 7.30 a.m. February 5th until 3 p.m. February 6th.

Weather conditions approximately the same. Care of heater performed in same manner in both tests.

By Hon. Mr. Calder:

Q. What is the difference there in the hours?—A. That is a difference of just 21 per cent in favour of the metallurgical coke. I do not want to give this for advertising purposes, but simply as a matter of interest.

I called up Mr. Norris, the manager of the Light, Heat and Power Company in Montreal yesterday, and told him I was coming up here to-day. I said, "You have been producing coke for a long time. Exactly what is your opinion of the difference?" He said, "Approximately 25 per cent between our best coke and the best metallurgical coke." The explanation is that the ordinary gas house coke is made in open retort ovens, whereas the by-product is made in a closed oven used for a specific purpose, so that the structure as to hardness and porosity of the by-product metallurgical coke corresponds more closely to that of anthracite coal, and therefore it does not disintegrate as easily, and one ton of it has approximately 25 per cent more heating value in it. But both of them can be used if people are educated, or will take the pains to educate themselves.

By Hon. Mr. Calder:

Q. As a rule is there much difference in the price?—A. Heretofore, Senator, there has not been. In the cases where we supplied our friends during the last winter, we have been able to get a domestic coke from the by-products plant, and the delivered cost, selling at cost, has been practically the same as that of anthracite coal. The law of supply and demand, I presume, governs the price of coke, as of everything else. Both in Boston and Detroit during the past winter, there has been a tremendous demand upon these plants for domestic coke, and their price has averaged during the winter \$11 a ton at the ovens. If we bring that to Montreal, there is approximately \$4 freight, and it means about \$15, which is a great deal higher than the wholesale cost of anthracite coal.

By the Chairman:

Q. Would you tell the Committee something about the New England Gas and Coke Company. That was started really for domestic coke?—A. Yes.

Q. And used Cape Breton coal to supply gas and domestic fuel. That was twenty years ago more than that?—A. I should say at least twenty years ago.

[Mr. Robert J. Mercur.]

We have been handling the foundry coke for the New England Company in Canada for approximately three years now, and I do not know that I can answer your question as to why they changed from entirely domestic coke to foundry, unless it was the same thing that I quoted before the law of supply and demand. I have been using coke as a consumer and merchant for the last 25 years, and I might say that it was just as difficult to get the average foundry to use by-product coke, when it was first manufactured, and to change their practice from using beehive coke, as it would be to-day to get the average anthracite coal consumer to change to using a high grade domestic coke; so I presume it was a gradual transition.

Q. Up to a certain point they used Cape Breton coal, then there were some difficulties in the way of prices, and one thing and another, and I think they bought their own coal mines in West Virginia, and were bringing it up and avoiding the payment of duty?—A. Yes.

Q. I know they still supply domestic coke, because one sees about Boston their delivery wagons and advertisements.—A. We have tried several times during the last winter to buy domestic coke from the Company in Boston, but with the exception of an occasional carload we could never get it. Their local demand has been in excess of the supply.

Q. We are working along the line of investigating the possibility of substituting a coke made of Canadian coal, if possible, for anthracite coal, as a source of fuel supply, which would involve, as you know, a very considerable outlay on the part of any company. Have you looked into that phase of the matter at all? Take, for example, Montreal, and eliminate the question of the source of supply of coal and deal simply with the question of the commercial possibilities.—A. Since I have seen what the commercial possibilities of domestic coke are, I have been for at least five years attempting to see if we could not put a by-product coke plant in Montreal; but our associates and our own directors have never been able to figure out that it could be made a profitable venture under present conditions.

Q. What were the difficulties?—A. I want to say that I am not a practical coke manufacturer. Questions of that kind could be answered by a man like Mr. Blauvelt, who, I understand, is going to appear before your Committee. I would not want to attempt to give any information with which I am not fully familiar. Briefly, speaking from our various conferences, I do not think the manufacture of a good coke from any Canadian coal has been positively assured as yet.

Q. They are making a lot of steel with Sydney coke?—A. A blast furnace coke is neither a good foundry coke nor domestic coke, Senator.

Q. Yes, but if you can make good blast furnace coke, why could you not make good foundry or good domestic coke? If a coal will make good coke of one kind, why would it not make good coke of another? Is that too technical?—A. I would say in answer to that that it takes a considerably higher quality of coal to make a good quality of domestic or foundry coke than it does to make blast furnace coke. Blast furnace coke is used under heavy wind pressure from the blowing engines, and they use coke that could not be used in a cupola with lighter air pressure, or in a domestic furnace with practically nothing but a natural draft. There are a great many technical things that I have heard discussed, such as low fusibility of ash and sulphur content, upon which I would not like to express an opinion. I would say from commercial observation that I do not think the Montreal Light, Heat and Power Company use any Dominion coal now. For what reason, I really don't know.

[Mr. Robert J. Mercur.]

By Hon. Mr. Laird:

Q. Have you ever considered the feasibility of using Western crowsnest coal for that purpose?—A. I am not familiar with that at all. We have always considered that so far distant, that there would be such a great length of freight haul, that none of our people have ever investigated it.

By Hon. Mr. Webster:

Q. How does your product compare with anthracite as regards heating values?—A. I have just been reading some simple reports here.

Q. Oh, you have given that?—A. We brought it in last winter more as a helping proposition for friends of ours who could not get coal. Personally, I used coke for fuel long before I moved to Canada, and personally, in my own house for eight years I have never used anything but coke. I not only supply my own house, but my gardener's house and two different farm houses which I have, and the different employees have got accustomed to the use of it, and if I gave them anthracite coal to use, I imagine they would make very great objections.

By the Chairman:

Q. The disposition of cost is an important matter?—A. Yes.

Q. Any enterprise other than the Light, Heat and Power Company, would have to make an arrangement with them to sell them the gas?—A. Yes. A by-product coke producing plant has to be an absolutely balanced proposition. A satisfactory market for the coke has to be assured, and for the gas, for the tar, for the sulphur, for the benzole, and the various other subdivisions. There is also the difficulty that if any one of those by-products which are coming out every one of the 365 days of the year backs up, it accumulates. For instance, we are undertaking to market the output of the little plant we are interested in that is being installed in Hamilton by the Semet Solvay Company. We will have not to exceed 350 tons of coke a day there, and we will have to make our preparations a good many months ahead so that the minute the coke comes out we will have our market. The same thing applies to all the other various by-products. Our Hamilton proposition happens to be a particularly fortunate one in the way of the gas consumption, because the people interested are the people that own the natural gas plant there and have a great many miles of existing mains and a decreasing supply of natural gas, and should also own the artificial gas plant. So between those two the market is assured for the gas. While I am not directly interested in the construction or operation of the plant, they tell me that with the other industries located in Hamilton the tar and all these other things are well taken care of. Of course that is a small proposition, probably not more than five hundred tons of coal a day.

Q. You will sell that coke for domestic purposes?—A. The last advice I had from them was that they could not afford to make domestic coke, as against making foundry coke, as there was an existing duty on the soft coal coming in for the manufacture of domestic coke, and as there is no duty on soft coal coming for the manufacture of metallurgical coke. That handicap would make a difference of so many dollars and cents that unless there were some change in that direction they could not manufacture domestic coke.

Q. We are told it would amount to about seventy cents a ton of coke, with the 53 per cent, duty and 65 per cent coke.—A. Yes. The duty is 53 and the average yield is about 70 per cent of a ton of coal. That would be about it.

[Mr. Robert J. Mercur.]

By Hon. Mr. Webster:

Q. When you said your company did not think it was a practicable proposition to erect coke ovens at large centres, what was the reason, or on what was the objection based? Is it a question of cost, or is it because there is not enough business?—A. We have never been able to see our way clear yet to a fixed profitable distribution of the various products.

Q. Would it mean that it would not be profitable in competition with other coal?—A. I think so, Senator Webster.

Q. Then if any assistance were given by the Government, in the way of subsidy or otherwise, would that be an inducement to erect coke ovens?—A. I should judge so.

Q. Have you any idea of what might be necessary?—A. I have not. I have had this opinion, that the manufacture of domestic coke in Canada, of a good grade, would gradually supplant the use of anthracite coal; and I have been of this opinion also, that the anthracite coal producers in the United States would not let the Canadian market go without a struggle. They have not given us very much, but I believe the estimate is—am I right?—about five million tons a year.

The CHAIRMAN: Yes.

Hon. Mr. WEBSTER: Four to five.

The CHAIRMAN: Between four and five.

Hon. Mr. LAIRD: Two per cent of the output.

The WITNESS: And a five-million-ton customer, in commercial terms, is not to be sneezed at. I think if coke enters into serious competition with it they would take steps to meet the competition.

By the Chairman:

Q. We have been advised that the strong probability—I do not think I am overstating it—is that there will not be any reduction in the price of anthracite coal; I mean the cost of production will tend always to rise.—A. Yes.

Q. As was pointed out by Senator Webster, there may be a reduction of railway rates.—A. I was down in my old home in Pennsylvania a few weeks ago and talking to one of the large operators there.

Q. That is in the hard coal district?—A. In the hard coal district—the anthracite district; and he told me he thought they had acted very well in holding the price at \$8 this year. They were doing it last winter, as all the big operators did. It was only the small independents who profited. He said he did not think there was going to be any possibility of it being lower.

By Hon. Mr. Webster:

Q. Did he give you any information as to why the price should be \$8 at the mines?—A. He only expressed the opinion that he considered it low, Senator.

Q. Due to labour?

The CHAIRMAN: We have had evidence that for every ton of anthracite it was necessary for them to pump—what was it?—13 or 30 or some number of tons of water.

The WITNESS: I know we used to buy it a great deal cheaper, but all prices have gone up, including the cost of transportation.

By Hon. Mr. Webster:

Q. Do you think the removal of the duty on special grades of coal would be sufficient inducement for the erection of coking ovens? Perhaps you have not given the matter study.—A. I have not gone into that far enough, Senator

[Mr. Robert J. Mercur.]

Webster, to give a definite statement on it, but I should hardly think that would be sufficient. It is a big investment. They tell me the little Hamilton plant is going to cost two and a half million dollars.

By the Chairman:

Q. To produce 350 tons daily?—A. Yes.

The CHAIRMAN: What is the daily consumption of anthracite in Montreal, Senator Webster?

Hon. Mr. WEBSTER: I should think that in Montreal and district we could take in nearly two million tons.

Hon. Mr. CALDER: In a season?

Hon. Mr. WEBSTER: Yes, two million tons in a season.

By the Chairman:

Q. So you would need a very large plant?—A. Yes; based on to-day's gas production of the city of Montreal. The Montreal Light, Heat and Power Company for their present gas production use approximately 275,000 tons of coal per year. They figure to produce of that about four billion feet of gas per year. So if they turned all that coal into by-product coke it would not go very far towards affecting the market.

By Hon. Mr. Laird:

Q. Getting back to the cost of this high-grade commercial coke that you mentioned a little while ago—you stated you brought it in and sold it at cost to your own employees and friends.—A. Yes.

Q. If that were imported for sale to consumers generally, at what could that commercialized coke be sold to the consumer, the necessary local dealer's profit and the distribution charges being added? I refer to the same quality that you have been speaking of.—A. Senator, I do not know of any commodity that varies in price in the United States more than coke.

Q. Take this last winter for instance; what would the average price be?—A. The average price last winter at the only two producing centres with which I am familiar, that is, Detroit and Boston, has been \$11.

Q. How much would that be, laid down in Montreal?—A. Fifteen dollars approximately.

Q. Then there would be the local dealer's profit and the distribution charges to add to that?—A. Yes.

Q. How would that compare with the delivered price of anthracite coal in Montreal during the last winter?

Hon. Mr. WEBSTER: Just as high.

Hon. Mr. LAIRD: Would it be higher?—A. I should imagine—Senator Webster can probably correct me, as he is more familiar with it—approximately \$4 a ton higher than the wholesale price per net ton of anthracite coal. Am I correct, Senator? About \$11?

Hon. Mr. WEBSTER: No, I do not think so. I do not think there is that difference. If you could get the anthracite, it should be laid down on the wharves in Montreal for \$13; that is, without the cartage and distributing charges.

Hon. Mr. LAIRD: Then there would be the local dealer's margin.

Hon. Mr. WEBSTER: There is on the anthracite too.

By the Chairman:

Q. They would probably be about the same.—A. On the present market

[Mr. Robert J. Mercur.]

By the Chairman:

Q. But I cannot see that \$11 would be a normal selling price for coke if there were a fair market for by-products.—A. As I have just remarked to the Honourable Senator (Hon. Mr. Laird), I have dealt in a good many different commodities, but I have never dealt in anything that has a greater variation in price than coke. It goes entirely, apparently, by the law of supply and demand. We have bought domestic size coke in Detroit as low as \$5.

Q. Within the past year or two, or three?—A. I would not want to quote prices offhand. I have them all in my office. But I remember the \$5 price. It was about the average for a number of years. That was before the war.

Q. That was not twenty years ago, was it?—A. Oh, no; recent years.

By Hon. Mr. Webster:

Q. Then the price of coke is regulated largely by the price of anthracite. In other words, the price varies very much, as you say, and that is due, is it not, to supply and demand?—A. In the producing centres, I should judge that would be the case. I was trying to reconcile it with the price of foundry coke; that is why I was hesitating; because that is absolutely supply and demand.

Q. Yes.—A. And the peculiar feature is that, while the average price of the domestic in Detroit and Boston has been about \$11 at the ovens for a great many months, the foundry has been \$14.

By the Chairman:

Q. Is there any flexibility in the by-product ovens so that they could make a domestic coke or could make a foundry coke by altering the process?—A. I understand that for the manufacture of domestic coke, which has to be sized, a considerable additional equipment has to be installed. That is the difficulty at the Hamilton plant to-day. If there is no change in the duty, and duty has to be paid on any coal that goes into domestic coke, why, they will not put in the additional equipment for making domestic coke. Domestic coke has to be sized like anthracite coal.

Q. Is not that the only difference? They make a good, hard coke and then size it.—A. Foundry coke to-day, that is satisfactory to the foundry user, is sure to make an absolutely satisfactory domestic coke, by being sized.

By Hon. Mr. Webster:

Q. But the country would not be safe in abnormal times, Mr. Mercur, to depend upon imported coke to relieve the situation.—A. Judging from our experience this past winter, Senator, I should say not.

Q. No.—A. We could have marketed a very large quantity wholesale if we had been able to get it, but the local consumption has practically take it all.

Q. And the alternative would be whether it would be wise to consider the erecting of coke ovens so that you would have a manufactured domestic fuel in the country during times of stress or high prices?—A. I should say, Senator, that would be an extremely wise provision for the Dominion of Canada.

Q. Then that becomes a financial proposition as to what is necessary or required in order to make it successful and profitable?—A. There is money available to put into such plants whenever the conditions would show that that money could be invested profitably.

By Hon. Mr. Laird:

Q. I do not think we have elucidated that point as to the practicability of establishing such an industry in Canada. Is the reason against it the large investment of capital required, or the lack of market, or what is the reason? You have evidently investigated the question.

By Hon. Mr. Webster:

Q. Or is it not the uncertainty of the market?—A. The uncertainty of the market as to price. For instance, if through some force of circumstances the city of Montreal could not get a pound of anthracite coal through the winter and they could get a good domestic coke, as they would then be obliged to use it, they would learn how to use it. After six months' use, probably, if a good domestic coke were available, not more than 25 per cent of the users would ever go back to anthracite coal, because when a man knows how to use it it is better—it is cheaper for him—I will not say cheaper; I will eliminate that; but it is better. If that market were taken away from the anthracite people, I think they would take steps to get it back. Their first step would be to cut the price, and, if coke were being manufactured in Montreal, that might throw a profitable commercial proposition into a losing proposition.

By the Chairman:

Q. Mr. Mercur, you have evidently looked into this question. You have given me the impression that you have looked into it as a possible thing for you and your friends to deal with.—A. Yes.

Q. What would you think of what was said to me by a man who had also looked into it? He said, "If you would undertake to pay me \$10 a ton for all the tons of domestic coke that I would turn out, I would find the money for it and go into it."—A. I should think that would be a very good proposition, if the same party had an equally good established market for all their other products. If they got \$10 a ton for their coke, but were not sure what they would get for their gas or other products, why, it might not be profitable.

Q. Then the situation would seem to be that a market for the gas is essential?—A. Absolutely.

Q. Then, from a commercial standpoint there are no mechanical difficulties. All that has been proved elsewhere. Provided the gas and the other things were taken care of, it would be a question of the fluctuation in price, due to the very natural and proper struggle of the competitors, the anthracite people, to retain a market which they already had, as everybody would want to do, and a market which is very attractive, because it is so regular.—A. Yes. Coal will always be needed in Montreal and in Ontario.

Q. And they are sure of getting a good, regular market there; whereas the farther south you go, according to the winter, the more uncertainty as to whether the market may be good or bad. Is that a fair statement?—A. I should imagine, Senator, that a schedule could be worked out which would give a domestic coke manufacturing proposition in Canada the necessary protection to make it profitable; but I am not prepared, I am not familiar enough with the subject, to say what that should be.

Q. Those were serious investigations, carried on with a desire to proceed with the proposition if conditions were favourable?—A. Yes, yes. I should think it would be an exceedingly good step to encourage the manufacture of domestic coke here as much as possible and get it started, if the duty on bituminous coal for the manufacture of that were equalized with the present duty on that same coal coming in for metallurgical purposes. I am not posted on tariff matters or how far-reaching they are, and all that, but just from a commercial standpoint it would not look to me unreasonable to say that if coal brought in for metallurgical purposes comes in free of duty, that same coal for the manufacture of domestic coke, which is certainly needed in Canada, shall come in free of duty.

[Mr. Robert J. Mercur.]

By Hon. Mr. Laird:

Q. From the public standpoint, of course, one of the main objections to establishing an industry of that kind would be that it is better to utilize our own natural resources than to impart products from other countries. Go just a step further. In case an institution of that kind were organized, would it have a large pay-roll—would it employ a great many persons, a large plant of that kind?—A. I would not want to give any figures, Senator, because I am not a manufacturer.

The CHAIRMAN: We are going to have Mr. Blauvelt here.

The WITNESS: A gentleman of that kind could give you the number of men per ton of coal carbonized, and all that sort of data. It would be simply guess work on my part, and I would not want to give you any figures. I should say that the labour employed would not be large, because so much depends on the machinery.

By Hon. Mr. Laird:

Q. We would employ a great deal of labour in the mining of coal if Canadian coal were used, and employment would be given to labour engaged in the transportation of it, and so on.—A. I think you might obtain information from a man like Mr. Blauvelt. There is another man who has looked into the subject very thoroughly in Canada, and could tell you exactly what Canadian coal would make and what it would not. I do not know.

The CHAIRMAN: We have Mr. Blauvelt called, and also Mr. Lucas, the coke man of the Dominion Coal Company.

The WITNESS: Yes? There is Mr. A. F. Leavitt, of Syracuse. He was employed with the Semet-Solvay Company there, but whether he is in it now or not, I do not know. His address is Syracuse. He is very well up on that subject.

By the Chairman:

Q. We gather from you that this is a matter that capital would seriously and favourably consider.—A. Yes.

Q. The erection of a plant at proper places in Canada.—A. Yes.

Q. What is the capital that is going into this Hamilton plant?—A. Approximately two and a half million.

By Hon. Mr. Laird:

Q. Have you any opinion to offer as to where an industry of that kind should be established? At the coal mines, or, say, in a centre like Montreal or Toronto?—A. Judging from the development in that same direction in the United States, it is necessary to establish such plants where there is an existing market for their gas. For instance, Milwaukee has a plant, St. Paul-Minneapolis has a plant, Baltimore has a plant, and Boston, Detroit and Syracuse have plants. The only other by-product plants that are established in the United States are in connection with large steel manufacturing plants, where they use coke in blast furnaces and use their gas as a fuel.

The CHAIRMAN: That is the case at Sydney.

The WITNESS: But as I understand, gas cannot be transported profitably a long distance, on account of the cost of the mains and because there are some mechanical or physical difficulties. So with the possible establishment of by-product plants in Canada, I should say there would have to be a number and each of them would have to be located where there was an existing market for their gas, as a first essential.

[Mr. Robert J. Meaur.]

By the Chairman:

Q. In other words, the coke must be brought to the source of consumption and there transmuted.—A. Yes. Coke does not transport very well.

Q. No.—A. You cannot throw coke into a vessel, take it out of that and throw it into a car without a certain amount of disintegration and loss.

Q. Do you find there is much disintegration in the coke you bring in in cars?—Is there much breeze—much waste?—A. There is less every year. They are putting in a very interesting test. I just happened to glance at a report here from our Boston plant on the shatter test.

Q. Yes?—A. It is based on 100 being equivalent to the breaking strain of anthracite coal. They have now brought coke up to 85·70. The higher it is, the less disintegration there is. I understand from Mr. Norris that the difficulty with the gashouse coke, which is made in open retorts, is that it is friable—

Q. It is much softer.—A. It has not the firmness. The by-product differs in the volume of coke as compared with the volume of cells. That really means there is a difference in density.

Q. Gashouse coke is ordinarily less dense?—A. Far more porous.

Q. Far more porous. But Mr. Humphreys and Mr. Bagg, who were here yesterday, showed us some gashouse coke which was pretty dense.—A. Since the Montreal Light, Heat and Power Company put in their last big plant they have improved the quality of their gashouse coke tremendously, not only on account of their carbonizing, but also as they have eliminated the use of any cheap or inferior coals. They bring in the very highest grade Pennsylvania coal they can get. They used to have a great deal of difficulty with their sulphur. You hear the ordinary layman say: "Oh, I have used coke and it burns out the grates in my furnace." Well, that is absolutely nothing but high sulphur. The sulphur in ordinary gashouse coke would run up to about 3 per cent. To-day the average sulphur analysis—that is, a monthly analysis—of New England coke is ·61. That is about one-half of one per cent.

Q. What coal are they getting, do you know?—A. Very largely Virginian.

Q. But you do not know from which part of Virginia.—A. I do not know except that they bring it in by vessel.

Q. I know they bring it in by vessel.—A. In speaking of the analyses they say they were off this winter, as it was necessary for them to bring in some English and other foreign coal. "However, we expect shortly to clean up this coal, when we will revert back to our standard analysis." The Solvay analysis runs to a maximum of ·70.

Q. When you say Solvay you mean Detroit?—A. Yes. I might say, of course, they cannot always keep up to their highest standard, because of various stresses and miners' strikes, and they have to put in poor coal, which makes poor coke.

Q. We gather from you, then, that it is a commercial possibility in large places in Canada, provided an outlet for gas can be obtained; have you any idea what by-product gas is worth? We have heard it quoted from 8 cents to 22 cents a thousand?—A. I should think it would be very difficult to make even an estimate on that, because the point at which it is produced would determine its cost so much. For instance, the difference of \$2 a ton in the freight rate in bringing in the coal would make a tremendous difference. I am afraid, gentlemen, I have not been able, just as a simple merchant, to give you very much information.

Q. We want that side of it, because the technical man perhaps places a good deal more reliance on figures and analyses than would make a good commercial proposition, and I think it is encouraging that you, from the commercial side, feel that it is a matter of arrangement; would you care, after reflection, to write us a letter and suggest what modification in the way of bounties would

[Mr. Robert J. Mercur.]

produce a serious proposition from responsible people?—A. I would be very glad to have the privilege of doing that, but I would have to have time to give it a very thorough investigation.

Q. Do you think it would be to the advantage of the Committee to call anybody from Hamilton, or could Mr. Blauvelt give us the information?—A. I should judge that Mr. Blauvelt would be able to give you complete Hamilton information, as he is the consulting engineer for the plant, and has looked into all details of the concern; in fact, he is the man we rely on to see that it is properly built for production.

Q. As I understand it, there are two practical types of ovens that are being put in, one the Koppers oven and the other the Semet-Solvay?—A. Yes.

Q. What sort of combustion plant?—A. The Otto Hoffman. There are different types of by-product ovens, and I should say any one of three or four standard used types would produce satisfactory coke to meet local opinion or price. There is one thing I am firmly convinced of, if you do not mind my repeating it, and that is that if there was any force of circumstances that compelled any certain community to use a high grade of domestic coke for a certain period, say, five or six months, that provided that supply of coke continued available at a reasonable price, 75 per cent of people would never go back to the use of anthracite coal. Now, I am not using that as guess work, or simply from my own personal experience, but in studying the situation in Detroit, St. Paul and Boston, and talking to users of every kind, from the Chinese laundry man to the man that has the big apartment house and is a big consumer. I should think that it would be a very advisable thing for the Dominion of Canada to give the question of making the establishment of by-product plants, that would manufacture a high-grade domestic coke in Canada, the most serious consideration, and study out as to what would tempt capital to put them in.

Q. We can look for your memorandum.—A. I will be very glad to give you that to the best of my knowledge.

Hon. Mr. LAIRD stated that in questioning Mr. Stutchbury on page 99, in No. 6 of the Proceedings, he had been under a wrong impression, and he had since found that freight charges on grain did not remain unpaid until it was disposed of.

COMMITTEE ROOM 534,

WEDNESDAY, April 25, 1923.

The Special Committee of the Senate met at 11.15 a.m., Hon Mr. McLennan in the Chair.

The CHAIRMAN: We have with us to-day Mr. W. H. Blauvelt, who has very kindly come up from the United States to give us some information. He is the gentleman of whom Mr. Pearce told us, in his statement at the opening of our inquiry, saying that he could tell us more than anybody else about coking. The point on which we would like to hear from you, Mr. Blauvelt, is the substitution of coke for anthracite, in view of the difficulty of getting it here, and the possibility of substituting Canadian coal in order to avoid sending money out of the Country for American coal. Perhaps the simplest way would be for you to give us, very briefly, the different types of modern coking ovens, and then go on to the commercial and scientific side of the question.

WILLIAM HUTTON BLAUVELT, Consulting Engineer, 120 Broadway, New York City, called and examined:—

[Mr. William Hutton Blauvelt.]

In the manufacture of coke for metallurgical purposes, and for any use where a good quality of coke is required, there are, commercially speaking, three possibilities:--First the Beehive Oven, the old type, but we may dismiss that, because it is too wasteful; I just mention it only to complete the list. The next of real commercial importance is the By-product oven, so-called, which essentially is a rectangular chamber somewhere about 10 feet high and 35 to 40 feet long, and 14 to 20 inches wide. That is heated on two sides, and the heat passes through the brick into the coal, and distills off the volatile matter as gas, and produces the coke, the by-products being produced by cooling this gas and scrubbing it. The peculiar qualities of that coke as compared with that made by other processes are that the conditions are most carefully adjusted so that the heat to which the different parts of this very considerable coal-body—perhaps 10 or 15 tons in one charge—the conditions are so carefully adjusted that just the right heats are maintained, and just the proper application of the heats are made for uniformity so that the whole of the coke shall be of the highest possible quality commensurate with the kind of coal that is used. So we have there two limiting conditions as to the coke—first, the quality of the coal. Once that part of it is fixed the quality of the coke is determined, for you cannot make a silk purse out of a sow's ear, though you can make a good pigskin purse, as somebody has said. We select our coal for those ovens in accordance with the purpose to which the coke is to be put—foundry coke, domestic coke, or industrial coke. Those are the characteristics, very broadly, of the By-product coke oven. Then, leaving aside again the types of apparatus that are out of date, we come to the Gas Retort. The gas retort to-day is a vertical retort. There are many kinds of horizontal retorts in use, but they are not now being built to any great extent. Illustrations of the vertical retort appear in Ottawa, as one type, and at Montreal, the same type, and at Toronto. Those three represent the vertical type. In this type there are two different sorts. One is the continuous vertical retort; the other is the intermittent vertical retort. To my recollection, all those in Canada are of the former type. The coal is fed into a long, high chamber, perhaps 22 feet high and, depending on the type, somewhere about 12 inches wide, and perhaps 22 inches long in one type, and 4 feet long in the other. So we have a tapering chamber getting larger as it goes down, and the coal is fed in the top, and the heat is provided by a gas producer heating the retort on the sides, and passing through the brick, as it does in the by-product oven, and the coal is coked as it comes down through this chamber. In most of those continuous types the quality of the coke produced is inferior, for the reason that the coal does not lie quiet during this coking process, and the result is a tendency to make the open, softer coke which is not used for metallurgical purposes, and is somewhat inferior for domestic purposes, on account of the tendency to break down in "fines," which are largely lost. There is another type of retort—I do not think there is any in use in Canada, but it is operating in a few places in the States—which is called the intermittent type. In principle, that is more like the by-product coke oven, in that the charge of coal is put through the top of a vertical chamber of the same dimensions as these described above, and lies very quiet until the whole coking process is complete. That charge is drawn off as a whole, and the new charge put in, just as it is in a coke oven. Those are two of essentially the most modern types—I have left out all of those that are passing into the background on account of competition—and we have in Canada illustrations of each of these types. We have coking plants at Algoma and the Dominion Iron & Steel Company, and at Hamilton with the Steel Company of Canada, and there is one now being built in Hamilton for public service purposes, primarily for the production of gas, and types of the vertical retorts at Montreal, Ottawa and Toronto. The coking process essentially consists in the driving off of all the volatile matter, which varies from 15 per cent to 40 per cent in ordinary coal;

[Mr. William Hutton Blauvelt.]

and a complete change takes place in the coal as well, because the tiny particles of gas, as they escape from this coal while it is heated and in viscous condition, open it out this way (illustrating) so you produce a porous structure which is not at all similar to the original coal, which has no pores or cells. The result is that when that gas comes out under the impulse of the heat, as the coal is passing from the viscous condition into the hard condition, that blowing apart takes place, causing coke to be light, and making it burn very freely as compared with anthracite. Scientifically speaking, that is what the coking process consists in. The recovery of the by-product is a process which I need not go into unless you wish me to. Those, as briefly as I can make it, are the essential types which are now prominently before the market for such purposes as you have in mind. Does that answer sufficiently your question?

By the Chairman:

Q. Yes; and of that type of by-product oven there are several kinds available?—A. There are three types commercially developed—I am not speaking of those which are out of date—the Koppers type the Semet-Solvay type, and the Wilputte type—Canada now has illustrations of each at those—also the Otto Hoffman type—which is rather out of date, but I mention it because you have it at Sydney, but I would not include that, because that is not being built for the market. All of them are essentially similar in their principle there is no essential difference; they are all constituted with this narrow chamber I speak of, 40 feet long, from 14 to 20 inches wide, and from 10 to 12 feet high. They are all heated on the outside of this chamber, and the heat passes through the brick in the same way. The essential difference is that in the Solvay type the heating flues are run horizontally, and in the Koppers and Wilputte types the flues are run vertically, about 32 flues along the side, and this half of them the gas is passing up, and it crosses over and passes down the other half. The manufacturers of each type claim special advantages for their own system. The Wilputte type is built at Algoma and Hamilton. That is similar to the Koppers type but claims to be an improvement on it. in principle. It is essentially the same as the Koppers ovens which are in operation at Algoma and Sydney. Solvay ovens are now being built at Hamilton. So we may say that horizontal flues and vertical flues are the two types; but this difference does not enter into your consideration, because the results obtained are precisely the same in the two cases; it is just a question of one firm or company preferring one or the other. As far as your interests are concerned, they are identical in results.

Q. Is there a possibility of varying the product from the standpoint of fuel—I mean, if you want to make a domestic coke you put a little more volatile in so that it would be a little more easily inflammable and combustible than what would be used, say, for a blast furnace?—A. Yes. That is very easily done, but from my own personal experience in my house it is not necessary, because in itself the hardest coke that is made is much more inflammable than anthracite, and we must look at the subject from the point of view of the common practice. If I were in England, I would talk entirely differently, because England is educated to a very easily ignited and combustible fuel, and they want a fuel like coalite which was largely advertised there; in which about 14 per cent of volatile matter left in the coal. The reason that was left in was because the English people were trained to that class of fuel. Now, the Americans and Canadians also are trained to anthracite. Anyone who has had practical experience, as I have had in my home for years—of using hard coke such as that used in a blast furnace, but properly sized for domestic purposes, would say at once that it is not necessary to leave this volatile matter in if you don't want to, because the coke is quite inflammable enough, and even more inflammable than anthracite to which we are all accustomed. You do not want to get too far

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away; in other words, from the conditions of the coal that people are used to, when you are dealing with a fuel you are offering in substitution. One thing I wish to impress upon this Committee is that you should not look upon coke as a substitute for anthracite. Coke is not a substitute for anthracite, in that sense of the word, because coke is, on the whole, a better domestic fuel than anthracite, once you find out how to handle it; for two reasons. Anthracite is getting more and more impure as the old pure veins, like the Mammoth vein, have become exhausted, and you will find in the average anthracite, I don't mean like last year, when you had much slate, but in normal conditions you have probably 20 per cent to 22 per cent of ash. Coke when made from average standard coal should not contain more than 15 per cent at most, and the best of it is under 10 per cent. In other words, you have only 50 to 60 per cent as much ash in a ton as you had in anthracite. Now, when you have a fuel which is more responsive to treatment, contains a good deal less ash—40 per cent to 50 per cent less—and is easier of manipulation by your cook in the kitchen, and gets heat for you quicker, and will last well over night, I think the time has come to acknowledge that coke is not a substitute but a competitor from the practical point of view, so we ought not to try to persuade people to use it as fuel because we cannot get anthracite; but rather with the view that it is a fuel which, when used, is more satisfactory. To illustrate this, I live just outside of New York and last fall I had told a neighbour that he had better get some coke, because we were going to have trouble with coal; I got him the coke and this spring he asked me if I could not get him more of that coke; he said he never had a fuel that suited him so well as the coke. I had selected the size and kind of coke he ought to have for his purpose. There is now no difficulty in getting anthracite, yet that was his attitude when he had used the correct coke for his purposes. The failure in coke has often been due to the attempt to use incorrectly prepared coke.

By Hon. Mr. Laird:

Q. How do you mean, incorrectly?—A. Wrong sizes. Correct preparation will save trouble from dust dirt, and objectionable moisture; there is one thing to guard against that we don't have to guard against in anthracite—that coke absorbs moisture, while anthracite does not—but the coke is not a substitute for anthracite; it is a competitor with anthracite.

By the Chairman:

Q. Would you say ton for ton?—A. Yes.

Q. That properly sized coke would give more satisfaction?—A. Properly sized and properly burned coke. Here is one trouble; the housewife or the owner of the house goes down and puts coke on his furnace; he puts on, say 4 shovels full, when he is accustomed to put on 2 shovels full of coal, and he says, "What an enormous amount of coke I am using!"—but he is not, because coke bulks twice as much as anthracite for the same weight, and while he seems to be using an enormous amount of coke he does not take time—no one of us does—to see how much anthracite he used last year in comparison with his consumption of coke this year.

By Hon. Mr. Laird:

Q. When you come to pay for it you would generally know?—A. If you check up your bills, but how many people sit down at the end of a season to find out how much they paid? They get an impression, "Here is this enormous amount of coke going into this furnace," and therefore they think they are using an enormous quantity.

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By the Chairman:

Q. What do you say about the two points we have heard about coke—one, that it clinkers, and the other, that it burns the grates out?—A. Well, all I can say to that is that in my own experience I have used coke about 7 years the whole winter through, as it was obtainable, and I have never had to replace the grate in any domestic furnace or stove that I ever had. Somebody in some part of your testimony here has talked about having to use a blast to make coke burn. I don't remember who it was, but that is manifestly perfect nonsense. If any one should try to use a blast I think they would certainly burn out their grates, because coke is a free-burning fuel, and on the contrary you must use less draft because it takes fire more easily, and there is more surface exposed.

Q. How would the cost compare, figuring on the cost of coking and deducting the value of the by-products from that—that an arbitrary figure, if you will, for coal?—A. In the early days, I mean before the war, conditions in the United States, generally speaking, were such that the supply of by-products obtained from a ton of coal—that is, the ammonia, the tar, the gas and the motor-fuel or benzol—would very comfortably pay for the entire operation of coking.

Q. That is, it would pay for the cost of carrying on the operation?—A. Yes; then you would have against that, of course, the cost of your coal and of your plant; in other words, the fixed charges; but in some cases under favourable conditions, the by-products would pay for those capital charges. That would depend upon conditions. In those days we used to feel that the cost of coke was practically about the cost of the coal with a little extra, perhaps, for the capital charges. But now conditions are quite different, for the reason that sulphate of ammonia sells for no more than it did before the war, roughly speaking, about 3 cents a pound; tar is a little higher than it was; motor benzol is just about the same, perhaps somewhat more; but on the other hand, the cost of plant and of labour costs are greatly increased. So no longer will the by-products pay these costs unless you can so locate your plant as to get a favourable market for the gas. There is to-day only one way that you can put yourself back into conditions you used to be in, where the by-products would in a general way pay for the carrying on of the operation. So to-day it is necessary to locate your plant where there is a market in which you can sell your gas at a reasonable price.

Q. Does that mean, for example, if you took Montreal or Toronto and the gas company would buy your gas at a certain price, a fair price, then you would be in the favourable condition previous to this new type of fuel?—A. Well, of course that would have to be gone into a little carefully before I could answer categorically, "Yes." But I could put it the other way around and say that if the Montreal Light, Heat, & Power Company would not buy the gas you could not afford to put in a plant for coking to sell in competition.

Q. Or Toronto?—A. Or whatever city it is. In other words, the situation is such that you must have a good market for the products. In the old days before the war—the by-product gas was sold in many cases at somewhere about 10 cents a thousand feet. Such prices as that will no longer justify, in Canada, the installation of a plant.

Q. That would be the unpurified gas?—A. That is a point that used to be brought up by the gas companies. They emphasized that "unpurified." The cost of purification in a large well-equipped plant is probably from around one half cent a thousand feet. In the early days of the use of by-product gas some of the gas companies used to buy this gas at about 10 cents, and they would purify it themselves, for two reasons—one was

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that they wanted to be sure it was done right. The other was, they did not want the impression to go into the public mind that all they did was to buy this gas at 10 cents and sell it at a dollar, and do nothing to it. I am speaking very frankly on that subject, to answer your question clearly. So I would not introduce the question of purifying as a factor of importance, because it runs only in the vicinity of a cent a thousand, not including fixed charges on the plant.

Q. Suppose you had coal with a good deal of sulphur content, should it not be higher than a cent?—A. It might run up a good deal higher. For instance, the Nova Scotia coals run from three to four per cent in sulphur, some of them; and then purification becomes a more important matter.

Q. You mean two cents, three cents?—A. Oh, yes, fully as much; in proportion to the increase in sulphur I should say that cost might run as high as that. It really becomes an important matter, and then you have to have specially designed apparatus to take out the great quantities of sulphur. It becomes a matter of special study when you have to come to remove such large percentages. The coal in the States used for these purposes, such as you get in Toronto and Hamilton, would contain three-quarters to one and one-half per cent sulphur at the most.

Q. There was an experiment tried—Mr. Lucas, who is here, will tell us more about it—of compressing coal, sort of stamping it; would that add at all to the value?—A. That is done a good deal in Europe, it is quite a custom there. In the United States, and in such plants as the Algoma Steel plant, they have not found that necessary, because the United States having a supply of coal of varying quality, is in such position that they can bring them together at the point of coking, and overcoming the difficulties in any given coal, whereas in England and Germany they have not done that, they have not followed the practice of mixing coals. There the coal plant is usually a subsidiary to the coal mining operation. It is not as it is in America, where the coke plant is usually located at the point of consumption.

Q. Could you tell us approximately the amount of labour required—in other words, if there was an inducement given to establish such plants as this in Canada, would not the coking process give a material amount of employment?—A. Oh, yes; that would be a very important factor, because a plant such as that at the Steel Company of Canada, or for example the one that Mr. Burns is erecting for the public supply of gas in Hamilton, would have a pay-roll, varying with conditions from 125 to 200 men, perhaps more.

Q. About what is the output of the Steel Company of Canada in coke?—A. I have the United States Government statistics here. They have 80 Wilputte ovens there, and their capacity per annum is 333,000 tons; that is about 1,000 tons a day would be their maximum. Such a plant as that would probably have 250 men at least on its pay-roll, and most of them would be men well above the common labour grade. In fact, there is relatively a very small amount of common labour in these plants. It is all more of a skilled or semi-skilled quality so if these plants were developed to any great extent the labour would be a very important factor.

Q. It would create a lot of extra labour?—A. It would be a very important factor. Of course the present situation under your order in council regarding coal imported for coking is rather unfortunate, it seems to me, for there is a penalty put upon the coal used to produce coke for the domestic consumer, while the manufacturer, the user of metallurgical coke, gets his coke without any penalty. I was sorry to see that situation when I became interested in the subject, because I would like to see the coke established for use by the domestic consumer. I do not think there is any feeling on the part of the anthracite

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users against shipping coke into Canada; I think they would rather like to do it, because it really gets the long haul; but to include coal for domestic coke under that duty as it stands is really a very serious handicap on it, for it means about 75 cents a ton on coke, and anybody who buys domestic coke is going to have to add it to the cost of the coke he puts in his cellar. I do not think that is the construction that should be put on it. I hope to see that situation adjusted very quickly.

Q. Either the coke imported should be free or the tax taken off coal brought in for that purpose?—A. The coke is free now; there is no tax. The only tax that bears on this importation is on the coal brought in to make this domestic coke, that is of special interest to you now. They seem to have selected the one thing which, to my mind, is the last thing they should have selected in the imposition of a duty.

By Hon. Mr. Laird:

Q. It seems rather peculiar that they would allow the manufactured product to come in free, and make the raw material subject to the tax?—A. Yes.

By the Chairman:

Q. You think that should be corrected?—A. Naturally, because there is a large amount of coke being brought into Canada free of duty. The manufacturer undertakes to enter the coke market; he says, "Here is a handicap of 75 cents; here is a domestic market, it is true," but he goes into the free market, for he cannot stand the handicap of 75 cents a ton on his domestic coke, so he naturally selects the easier road and produces domestic coke.

By Hon. Mr. Laird:

Q. If he is going to locate anywhere, he will locate on the other side of the line?—A. Yes.

By the Chairman:

Q. It would be a great deal better for him to make his coke in Buffalo, and send it over?—A. Yes, he would save 75 cents a ton, rather than make it a Canadian industry.

Q. That, of course, is a thing that would have to be taken up?—A. I would think so.

Q. I think, obviously, if it was dealt with the Government could correct that?—A. Of course, I recognize that your Government, like our own, is in great need of income, but the fact is that they would be losing no income, because every ton of coke that is put into the domestic market just keeps one ton of anthracite back in the States, and there is no difference, or would be no difference in the duty at all. In other words, if the duty were provided so that it would read that coal imported for the purpose of making by-product coke, or making coke in by-product ovens, would have 99 per cent remission or drawback, you would have a clear situation. Now, you have really an impossible situation, from the point of view of the manufacturer, or from the point of view of the domestic consumer, unless he can get coke from the States, which is being done at present.

By Mr. Laird:

Q. How does this Hamilton concern get over that difficulty?—A. The Hamilton by-product coke oven?

Q. Yes.—A. They would get over the difficulty by going into the metallurgical market. I know Mr. Byrnes, the President of the company, pretty well, and I think he has the point of view that he wants to be of service to his

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community, because he has always worked for Hamilton, and thinks Hamilton is a pretty fine town, and it is. All this gas, as you probably know, will be used for the supply of Hamilton.

Now comes the question of the disposal of the coke. What are his alternatives? They are two: Here is one market, a domestic market, which I think he would like to go into, because I think he is sincere in wanting to serve the citizens of Hamilton and Toronto—here is a market on which he must pay a duty at 75 cents a ton. Here is another market which is amply large to cover his production, now mainly supplied by imports from the United States, and he can get the full price. What is he going to do? One of his motives is patriotism, but it is a pretty heavy strain to bear.

By the Chairman:

Q. Now, will you tell us something of the different places where this is actually working? We have heard in a sketchy way, perhaps, about St. Paul and Minneapolis and Detroit, and the New England Gas Company and Sparrow's Point and some other places. We are told first of all that St. Paul and Minneapolis have never been an anthracite market to any great extent.—A. Well, of course, I haven't any figure on the amount of anthracite used in those twin cities, but I can say that I have been there a good many times, and that that statement is not correct. That is to say, you go into the average man's house, and he is using anthracite if he can afford it; naturally it costs him more money than it does in Scranton; but he is using it.

Q. They have displaced anthracite to a great extent?—A. To a considerable extent. Of course, there is a conservative feeling regarding any change in fuel. You know in the old days anthracite was called stone coal, and nobody would use it. We are in the same position to-day in regard to coke. Take Mr. Byrnes' case in Hamilton as an illustration again. His programme is to show person by person, in a regularly organized campaign, that this fuel is equal to and superior to anthracite. The change is so trifling that it is easily learned.

Q. You agree that education in all these things is essential?—A. Yes, but it is very trifling. Usually one or two good showings—one ordinarily and two at the most. My own cook is an Irish woman of the usual grade in that class of work—an intelligent woman but not specially educated—and she was taught in about one day, and now she says it is much easier to handle because it is so responsive. It requires less draft, a little ash left on the grates, and a little more frequent attention, because not quite so many pounds of fuel go into your fire pot. That almost covers the situation.

Q. Would there be any difficulty in such a severe climate as we have in keeping it in overnight?—A. Not in the least. I will say this. The American Radiator Company, one of the largest builders of household furnaces and supplies I know of were very much impressed by a talk they asked a coke man of my acquaintance to give them. They agreed that it was in the interests of their business that they should put out a line of fire pots somewhat deeper than the ordinary fire pot used for anthracite. It would be an advantage to have that deeper fire pot for the simple reason that you cannot get in as many pounds of coke in the ordinary fire pot as you could of coal. If we could only keep pounds and not volume in our minds, we would have a clearer idea of the relative values of those fuels. Coke is not a substitute for anthracite, but a capable competitor, and all it wants is a chance. In the city of Detroit, before the war, the consumption was three hundred thousand tons of domestic coke a year; in the city of Chicago, where they did not carry the propaganda quite so far, they had about two hundred thousand or two hundred and fifty thousand tons a year.

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Q. Domestic?—A. Yes, domestic, Detroit was the star town, because they had an intelligent class of people there, and intelligent propaganda.

Q. Was that locally made?—A. Yes.

Q. That is the Semet Solvay?—A. Yes.

Now, I want to touch on the point of types of ovens. So far as this Committee is concerned there is no particular difference between the different types of ovens. I saw in your minutes the statement that a great improvement had been made because they used to coke in eighteen hours and now they coke in fourteen hours. This change was largely due to using a narrow oven. I think in your study of this subject you should keep away from these things; they are not germane. What you want to know is whether this fuel is suitable to replace anthracite, and under what conditions it can be satisfactorily made so that capital will flow into the industry. Isn't that it?

Q. Quite. Sparrow's Point was in connection with blast furnaces?—A. Yes, they supplied the blast furnaces. I don't know how much domestic coke they are selling; if any. The bulk of their gas is going to the city for use.

Q. Take Detroit, which corresponds pretty well with some of our own towns in distance from the coal fields. Tell us something of the history of that development.—A. That development started on a small scale. First they built forty ovens. They would have a capacity of about seven hundred tons of coal; that would be about five hundred tons of coke. They started back in 1903, twenty years ago, in a small way, and got a contract with the gas company for the gas, but they didn't know how to make it or maintain the uniformity of supply and quality, and in those days the price was necessarily very low. They had quite a struggle. Their purpose was to make metallurgical coke. As they grew they saw this market for domestic coke, and by properly sizing the coke and keeping the dirt out of it, they developed this market for three hundred thousand tons a year referred to above. In the early days we used to joke the sales manager about his troubles—I was connected with that company at one time. A customer came in and said to him: "You can take that coke out of my cellar. My wife says if you don't she is going home to mother." That was simply due to the fact that she didn't know how to use it. That man was shortly after a confirmed and lifelong user of coke. The conditions we have met in Canada in regard to the anthracite supply during the last year have been great educator of the public in regard to other fuels; but we have to show the domestic consumer that this coke is not something that we are going to try to get along with, but is a better fuel than anthracite, has more heat in it per pound, and that results can be got more quickly.

Q. Is the Detroit plant profitable?—A. Yes. Detroit lost all that business during the war because the Government permitted no coke to be used except in the making of steel for war purposes. Of course, very many people went back to other fuels; some went to the cheaper soft coal, a good quality of Pocahontas, and they accustomed themselves to the smoke and dust, and hardened themselves to that, and it was difficult to get that business back.

Q. It is coming back?—A. Oh, yes, very much. Of course, last year was a great help towards bringing it back.

By Hon. Mr. DeVeber:

Q. They burn coal, I suppose, to produce the heat that makes the coke?—A. That is done in one of two ways. The ordinary metallurgical coke plant such as we have at the Soo or Hamilton, at the Steel Company of Canada, use about 35 to 40 per cent of the gas from the coal to heat these retorts. Now, if the demand for this gas, either for heating furnaces, or for use in the city, is great, producers can be substituted. They are large cylinders, lined with brick with an air blast, and coal or coke breeze or something like that can be

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used as fuel. They produce an inferior grade of gas, but it is sufficiently good to heat the retorts, and if there is a sufficient demand for gas that is often done.

Q. How much coal would it take to provide heat enough to produce a ton of coke?—A. To speak technically, it takes from two million to two and a half million British thermal units to coke a ton of coal. Translated into coal, that means about eleven pounds, allowing twelve thousand b.t.u.'s per pound of coal. But that is not done by directly firing coal into these retorts. The reason for that is that the successful operation of the coke oven is dependent upon the very accurate distribution of the heat. It has to be very carefully done so that the heat is uniform all over; then the whole charge is completed at one time and comes out perfectly coked and this even distribution of heat can only be obtained by gas firing.

By Hon. Mr. Laird:

Q. From what you state, I gather that there are two kinds of cokes made—coke where there is gas as a by-product, and then, coke for metallurgical purposes?—A. I would not put it quite that way; I think that might perhaps mislead you. All of these systems of distilling coal—that is the technical phrase—changing coal into coke, and produce this gas. Now, if you have a coal that is low in volatile matter, twenty or twenty-five per cent, you get one amount of gas; if you have coal of thirty-five or thirty-eight per cent, you get an entirely different amount. That gas is of the same composition in each case—city gas, or illuminating gas, in each case—but in one case you are making, say, foundry coke; in the other you are making, perhaps, domestic coke. You are making the gas in both cases.

Q. In the case of the foundry coke you do not necessarily use the gas for illuminating purposes?—A. It may be used for industrial purposes, but it is like all the other articles that are recovered from the process you must get all you can from these products in order to pay your expenses. As I brought out a few minutes ago, the value of these different by-products is much less than it was before the revolution in the value of the dollar. Three cents a pound used to be the price of sulphate; three and a fraction cents is the price now. If you had a plant in Montreal and there was no market for the gas, whether you make one kind of coke or another, it would not operate successfully.

Q. That is the point I have been trying to bring out. Take the case of a city like Toronto, where I imagine there are existing franchises for the supply of gas. How would it be possible for any new concern to put in the large amount of capital necessary to carry on an enterprise of that kind? How would it be possible to go into a city where there would be no possibility of selling the by-product gas, because the gas franchise is already held by the existing company?—A. The usual way of meeting that situation, which frequently occurs, is to go to the gas company and say: "We are going to make some perfectly good gas here; we would like you to buy it."

Q. It would not be possible unless they could sell to the gas company?—A. Usually not; but there might be conditions under which the other products would bring such a high price that it would be possible.

Q. I will take you just a step further. Supposing the existing gas company held the franchise, and supposing it was not possible for the new enterprise to dispose of their surplus gas to that company, would it be practicable to start a concern of that kind in a city under those circumstances?—A. There might be conditions in some places where it would, but they would not be usual. For instance, suppose you were located on the St. Lawrence river, away down below Montreal, where you had an opportunity to get a first-class Welsh coal by water at a very low price. You would then be at a very great advantage

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in the cost of your coal. It takes a ton and four-tenths of coal to make a ton of coke. Say you would save \$2 a ton on coal. You can see that there might exist conditions where there was no market for the gas, but where, nevertheless, that loss of income would be made up by the low cost of coal. Suppose you had six thousand feet of gas per ton of coal, which is the ordinary surplus, and you are selling that at forty cents a thousand. That would be \$2.40 per ton of coal. You suddenly find that the gas company will not buy that gas, and you have lost an earning of \$2.40, but if you can bring Welsh coal in at \$2.40 below the figure you expect to pay for coal from the United States, you balance that.

Q. Where you would sell the gas.—A. You would not sell it.

By the Chairman:

Q. You let it blow away?—A. Yes.

Q. Or try to get some industry to use gas?—A. Yes, you would go to the bakers, for example, or some factory using oil.

By Hon. Mr. Laird:

Q. Then you might be up against the franchise of the gas company?—A. You might, although ordinarily speaking, public interest might justify you in getting a single line to a single trade or to a certain factory. But generally speaking, you cannot successfully operate a plant under modern conditions, unless you sell the gas at a fair price. But there might be a case such as I mention. It is not an absolutely cast iron law. You have to balance those conditions.

Q. Wouldn't you consider those conditions problematical in this country?—A. Yes, and unlikely to happen.

Q. So that when we are considering this question of enlarging facilities to produce a fuel to replace anthracite, and come to the consideration of establishing coke manufacturing concerns to burn Canadian coal, supply Canadian users, and thereby keep the money in the country, when it comes to inviting capital to come in to the extent necessary to establish an institution of this kind, we are face to face, right at the outset, with this almost impossible barrier of existing franchises in most Canadian cities?—A. It is not necessarily an impossible barrier, for several reasons. One is that manufactured gas has only been marketed to a limited extent. I know of cities, for example, which are asking the gas companies to furnish gas to heat their houses. It used to be impossible, but to-day there is a very large potential market in a number of towns, some of them not very far from here, where there is going to be an important consumption of gas for heating houses. What is the reason? The reason is that they used to pay \$7 or \$8 a ton for coal, but the coal price has grown and the price of gas has not grown.

Q. May not that be because of the lack of demand? The law of supply and demand?—A. The production and sale of gas has grown enormously. But the point I am making is that there is a great potential market that has not yet been touched. In many places little manufacturers are getting along with poor coal or are burning oil. If they put in gas, under the franchise the price is held very closely to a certain figure, they can use it with good economy and they know what their costs will be. In this line there is an enormous possibility of growth. It is not going to come in a minute, but the idea is to start off these things and make the demonstration. For instance, you have one or two towns, say in Ontario, where this has been done, and as I hope Mr. Byrnes is going to be able to do it in Hamilton. A demonstration is just exactly what you are trying to get. Suppose you had one or two other places. As soon as this potential low cost gas comes in—I don't mean ten cents

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a thousand, but a price at which it can be used—immediately the market is there the capacity is going to be increased. Mr. Byrnes' company has been in the position for years and where he could not fill the demand because he hadn't the supply of gas.

By the Chairman:

Q. Does he control the present Hamilton gas company?—A. He is the president of the gas company.

By Hon. Mr. Laird:

Q. What are the returns? Is it considered a profitable business?—A. There are quite a number of installations in the United States that have not been profitable. Like any other business, it depends upon the way in which it is conducted—for example, the salesmanship in the disposal of the products. It is not a thing where you can put a plant down and make a sure fifty per cent. The conditions of manufacturing in general seem to be such that you have to have in every case sufficient capital, careful manufacturing, careful management, irrespective of whether you are making coke, glass or shoes.

Q. Do you say that if there was no opportunity to sell the by-products of gas that the proposal to manufacture coke in Canada would not be practicable?—A. I would put it less definitely than that. I should say it would be a very serious handicap to the undertaking. To say that because there was a gas franchise in any town there would be no market for the gas, would not be a correct line of reasoning. I do not know of any case in which a coke company has gone to a gas company in the States and negotiated on proper terms without having been able to make some kind of arrangement for selling the gas.

By the Chairman:

Q. Could you give the price, approximately?—A. To the gas company?

Q. Yes.—A. Let me say that my own judgment is that that is the correct way to deal, through the gas company; not to start competition with a public service. Somewhere in the vicinity of forty to fifty cents a thousand under the present condition of markets is about the price that coke companies are getting for gas.

Q. Purified?—A. Yes, but you must not stress that point of purification too much, because it is not an important point one way or another.

By Hon. Mr. De Veber:

Q. Supposing this by-product gas were supplied to the cities for forty, forty-five or even fifty cents. You say the purification would be how much? Two or three cents?—A. It would depend upon how much sulphur there is in the coal, but ordinarily a cent or two. That is included in the forty or fifty cents.

Q. We will say sixty cents. Say the gas company in Ottawa could get it for sixty cents and sell it, as they do, I think, at about \$1.60 a thousand—is not that the price?

The CHAIRMAN: I do not know what the price is in Ottawa.

Hon. Mr. LAIRD: Of course their point of view would be, at how much less than sixty cents could they produce it themselves.

The CHAIRMAN: I am told the price here is \$1.73.

Hon. Mr. DE VEBER: Look at what the gas company would be making.

The CHAIRMAN: We were told it was \$1.10. There is another point—

The WITNESS: I do not want to leave this point until I have a little more to say, if you do not mind, because I do not want you to have a wrong conception. I just want to say that I was giving you a generalization on a small town, where the amount is small. In the first place the gas company's returns per

[Mr. William Hutton Blauvelt.]

foot of main, or mile of main, are very much less in a small city than in a city like Montreal or Toronto, which is closely built up and in which large amounts of gas are used in every block. There is a great difference there. In the second place, I would not want you gentlemen to get from me the impression that all coking plants should sell to all gas companies at from forty to fifty cents a thousand, because that is not so. I was just giving you a generalization as to what prices are in the large cities in the States. Ottawa is not a good example to pick; it is small; it is not typical. If you took Toronto, Montreal or Hamilton, I should think it would be somewhere in that vicinity. And I do not want you to get the impression that if the gas companies bought their gas at forty or fifty cents they would necessarily have to sell it for sixty cents or any figure like that, because they could not do so. Also, there might easily be places here in Ontario where a coke company, in order to live, would have to have more than forty or fifty cents for its gas. That would depend upon the local conditions. Every problem has to be worked out according to its own conditions; just as when, down on the St. Lawrence river, you bring in Welsh coal for a freight rate of \$2, you have a condition which does not exist anywhere else in Canada. So each place has to be taken on its own foundation and under its own conditions and figured out by itself. But, as I see it, you get right back to the point: Here is a market now filled by anthracite from Pennsylvania, with the price at so and so. Can a coke company come into this territory and put coke into the market at the same price or, we will say, at a little less than the same price, in order that Canada may be secure in its fuel supply for its people, and that, if possible, it may use Canadian coal. The use of Canadian coal is another subject. Here is the real problem: Can we relieve Canada of the present unsatisfactory situation? Will the manufacturers bring their money here and invest it—not to sell coke at \$5 a ton under anthracite, but can they bring it in and make an even break? Can they get returns which will attract capital? For capital will not come unless it can earn something. The reason I am stressing this point is that I do not want you to get on your minds the impression that all coke plants can always sell gas, anywhere in Canada, at forty or fifty cents; for I am pretty sure, although I have not examined the situation, that in some places they cannot do so, just as the Ottawa Gas Company cannot compete in price with Montreal or Toronto, because conditions are so different here from what they are in those other cities.

By the Chairman:

Q. How small a unit for by-product ovens is commercially practicable?—
A. Say a million feet of gas a day.

Q. About how much coke would that make?—A. It would make about one hundred tons. But you must remember that, like every other small manufacturing, the costs per unit of products are much higher than in the large factories. But I made the answer as I did because I know that the builders of coke ovens have built plants as small as this to make gas and coke.

By the Chairman:

Q. The point I was trying to bring out there was whether it would be possible to consider anything of this kind in a smaller town than, say, Montreal or Toronto.—A. Oh, yes, Hamilton is much smaller. It is being installed there. Hamilton has only 125,000.

Q. How many ovens are they putting in?—A. They are putting in twenty-five, I believe. They are going to make about one hundred thousand tons of coke a year.

By Hon. Mr. Laird:

Q. They are going to sell their gas to the local company.—A. I understand that is their plan.

[Mr. William Hutton Blauvelt.]

Q. Can you say offhand how much coke is being manufactured in Canada to-day per year?—A. Yes, I have the United States Government report on the subject.

Q. What is the total manufactured in Canada?—A. According to this report by the United States Government, the total is about 2,000,000 tons a year.

Q. All manufactured in Canada?—A. All of which is for metallurgical purposes.

Q. Have you anything to show how much is being made for domestic purposes?—A. None at all.

By the Chairman:

Q. None. Hamilton will be the first one.—A. I do not know that Hamilton will make domestic coke.

By Hon. Mr. Laird:

Q. How much is imported into Canada from the United States for domestic purposes in a year?—A. I think that probably Mr. Mercur, who appeared before you a short time ago, could tell you that.

The CHAIRMAN: Do you remember, Mr. Mercur, what quantity of coke you said came into Canada for domestic purposes?

Mr. MERCUR: I think I only quoted the approximate tonnage we were bringing in for foundry purposes.

The WITNESS: The quantity is small, I know.

By Hon. Mr. Laird:

Q. Is there an ample supply of coke available in the United States for export?—A. That depends on market conditions. There has been, as you probably know, a great demand for coke during the last six months, on account of the boom in the iron business. Pig iron is at \$29 a ton. There has been a great demand for coke; so there has been some shortage. But in the United States the beehive ovens have been forced into the position of becoming a fly wheel to the coke industry. Beehive ovens are very quickly put into and out of running, and the cost for doing it is small, and they do not take any harm from being stoped. So they have taken the position of a fly wheel. A great many beehive ovens are not in operation when times are dull. They are nearly all in operation, as they were last year, when times are good. There are perhaps sixty per cent of them running. They are more or less in a rather decadent condition physically. But there is always that fly wheel; so if there is a demand they go into blast and fill it.

Q. There is an available supply there at all times?—A. Yes, and of course there is an unlimited supply of coal for the manufacture.

By the Chairman:

Q. At a price?—A. Yes.

The CHAIRMAN: Is there anything more to ask?

Hon. Mr. LAIRD: You were going to deal with the question of the practicability of Canadian coal for making this coke.

The CHAIRMAN: We have Mr. Lucas, of the Dominion Iron and Steel Company, here. He has coked many hundreds of thousands of tons and I thought perhaps we would ask him on that.

Hon. Mr. LAIRD: By the way, there was one point further, as to the necessary capital.

The CHAIRMAN: Yes, that is important.

[Mr. William Hutton Blauvelt.]

By Hon. Mr. Laird:

Q. What necessary capital would be involved in establishing an enterprise of this kind here, with the capacity of the Hamilton plant, for instance?—A. Just in round figures, you would have to have a couple of million dollars.

Q. That would be for an output of one thousand tons a day?—A. No, not as much as that. One hundred thousand tons a year is the output they will make, I think.

Q. I understood you to say it was three hundred thousand.

The CHAIRMAN: No. Twenty-five ovens.

The WITNESS: Yes. If you want that in terms of dollars per ton, you must bear in mind that the smaller the plant the higher the cost per unit the product is. So it is very difficult to give an intelligent figure.

By Hon. Mr. Laird:

Q. It involves quite a large expenditure?—A. Quite a large expenditure, because you are handling large tonnages. Now, I do not know, but I think there are very few gas companies in Canada that are coking, carbonizing, over five hundred tons of coal a day. I suppose Montreal probably does, and perhaps Toronto; but outside of those cities I do not believe there are any gas companies in Canada carbonizing that much coal. So a large-scale operation is, you might say, essential. You do not build three or four ovens. It is not that kind of operation.

By the Chairman:

Q. Twenty-five ovens I suppose, would be quite a small plant.—A. Well, not so small. There has been a development there which we have not touched on. In the earlier days of the building of by-product coke ovens they were built for metallurgical coke primarily. If there was any domestic coke made, it was incidental. Those were the days of the large unit, and there was competition among the builders to get larger and larger units, more coal per oven. They got up to twenty-five tons of coal per day per oven. The big steel corporations were largely interested and their idea was to have everything big. When attention was called more particularly to the so-called gas oven, which is practically the same thing except that it is adapted in detail to the manufacture of gas as a primary product, then it was recognized that that was the wrong way to go—the units were becoming too large for most of the conditions.

Q. You are speaking now of the size of the oven?—A. Yes.

Q. Not the number of ovens.—A. The number of ovens is just a matter—

Q. Of multiplication?—A. Yes. At the great plant at Gary, Indiana, they coke ten thousand tons of coal a day, and the bigger the oven, or the bigger the unit, the better; but when you get down to conditions for gas works, where the manufacturers began to compete for the business of the gas companies who are making one, two, three, four, or five million feet a day, then they developed very successfully a much smaller oven, which perhaps would not hold over four or five tons of coal, and have adapted their conditions to meet this new demand. So we have what is called by the builders the gas oven, as distinct from the coke oven, although essentially they are the same thing. It is mainly a matter of size.

COMMITTEE ROOM No. 534,
THURSDAY, April 26, 1923.

The Special Committee of the Senate met at 11 a.m. Hon. Mr. McLennan in the Chair.

FRANK P. JONES, Esq., President of the Canada Cement Company, of Montreal, appeared as a witness before the Committee and testified as follows:—

The CHAIRMAN: We thought, Mr. Jones, that as you had a chain of works using coal pretty well across the continent, you might be able to give us some valuable information upon the matter, the object of the Committee being to see where we can displace foreign coal by Canadian coals, with a view of keeping money in the country and developing our own resources. Would you rather be questioned or make a statement to us?

The WITNESS: Whichever your prefer, sir. I can make a statement, and if you want to interrupt and question me, I could perhaps answer and make it clearer to you. As you say, we buy coal for plants from Montreal right west into the Rocky mountains, having one plant in the Rocky mountains. Our eastern plants, we feel, should be supplied entirely by Nova Scotia coal. In Nova Scotia I of course include Cape Breton. I do not see any reason why, with the development that we all hope and look for down there, the Nova Scotian coals cannot practically take care of all the Quebec requirements and a large part of Ontario. I am now speaking of coal principally for industrial uses, not for domestic. At the same time, we need not freeze to death when we can use bituminous coal for domestic purposes. It is a perfectly good fuel for domestic use. It may be a little more objectionable to the neighbours than to the man who uses it. I may say that in my own house, with the exception of a little Welsh anthracite, I burned nothing but Cape Breton domestic coal in Montreal all last winter, and it was perfectly satisfactory.

By the Chairman:

Q. What kind of furnace have you?—A. The ordinary Daisy furnace.

Q. That is just as I have done.—A. There is no trouble about the furnace—if you have a draft there is no trouble at all.

Q. Did your household complain of dirt?—A. My household did not. There is no more dirt in the house from that, with steam heating and hot water, than from hard coal. More dirt comes out of the chimney, and the neighbours get the benefit of that more than you do. In the West, in Ontario—

Q. What plants have you in Ontario, Mr. Jones?—A. We have two plants in Ontario right near Belleville; we have a plant at Port Colborne, a plant at Lakefield, which is right north of Peterborough, on the Trent canal, and a plant up at Shallow Lake, which is twelve miles from Owen Sound.

Q. Those, I take it, are not using Canadian coals.—A. Those plants are running, and have been ever since I have been connected with the company, entirely on American coal, with the exception of 1920, when we shipped Nova Scotia coal as far west as Port Colborne; transferred it at Montreal to a small steamer, took it up and discharged it at Port Colborne. We also supplied our Belleville mill with some Nova Scotia coal, which we discharged from the steamer into cars and railed to Belleville.

[Mr. F. P. Jones.]

Q. Was that under exceptional circumstances?—A. Under exceptional circumstances.

Q. Under normal circumstances the American coal would beat out the Canadian?—A. It is much cheaper in those places.

Q. Would improvement of the waterways help to get our coal farther up?—A. The enlargement of the St. Lawrence canal would undoubtedly allow Nova Scotia coal to come much farther.

Q. Yes.—A. Because you would save the transfer, and then I think you would have the same experience as they had when they deepened the Sault canal, that is, the use of a ten thousand or fourteen thousand ton boat as against a two thousand, which divides the cost of transporting either by five or by seven. In other words, a ten thousand ton boat will transfer for about one-fifth of the cost of a two thousand ton boat.

Q. Do you happen to remember what was the barge freight up from Montreal to Belleville?—A. We have shipped coal to Belleville for a dollar a ton and as high as \$1.75 a ton. Belleville, I may say, usually takes a higher rate than Port Colborne. To Port Colborne you can ship more cheaply as a rule than you can to Belleville. At Port Colborne the boat can load up.

Q. The distance is about what?—A. To Belleville it would be about 170 miles.

Q. And the other is about 700?—A. No. Montreal to Port Colborne—

Q. No, but I mean from Sydney to Montreal is about 700 miles. It certainly would not cost anything like \$1.—A. In the old days, as you know very well, Senator, it used to be carried for 55 and 60 cents. Well, double that and you get \$1.10 or \$1.20.

Then, in our Winnipeg mill—we have a mill situated just outside the city of Winnipeg—we have used Canadian coals, that is, Western Alberta coals, and American coal.

Q. You say you are using, or you have used?—A. We have used. The Canadian coal we used, I might say, purely for the sake of endeavouring to use it, and not for economical reasons, and we have found that under existing conditions to-day it is not practicable to use Alberta coal even in Winnipeg.

Q. On the ground of extra expense?—A. On the ground that the coal costs more money per thousand or per B.T.U. than the American coal costs. In other words, if you take Alberta coal you have to use about one and a third tons of that—I am speaking of the general rule; there are exceptions—you have to use about one and a third tons of Alberta coal to equal one ton of Cape Breton coal or American coal.

Q. Is there anything peculiar in the way you use that coal as compared with ordinary steam-raising, for example?—A. The way it is fired is different; but that is not what makes the difference. When you are buying coal, ninety-nine times out of a hundred you are buying it for the heat units it contains. The question of how you fire those coals is not the important point. There are different methods of firing. We happen to fire it by pulverizing the coal and blowing it in, and immediately it goes in it gasifies. For that reason we must have high volatile matter. But Alberta coals are very high in volatile and very suitable in that respect.

Q. That is the point I wanted to get at.—A. But the Alberta coals are high in moisture content and high in ash content, and consequently low in B.T.U. And then the price at the mines is anywhere from two to three times what the American coal is at the mines.

Q. Oh!—A. You can buy all the American slack coal you want at the mines for \$1.65 to \$1.75 to-day. Now, probably the Alberta people have told you about the price of Alberta coal.

[Mr. F. P. Jones.]

Q. I do not think they told us the price of slack.—A. You can take run-of-mine: As a rule it would be from 50 cents to \$1 over slack, varying according to the demand. To-day the run-of-mine would be about 60 cents over slack, or 75 cents at the most. As a matter of fact, we tried to buy some western coal inside the last month for our Winnipeg mill, and on the best terms we could possibly get for western coal it would cost us \$9.50 a ton f.o.b. cars, our mill at Winnipeg. It figures out 77 cents per thousand B.T.U. That is the way we always naturally look at it. If you are buying coal in large quantities you are compelled to look at it that way. We have bought American coal there which figures out at \$7.74 per ton f.o.b. cars Winnipeg, and that is 59 cents per 1,000 B.T.U. If you put both on the same basis, that is, use as much Alberta coal as will equal one ton of American, you will find there is about \$4.90 per ton in favour of the American coal. It seems a large sum of money. That is the reason we are burning the American; not because we want to.

Q. Is that Pocahontas?—A. No, that is not Pocahontas; that American coal is Pennsylvania coal.

Q. That of course would decrease as you get into the mountains—as you go farther West.—A. As you get farther West that decreases. The cheapest rate we have from the West to Winnipeg—I said “we have,” but that is incorrect, sir—the cheapest rate the coal operators have is \$5.10 to Winnipeg. That, as you see, means they are basing their slack coal at the mines at \$4.40, as against \$1.65 to \$1.75 at Pittsburgh, Pennsylvania. The American freight rate—

Q. One moment.—As I understand the situation, you asked for prices from both of them. This is a recent transaction?—A. The prices I am giving you are from a transaction that took place this month. Not only did we ask for prices, but we delayed buying—gave instructions that we must buy Alberta coal if it were possible to do so; and when everything was boiled down I simply had to throw up my hands and say, “We cannot do it.” You can buy Cape Breton coal, I imagine,—slack coal—for about \$5 in Montreal.

The CHAIRMAN: Do you happen to know, Senator Webster?

Hon. Mr. WEBSTER: That is about right.

The WITNESS: Now, that is true, and the other coal costs \$4.40 in the western part of Alberta. You are talking about supplying Quebec and Ontario. It seems to me you are facing in the wrong direction. You should look to the East.

The CHAIRMAN: Of course the effort that is being made now is on domestic coal.

The WITNESS: Most of the coal in Eastern Alberta is a lignite. As you go West you get true bituminous coal. It is a question of using bituminous fuel for domestic purposes, which is quite practicable, and, except for the smoke over the big cities, I do not see any serious objection to it. But then I say that the Cape Breton coal contains more B.T.U., excepting the Crows Nest coal, which is about the same as Cape Breton, and therefore if Cape Breton coal can be bought in Montreal for about 50 cents more than is charged at the mines in Western Alberta, it does not seem logical to look to Western Alberta to ship to the East.

Q. As I understand what you say, that would point really to the fact that the cost of production in the West, or the prices that the operators are asking, are the very serious difficulty, even in getting the Manitoba market.—A. At the prices they are asking from large buyers they are not able to compete in the Winnipeg market. As I say the difference on slack coal, for instance, is to-day about \$4.90 in favour of American Coal. That is, it seems to me, almost insurmountable.

Q. We used to count 10 cents or 25 cents as sufficient to turn business.—A. Naturally. I honestly believe that the Western coal operator is deserving of every help that we or anybody else can give him, and I think it is our duty to give him help, but I do not think it should be applied in the wrong direction. I do not think you are going to give any help by taking \$500,000 or \$1,000,000 or \$2,000,000 out of one pocket and hauling coal at a loss to a market you cannot retain; but if you can develop his local market for him you give him a permanent market and help him in a way that will really do him good. At the same time I think, if I may say so, sir, that the Government should do like the Lord,—help those who help themselves. There is no use in helping a man if his proposition is an impossible one, or if his costs are outrageous. They tell us—I do not know why it is, but any Hungarian or any Italian or man of any other nationality working in and about those mines makes a wage double what a man working on a farm makes; not for underground work, but on the surface. Why should he? Their answer is that he gets only 150 days' work in a year. My answer to that is that the best miners that I have ever seen have been fishermen and farmers. The Lord put that coal there and it is necessary to burn it in the winter. Why cannot that coal be mined in the winter and why cannot the miner help the farmer in the summer, and, instead of working 7½ or 8 hours a day, and loafing half the year, work like the farmers the year round and earn a living? I think that the mine operators have been up against it because the union fixes a maximum wage for a minimum amount of work, and they want to make enough money in 150 days to live for 365 days. Now, if that is correct, sir, I cannot see that any assistance that the Government is going to give them will do any permanent good.

By Hon. Mr. Webster:

Q. Is there any reason you know of why their coal should cost \$4.50 f.o.b. cars at their mines, as has been indicated by some previous witness?—A. None excepting the reason that the mines are operated from the headquarters of the union in the United States and not by the operators, and that our Governments have not given the operators protection. They have allowed picketing and allowed men who wanted to work to be prevented from going in. I think that is really the root of the trouble.

Q. Are there too many coal mines operated in Alberta?—A. To run steadily?

Q. Yes.—A. I think there are undoubtedly.

By the Chairman:

Q. That of course is a thing that has gone through every coal field.—A. Every coal field.

Q. It was true in Cape Breton. It is very true in the United States.—A. The cure for that, it seems to me, Senator Webster, is two-fold. If they can cut their price of producing coal—I was going to say, cut it in half, and there is no reason why they should not—they are certainly going to be able to come farther East. If the Government can help in two ways, by settling the country and by developing their local market for them, that overdevelopment will be rapidly overcome.

By Hon. Mr. Webster:

Q. If their mine costs were equal to those of the American operators, there is no reason why they should not have a greater market for their coal?—A. If their mining costs on their coal were the same, and if we assume that both make the same profit, well, they would be selling their coal for \$2.75 a ton less than they are to-day.

Q. According to your information are there any physical differences that call for that extra cost of mining?—A. Not outside of the Crows Nest and some

of those mines where they have these heaves in the mountain. I think there is a difference there, but outside of that there is none. I do not see any reason why the Alberta coal should not be produced as cheaply. Now, I speak subject to correction, and without having gone into the matter in detail, but I would say that if the Alberta coal could displace American coal in Winnipeg and American coal at Lake Superior, it would take the whole output, nearly.

By the Chairman:

Q. The whole output?—A. Yes. They would not be suffering from this side. At the same time, if you owned a mine or ran it privately and found yourself losing money, or not making money, as is the case, I believe, with a great many of those mines, and you found that you were tied up by want of protection and by unionism, so that you could not reduce your costs or operate the mine the way you wanted to, you would naturally look around for some means of escape, but I do not believe you would look 3,000 miles East and pass a market of 1,000,000 tons on the way.

Q. Where is that market?—A. The market is in Winnipeg and at the head of the lakes.

Q. Oh, yes.—A. Now, if the railways are going to give an indirect bounty by hauling this coal at rates less than those at which they haul other commodities shipped under similar conditions, why not make it apply first to Winnipeg or the head of the lakes, where there is a chance of developing a market which they have some hope of retaining? Of course trainload lots are no more applicable to train loads of coal than they are to grain and a hundred other commodities.

Q. Your view then would be that with the best will in the world to use Canadian coal, your company, or yourself, have been forced to buy American coal, largely on account of price?—A. Yes, entirely.

Q. Entirely?—A. That is true of every plant we have excepting our plant in Exshaw, which is situated just within twenty or thirty miles of Banff. We are using Alberta coal there.

Q. Where it is competitive the Americans are beating out?—A. Yes, they are beating out so far that there is no comparison.

Q. That there is nothing?—A. Nothing to it.

Q. No—A. No hope.

Q. No manager would be justified in doing anything?—A. He would not be manager long if he did it.

Q. And you ascribe it to the cost of production and the selling price as the most important elements?—A. The cost of production is most important. The cost of production also makes the mines idle for a greater period in the year than they would be if there were a lower cost of production. So reduction in selling price and reduction in cost would also give them a greater tonnage.

The CHAIRMAN: Are there any other questions?

By Hon. Mr. Webster:

Q. From your previous experience in the Nova Scotia coal fields, Mr. Jones, you are of opinion that the Nova Scotia mines can take care of the Maritime Provinces and Quebec and should take care of Ontario in any coal crises that may occur?—A. My experience down there makes me believe that the areas are amply sufficient to take care of the Maritime Provinces, of Quebec and a large part of Ontario. But we are not developed to do it. Their production, as you know, has been going down rather than increasing, in late years. But if Ontario and if Quebec feel that for any reason, good or bad, they must be independent of American coal, it would be, I think, much more logical, commercially, to look there than it would be to look to Alberta, because in the one case you have water-

[Mr. F. P. Jones.]

ways coming right to your door, as against the rail haul, and you get cheaper production, evidently, and better coal—higher B.T.U. per ton.

Q. That would apply for domestic purposes as well as for industrial plants?—A. Taking the analyses of the coal, yes. Both give high volatile coal, and Cape Breton coal runs over 13,000 B.T.U., which is considerably higher than the Alberta coals. I may say right now there is a great deal of public opinion that is not just to the Cape Breton coals. That is, Cape Breton coal is spoken of as something inferior. Now, Cape Breton coal is a steam coal and in B.T.U. is not inferior to American. For certain metallurgical work, in which you want low sulphur, it is inferior because it is higher in sulphur content. But it is a good heat producer. Last year in the Montreal mill we used about 100,000 tons of Cape Breton coal, and the heat producing quality was just as good as that of any American coal that we had had delivered in Montreal, and better than the English coal.

By the Chairman:

Q. That is, better than the English coal you get out here?—A. I am speaking of the English coal that comes out,—that we have received.

By Hon. Mr. Webster:

Q. Disregarding the question of price, the Western Provinces can take care of their local markets.—A. Oh, undoubtedly.

Q. That is unquestionable.—A. More than taken care of them.

Q. Then the situation resolves itself largely into a question of cost of production and transportation?—A. And transportation; and, as I said, Senator, it seems to me the logical thing is to enlarge your circle for western coal gradually—to take in Winnipeg and the head of the lakes. In my opinion, the greatest benefit that can be conferred on the western coal producer is to increase his local market by developing that country.

Q. There has been some suggestion made that the National railways might reduce the cost of handling coal from Alberta to Ontario by about 50 per cent, I think. The figure given us was \$12.75.

The CHAIRMAN: It was other people making figures for the railways; it was not figures made by the railways.

The WITNESS: I hope those figures are correct and that they can reduce the cost of handling not only coal, but all other commodities. We would all feel relieved if they could. But if they are going to handle Alberta coal at rates proportionately lower than those at which they are handling other commodities, it comes right down to the same thing as if your Government were giving a bounty to the coal producer in Alberta, and nothing else. If you want to do that, give the bounty direct and let us know where the cost is.

By Hon. Mr. Webster:

Q. And you think it should apply to the farmers as much as to the coal operators?—A. It would be more beneficial to the country.

By the Chairman:

Q. In other words, it would be temporary only, because of the pressure of other interests?—A. Absolutely. Naturally, if you are going to haul coal for half the present rates, when under present rates the railways are showing huge deficits, I should be surprised if any farmer in the West did not demand a reduction of the rates on his grain. I know I would certainly demand a reduction in our cement rates, because we can ship in trainloads better than most of the mines can.

[Mr. F. P. Jones.]

Q. You refer to the volume of business you give the railways?—A. Yes. We give them more than the coal mines, and most of those Western coal mines do not produce enough to ship a trainload every day without holding the cars to be loaded. The farmer does that with his grain elevator, and so do we with cement. It may be wise to help the mines, but I hope that it is done directly, by direct vote, and not indirectly, in such a way that we cannot trace it.

By Hon. Mr. De Veber:

Q. The farmer has already had a great reduction in railway rates in the Crows Nest Agreement.—A. Yes, in certain sections, undoubtedly.

Q. The coal operator has not had any reduction.—A. The coal operator to-day has a much lower rate, sir, than we have—much lower. Now, if that is going to be further reduced, we shall be compelled in protecting our own interests to apply for a reduction of the rates on cement.

By the Chairman:

Q. Well, cement is a different class. Is there not a justification there in regard to coal?—A. Cement is not selling so very much more over the price of some coals here per ton. Of course it is true it requires a box car instead of an open car.

Q. And there is the liability to damage?—A. Well, we would take that liability in exchange for a reduction in rate. We would assume it. And it is not only cement, sir; it is a thousand other articles.

Q. All manufactured goods?—A. All manufactures of what you might call cheap tonnage goods. Take the steel mills: take rails.

Q. Take rails from Sydney. That is very important.—A. Very important; and wire rods or steel billets—any of those commodities.

Q. Your view would be, then, that the form of assistance should be rather in the way of a bounty or bonus on coal shipped beyond a certain district, rather than a reduction of rate?—A. I would say that if it is necessary and wise to give a relief in that respect it would be much better to give it direct in the way of a bounty than to reduce rates out of proportion with other rates. I am not prepared to discuss whether your coal rates are too high as compared with others, or not. They may be or they may not be, but rather than reduce them so that they would be absurdly low as compared with the rates on other commodities, I think it would be much better, if you want to assist, and assist immediately, to give the assistance in cash on coal shipped beyond a certain radius.

By Hon. Mr. Laird:

Q. How would you justify the fact that under the bounty system the Western people would be paying for the supply of coal for Eastern people?—A. Well, I am not attempting to justify it, sir.

Q. Under the bounty system that would be the logical effect. How would you justify it?—A. I do not justify it.

Q. You recommend it?—A. No, I do not recommend it. I have not made myself clear, sir. I say that if you come to the conclusion that it is wise to give that assistance, it is better to give it in a straight bounty than to give it indirectly by fixing absurdly low rates on the railway which you happen to own. Either of them is a bounty.

Q. Yes. You cannot expect the railway to transport coal or any other commodity at less than cost.—A. They should not.

Q. They probably will not do it.—A. I hope not.

By Hon. Mr. Webster:

Q. You do not see any chance of the Alberta operators invading the Ontario market?—A. You mean by Ontario, Toronto and that section?

Q. Yes.—A. None whatever.

By Hon. Mr. Laird:

Q. Are you referring to bituminous or to domestic coal?—A. All the Alberta coal is bituminous, practically.

Q. Of course the Alberta people do not claim to be able to ship bituminous. They would abandon the idea of shipping bituminous.

The CHAIRMAN: Better call it steam and domestic.

By Hon. Mr. Laird:

Q. They say their hope is to be able to ship domestic coal.—A. Even when they ship domestic coal, their coal is either bituminous or lignite.

By Hon. Mr. Webster:

Q. I think what Senator Laird has reference to is coal in competition with American anthracite for domestic use, and not for industrial purposes.—A. Of course the Westerner is not going to compete with bituminous coal against American anthracite; he is going to compete against American bituminous, because the American bituminous can be used just the same as the Western.

By the Chairman:

Q. There is less soot and smoke, they tell me.—A. Well, there may be.

By Hon. Mr. Laird:

Q. There is a great difference between bituminous and the Western coal that we call domestic or soft coal.—A. You can tell the coal pretty well by analysis.

Q. We can tell by practical use. We have been using it for twenty years. It is used for entirely different purposes and it is used with entirely different results.—A. Of course you understand quite well that Cape Breton coal or American bituminous coal will do very well for domestic use. Take the Maritime Provinces; there is no anthracite used there; it is all bituminous coal. We do not hear any complaints from them. They are quite happy with it.

By Hon. Mr. Webster:

Q. Ontario would be the natural market for Nova Scotia coal, rather than for coal brought in from Alberta, would it not?—A. Why, if Ontario is going to use domestic coal, my opinion is that she certainly will use Eastern and not Western coal. I am speaking of Eastern Ontario, not the district around Fort William.

Q. No.—A. But it seems to me that the Alberta miner can get immense relief—and he is entitled to some relief—by getting the Winnipeg market and the market at the head of the lakes, and by getting assistance to help production at a reasonable cost.

Q. Have you any idea of what would be the quantity of American coal imported into Fort William, for distribution in Manitoba as well as in Ontario? About?—A. I should think it would be well over 1,000,000 tons.

Q. Well over?—A. I should think so.

The CHAIRMAN: Probably Mr. Stutchbury could tell us that.

MR. HOWARD STUTCHBURY: I could answer that question, but I have not the figures with me.

By Hon. Mr. Webster:

Q. One witness gave us 2,000,000 tons?—A. It is approximately that. The great bulk of that is steam coal, railway coal which they use east.

Q. Why don't they get after the Government first, if it is Government steam coal?—A. No, that is all C.P.R. The Canadian National Railways are using Alberta coal as far as Chapleau.

By the Chairman:

Q. That is, they land the coal at Fort William, but it is used east and on the north shore of Lake Superior?—A. Yes.

By Hon. Mr. Webster:

Q. The Canadian Northern some years ago brought in a very large quantity of coal from Pennsylvania to Fort William?—A. Yes, but they are using very much less now.

Q. Is not the Canadian National Railway importing coal from Pennsylvania?—A. Yes, but not to the extent they were.

Q. Do you know what proportion?—A. No; I could get those figures.

(To Mr. JONES.) Q. Have you any information, Mr. Jones, as to briquetting plants, as far as domestic coal is concerned—whether it would be practicable and profitable?—A. Well, they are briquetting at the Hillcrest Collieries on the main line of the C.P.R., and I believe they are selling it to the railway. Whether they are selling domestic I do not know. Some years ago, when I was in Cape Breton, I had occasion to look into a briquetting plant, and in fact purchased one. Where you have small coals, and where you have the pitch or the tar necessary for the binder I believe it is quite practicable to do the same as they do in Europe, and you have considerable advantages, because you can ship that coal, or store it practically for any length of time without deterioration, but the other coal you can not. I think for a lot of our fine coals that is going to be a future solution, the same as it was for Belgian coal, which would be practically on its back without briquetting. When the pitch has to be hauled the question of economy of production comes in. In the Crow's Nest field they have beehive ovens instead of by-product ovens, but I think by-product ovens there would help that whole district.

Q. Should the briquetting plant be erected alongside the coal mine, or at a centre of distribution such as Toronto?—A. At the mine, beyond question, because then you can briquet as your market demands more. If you get your plant where you produce a surplus of slack you can briquet it and stock it, but if you have your plant at the point of distribution you limit your choice. More than that, you can briquet cheaper at the mine than at a centre.

Q. As a manufacturer, have you experienced any serious difficulty in getting fuel?—A. Oh, they are tumbling over each other to give it to us this year.

Q. And last year?—A. Last year there was no serious difficulty, but in 1920 of course there was.

By Hon. Mr. Laird:

Q. What was that caused by? Transportation?—A. The trouble in 1920 was transportation and anticipated trouble from strikes, but mostly transportation. In 1920 ordinary slack coal in the United States that usually sells at \$1.75 went as high as \$10 at the mines for shipment. It was an abnormal condition.

[Mr. F. P. Jones.]

By Hon. Mr. Webster:

Q. Those would be conditions that would rule all over the world?—A. Oh, yes, it was exceptional conditions. I have never in my experience seen anything like it before, and hope I never will again.

Q. So we may take comfort in the thought that we are fairly well provided with heating fuel?—A. Oh, I don't think that we Canadians are going to freeze to death if we have notice, and I cannot believe that any friendly nation would cut off the supply without notice.

HOWARD STUTCHBURY, recalled and examined.

By the Chairman:

Q. Are there any points that Mr. Jones touched on with regard to the western field that you could explain shortly?—A. I think that Mr. Jones is not quite seized of all the facts in Alberta coal, if I may say so.

Mr. JONES: I don't pretend to be.

The WITNESS: I am thinking of the market that you say we might have already secured. The domestic market in Winnipeg is now almost entirely supplied with Alberta coal. Three years ago we had probably 15 or 20 per cent. This year we have almost 95 per cent. We have nearly 60 per cent of the steam coal market. Our difficulty in the steam market is that the head of the lakes is a dump market for the west; that is, whenever there is a surplus of American bituminous coal the head of the lakes is a pretty safe dump, and it is sold there at any price they can get. I have seen coal sold that would average at the mine \$1.30. That is not the cost of production of American coal.

Mr. JONES: We did not buy any cheaper in the west than we did from eastern markets.

The WITNESS: You would not on tracks, but there is the dump market.

FRANK A. COMBE, Consulting Combustion and Steam Engineer, Southam Bldg., Montreal, called and examined.

By the Chairman:

Q. You are Chairman, we understand, of the Montreal Committee of the Engineering Institute, looking into all matters connected with the economical burning of coal?—A. Yes, for domestic purposes. We are confining ourselves to the domestic problem in Montreal alone. The objectives of our Committee are as follows:—

(1) To take stock of the various fuels available in the Montreal district, and to provide authoritative information as to their relative heat values, costs and special characteristics.

(2) To consider the suitability and limitations of the existing furnaces and stoves for burning these fuels, with any device designed to render them more effective.

(3) To study, and to make recommendations regarding modifications or changes in design of furnaces, which could advantageously be adopted in the case of future installations.

(4) To furnish simple instructions in the methods of using different fuels to the best advantage.

(5) To co-operate with Governmental or other bodies in such ways as may appear desirable or beneficial.

[Mr. F. A. Combe.]

It appears to us that every locality has its own particular problems, and we can do some useful work in clearing up misunderstandings of people, particularly at this time when they are endeavouring to get away from burning American anthracite. During the last season a great deal of misrepresentation, or misunderstanding, has existed, particularly in regard to any Welsh coal that has been sold. People have thought that they were getting the best Welsh coal when they were really getting dry steam coal. It was good steam coal, but it was not as suitable for domestic purposes as the real Welsh domestic fuel. There is one other thing that they have had some difficulty with, and in which we think we can give some help by giving out information, and that is the question of oil. There have been innumerable oil burners sold, and some people have put them in when their conditions were not suitable for burning oil at all. Others have not realized just what oil-burning means, and they have probably gained an impression which would have been avoided if they had known beforehand what type of oil-burner to put in, or whether their conditions and size and installation were proper for oil, or whether oil could be considered. Fundamentally, we have really in mind a service to the public, the consumers—to encourage and educate the public in the better utilization of the different fuels which will be available. We are not concerning ourselves so much with how to get them; there are others more qualified to do so than we are; but when we find the fuels that are available in Montreal, we will do our best to encourage their use in the best way.

Q. What progress have you made along those lines?—A. Well, up to the present we have not done very much more than to collect data, for the reason that this Committee was only formed during February, and we did not think that it was advisable at that time to put out anything in the way of snap rules which we might make up in a hurry so close to the end of the heating season. What we have in mind now and the near future is that the consumers will be wanting to know something about the different fuels that are available to put in their bins.

Q. Those are at present, in Montreal, what?—A. We have the American anthracite, and we have a number of available substitutes such as coke or Welsh anthracite. We have been interesting ourselves in finding out, as far as possible, what are the chances of getting Welsh anthracite, and what are the chances for the future in getting a supply of coke for domestic furnaces. We consider that coke and Welsh coal are the logical substitutes for American coal, for domestic use. We look upon straight bituminous coal as something which can be used as an emergency, but something to be avoided if possible, for the furnaces are not adapted to burning bituminous coal, but are designed particularly for burning American anthracite. The combustion chambers are not big enough, and while bituminous coal can be burned, it cannot be efficiently burned, and it cannot be taken up like anthracite, unless we build our furnaces to do it.

Q. It is not the most desirable way of utilizing that coal?—A. No.

Q. What about gas?—A. Gas, of course, is an admirable fuel if it can compare at all in price with coal, but the present indications are that we cannot see that it will be so. You cannot get more heat out of a fuel than there is in it, and you cannot beat coal, if you can get a supply of coal, by gas. Of course if we could get natural gas, or if we could get gas supplied at a price, the people would use it.

Q. But that would be distinctly lower than the current prices, to make it much of a success?—A. Yes; you would have to cut it in half.

Q. To get a really wide market for it?—A. Yes, to get one that is going to make people take it up, comparable with the cost of heating with coal.

[Mr. F. A. Combe.]

Q. What about oil?—A. Oil we look on as more or less of a passing phase. It is another of these emergency fuels. The price and the continuous supply of oil is very uncertain.

By Hon. Mr. Laird:

Q. You mean fuel oil?—A. I mean the oil that would be used for domestic purposes, which runs from 30 to 36 Baume. Most domestic oils are not safe for burning, but heavy fuel oil. They burn a light oil, not a kerosene oil.

Q. That is a higher grade oil and more expensive than what is commonly known as fuel oil?—A. Yes, it runs about 12 cents a gallon.

Q. As against what for fuel oil?—A. Fuel oil is usually bought as low as 7 or 9½ cents, and there is not much used for domestic purposes, because it would have to be higher than that if it is to be carried in a furnace. But it is not oil that will be taken up very much, because it needs a special equipment for burning the oil.

By Hon. Mr. Webster:

Q. Would the refineries at Montreal and St. John and other places in the eastern provinces not be able to turn out cheaper oil for domestic fuel purposes?—A. They will not make any contract or make any statement about what they will do at all. That is why we cannot get anything definite.

Q. You have been in touch with them?—A. Yes, but they will make no statement about what the fuel situation is going to be at all.

Q. Are the Government supporting your efforts in obtaining this information, or how is your Committee to be operated?—A. At present we are anxious to obtain co-operation and support from wherever we can get it. I might say we are not actually recognized as much as we hope to be, because we have only commenced.

By Hon. Mr. Casgrain:

Q. Who is paying for this work?—A. It is partly voluntary. We have no funds, and that limits our activity. The Engineering Institute of Canada is a technical society, and this is a Committee of the Montreal Branch. We only have such funds as that branch have at their disposal and feel can be put to this purpose. It means that those who are doing this work are doing it gratuitously. If the Government would support us we could carry our field of endeavour very much further.

By the Chairman:

Q. Along what lines would you suggest?—A. There were several ways suggested. One was that we could constitute ourselves as an authoritative body to make tests and pass upon such devices or improvements as may be brought out from time to time for domestic service. Another was that we might encourage or make recommendations, or even enforce some regulations or ordinances regarding smoke nuisance and economical use of fuel. You cannot compel a man to burn fuel economically, but there are certain ways in which you can restrain volumes of smoke. Another way that has been suggested is that the Government could provide, for a supply of fuel, some regulations similar to the Pure Food laws, or something like that, that would restrain unscrupulous—perhaps that is too hard a word—but dealers who are unintentionally selling fuel that is not up to the standard that people think they are getting when they purchase it—I am particularly referring to Welsh coal. There may be ways of specifying or grading the coal so as to guarantee to the consumer that he is getting what he is offered.

[Mr. F. A. Combe.]

By Hon. Mr. Casgrain:

Q. But suppose a merchant buys it in the coal yard and it has 25 per cent of ash, how is he going to come out?—A. Speaking particularly about Welsh coal, a dealer will order the coal from Wales, and they will send him the coal he asks for. If he asks for dry steam coal they will send that. Well, he could not sell that as the best fresh anthracite.

By Hon. Mr. Webster:

Q. Have you any instances where fuel was not up to the standard?—A. A number of instances have been reported in Montreal. There has been a considerable number of complaints in Montreal the last season, of people thinking they have got Welsh anthracite when they have not. As a matter of fact very little Welsh anthracite was brought to Montreal after last summer.

Q. The complaints come from the consumers?—A. Yes.

Q. Those in the trade would know whether they are getting the right coal or not?—A. Oh, presumably, yes. While I do not want to mention the word unscrupulous, there is not enough known about the different grades of Welsh coal that are suitable for domestic purposes. No doubt if you get the real Welsh coal it cannot be beaten.

Q. You are speaking about the domestic?—A. Entirely, Welsh anthracite.

Q. Are your operations for obtaining information confined to the province of Quebec?—A. We are dealing entirely with the local problems of Montreal.

By the Chairman:

Q. We had a coke expert here yesterday who protested against coke being described as a substitute for anthracite coal?—A. Well, he probably had some grounds for it.

Q. He says it is an alternative, and on the whole a superior fuel?—A. I am inclined to agree with him.

By Hon. Mr. Casgrain:

Q. Superior to anthracite; is that right?—A. I am inclined to agree with him, yes. I burned this year some of the heavy process coke and some anthracite Welsh coal, and some of the American anthracite. Certainly to compare with the quality of American anthracite we have been getting recently—which we know is not normal—it is undoubtedly better fuel. Even compared with the normal supply of American coal that we would get at this time I think coke of the quality of heavy process coke is at least equal to that.

By Hon. Mr. Laird:

Q. What does that cost in Montreal?—A. \$17.25, that is the heavy process coke; it is foundry coke, metallurgical coke. As a matter of fact they are not putting it on for domestic purposes. I bought some because it has been sold and used as a foundry coke, just to see what it could do. That is most excellent coke.

By Hon. Mr. Casgrain:

Q. The coke you got from the Montreal Light, Heat & Power Company, is that any good?—A. I burned that, too.

Q. Is it good?—A. No, it is not comparable with the other. It is perfectly serviceable coke, but it is not such a high grade coke as this other coke.

[Mr. F. A. Combe.]

By Hon. Mr. Webster:

Q. Ton for ton, that Montreal gas coke would not be equal to a ton of American anthracite coal for domestic use?—A. No, I don't think so.

By Hon. Mr. Casgrain:

Q. What proportion?—A. It is very difficult to say on account of the varieties you would get; there may be a variation.

Q. What about the B.T.U.?—A. The B.T.U. would be higher in the anthracite coal, but coke can be burned with slightly higher efficiency; you can get more percentage out of coke if it is properly fired. There comes another point—about the proper dealing with the coke. These different fuels have to be treated differently in the furnaces. Each requires special treatment.

Q. The coke burned out all my grates in the apartment this year?—A. If they did it is because the fireman was not used to burning coke. If he was used to burning coke in the way in which it should be burned there is no reason why he should burn the grates out.

By Hon. Mr. Webster:

Q. Have you any comparative figures as between the various fuels that might be used for domestic purposes?—A. We are getting together data for that now, but I would not like to say we have anything to give out. As far as the metallurgical coke and the American anthracite are concerned, I think they really run about on a par. If you get the best Welsh coal it is higher, it is better.

By the Chairman:

Q. Better than anything?—A. Better than anything, and of course, being better, it is worth a higher price.

By Hon. Mr. Webster:

Q. I think Mr. Ellis mentioned that he thought Welsh anthracite was worth \$3 a ton more than the American anthracite in burning properties?—A. I think it is.

Q. Could you develop any further your comparison of relative values of fuels, in regard to oil or peat or briquettes or any other well known fuel?—A. When people are selling oil burners they are apt to compare the highest efficiency oil burner with the lowest efficiency coal; but taking the average, I think it can be taken that around 120 gallons of oil or equivalent would probably be on a par with a ton of American anthracite.

Q. Could you give us the comparison in dollars and cents? What, in your opinion, is the most economical fuel for the people of the province of Quebec, or Montreal, to use?—A. Some things we are collecting data on now, and we do not want to definitely state. If we can get a supply of good coke it is certainly comparable with American anthracite. Now, Welsh coal, it depends entirely on the price; I don't know about \$3 a ton, but the best Welsh coal, I believe, might be considered \$3 a ton better than the average American coal, at any rate, what we have been getting recently.

By Hon. Mr. Casgrain:

Q. American coal is selling at \$18, though?—A. Well, selling at \$18 would bring the other up.

[Mr. F. A. Combe.]

By Hon. Mr. Webster:

Q. Take it on a basis of \$15 in Montreal?—A. If I could get American coal at \$15 in Montreal I would certainly get Welsh coal at \$18 if I could get it.

By the Chairman:

Q. What would you pay for metallurgical coke?—Q. I would pay the same price as I would for American anthracite.

By Hon. Mr. Webster:

Q. Would you with a furnace not equipped to handle and to burn coke?—A. The furnaces are equipped to burn coke.

Q. I understood you to say in the beginning of your evidence that we were not equipped here in Canada to burn coke?—A. Oh, no; if I did, I didn't mean to give that impression. Coke and anthracite can be burned in the same furnace. If you are going to burn the softer grades of Welsh coal they need some modification, or any bituminous coal. It is bituminous coal I mentioned particularly as not being suitable for it; the combustion chamber is not big enough, and they shut up the heating surface.

Q. At what price would fuel oil be in comparison with anthracite?—A. Well, I have just made a memorandum, taking a typical example of about the limit where you could start to burn oil; that is, in a house where you would normally burn 25 tons of coal in a season. Your balance sheet for 25 tons at \$16.50 would be \$413. Taking a furnace man for six months at \$15 would be \$90 added to that, which would come to \$503 for burning coal. For burning oil the figures would be—3,000 gallons at 12 cents, \$360. Gas and electricity and that sort of thing to be considered in putting in oil burners—there is certain equipment necessary either for pumping the oil or for a pilot light for lighting the oil, or something which amounts to the same thing—and for that I put down \$40. Interest on the investment with a little for depreciation comes to \$109; that is, interest at 7 per cent on \$700, \$49; depreciation, 10 per cent on \$600, because the oil burner in 10 years will be out, though the tank will not be, that is \$60; a total of \$509 for oil, as against \$503 for coal.

Q. In heating with oil you would have to have somebody in the house to look after the oil furnace?—A. Well, if someone in the house is going to look after the oil furnace it is not going to be practical.

Q. As a rule a man can put a few shovels full of anthracite on his furnace in the morning, and leave it till he comes back at night, but he could not do the same in an oil furnace?—A. That is the claim, but there is no necessity of attending to it at all times in the day.

Q. No, but it requires some attention?—A. It requires more intelligent operation than the coal.

Q. This Committee is desirous of giving information to the public as to the various methods and the best methods of heating their houses, especially domestically, and what we would like to give out would be practical suggestions that would help consumers to decide for themselves what they could use and how it should be used?—A. Well, that is one of the objectives that we propose to do. There is one difficulty that we are up against there. Once you make a comparison of prices in values of fuels and what they might pay for them, it means that we don't want to go on record really as telling everybody that one particular fuel is the only thing they can burn. It means that there are certain advantages and disadvantages in most of those fuels, and we will make a statement of what they are. It is up to the people, then, to see what they are buy-

[Mr. F. A. Combé.]

ing, and whether they will be all brought to the same basis of price or not I do not know.

Q. There are certainly some conveniences attached to using oil?—A. Yes; its cleanliness for one, freedom from smoke, etc. The disadvantages are that most of those oil burners make quite a noise, and if they are not burned efficiently they may make quite a smell.

Q. What would be the position if your electric current is off for five or six hours in the middle of winter, as it was this year in Westmount?—A. Of course most of them have automatic arrangements which would stop the oil.

Q. But you could go further than that; will your pipes not freeze?—A. Well, it is exceptional that in any house reasonably built the house is going to freeze when pipes are hot in six hours.

Q. But in the middle of the night, after your heat is shut off?—A. In a house with the windows open you are liable to freeze the radiators.

Q. Then there is some danger from that source?—A. Yes.

Q. Has the gravitation system been successful where it has been used, with the oil in the basement?—A. With the light oils, usually there are many of them in the market; but most of them, for getting efficient burning, use some motive power for pumping or forcing the oil out of the jet.

Q. From your experience is gravitation really safe for the heating of your house?—A. It is not.

Q. Would it be safe with an electric-driven motor?—A. You are always up against the possibility of stoppage of power. They are all—most of them, anyway—equipped with thermostatic controls, or controls which will cut it off so that the danger from spilling the oil is all right, but you are always up against the failure of motive power.

By the Chairman:

Q. Suppose you got people to continue to be keen about saving fuel, and so on, and a man says, "I will do this; I will take this up;" at present he is more or less at the mercy of the vendor of some new type of furnace or fuel, and does not know where to go to have that checked up; would it be possible to have some agency, governmental or society, with authority to examine and report on different types of apparatus?—A. That would certainly be well. I have already had numbers of people coming around with all sorts of ideas which they would like to make public, looking for advertising mediums. Now, of course that is one of the fields of endeavour which we could take on—passing upon and O.K'ing really sound work.

Q. Saying, for instance, "Such and such a furnace is capable of heating a house with so many cubic feet"?—A. We could make tests and give service.

Q. So that the vendor would have that back of him?—A. We would report on what things are reliable, and what are fake things. Of course such a field of work requires more funds and attention than is at our disposal now.

Q. A dealer or inventor who starts to make an apparatus usually has confidence in it, and would be willing to pay for the certificate of efficiency from some responsible body?—A. Yes.

Q. Have you looked into the matter of central heating at all?—A. Yes, it is part of my work. At the present time I have two cases in Montreal in which I am considering the possibilities of central heating plant. In Montreal and district, served by hydro-electric power, our heating plants must be entirely heating plants. Of course the best paying ones are those than can combine electric generation of power and use the exhaust steam for heating.

Q. That is done in the west?—A. That is done in the west, and there is no reason why that should not be a very profitable undertaking. Where it is a heating plant alone the conditions have to be studied almost in every case. In the two particular instances I mentioned, one would pay and the other would not. If you can get a district which is highly concentrated as far as buildings and possible consumers are concerned, that is almost necessary before you can consider such a thing. In the ordinary scattered residential district it is very questionable.

By Hon. Mr. Casgrain:

Q. Mr. Carswell had a central heating place like that?—A. Yes; I had charge of that, the first in Canada.

Q. He stopped that?—A. Yes, he did, but they generated power and also supplied light to some surrounding districts, and utilized steam for heating.

Q. It went out of business?—A. It was taken over by the Montreal Public Service Corporation.

By the Chairman:

Q. But it was effective?—A. It was effective, yes.

Q. Can you give us a comparison as to the efficiency of a central heating plant comprising 40 houses, and individual heating arrangements for the same number of houses?—A. If you take a block say 300 feet by 320, that would include say 20 small houses, semi-detached or medium, or going up to 6 large houses, the cost per year for individual heating in either case would amount to about \$4,000 for heating that block with individual furnaces. If occupied by apartments or large buildings you could concentrate in the same block up to four times that. With a central plant in a residential district the heating of that block would pay a return of about 5 per cent. As a rule it will not work out if you calculate all of them as tenants taking the power, because you can only figure on probably 70 per cent taking it.

Q. Where would you put that central heating plant?—A. It has to be more or less a community matter for someone to provide the lot. If you have a community small enough you could put it in the back yard, but then it is not large enough to make up the amount. You need to run to four or five blocks, or more concentration of one or two blocks, as well as several apartment houses put together, or larger buildings, and you thus get an advantage, because one of the larger costs of central heating is the distribution of pipe lines under the ground, and if you can get the buildings side by side you can run right through basements without any underground conduit, and have it fairly concentrated. You are then getting where you could consider central heating alone, without any by-product of current; but where you get it in a scattered neighbourhood it should be carefully considered. I think the broad statement should not be made in any case, that central heating by itself is a paying proposition; it depends so much on several factors. You have to figure on 70 per cent of the tenants, or perhaps start at 40 per cent and see it grow. Then there is another question; if that plant is put in at the start, before the individual furnaces are put into the houses, there is quite a saving in the cost of those individual furnaces. If you are simply going to take the place of houses with their individual heating systems, of course you cannot take any credit for them.

Q. There is a central heating plant at the top of Côte des Neiges Hill?—A. Yes, there is a group of buildings there; in fact I have been endeavouring to get information on that during the last week, but I have not got the figures. Of course you cannot get a comparison except for buildings of the same size; but where it is put up in the first case by one concern who has built the houses and

arranged the distribution system so that it shall be right, it will undoubtedly pay because all the heating systems in the houses are laid out for it. One other thing in favour of central heating is that people will probably pay a higher rate, which will assure the cost being covered, because of the added convenience, and also the extra space which would have been taken up by the furnaces, and also assurance of the right temperature all the way through.

By Hon. Mr. Webster:

Q. Have you given any consideration to peat or briquettes?—A. Peat is undoubtedly an auxiliary fuel which can be used supplementary to coal for heating in grates and kitchen ranges. I never used it myself, but I can see its advantages in the kitchen range and open fire places.

Q. It would not be a practical fuel to heat through the depth of the winter in Montreal?—A. No, because you don't want to get up every two hours to fill the furnace, and if you did not it would cool right off during the night. As a supplementary fuel during the early and later parts of the season it could be used, as an auxiliary fuel.

By Hon. Mr. Casgrain:

Q. It has only half the heating power of ordinary coal?—A. Yes. Of course it comes down to a question of cost. It is not dollar for dollar of the same value. Of course the other fuel must be of a corresponding value to peat.

By Hon. Mr. Webster:

Q. What was the result of your study of briquettes?—A. We have not done very much in briquettes, but I understand that the ovoids of Welsh coal that were sent over gave good satisfaction. There were certain briquettes made from time to time that were on the market in Montreal, and I believe they were burned; I had some once which I did not consider very good, but other people had some at other times which they considered satisfactory. Individual briquettes could be arranged to make a very nice fuel.

Q. Would it be a fuel that would be profitable from the consumer's standpoint? We are endeavouring to find a cheap fuel for the consumer?—A. There it comes down to a question of cost. I imagine they would not be prepared to pay the same cost.

Q. Have you any figures as to what briquettes made from American anthracite slack ought to sell for in comparison with anthracite coal?—A. I have not studied that enough to be able to give you the value, and would prefer not to quote it.

By the Chairman:

Q. Is there any other point which suggests itself to you?—A. I do not think anyone yet has touched on the point of utilization of heat from garbage and ashes carted from the houses in cities. This could possibly be done only in larger centres. In a paper I read last winter on Refuse Disposal I made a statement that in the Montreal district alone there is wasted in the ashes from domestic furnaces the equivalent of 50,000 tons of fuel a year, practically in the form of unburned coal.

Q. That is, from carelessness in the households?—A. Yes, largely. That is entirely wasted and thrown away. The garbage in most cities here is carted away, and there is no revenue derived from its destruction. In Europe and England it is almost the rule that all municipal garbage collections of rubbish and ashes are burned in incinerators, and the heat utilized to generate electrical current, and the revenue derived from it will more than pay for the cost of that

destruction. This is an extract from the paper which I read to the Engineering Institute of Canada on December 7, 1922:—

“In districts served with hydro-electric power, there is possibly not the same incentive to utilize the heat from the combustion of refuse for generating electricity as in localities using steam-electric power, but other opportunities and possibilities should not be overlooked or lightly considered. Steam is required in every large town for many purposes, not only in factories, but, particularly in this climate, for heating buildings.

“A modern high temperature destructor will furnish sufficient waste heat for the evaporation of from one to two pounds of steam per pound of refuse burned, depending upon the composition of the materials, in addition to any preheating of air required for the furnace operation. Taking a conservative figure of 1,750 pounds of steam, or 50 boiler horse power per ton of mixed garbage and rubbish burned per hour, as available for actual outside use, then a 200-ton destructor plant, which normally would take care of a population of 200,000, equipped with boilers and operating 16 hours per day, as is common practice, can supply over 20,000 pounds of steam per hour for manufacturing purposes, or say 1,000 engine horse power.

“The household ashes collected from a district containing the same population can be utilized to generate up to 70,000 pounds of steam per hour, 24 hours per day, throughout the heating season, depending on the outside temperature. In other words, there would be sufficient fuel to operate a central station to heat, and supply domestic service for buildings aggregating over 10,000,000 cubic feet volume. To appreciate better what this means it may be mentioned that the cubic contents of the entire group of buildings of McGill University are approximately 8,000,000 cubic feet.”

In Canada we have done nothing in that way.

By Hon. Mr. Casgrain:

Q. What about the Decarie incinerator, near the River St. Pierre?—A. You mean the little one?

Q. Down by the canal.—A. It is out of business now.

Q. The Decarie incinerator.—A. Was the heat ever utilized for any purpose?

Q. To make electric light.—A. I am speaking of the present time. That was some years ago.

By Hon. Mr. Webster:

Q. You mentioned the exception of Westmount.—A. Westmount has a small suburban plant. They use it as an auxiliary for supplying light.

Q. A very important plant.—A. Yes, it is. But now the larger cities do not. Take Toronto: it does not. Montreal of course does not, it has no incinerator. But if you take a population of 200,000, which is the basis, because it is the size of plant required for such a population that could be put in very economically,—the heat from burning garbage and ashes, and particularly ashes, is sufficient to heat a district up to 10,000,000 cubic feet capacity, volume of buildings. That is quite a large amount. As a matter of fact, that is the size of your Centre Block here. Of course this may not look so large because it is

[Mr. F. A. Combe.]

in a block, but it represents a good many small buildings. The McGill buildings in Montreal aggregate about 8,000,000—all those building put together. We probably have not in districts served by hydro-electric power the same reason to advocate the use of electric power plants in connection with it, but it seems to me that as far as central heating plants are concerned, you have there a fuel, and especially with the ashes in the winter that fuel is derived in proportion to the rate at which you need it during the heating season. There is an opportunity there of utilizing those stations.

Another thing is that a modern incinerator plant—a destructive plant, we call it, for it is a little different from the ordinary incinerator—can be made entirely free from nuisance. It can be built in the centre of a city. As I say, in England and other older countries, it is quite common to see destructive plants in residential districts, or next to city halls, hospitals, etc. Over here it seems to be considered necessary to put such a plant near the outskirts, but with the modern destructive plant there is no need for doing that.

By the Chairman:

Q. It can be made free from nuisance.—A. Now there is a possibility of utilizing some of the present waste to generate heat for central district stations. I do not say it is feasible in every case in small towns, but it should be considered more than it is to-day.

Q. Would you let the Committee have a copy of that paper?—A. I shall be glad to let you have a copy.

By Hon. Mr. Webster:

Q. Has any thought been given to any appliances that might be attached to furnaces to save waste of heat and gas?—A. Yes. As I say, we have had from time to time brought before us various devices which people have brought out to improve the efficiency of furnaces. At present we have more or less refrained from committing ourselves; we have not taken any stand in the way of giving any public approval or not to them. It is something which we might do, but we have not yet done it. No doubt there are several—one or two anyway—devices on the market which for the burning of certain fuels are useful. There are others which are not.

Q. The question as to unburned ashes that are thrown out is a matter of education?—A. Very largely. Of course if you can educate the consumer not to throw away the coal in his ashes you will not have that saving from a municipally owned plant.

By Hon. Mr. Casgrain:

Q. It seems to be a question of labour. Formerly your furnace man sifted the ashes and brought them back into the house.—A. Yes.

Q. I used to heat all my stable with siftings from my furnace. Now the help will not do the sifting. You would have to pay more for it than you would save in coal.—A. At present the coal is wasted. If you cannot get it saved in the houses, it can be saved centrally.

FRANK P. JONES, recalled and examined.

By Hon. Mr. Webster:

Q. When you were giving your evidence I overlooked asking you in regard to the electric energy which might be used to displace coal, and perhaps assist

[Mr. F. A. Combe.]

in the fuel supply; you are a manufacturer, and have had considerable experience; could you displace coal in any of your processes by electricity if there were a more abundant supply of it?—A. Absolutely. A great many paper mills in Quebec are using electrical energy for producing power. Roughly speaking, electric energy at \$10 per horsepower per year is equivalent to \$8 coal.

Q. Then there is the question of electric stations on the St. Lawrence?—A. There is the possibility of getting 4,000,000 horse-power between Montreal and Prescott; that is waiting to be developed, and that is an economic development of power that could be sold at \$10 and pay 6 per cent interest, and 2 per cent on the sinking fund.

Q. The advantages that would accrue from such development are very considerable; would you oblige us by preparing a statement in regard to that?—A. I would be quite willing to do that.

The Committee adjourned at 1 p.m.

COMMITTEE ROOM No. 534,

OTTAWA, Friday, April 27, 1923.

The Special Committee of the Senate met at 11 a.m., Hon. Mr. McLennan in the Chair.

FARQUHAR ROBERTSON, Esquire, President, Farquhar Robertson, Limited, Montreal, appeared as a witness before the Committee and testified as follows:—

By the Chairman:

Q. How long have you been in the coal business in Montreal?—A. Since 1879.

Q. We will not stop to ask you what changes you have seen in that time.—A. I have seen a good many changes in that time.

Q. But we would be glad if you would tell us your experience during last winter in shortages of coal—the impression made on yourself and on your customers by the coals that you have used instead of anthracite.—A. We used various kinds.

Q. Did you use any Welsh anthracite?—A. Yes, Welsh anthracite. We used Welsh anthracite with very good results as to quality.

Q. As to quality?—A. The trouble with Welsh coal is that the degradation is very high, due to breakage. It is very friable.

Q. As I understand, it comes out very uneven, as regard size?—A. What we got out was very even. The bulk of what we got out was what they call cobbles, something about the size of furnace coal. However, it was shipped on the other side in excellent condition. Of course this was what they call machine-made cobbles that we had last year; the bulk of it.

Q. That was broken up?—A. Broken up and washed with water.

Q. Indeed?—A. Yes.

Q. In other words, you are speaking now of the very best type of Welsh anthracite?—A. The very best type of Welsh coal.

Q. About what degradation would there be in that?—A. About 40 per cent.

Q. As much as that? What is there in good anthracite?—A. Degradation?

Q. Yes.—A. Well, that varies. You mean American?

Q. Yes, American anthracite.—A. I think there is nearly 10 per cent.

Q. Ten?—A. That is of what you call screenings and buckwheat coal.

[Mr. Farquhar Robertson.]

By Hon. Mr. Webster:

Q. That would be for water-borne?—A. Water-borne coal, yes. There is a big difference between water-borne and rail.

By the Chairman:

Q. The rail coal would come out very much better?—A. Oh, decidedly.

Q. There would be very little degradation? It would be almost negligible?—A. In the old days they used to screen the coal on the docks before putting it into the boat; but they do not do that now. It comes along just as it is from the mine.

Q. As a fuel Welsh coal was satisfactory?—A. Oh, absolutely.

Q. Very satisfactory?—A. Very satisfactory.

Q. Did you get any of the Welsh steam coal?—A. We had some Welsh semi-anthracite.

Q. What was your impression of that semi-anthracite?—A. It is a very good coal, but the degradation on that is very, very heavy indeed.

Q. Even heavier?—A. Worse. I would not like to say just exactly how far that would go. But if the coal is screened just before you deliver it, it is a very good substitute for American anthracite. There is a little more smoke to it than there is to anthracite coal; but not so very much. And there is very little of impurities.

Q. That is, it would be low in ash?—A. Yes, it is not high in ash.

Q. What else did you use for domestic?—A. We had what they call ovoids, or briquettes. I suppose we call them briquettes here. The results from those were, so far as the fuel was concerned, very satisfactory. I do not know how satisfactory they would be in very severe weather, such as we had this last winter. We sold most of ours, I think, before the severe weather. I think they were all sold about the 20th of January.

Q. Were those Old Country Welsh briquettes?—A. Oh, yes, made from Welsh anthracite coal.

Q. Did you use any American?—A. Briquettes?

Q. Briquettes.—A. Yes.

Q. How were they?—A. Well, they are not a bad briquette at all. They are a little more ashy than the others. One trouble with the British briquettes was the degradation on those too; it was very heavy. There was about 22 per cent.

Q. How were those discharged? By buckets?—A. By clamp buckets.

Q. Large sized buckets?—A. Oh, yes. They were just the shape of a hen's egg, about the proper size for the average consumer.

Q. Have they a hole through them? Are they that kind?—A. No, there is no hole through them.

Q. What was the next?—A. The next thing we had a little peat; but the quantity of it was very small—comparatively small.

Q. How did your customers like that?—A. Peat is a fuel than can be used in ranges at any time and with very good results. I think it is quite as good a fuel as—and some people think it is better than—anthracite coal.

Q. For a cooking stove?—A. For a cooking stove.

Q. Or range?—A. It could be used at any time of the year. It is very good too for open grates. I do not think that in a furnace it would last long enough.

Q. The evidence we got here was that a good many people used it satisfactorily in spring and fall in their furnaces.—A. You could do that. You could take this weather, for instance, and use it.

[Mr. Farquhar Robertson.]

Q. Could you give us approximately the prices of these various fuels?—A. I am sorry I did not know exactly that you wanted that information. I could have given it to you definitely. I do not think my memory will carry me back. I think the peat cost us \$5 at the mine.

Q. If it would not be too much trouble, would you have some one give us, say, a statement showing what is a fair difference in Montreal in the prices of these various fuels.

Hon. Mr. WEBSTER: Mr. Robertson could give us the relative values.

The CHAIRMAN: Your idea of what would be the relative values.

The WITNESS: We had a cable only yesterday or the day before, asking us 8 or 9 shillings more than we paid last year on the other side. So it is pretty hard to gauge.

By the Chairman:

Q. American anthracite has been the standard fuel of this country for a long time?—A. Yes.

Q. Where would you place Welsh anthracite in relation to that?—A. As to values?

Q. As to values.—A. Or quality?

Q. Or quality.—A. Well, it is pretty hard for me to define that very closely. Some people will take Welsh anthracite coal if they can get it at the same price. Others will tell you they will pay a dollar more, and they will forget all about it.

Q. When you are making the next trade?—A. The next deal. So the emergency fuel you cannot figure out as a fair criterion to go on, at all.

Q. But those fuels are all— A. In emergencies they are all right.

Q. They are satisfactory fuels?—A. Yes.

Q. It is a question as to preference and conditions of the market and one thing or another?—A. Yes.

By Hon. Mr. Webster:

Q. You consider there is always sufficient emergency fuel to take care of any crisis?—A. Oh, yes. You see now—you talk about last year—if there had been no strike, I think the American anthracite market would have been more or less demoralized, because there was some coal left over.

By the Chairman:

Q. From the year before?—A. From the year before.

Q. When you had five and a half months of idleness it made the supply short enough, particularly towards the winter time. But there would have been a surplus of coal this year if it were not for that strike.

Q. What is your impression as a purchaser of anthracite over a long time, as to the probable course of prices?—A. I do not think we shall ever have anthracite at the prices we used to get it at. The tendency is now, they claim—I am not personally familiar with this—that the anthracite coal is getting comparatively scarce. You see, in the early days in mining the coal it was easy to get at. Now they are going back over those properties and pulling out—

Q. Taking out pillars, etc.?—A. Yes.

By Hon. Mr. Webster:

Q. May I just here ask this question, Mr. Robertson? You have been one of the largest distributors of domestic coal in Montreal. Did you witness any real distress last year?—A. Absolutely none.

[Mr. Farquhar Robertson.]

Q. In Montreal?—A. Absolutely none.

Q. Or in the province?—A. Or in the province either.

Q. You heard of no distress?—A. There has been none.

Q. Or no suffering for the want of coal?—A. You see, people said that they could not use soft coal. Talking about substitutes, you know there was some soft coal used, and some people may continue to use soft coal. That is, it was satisfactory. People who will take a little care to run their furnaces can use it.

Q. In your opinion soft coal can always be used as a substitute if the situation demands it?—A. Absolutely. No person need suffer if there is soft coal.

Q. And we have an ample supply of soft coal?—A. I know a big operator in New York in the anthracite business who burned about 150 tons of soft coal last winter. He got panic-stricken before the strike was finished and he put in three carloads of coal, and says he got on very well with it. This was not in New York City, but outside. That is only to give you an illustration.

By the Chairman:

Q. There is another phase of the business, Mr. Robertson, upon which you can enlighten us. We have had brought to our attention that with the same price for anthracite at the mine, and after allowance is made for any difference there may be in freight rates, there is a difference in the prices at which the coal is sold to the consumer, say, in Montreal, in Ottawa and in Toronto.—A. Yes?

Q. And we are all familiar with the fact that people are inclined to underestimate the cost of doing business, and also with the fact that people in the coal trade are like other people sometimes: they like to get all they can.—A. Surely.

Q. Now, will you tell us—A. What should be the comparison between Toronto and Montreal?

Q. Yes, or the various elements that enter into the cost to the merchant.—A. One of the big factors in the delivery of coal to-day is the cartage.

Q. Yes?—A. The cartage of coal in Montreal and the cartage in Toronto or Ottawa are different propositions. You know we have those hills and we have to double up—to put two teams to do what one would do elsewhere. That is necessary on a great portion of our business. Anything that goes above Sherbrooke street and up through Westmount has to be hauled with a double shift. That adds very much—I would not like to say exactly what it adds to the cost, but it adds very materially to the cost of delivery.

Q. How large a proportion of your output, roughly speaking, would go to those districts?—A. Oh, a very large proportion to-day.

Q. And what does not go much above the hills makes up in distance? I mean, if you go to Outremont.—A. There is a hill when you go to Outremont. You have to climb over Sherbrooke street. Nearly every day they go out, for every delivery going out to Westmount, we have to carry an outfit to do the towing. And it is not only that difficulty, but when you get to a man's house he perhaps lives in the third storey and you have to pull that up bag by bag. People do not consider those things. If in delivering your coal you had only to throw it down at the man's door, that would be quite a different thing, but we not only carry it, but carry it in.

Q. What is the practice of the trade in order to average those? Do you charge?—A. Sometimes we charge a little more.

Q. You charge more for bagged coal?—A. Yes. We charge extra delivery sometimes too. We have to.

[Mr. Farquhar Robertson.]

By Hon. Mr. Webster:

Q. There has been some complaint, Mr. Robertson, regarding the spread between the price at the mines in Pennsylvania and the delivered price in our large cities.—A. Yes.

Q. Would you enlarge a little on that and elucidate some of the points?
The CHAIRMAN: Of course the cartage is the first.

HON. MR. WEBSTER: But there are a great many more things that enter into it.

The WITNESS: As I say, you buy a cargo of coal—

By Hon. Mr. Webster:

Q. I think you spoke of degradation.—A. Degradation is a very large factor. The labour in screening, the bagging, and your overhead generally add, according to the way you do your business. Some people have only a horse and cart and buy a carload of coal. That is no criterion, because such a man might be given an order for coal to-day and would not be able to deliver it for a month. We are fixed so that as a rule we have coal on call within a few hours' notice. We carry a large stock. There is the interest on your plant, and there are the interest and insurance on your coal.

By the Chairman:

Q. I suppose you customers do not all pay you within thirty days.—A. No, I guess they do not.

By Hon. Mr. Webster:

Q. Is most of your domestic coal water-borne?—A. Yes, the bulk of it.

Q. You mentioned a little while ago, I think, that there was considerable shortage.—A. Oh, yes, there is a shortage.

Q. In the out-turn weight as compared with the bill of lading weight?—A. Yes.

Q. Can you get all the anthracite you want from the standard companies?—A. No, no, you cannot. You have to go outside and pay a premium.

Q. You might enlarge on that point.

By the Chairman:

Q. Are you speaking of the trade generally or are you speaking of a well established house like your own?—A. Even a well established trade has to go outside sometimes.

By Hon. Mr. Webster:

Q. Speaking generally for the trade—I do not think it is desirable to take one individual case, but speaking generally for the trade, so that it may go into the record—can the trade generally obtain their coal from the standard companies in Pennsylvania?—A. No, they cannot.

Q. At the standard rates?

By the Chairman:

Q. Do you mean that year in and year out?—A. The standard people fall down like other people sometimes.

Q. The old line companies?—A. Yes.

By Hon. Mr. Webster:

Q. When there is only a certain quantity to go around, they must distribute it among all their customers?—A. I suppose so. I do not know why, but they do not always come forward with the goods, you know, when we want them.

Q. What is the difference in price, Mr. Robertson, between the standard companies and the independent coal companies?—A. Last winter it would run up as high as \$4 or \$5 a ton.

Q. Four or five?—A. Yes.

By the Chairman:

Q. At times?—A. At times; well, pretty nearly all last winter. Of course I was not here during the months of February and March. I think those were the most strenuous of the season.

By Hon. Mr. Webster:

Q. How many coal merchants would there be in the city of Montreal distributing coal?—A. I would not like to tell you how many.

Q. Over a hundred?—A. Yes.

Q. Over a hundred in Montreal?—A. Of so-called dealers.

Q. Well, distributors.

By the Chairman:

Q. A good many of them are men who come to you or the other big firms?—A. Yes, if we have coal; but if we have not, they have to go out themselves and buy the coal.

By Hon. Mr. Webster:

Q. And pay the premium?—A. Yes.

By the Chairman:

Q. There are a number of cases in which there is what looks like an excessively high price, whereas the price is really not excessive.—A. I know some people who bought coal this year and lost money on every ton of coal they sold, in order to keep in business.

Q. They were not the people whose prices were the lowest?—A. No.

By Hon. Mr. Webster:

Q. You spoke of cartage in various sections of the city, Mr. Robertson. Is there any suggestion you could make whereby any of the standard companies could co-operate to economize on the expense of cartage?—A. Oh, I do not see how you can.

Q. There is nothing practical?—A. I do not think so.

Q. Each man for himself and the devil for the last?—A. Yes.

By the Chairman:

Q. Parliamentary Committees hear a great deal about combines and trusts.—A. Yes.

Q. Could you———A. Put all the coal in a pot?

Q. Could you make your delivery subsidiary so that it might save money?—A. We thought of that once in Montreal, but it came to naught. That was a good many years ago, though. That is, it was suggested that all the coal be pooled.

Q. Yes?—A. But there were so many different interests in it that the thing fell through. I believe it would have been a good thing if it had gone at that time, but it would be hard to operate it now, there are so many people in the business.

[Mr. Farquhar Robertson.]

By Hon. Mr. Webster:

Q. Do you see anything of a practical nature that might be worked out for the benefit of the consumer?—A. I have not thought it over, but I do not see anything.

By the Chairman:

Q. Why would that not be good now?—A. I do not know. At the time the understanding was to have a large receiving depot, you see, to cut the expense down. You could not do it now, because coal comes from so many different sources and in so many different ways.

Q. Coal comes down the river to you by water?—A. Yes.

Q. We are speaking now of hard coal.—A. Yes.

Q. It comes by rail on the D. and H.?—A. Yes.

Q. And by rail from the West again, does it?—A. Well, yes, over the Adirondacks.

Q. Over the Adirondacks?—A. Yes; New York Central.

By Hon. Mr. Webster:

Q. Does most of the coal come into Montreal by water or by rail?—A. We think it is nearly fifty-fifty now.

Q. Fifty-fifty.—A. The water used to dominate, but it does not now. You see, a man can get a carload of coal delivered at the terminal and save his cartage. Those small dealers do that.

By the Chairman:

Q. At the railway terminal?—A. At the railway terminal.

Q. What do the larger houses do? I suppose they receive both by rail and by water?—A. No; some of them have all rail.

Q. All rail? How do you get it? By both rail and water?—A. Mostly water for our Montreal trade. It is practically all water now.

By Hon. Mr. Webster:

Q. Are the rentals on the harbour front expensive too, Mr. Robertson?—A. Very.

Q. Very expensive?—A. Very.

Q. Is there any figure you could give?—A. I think we pay now 12 cents a square foot a year.

By the Chairman:

Q. For your storage and your plant?—A. Yes; and then we have to pay the city taxes with that.

Q. About how much coal would you put through that yard in the course of a year?—A. Oh, it varies. We put some soft coal through there as well. We have put through up to say 100,000 tons.

Q. What would your rental be per ton?—A. I could hardly tell you that; I have not the figures just now; we are paying to-day to the Government 12 cents a foot.

By Hon. Mr. Webster:

Q. Those spaces that the Montreal Harbour Commissioners rented while you were a Commissioner were from \$12,000 to \$15,000 or \$19,000 a year for such as the Nova Scotia Steel Company had?—A. Yes, that is about right; I think the rate there was about 10 cents a foot.

By Hon. Mr. Laird:

Q. You spoke about the difference in the car out-turn; is there a shrinkage in every car?—A. No, not in every car.

Q. Taking by and large, one with another?—A. If you take just what happened in the last 10 days, I think the average we get on cars is 2 tons short on an average of thirty-eight ton cars.

Q. That would be about 5 per cent?—A. Yes.

Q. Taking the season through, what would be the difference between the railway weights and your scale weights, how many pounds to the ton?—A. I couldn't tell you that off-hand; I could give you the figures from my office.

Q. Is that not a material factor that enters into the coal business?—A. Yes; you have always got to figure on the possibility of shortages.

Q. How do you account for those shortages?—A. Difference in weights; sometimes stolen on the way; and you know, when you are handling a cargo of coal there is more or less of it blows away; take and hoist it up in unloading—we have modern unloading plant—and when that is dumped into the hopper there is a cloud of dust goes off.

Q. Do you take care of that anticipated shortage in the price or in the weight?—A. In the price.

Q. You don't make any deduction in the weights for that?—A. No, but we figure on a certain percentage of shortage as an element in the expense of the coal.

Q. You take care of that in the price you charge for the coal?—A. Yes. You see, there is no doubt it looks a very small thing, but there is a lot of coal goes off in the wind when taken out of a dry cargo of coal—just a cloud of dust goes off every bucket.

By Hon. Mr. De Veber:

Q. Is there not quite a bit of coal lost in falling off the cars in transit, and being stolen off?—A. Yes, I think there is. Sometimes they fill the cars too full. When a car may be pretty full, after you give it a jolt it goes down quite a bit, but even after that there is liable to be a little fall off. But I think this spring and winter particularly there has been a good deal of coal stolen.

By Hon. Mr. Laird:

Q. Would not the shortage in cars be more perceptible in times of general shortage of coal?—A. I think so.

Q. People help themselves in transit?—A. Yes.

Q. I have known whole carloads of coal stolen?—A. We had a carload the other day 14 tons short.

By the Chairman:

Q. Of course that was visible?—A. Yes.

Q. Then there is another source of loss—bad bottoms sometimes, and there would be a dribble?—A. That happens occasionally, but not so much as you would expect.

By Hon. Mr. Webster:

Q. Have you any recourse against the railway companies for a shortage of 14 tons?—A. If you suspect a car is short you can have it weighed; you pay for hauling it out to a scale and drawing it back, and make a claim for the shortage.

By Hon. Mr. Laird:

Q. Do you get those claims allowed?—A. Sometimes, and sometimes not.

Q. Who absorbs the difference? The shippers?—A. No, the delivering railroad is supposed to look after it.

[Mr. Farquhar Robertson.]

By Hon. Mr. Webster:

Q. In regard to water-borne coal, are your shortages greater or less?—A. I would say they are less. What I mean is that there is less stealing by water-borne coal.

By Hon. Mr. Laird:

Q. Could you not form some estimate of the season's operations and the percentage of coal that deteriorates in weight?—A. Sure.

Q. What would that be, from the railway weights to the out-turn?—A. We don't unload enough of that coal by cars to make it a factor in our business.

Q. You say you take care of any anticipated shortage in the price; now, how much do you add to the price, or how do you figure?—A. It depends on the price of the coal. I would not like to tell you just now, because I am not very familiar with the price of my coal.

By the Chairman:

Q. Perhaps after you get back you would write us a letter on some of those points of detail?—A. If you will put your questions down I will try and answer them.

Q. I would say the special point would be the loss in weight from the bill of lading weight to the delivery in the cart, divided into two parts—deterioration and short weight?—A. You see in the first place you take in a cargo of coal as you get it. Your domestic sizes you have to screen and deliver carefully. Then you have what we call hopper screenings that we re-screen again to take the buckwheat and the pea coal out of it, and the dust. So it is quite an operation from the time you get a boat-load of coal in till you get it out.

Q. And of course you do sell the screenings?—A. We sell the screenings at a very small price.

Q. Did you supply or handle any coke?—A. No. Coke is a good fuel.

By Hon. Mr. Laird:

Q. Is coke a material factor in Montreal by way of competition with anthracite coal?—A. No. They have always sold coke. The gas company have got to sell their coke in the market. Sometimes we used to grumble when they were selling it too cheap, when they would give it away for \$3 or \$4 a ton. I think this year it was as high as anthracite coal.

By Hon. Mr. Webster:

Q. Do you look upon coke as a competing article with the anthracite?—A. I do not.

By the Chairman:

Q. Do you distinguish?—There are two cokes?—A. Yes, I know there is gas coke and the metallurgical coke, and there is another coke, where they make foundry coke; they have what they call their breakages, and some of them put it through the breaker and size it up—stove and chestnut.

THOMAS C. SHIELS, Assistant to the General Manager of the Elias Rogers Company, Limited, Toronto, called and examined.

By the Chairman:

Q. You have heard Mr. Robertson's evidence; perhaps you might say if you agree with it, or give us some of the details as to how the coal trade is conducted in Toronto?—A. Yes, I can agree with everything Mr. Robertson has said about it. Delivery in Toronto is perhaps a little different to any other city. We deliver altogether in bags. All anthracite coal is delivered in bags; there is not one ton in a thousand that goes any other way.

[Mr. Thomas C. Shiels.]

Q. You mean in delivering to private houses?—A. Everywhere. It has come to such a pass in Toronto that even large buildings are not made with facilities for taking loose coal, that is, hard coal. Soft coal is another proposition.

By Hon. Mr. Laird:

Q. What advantage do you find in delivery of that kind?—A. In bags, it is not an advantage at all. You could deliver coal much cheaper loose.

Q. Then why do you do it?—A. Well, it has been delivered that way for the past 20 years. I suppose originally it was competition among the coal merchants that started it.

By Hon. Mr. Webster:

Q. In what way is it more satisfactory to deliver it in bags? Is it a question of allowance, or a question of dust or yard room?—A. Everything; yard room particularly. In Buffalo coal is delivered on the kerb, on the street in front of your house. That is something that crops up every now and again in comparison of prices. The Buffalo price is always the price on the kerb in front of your house, and you have got to pay to put it in. The Toronto price is the price in your bin, no matter how difficult it is to put it in.

By Hon. Mr. Laird:

Q. Do you make a varying price for difference kinds of delivery?—A. No, we have a flat rate.

Q. Don't you make a price for taking it up in a building?—A. There is very little goes upstairs; practically none.

By Hon. Mr. Webster:

Q. Is your price the same in all the wards of the city?—A. Yes, a flat price.

By the Chairman:

Q. You lump the thing—general cost of delivery?—A. Yes.

Q. And you don't make differences as to how near or far it is from your yard?—A. No. A few years ago we did deliver to certain points outside of the city and we had a charge of from 25 cents to 50 cents extra according to the length of the delivery; but lately, since coal has been at different times hard to get, we have eliminated those outside deliveries and kept to the trade within the city limits.

Q. Would you agree with Mr. Robertson on what he said about those different classes of fuel? Because I suppose you handled them all?—A. Well, we didn't handle any Welsh coal. We went into the question of substitutes very thoroughly last summer, as soon as we saw there was going to be a serious shortage. We bought a car of Alberta coal, just to see how it would work out.

By Hon. Mr. Laird:

Q. What kind of Alberta coal? Bituminous?—A. No, the best Alberta coal; I just forget the loading point.

Q. Was it steam coal, or soft coal?—A. It was domestic coal; it was smokeless, low volatile coal, and we brought that in and considered it, went into it from every side, and we went into the different substitutes.

Q. What was your experience with Alberta coal?—A. Well, of course it is very expensive.

By the Chairman:

Q. But leaving that element out?—A. Well, the coal you could burn it. It does not compare with American anthracite by any chance, so far as domestic use goes, but of course you won't freeze when you have it, that is certain.

Q. In what respect? We have had evidence here that differed from that?—
A. Yes, I suppose. Well, that is our experience.

By Hon. Mr. Laird:

Q. Was it because the people in Toronto were in the habit of using anthracite coal, and not in the habit of using Alberta coal?—A. That may have had something to do with it, but the price, you see. Had we been able to get it, or had we been able to get a hope of getting a price where we could lay it down and sell it, we would have gone into it. In fact, we have connections now in Alberta.

Q. But aside from the question of price; on the merits?—A. Well, it does not compare. We tried it. We gave it physical tests. We tried it in our own furnaces, our own men, and we had analyses on the different coals, and that was the conclusion we came to—that it was not practical.

By Hon. Mr. Webster:

Q. Would you just develop the thought you started out upon—of substitutes?—A. We went into the coke; we handle quite a bit of coke.

Q. From where?—A. We bought wherever we could. We bought a lot of what they call heating coke, 48-hour coke.

Q. What was your experience with that?—A. Coke is quite a satisfactory substitute. We had Pocahontas coal, handled quite a lot of Pocahontas.

Q. That you turn over for domestics?—A. Yes.

Q. Even though last year was an abnormal year all over the country, was there any suffering you knew of in Toronto from the want of getting coal or the substitutes?—A. I don't think so.

Q. You can always depend on substitutes to take care of any distress that might arise through the want of getting American coal?—A. I think so. Our experience was that the winter of 1917-18, the shortage that occurred then, was more inconvenience to the public than last year, when the real shortage was greater.

Q. Have you difficulty in getting coal from the standard companies that Mr. Robertson spoke of, or can you get all you require from standard companies?—A. We have had very little difficulty, only in cases in a year like this last year was.

Q. In normal times you can get a fuel supply?—A. Yes.

Q. Does that apply to the other merchants of Toronto?—A. I believe so.

By Hon. Mr. Laird:

Q. Do you find the quality of anthracite coal recently equal to the coal that formerly was brought in?—A. The old-line coal, I doubt if the quality was very much better—not in my time, which is fifteen years in Toronto. Naturally, independent coal, there would be a certain tendency to take advantage of the situation and crowd something on the market that was not just up to the mark.

By Hon. Mr. Webster:

Q. Do you confine your importations largely to one standard company?—
A. Yes, to one, although of course we buy wherever we can. Take a year like this last winter, we bought from whatever source we could get it.

Q. In normal times you have no difficulty in getting all the anthracite coal you want?—A. Not in normal times.

By the Chairman:

Q. You have a close connection with one?—A. Yes.

[Mr. Thomas C. Shiels.]

Q. There are other dealers in Toronto in that same position—that have a close connection with some large producer?—A. I believe so. All those old-line companies—there are seven of them, I believe—they have all had their customers for years.

Q. Your experience would be that the coal was as good and as carefully prepared this winter from the old-line companies as usual?—A. Yes, absolutely.

Q. We have had evidence from a good many people that coal as we got it this year was inferior?—A. That applies to the independent coal; I don't believe it applies to the old line, the old standard companies' coal.

By Hon. Mr. Webster:

Q. Is your coal largely brought in by rail, or water?—A. Practically all by rail.

Q. About what was the quantity of domestic coal or anthracite used in Toronto, and also in the province of Ontario? Have you those figures?—A. No, I have not. There are statistics on that.

Q. How many coal merchants have you in Toronto?—A. I would hesitate about guessing at that. A great many.

Q. Over 100—a larger number than Montreal?—A. I would not like to say. Of course this last few months, in the winter, there was any amount of dealers sprang up that would buy a car and put it on a siding.

By Hon. Mr. Laird:

Q. What is your experience in regard to deterioration as between railway weights and delivery weights?—A. Well, there is quite a loss. A year ago last January I had a whole train weighed, a train of our coal coming in, and even taking the railroad weights there was a loss.

Q. Sometimes it would be over, and sometimes under?—A. On the average there was a loss, taking the railroad weights.

By the Chairman:

Q. Notwithstanding the amount of ice, and so on, that had come into the car on the journey?—A. I will admit that we took a time when there had been very little.

Q. How do you provide for that shortage?—A. It has to be considered in the price.

By Hon. Mr. Webster:

Q. Have you any suggestions to give the Committee that might reduce the price on domestic fuel for the consumer?—A. Well, I don't know that I can think of anything.

Q. Are there any cheap substitutes that would make satisfactory domestic fuel, that would work out to better advantage?—A. I don't know of anything. There are lots of substitutes, which are very satisfactory as substitutes.

By the Chairman:

Q. I think you said you used some coke?—A. Yes.

Q. How did you find it?—A. Well, it was very satisfactory; I really would place it next to anthracite, as our experience, for a domestic fuel.

Q. Where did you get it? Was that American?—A. Yes, a lot of it came from the Connellsville district, and some of it was by-product coke. There is quite a difference in coke. I am not an expert in this at all.

Q. But you bought not only the beehive coke, that would be the common, but by-product coke?—A. Yes.

Q. And your customers were satisfied?—A. Yes, as a substitute it was quite satisfactory.

Q. You would be quite satisfied to keep it in the future—I mean there might be a market for it?—A. Well, I don't know, in competition with anthracite on even terms in normal years, I don't know. There is a certain amount of coke marketed all the time for domestic use.

By Hon. Mr. Laird:

Q. How did you find it compare in utility with anthracite coal; that is, how far would it go?—A. No, it would not go as far as anthracite coal.

Q. To what extent would it go?—A. I don't know. I know our customers said it would not go as far as anthracite. We only handled it last winter; as a general thing we don't handle it.

By the Chairman:

Q. I suppose your attitude really is that you sold it to the people, and you have just the impression that they brought back to you, that it was satisfactory?—A. Yes.

Q. You made no tests, or you have not handled it long enough?—A. No; it is just the reports we had from customers.

Q. Were they, on the whole, satisfactory?—A. Yes. Of course it has certain qualities.

By Hon. Mr. Laird:

Q. Coming back to Alberta coal, how many cars did you experiment with?—A. We bought for ourselves only one car.

Q. That is as far as your experience extends—just one car?—A. Yes; that was last summer.

Q. Hardly a fair test?—A. Well, it was merely an experiment. We could foresee a coal shortage, and we were going into the question of substitutes.

By the Chairman:

Q. Did you bring up any Nova Scotia coal?—A. I ordered two cars, but never got them. Of course it is a bituminous coal, very soft coal.

Q. The steady supply of coal in Ontario is practically all American anthracite?—A. Yes.

Q. Has the trade in Toronto ever got as far as they got in Montreal, according to Mr. Robertson, as to the question of pooling their business with a view to economy?—A. I don't think so. Toronto is fairly well supplied with railroad facilities. Our company has five yards at various points, so that the cost of actual delivery is reduced by delivering from the most convenient spots.

Q. How do you do cartage? Have you your own cartage, or do you hire?—A. We hired a lot of trucks and horses to augment our own delivery.

Q. But you have a nucleus of your own?—A. Yes.

Q. Probably what you can employ all the year around?—A. Yes, exactly.

Q. What capacity have you in your delivery plant?—A. We could deliver, if pushed in times of big demand, if we could get coal enough, we could get it up close to 2,000 tons a day by our own plant. That figure, of course, is only theoretical. The demand does not call for that in normal times. It is more steady day by day, and in abnormal times if we could obtain that much coal day by day we could deliver it; that is what I mean.

Q. Does your company own those yards?—A. Yes.

Q. The land and the plant?—A. Yes.

FRANCIS W. GRAY, Assistant to the Vice-President of the British Empire Steel Corporation, Sydney, N.S., called and examined.

By the Chairman:

Q. Have you seen Mr. Lucas since he gave evidence here?—A. No, not recently.

Q. We called you, as representing one of the chief sources of supply of Canadian coal, largely on two points: if there was an increased demand in the St. Lawrence how far could Nova Scotia respond to it; and secondly, the possibility of the manufacture of coke to take the place of coal?—A. I think there would be no difficulty at all in Nova Scotia supplying all the coal that Quebec, at least, and probably Ontario, would need, in the way of coke as an equivalent for anthracite. I might say that I have used Sydney coke all winter at Ste. Ann's.

Q. What was your experience?—A. Well, I would rather have it—much rather—than anthracite. It is less trouble; it is less expense. I was away from home all winter, and my boy, who is only fifteen, managed the furnace most all winter. It was a cold winter, and we have an exposed house, a big house, and we had no trouble at all, no ashes, far less trouble.

Q. You have been in that house more than one winter?—A. I have been there five winters.

Q. Could you give us anything as to the quantity, as compared with your burning anthracite?—A. I would say, roughly, about ton for ton. It is a little bulkier than anthracite.

Q. But allowing for that, taking actual weight?—A. Yes. I experimented a little in the early part of the season: I didn't know whether the coke would be quite satisfactory alone, and I got some Welsh anthracite. It was good Welsh anthracite, and very slacky, and I threw it in among the coke. It disappeared. It made a very nice fire, but I think the coke is just as well alone.

Q. When properly handled?—A. Yes.

Q. Your impression would be, then, that ton for ton, at an equivalent price, you as an ordinary consumer—not as belonging to the British Empire Corporation—would quite as soon have coke?—A. I would much rather.

Q. Less trouble?—A. If I had to live there again I would never use anthracite any more if I could get domestic coke.

Q. Would you pay any premium for domestic coke?—A. No, because I would expect to get it for less price than the anthracite.

Q. But I mean if you could get coke at a premium would it have any advantages that would induce you?—A. Yes, I think I would pay more for it. Of course anthracite varies. Some anthracite will run, I suppose, 30 per cent ash; it depends on the quality.

The CHAIRMAN: Mr. Shiels, you would say that was from the independent companies?

Mr. SHIELS: Yes, that is pretty high.

The WITNESS: Good anthracite will run from 15 to 17 per cent ash, normally.

Mr. SHIELS: I have an analysis here (handing to Chairman).

By the Chairman:

Q. It has been represented to us that the desirable way of producing coke to supply Ontario and Quebec would be to do it in Ontario and Quebec at the larger places, rather than making it at the mines.—A. Distinctly so.

Q. That the other would be practically impossible?—A. Yes, it would.

[Mr. F. W. Gray.]

Q. Are you in a position to say anything about your company having that in contemplation at all?—A. Yes, I think Mr. Woolvin announced at the last annual meeting that he had that in contemplation—was looking into the question of putting up a coke oven plant in Montreal.

Hon. Mr. LAIRD: Would that be a gas plant?

The CHAIRMAN: It would be producing gas and those by-products.

By the Chairman:

Q. Undoubtedly there would be some arrangement with the Montreal Gas Company?—A. I think so.

By Hon. Mr. Laird:

Q. Would that involve a large capital expenditure?—A. Yes, quite large; it would depend upon the number of ovens.

Q. Approximately how much?—A. It would run between \$3,000,000 and \$5,000,000, depending to a large extent on the site and the storage ground and the cost of water.

Q. What output would that give you? A plant of that size?—A. About a sixty-oven plant would give about 1,000 tons of coke a day. Of course, the old line gas plant has been entirely superseded by the by-product coke oven. You can make better gas and more of it, and get a greater recovery of by-products from the modern by-product oven than from the old-fashioned retort gas works. They are out of date. I might say, too, that there is no comparison between gas-house coke and by-product coke. In the gas works your object is the destructive distillation of coal to obtain gas; in by-product coke your object is to get a high carbon fuel. The coke oven has, I think, entirely superseded the gas plant where coal is used alone. Water gas is a little different.

By the Chairman:

Q. If that project went through, it would make a large increase in the output of Cape Breton coal?—A. Yes. You get about 64 per cent yield; that is, 1,000 tons of Cape Breton coal would give about 640 tons of coke.

Q. I understand that some of the modern by-product ovens claim to get 70 per cent or over.—A. That depends to a large extent on the amount of volatile you will have in the coke.

Q. You have never been a coke maker?—A. I have been connected with coke ovens all my life.

By Hon. Mr. Laird:

Q. Have you any idea what quantity of labour would be employed in a plant of that size? Would it be a large employer of labour?—A. Not extraordinarily large. A modern plant of that kind would put in mechanical means for pushing and loading the coke. The coke would be pushed out and loaded into belt conveyors. I would not say that you would require more than 100 men on a plant to produce 1,000 tons a day. I am speaking entirely from memory. At Sydney, the Dominion Steel Company have three or four blocks of ovens which have been successively improved on, and they have cut the number of men into a quarter.

Q. By putting in labour-saving devices?—A. Yes. In the old days they used to push the coke by a ram, and the men handled it with big forks; to-day it drops into a big iron car and goes under a quenching spray, which practically breaks it all up, and is dumped on a belt conveyor and is never touched by hands at all.

[Mr. F. W. Gray.]

By the Chairman:

Q. Of course, from the national standpoint there would be a large increase in employment through the production and transportation of the coal turned into coke?—A. Yes.

Q. And the process of turning it into coke, which is now done in a foreign country, would be done in our country.—A. The great advantage to Nova Scotia would be—anthracite or hard coal, or any smokeless coal, seems to be a necessity in modern Canadian cities; the flues in furnaces have been made to burn anthracite. It has been the custom. You practically cannot throw out that equipment; it must remain; but it can be modified in houses, and in building new hotels and factories you can put in flues big enough. But the better way, if you can do it, is to use a non-volatile equivalent to anthracite—and coke is such a one. So, hard coal or coke is a necessity; it must be had year after year—there is a steady market for it. If Nova Scotia could supply say the island of Montreal with coke, it would mean that there would be an outlet for say a million tons of Nova Scotia coal a year, on which the operators down there could depend, without any trouble. They would know they were going to get that just as a baker knows he is going to sell so much bread.

By Hon. Mr. Laird:

Q. Would that reduce the cost of production?—A. It would have a steady-ing effect; it would provide a stable market. That is one thing Nova Scotia has always lacked. The large railways of Canada have been quite unfair to the Nova Scotia operators. They pin them up against American competition every year. Every spring they want to make new contracts for coal, and the Nova Scotia operator never knows what he is going to get for coal, and the railways quite ruthlessly—they make no bones about it—say: "If you can produce and give us coal as cheap as the United States, we will take it."

Q. Do you think they would be justified in paying higher prices?—A. Not excessively higher prices, but I think they would be justified in paying somewhat more for it. To elaborate that, it has made for an unsteady condition of labour and investment in Nova Scotia, because we never know whether we are going to get the railway contracts or not. If we could get the anthracite market that is now going to the States, we would have a steady back log every year.

Q. You could get that by means of coke?—A. That would be one way. I think as people realize that this country is full of soft coal or bituminous coal, and that anthracite is a disappearing commodity, they will come to burning bituminous coal, as they do in Europe and Nova Scotia and British Columbia.

Q. As they do over 90 per cent of the world where coal is used at all. But, Mr. Gray, is not the method of using coke distinctly the most economical for the country?—A. Absolutely.

Q. A ton and a quarter of bituminous coal, say, will make a ton of coke, which is the equal, let us say, of a ton of anthracite?—A. Yes.

Q. And beyond that you have two or three gallons of benzol, you have creosote, and all these other things?—A. Yes.

Q. So that if the money could be found to establish plants of that kind at various places, it would be a great deal better than burning an equivalent number of tons of raw coal?—A. Yes, much better. As a matter of fact the by-products are worth more than the coal, particularly in regard to Nova Scotia coal, because Nova Scotia coal has, I think, probably the highest yield of by-products.

Q. It is very high in certain by-products?—A. Very high in ammonia and sulphate.

Q. And is not the tar peculiarly rich?—A. Yes. I saw a letter the other day from the head of one of the big firms in Boston—Captain McKay of the

[Mr. F. W. Gray.]

New England Gas and Coke—in which he said Cape Breton is peculiarly rich in by-products—and they use a lot of it.

Q. Notwithstanding the sulphur, it is very high in by-products?—A. Yes.

Q. Did Mr. Lucas mention the possibility of entirely taking the sulphur out of gas by new methods?

Q. No, he did not. We would be very glad to hear from you on that. I may say that Mr. Blauvelt, who appeared before us, minimized the importance of sulphur and stated that it could be taken out.—A. It can.

Q. Would you tell us more about that?—A. By what they call the liquid purification method the entire elimination of sulphur is quite possible from the gas, not from the coke. The mixture is a weak solution of bicarbonate of soda and water. The gas is passed through that, and the solution is aerated, blown through like a Bessemer furnace, and that takes all the sulphur out of it in the form of sulphate of hydrogen. That can be disposed of either by a high stack or by passing it under boilers and burning it. The fumes, of course, are objectionable.

Q. That has been demonstrated?—A. It is a development of the last year. Also, they are making a lot of progress in taking the sulphur out of coke, by steaming it.

Q. At what stage?—A. They steam it in the oven just before it is drawn, and they can reduce the sulphur quite appreciably.

Q. That has not been tried with you?—A. No. Not only that, but they increase the yield of gas, the yield of volatiles. That has been tried in England.

Q. Those processes are still in the experimental stage?—A. They have proceeded so far that they show considerable promise. In England they are actually increasing the yield of gas by steaming not only in coke ovens, but in gas retorts.

Q. So the figures we have had as to the yield of gas may be increased in volume, and there would not be very much after-purification?—A. Yes.

Q. There is another point. As you know, we are at a disadvantage in meeting American competition in mines which produce coal very much cheaper than ours do?—A. Yes.

Q. There always has been some difference?—A. Yes.

Q. As I remember the figures, that difference is greater now than it was?—A. Yes; at least it is as great.

Q. Have you anything optimistic, which will be borne out by the facts, that we can look forward to in the reduction of that difference?—A. No, I am afraid not. Of course, the old line States—Pennsylvania, Illinois, and Ohio, the cost of mining has gone up pretty much in the same proportion as it has in Nova Scotia. The biggest menace from the coal operators' point of view is West Virginia, where coal can be mined, I suppose, more cheaply than anywhere else in the world. It is a new field, with new seams. I could not say, however, that you are likely to get coal much cheaper in Nova Scotia from the physical point of view. If wages decline, and the cost of material, then you get a little lower price.

Q. There is not much tendency that way yet?—A. No.

Q. But it is a very serious handicap on our mines?—A. Yes, it is quite serious; but we have one advantage, and that is our water transportation.

Q. I do not think there is any place in the world where coal can be put on vessels and carried and discharged cheaper than between Cape Breton and Montreal?—A. No, I think you are right.

Q. When I knew more of it in detail, there was certainly nothing on the seaboard of America or Europe that could equal it.—A. No, we were in advance in those days.

Q. In advance in every respect of Newport News or any of those places, or of any discharging plants?—A. The States have made great improvements recently. Newport News and Baltimore have put up very modern and expensive structures and have brought down their costs.

Q. How are vessel freights to-day?—A. They are fairly steady. I do not think there is any tendency to decline.

Q. We have had a dollar quoted to us as about the current cost. Would you care to say, or do you happen to know, whether that is the rate from Sydney to Montreal?—A. That entirely depends upon the size of the vessel.

Q. I mean as you are doing it now. There have been times when you carried it for fifty or fifty-five cents?—A. I would say one dollar would be a fair estimate of the cost from Sydney to Montreal. That would include discharging, possibly, but no handling after discharge.

Q. Have you given any particular attention to the possibilities of carriage up the St. Lawrence beyond Montreal?—A. Yes, we put two cargoes up there, I think it was in 1921. In each case I think—I am not certain about this—in one case, at all events, the ship was lightened at Montreal. If it were possible to send an ocean going vessel to Toronto, there is no doubt that Nova Scotia coal could compete in Toronto with American coal.

The CHAIRMAN: What is the price, Mr. Shiels, of a good grade of bituminous coal in Toronto?

Mr. SHIELS: Steam coal?

The CHAIRMAN: Yes. The kind of thing I have in mind is Reynoldsville.

Mr. SHIELS: About \$7 to-day, f.o.b. Toronto. That is lump.

By the Chairman:

Q. Could you meet that?—A. Not under present conditions; no, not at Toronto. If we had a through freight, if we could send a ship from Sydney to Toronto, we could do that. It would depend to some extent upon the grade of coal you are competing with.

Q. I mean the kind of steam coal, for example, that we have displaced before. Reynoldsville used to supply the Grand Trunk at Brockville. We have taken that business away from them.—A. Yes. We sent coal up to Brockville regularly.

Q. Have you recently?—A. Not recently.

Q. That was a good grade of American steam coal?—A. The point of view I have tried to explain to myself, not speaking as an official of the Company at all, is that if you can make an equivalent fuel for anthracite from Nova Scotia coal, there is no particular object in sending bituminous coal to Toronto until you have supplied Quebec.

Q. Of course, you have a long way to go now to drive American coal out of Quebec.—A. Yes. We hope this year to put almost as much coal into Montreal as we have ever done. It has taken a long time to get that back. Last year was an abnormal year because of the strike in the States. Prices this year will be lower than last year, because coal will be more plentiful. We hope to put up the St. Lawrence nearly two million short tons this season.

Q. Of course, you have put up more than that in the past?—A. My recollection is about 1,930,000 short tons.

Q. That would be another ten per cent?—A. Yes.

Q. But you are getting back?—A. We are getting nearer this year than we have been since the war.

FRANK E. LUCAS, Esquire, Economy and Fuel Engineer, British Empire Steel Corporation, Sydney, N.S., appeared as a witness before the Committee and testified as follows:

By the Chairman:

Q. Mr. Lucas, have you seen our evidence?—A. Yes, sir, I have.

Q. And you were here yesterday when Mr. Blauvelt gave evidence?—A. Yes, sir.

Q. As time is short, will you tell us what we ought to know and so far as possible avoid going over any ground that Mr. Blauvelt covered. And we have heard from other sources in reference to coke.—A. I assume that the object of this Committee is two-fold: primarily, to find a successful substitute in order to prevent or offset the importation of American anthracite; and, secondly, in so far as possible, to make Canada entirely self-supporting from her own fuel resources. I would say generally that I entirely agree with and endorse every statement made by Mr. Blauvelt yesterday with respect to coke oven plants and the value of the products.

The CHAIRMAN: I may tell you, as Mr. Lucas is modest, that he has had experience and ever-growing responsibility in connection with the coke plant at Sydney in the last twenty years, is it not?

By the Chairman:

Q. How much coke do you turn out there?—A. Our average output of coke would run—well, at the present time we are running at the rate of about 350,000 tons of coke per year.

Q. About 1,000 tons a day?—A. About 1,000 tons per day.—No; at the present time we are doing a little better than that.

Q. That is near enough. It is a large property and there are large batteries of ovens.

By the Hon. Mr. Webster:

Q. How much of that coke do you use for your own manufacturing purposes?—A. Practically all of it. For a number of years past we have supplied our employees, who formerly purchased anthracite coal, a certain amount of what was known as the coke breeze; that is, the coke under three quarters of an inch. We did that to protect them about 1914, when hard coal practically stopped coming into that town. There never was very much of it; there were perhaps one or two schooner loads in a year.

Q. Why was that brought in?—A. It was brought in to take care of what really amounts in my opinion to a crying need for anthracite coal or a substitute in this country; that is, for the poorer people, who own their houses or have some individual cottages and cannot afford to put in a hot water or steam heating system. In order to get something that will keep their houses reasonably heated and at the same time stay in overnight, they must have a non-caking and a very low volatile fuel. So far, practically the only thing they have known about has been anthracite coal, which is usually fed into a stove containing a magazine at the top.—

By the Chairman:

Q. A baseburner?—A. They put in a scuttleful of coal and that maintains heat overnight.

[Mr. Frank E. Lucas.]

By the Hon. Mr. Webster:

Q. Is there any difficulty about your fuel staying in overnight?—A. Absolutely no. I had it suggested to me last fall to put this on the market in the Maritime provinces. The Government reports show approximately 150,000 tons of anthracite imported per year. When I came to look into the matter I was really surprised that people living in proximity to coal mines had always been using anthracite coal. Anthracite coal was selling in Halifax for about \$23, American or Welsh. I had one case, in a schoolhouse in Yarmouth which was heated by the coke up to 80 degrees—I am quoting the janitor now—very much more quickly than he had ever been able to do with anthracite. The fire was banked at four o'clock on Friday afternoon and was not looked at again until about ten o'clock on Saturday morning, and the school was well heated and there was a splendid fire still in the furnace. I had made no demonstration myself, any more than just to instruct him with regard to the thickness of the bed and the control of the drafts. I may say that experience has been repeated time and again all over Nova Scotia, and the extent to which we could market this was governed entirely by the amount we had available; that is, what we did not need for our metallurgical operations.

By the Chairman:

Q. Did you push it?—A. We did for a time, when we could spare it from our metallurgical operations.

Q. At what price did you sell it?—A. That was sold at \$8 at our plant.

Q. My men told me that it burnt out the grates.—A. So far as Sydney is concerned, we made no demonstrations there until a year ago last fall. Our company has always had a booth at the local exhibition, usually confined to "safety first" etc., and I suggested at that time that we put in an exhibit with the idea of going ahead on this coke, and we got a baseburner and a Thompson hot water furnace—a small Thompson hot water furnace, and maintained for three days and three nights a continuous fire in each one. We did not clean out a pound of ashes or take out any clinkers, and we maintained the fire without any trouble. We banked it at perhaps half past ten at night and opened the furnace in the presence of witnesses at half past nine the next morning, to show that the fire was not tampered with. Just for advertising purposes I had a little card printed. I will give you a copy. There has always been an unfounded prejudice against coke because it burnt the grates out. Frankly it will if you let it. Coke is primarily made as a metallurgical fuel to smelt iron, and it is simply a question of controlling that possible temperature, and the control is very, very easy. When I came to put it on the market I got some cards printed and handed them to the dealers, that they might send a copy with each trial lot to the consumer, (copies handed to Chairman and other members of Committee).

The CHAIRMAN: If I might interrupt you, Mr. Lucas,—I think there is one point there which Mr. Lucas has put extremely well. After saying that it is made from coal mined in Nova Scotia, he goes on: "The manufacture of one ton of coke produces enough gas for cooking for the average family for a year. Enough fertilizer for a large garden. Enough tar to spray the road in front of your lot. Enough motor fuel to drive your car fifty miles." It seems to me that that is a very succinct statement of what it will do.

The WITNESS: I would say generally, sir,—and I am quite willing to stay here and let you question me as long as you like, until I convince you of what I state—that I regard the installation of by-product coke plants in, say, Montreal and Toronto, as one of the greatest economic assets that this country could have. I mention those two places in the meantime. It might be extended later. It would be an asset in the industrial development and building up of those areas which would be practically equal to what happened in either because of the introduction of cheap hydro-electric power.

[Mr. Frank E. Lucas.]

By Hon. Mr. Webster:

Q. What has been your success with the introduction of coke in that conservative province of Nova Scotia? I do not speak politically.

The CHAIRMAN: It seems a misnomer.

The WITNESS: I would say this, sir, that within three weeks of the delivery of the first trial car it has been a success. I will admit that in some cases dealers were doubting Thomases, but I asked them to take a car at our expense, if they or the consumers did not want to pay for it. In one case, at my suggestion, the second largest dealer in Halifax shipped out his entire carload in those small canvas bags with which you are familiar, and which are used for the delivery of hard coal. He sent a few bags to each customer, and each lot was accompanied by one of those cards, with the request that the customer try out this coke at the expense of the dealer. We, of course, would have borne it if he had fallen down, and if they did not want to pay for it they needed not. In all cases, 100 per cent, those customers who were picked for the purpose of these trial orders came back with orders, varying from half a ton to three tons. That was the result of their initial trial. The only limit to the amount we could place there was the limit of the quantity that we had. The main dealer in Dartmouth, Mr. Bishop was, as far as I know, the only dealer in the province of Nova Scotia who got all the anthracite he required—his normal requirements for the year; and to-day he still has, according to his own say-so, plenty of anthracite on hand because he cannot sell it in competition with coke.

By Hon. Mr. Webster:

Q. At the same price?—A. The coke is being put on the market at \$15 in Halifax. There is a freight rate that eats up \$3.

Q. And the anthracite is put on at what price?—A. When they had it, some people were selling it at \$23. In Yarmouth some anthracite was selling as low as \$13. It depends entirely on the dealer and where the dealer got it. Some got it in New York and paid a very high price. Others got it from the producers and with the addition of about \$2 freight rate and 40 or 50 cents for unloading, they were able to sell at a lower price and protect their customers.

Q. Are you hopeful that your coke can displace American anthracite at the same price?—A. At the same price?

Q. Yes.—A. I am sure it can, ton for ton; not bulk for bulk, because it is very much lighter than anthracite. It is about 30 per cent lighter than soft coal. Metallurgical coke and domestic coke are one and the same thing, except for size.

Q. Would it not be fair to put it "price for price"?—A. Price for price, it is a better fuel in every way than American anthracite, and better than Welsh anthracite.

Q. Cheaper?—A. I would say yes.

Q. Cheaper to the householder, I mean.—A. Cheaper to the householder.

Q. What will the final analysis be?—A. The final analysis will be that for a dollar spent on coke you will get very much better results than for a dollar spent on any other solid fuel that can be bought in this country to-day.

Q. Welsh anthracite or American anthracite?—A. Barring none; and as corroborative evidence I would state this, that the American Fuel Testing Bureau rates them in this way: Number one in point of efficiency, by-product coke; number two, gas coke; number three, anthracite. Now I would insert a fourth one, and I would make number three Welsh anthracite and number four American anthracite, because the average American anthracite will run anywhere from 20 to 35 per cent ash to-day; that is the American anthracite that comes into Canada.

By the Chairman:

Q. Do you happen to have the reference to that report of the American Bureau?—A. Yes, sir. I haven't the pamphlet with me: It is called "Why and how to use coke for domestic purposes." It is published by the Bureau of Mines at Washington.

Q. Summing up, your experience in Nova Scotia is that you might look to a largely increased market for your coke and to its displacing anthracite coal?—A. Undoubtedly. We made no effort in New Brunswick, nor in Prince Edward Island, where they consume about ten thousand tons of anthracite a year. We are turning down orders. As a matter of fact we had only three thousand five hundred tons per month to spare.

By Hon. Mr. Webster:

Q. Did you market all that in Nova Scotia?—A. Yes, and we turned down orders doubling that amount. It was all in Nova Scotia, except three cars that we sent up to St. Anne to Mr. Gray.

Q. And you look for a larger demand this year?—A. It just depends on how far we will be able to take care of it.

Q. Can you not increase your output if you have the demand?—A. We can to a certain extent. For instance, we have three batteries. At that time we had only two on, and could just about nicely run our three blast furnaces. With three batteries on, when we had only two blast furnaces on, we did take some metallurgical coke and run it through the crushers. So far as the coke trade is concerned, it is practically 100 per cent in Halifax and Dartmouth, which are the largest places. In the second place, the anthracite coal all comes in by water, and many of the dealers are not very strong financially, and it is a very great strain upon them to put up from \$15,000 to \$40,000 to carry that coal when some of the bills are not collected until the end of the year, whereas by taking the coke a car at a time there is a very much more rapid turnover.

Q. The reputation in the trade is that the Halifax coal merchants are a very wealthy class?—A. Some of them, possibly, may be, although I have no definite knowledge of that. We paid for absolutely no advertising. The dealers paid for that.

By the Chairman:

Q. Have you formed any idea as to how small an installation would be economical? Suppose Montreal or Toronto did not do it, would a place of 60,000 or 80,000 where they could get coal to advantage be able to put in a small plant?—A. It is pretty hard to generalize. A town of 60,000 to 80,000, if it has a certain number of industries, could well stand a plant.

Q. Where they could get a sale for the gas?—A. Yes. The sale for the gas in a small town like that would need to be to a certain extent industrial. Even in Montreal—Quebec takes 1,500,000 tons of anthracite, which means approximately 2,500,000 tons of soft coal to make coke—to make that quantity of coke in the island of Montreal would produce so much gas that you would have to use that either under boilers or internal combustion engines to generate power, or sell it cheaply to various industrial enterprises now using coal under boilers. It has been largely the history in every case whereby by-product plants have gone up in a city or near a city, that there has been a cheapening of the gas because gas may be sold to a gas plant at a price cheaper than they could make it, and still leave a fair price for the by-product plant. Gas heating is most economical so far as the ordinary city is concerned. Gas heating is an ideal method, and

[Mr. Frank E. Lucas.]

that, I may say, is the reason why coal is pulverized; it is to bring it as nearly as possible to the same condition as gas. Then there is the ease with which you can handle it with thermostatic control. With thermostatic control it does not require much attention; and while perhaps it is not advisable to never look at it, it is not necessary to look at it from one week's end to the other.

Q. Now, about by-products. Do you get a final crude oil, or could you get fuel oil?—A. Well, in the recovery of the by-products you get first a tar which comes out partly by cooling and partly by scrubbing—actual mechanical scrubbing, impinging the gas on a more or less rough surface. You can burn that as we did for a number of years, and do in some cases yet, for instance in our open hearth practice, our mixer. That is entirely fired with tar, the same as you fire with oil; but it seems like an economical waste to do that, because that tar contains very valuable oils which can be used as fuel, but which are very much more valuable for timber preservatives. That is the source of creosote and anthracite and creolin. The residue of that is the pitch, which may be more or less solid. If you take out the last drop of oil you get a pitch which is brittle even on a summer day; or if you leave in more oil you get a roofing pitch. So far as our market is concerned, that pitch is largely sold to Europe for briquetting purposes.

Q. And could be used here?—A. And could be used here in the event of briquetting.

Q. In other words, from the tar there ought to be nothing wasted?—A. No, there ought to be nothing wasted; and practically there is nothing wasted. We do not treat our tar ourselves, as you know.

By Hon. Mr. Webster:

Q. Have you considered the question of briquetting as you have both coal and tar?—A. Yes, and one time we went so far as to purchase a plant. But conditions altered, and the market for the slack coal became greater, so to-day we make our coke entirely out of slack coal when we can get it, in fact the production is not general enough for our coke requirements and there is nothing to be gained by making briquettes at the present time. Industrial practice—and this can be borne out by European practice—and a number of tests made some years ago by the American Bureau, show that the efficiency of a good coal is increased by about 20 to 25 per cent by briquetting, except for household purposes, and there it was found to be a little too sooty because of the 7 to 10 per cent of pitch that was added as a binder.

Q. You have practically no duff or slack?—A. No.

Q. What about some of the other coal mines in Nova Scotia? Could they profitably take up the question of briquetting?—A. There was a mine at Bras d'Or, the McKay Mine—I don't know the name to-day—where they did build a briquetting plant and where they were selling briquettes and working up a very nice business. I burned some in my own house, not in the furnace, but in the grates and they were delightful. Briquettes can be made even from a clinkering coal—and I may say that all Nova Scotia coals are clinkering, that is they have a low fusing point ash; but that does not militate against the use of the coal. It has been used with perfect success by the British Admiralty.

Q. Why did that plant give it up?—A. The plant burned down and there was a lack of capital.

Q. Why do the people of Nova Scotia use so much anthracite when they have soft coal at their back doors?—A. Well, I don't know, I am sure. It is largely a matter of habit, I suppose.

Q. Is it habit, or luxury?—A. Possibly that, except for the fishing districts. Take down the Southwestern for instance, Liverpool, Lunenburg and Barrington

[Mr. Frank E. Lucas.]

Passage, and places like that; the small towns and even the small straggling fishing villages use it because it is a rarity to find a furnace. They heat by means of a base burner in the main hall, and the chimney goes up through, and there is a drum on it, and in the bedroom there is another drum, and for these stoves they must have a non-caking fuel.

Q. Might not the reason be to avoid the capital expense of putting a furnace in?—A. Possibly so.

By the Chairman:

Q. And there are schooners going backwards and forwards?—A. Last winter they were selling some hard coal for as low as \$13.50.

By Hon. Mr. Webster:

Q. Can that luxury system be displaced by a substitute?—A. Yes. There is no doubt that it can be one hundred per cent replaced by coke. I will make this statement generally, and make a reservation afterwards. Generally speaking, any house furnace that is equipped for hard coal can be used with a soft coal; but you have to remember that a ton of hard coal will run say 10,000 b.t.u's, and I doubt if there is any American anthracite which comes to Canada running that to-day; probably it is running 8,000 or 9,000 b.t.u's, and that will go further, or quite as far, with the most careful firing. Ton for ton it will be equal, but as against 10,000 b.t.u's you are burning 13,000 or 14,000 b.t.u's in soft coal. In industrial work you have such control of your air, and such long passages that you can burn the gases; but in the ordinary household furnace it is simply up and out, and the volatile matter is largely lost—as against the carbon with 14,000 b.t.u's. the hydrogen, with practically 60,000 is practically lost.

Q. The figure that we have on the importation of American anthracite to Nova Scotia seems to show that it is on the increase.—A. I would hardly say so. I recall a chart that was issued by the Fuel Commission about two years ago, showing the importation, and it has gone, I believe, as high as 200,000 for the Maritime Provinces. The year before last it fell away down.

Q. That was an abnormal year. There was a strike on.—A. There has been nothing to compete with it until this past year. One dealer in Halifax last winter handled no hard coal at all, not because he could not get it; he could have gotten some; but we got him to try this out, and he handled no hard coal at all.

By the Chairman:

Q. Roughly, with a production of 350,000 tons of coke per year, about how many men do you employ?—A. I would say that the total force on the plant, including the yard, the mechanical, the electrical and all the men necessary to operate that plant, and recover all the by-products would not exceed 200.

Q. We got an impression from Mr. Blauvelt yesterday that the number of men would be considerable, following the establishment of this industry?—A. Of course the establishment of a new plant like this would retain money in Canada, and a few more men would be employed, because in addition to what we have there you would require your docks, coal and coke storage, shipping, etc.

Q. Of course that applies to coal also?—A. Yes, but that is not included in your particular force there. You would require your coal-handling apparatus, you would have to have your shipping, for instance, where our shipping is simply running down a chute into the cars, and the whole thing goes to the blast furnace, and it is automatically screened; but there you would have to have

crushing equipment and other shipping arrangements in order to take care of all manner of orders, so that your force would be reasonably increased. That of course is for a plant of that size, and the larger the plant of course it would be increased. There would be a difference of perhaps 30 or 40 cents a ton in comparing a plant that would coke 1,000 tons a day and one that would coke 1,500 or 1,600 tons a day. When you get down to the very smallest plants that are being built to-day, for the production of approximately 100 tons of coke a day, your labour costs are naturally very high proportionately. I feel very strongly in this matter, and I would like to draw your attention to other points which I will send you in a written statement.

Statement by Mr. Lucas follows:—

With further reference to the question as to how small an installation would be economical. It is well to remember that in common with most all manufacturing industries quantity production makes for cheapness of the product, and where possible, plants should be located at the largest centres. The coke coming into competition with anthracite can stand freight to the smaller towns and the gas can be carried in small mains under high pressure to any reasonable distance from the coke plant. One plant is delivering gas 120 miles away, so without the high operation costs necessary in small units it would be possible for the smaller towns to have all the advantages of gas fuel or coke equal to the large city where the plant was located.

Contrary to a more or less popular conception a by-product coke plant is a very flexible installation. The production can be varied down to twenty-five per cent of the maximum without changing the quality of the product. The cost, of course, will be higher due to the same overhead and labour being charged against the small production. The quantity of saleable gas per ton of coal coked can be increased by upwards of forty per cent by heating the ovens by producer gas, and sending out all the gas made in the ovens. Or a still further increase can be arranged to take care of peak or winter loads by making water gas from some of the coke.

Loss in handling.—Once the coke is prepared at the plant for domestic use there is no loss in handling or breakage which would necessitate screening at the yards of the retailer.

Cost of transportation.—The railroads generally have set a rate on coke considerably higher than on coal, but this rate has been based on foundry coke which is the largest size and consequent low weight per cubic foot of car capacity. In the case of domestic coke, which is much smaller, there is very little void and cars can be loaded practically to their rated capacity, so that it would be reasonable to expect a lower rate.

Marketing.—In a district like Montreal or Toronto, where domestic fuel has been 100 per cent anthracite, it would doubtless take a little time and entail considerable expense to introduce coke. It is, however, from the standpoint of excellence and also from an economic standpoint the logical fuel, coupled with the gas which will be produced in such large quantities. Oil, peat and wood may be a more economical fuel in certain favoured localities, but none of them can be looked to as an effective or permanent cure for the present condition of depending on American anthracite.

Cost of production.—I have been asked this question and while I do not think it would be advisable to publish a balance sheet of operations which at the best would not be applicable to all locations, I will state that domestic coke, which is in every way and for every purpose superior to anthracite, can be manufactured and placed on the market at a price to compete with anthracite.

[Mr. Frank E. Lucas.]

Government aid.—I have also been asked about Government aid for the building of a coke plant. I believe this would be advisable for the first plant at least, until such an industry became established, but I do think that such aid should be preferably given to a company who would use Canadian coal.

The Chairman stated during the hearing of Mr. Blauvelt that I would throw some light on the question of stamping or compressing coal for improving the quality of coke. This practice has been carried on in many plants in Europe where the ovens are wide and the heats relatively low. It has also been tried out in this country at the Lackawanna Steel Co. in Buffalo and at the Dominion Iron & Steel Co. at Sydney, but in neither case was the expense found to be justifiable. American practice has been to design the ovens so that the required heat treatment may be given to each particular coal. By this means a high grade metallurgical coke is now being produced from some of the poorer grades of coal, e.g. in Illinois, which were previously regarded as valueless from a coking standpoint.

The quality of coke produced by compression of the coal charge is distinctly inferior to that produced by proper oven design and heat treatment both for metallurgical and domestic use.

The Hon. Mr. Laird asked Mr. Blauvelt about the practicability of making coke from Canadian coals. So far as Nova Scotia coals are concerned, the statement that the Nova Scotia Steel Co. and the Dominion Iron & Steel Co. have been running their blast furnaces ever since they were built on coke made from 100 per cent local coal and the success that has attended the introduction of the same coke for domestic use, should be sufficient answer.

So far as the western part of Canada is concerned, there are many good coking coals. In "An Investigation of the Coals of Canada," issued by the Department of Mines in 1912, is a list of coals which were tested for their coking qualities on the plant of the Dominion Iron & Steel Co. and many of them were found to be of high quality for that purpose.

Room No. 534,

OTTAWA, Thursday, May 17, 1923.

The Special Committee of the Senate met at 11 a.m. Hon. Mr. McLennan in the Chair.

EDWIN P. MALLORY, Director of the Bureau of Statistics, Canadian National Railways, Montreal, called and examined.

By the Chairman:

Q. Mr. Mallory is the Director, Bureau of Statistics of the Canadian National Railways. Now, in regard to tables or anything of that kind that you have given to the other Committee, it is unnecessary for us to reprint them with our evidence. The evidence taken by the Committee of the House of Commons will of course be available to us. The purpose was rather to supplement that. Is there anything that has occurred to you as being desirable to tell us, or that we might inquire about?—A. Nothing further has occurred to me with regard to our estimate of the cost of handling the Alberta coal to Toronto—the \$9 rate.

Q. As I understand it, that \$9 rate took in the whole Alberta field.—A. It is the average of the Alberta fields to Toronto.

Q. You would vary that somewhat from mine to mine?—A. Yes, sir.

Q. We have had an application from Saskatchewan people. Would you give them the same rate, pro rata?—A. Well, sir, I could not say as to that.

[Mr. E. P. Mallory.]

Hon. Mr. LAIRD: Where in Saskatchewan is that? Estevan? Is it the lignite?

The CHAIRMAN: The application was from Hugh Sutherland.

Hon. Mr. LAIRD: There is no use talking about bringing that coal down here. I imagine it is the Estevan stuff.

The CHAIRMAN: We will look that up.

By the Chairman:

Q. That would be an average rate?—A. The \$9 rate is the average of the Alberta fields to Toronto.

By Hon. Mr. Webster:

Q. Is that per net ton?—A. Yes, sir.

By the Chairman:

Q. Are all coal freights net ton?—A. Tariff rates are generally quoted so much per hundred pounds.

Q. Yes, but on coal would you put it that way too?—A. Yes, sir.

Q. There is another matter which, at all events in conversation, we brought up with Sir Henry Thornton, namely, that you would give the same rates from Quebec on Nova Scotia coal, I understood, as for Western coal; pro rata rates.—A. On the basis of cost?

Q. Yes, on whatever would correspond to the \$9 rate.—A. Well, I have not had any instructions, sir, as to that. The figures that I have worked out are confined entirely to the Alberta properties.

By Hon. Mr. Laird:

Q. That would cover Drumheller as well, would it?—A. Oh, yes, sir.

The CHAIRMAN: Anything in that field.

By Hon. Mr. Webster:

Q. In mileage about what distance would that \$9 per net ton cover?—

A. An average one-way mileage of 2,126. That is the average between—

Q. Would that be about six-tenths of one per cent per mile?—A. No, sir; that is about four-tenths—423.

By the Chairman:

Q. What about other places in Ontario? Would you pro rata on them?—

A. Well, I think Sir Henry's telegram mentioned that that would be adjusted.

Q. Yes.—A. That this would be the basis and it would be adjusted to other points in Ontario.

By Hon. Mr. Laird:

Q. Let us understand that. That is the rate to Toronto. Would it be the same rate to London and Brantford and other places in Ontario?—A. There are details in connection with that on which I am not in position to speak. They would have to be worked out. But on general principles I think it was Sir Henry's intention that the \$9 rate would apply from the Alberta fields to the central Ontario area.

Q. To all points in that?—A. We took Toronto as a basis. I think he mentioned that in his telegram.

Q. That is an important feature, whether the local rates were to be paid from Toronto—from the point of distribution on.—A. We have not worked out anything since Sir Henry's telegram.

[Mr. E. P. Mallory.]

The CHAIRMAN: I think it would be desirable that we should have that information.

Hon. Mr. LAIRD: It would materially increase the cost of coal if local rates were to be paid from Toronto—from the central point on to the local point.

The CHAIRMAN: Quite; because whatever might be the cost, there would be more in getting the coal to places outside of Toronto, farther inland than Toronto.

The WITNESS: I think our traffic department has already dealt with that, and I do not think there need be any fear on that point.

By the Chairman:

Q. Is there anybody here who can speak for it?—A. No, sir, but we could have somebody come here.

By Hon. Mr. Laird:

Q. Could you write us on that point? All that would be needed would be a letter stating that that was a blanket rate.—A. Yes.

The CHAIRMAN: Yes. That would be to other points in Ontario.

By Hon. Mr. Webster:

Q. Do you expect that that rate would leave you some profit?—A. No, sir, none whatever.

Q. Then must the loss be made up on some other article?—A. We tried to figure so that we would have no loss. We tried to get at the exact cost; that is, our actual out-of-pocket expenses.

By Hon. Mr. Laird:

Q. What overhead did you figure on that?—A. None at all.

Q. You figured no rate for right of way?—A. No, sir.

By the Chairman:

Q. Have you prepared a statement as to how it is made up?—A. Yes, sir. I have a copy.

Q. Perhaps you had better put that in evidence.—A.

CANADIAN NATIONAL RAILWAYS

BUREAU OF STATISTICS

MONTREAL, QUE., May 4, 1923.

E. P. MALLORY,
Director.

Estimated cost of transportation of coal in train load lots from Alberta to Toronto during May, June and July.

Train miles from average Alberta point via Long Lake	
Cut-off	2,126
Round trip mileage	4,252
Tons of coal per car	36
Cars per train	50 and caboose
Tons of coal per train	1,800

Estimated cost per train mile. cents

1. Repairs to track and structures occasioned by use. 36.2

Equipment Repairs.

2. Road locomotives..	34.4	
3. Yard locomotives..	2.7	
4. Freight cars..	83.4	
		120.5
5. Proportion of shop and machinery expense..	20.1	
		140.6
6. <i>Traffic Express</i>	Nil.	140.6

Transportation.

7. Superintendence, dispatching, station forces, etc..	Nil.	
8. Engineers' wages..	18.6	
9. Trainmen's wages..	20.3	
10. Fuel for road locomotives..	62.5	
11. Other locomotive and train supplies..	14.0	
12. Engine house expenses and road locomotives..	10.4	
13. Yard service..	31.2	
14. Clearing wrecks, injuries, claims..	3.1	
15. Loss and damage freight..	6.0	
		166.1
16. General and miscellaneous..	Nil.	166.1
10 per cent for contingencies..		34.3
		377.2
Total cost per train mile..		\$16,038 00
4,252 miles at \$3.772..		8 91
Cost per ton..		9 00
Say..		0.423 cents

By the Chairman:

Q. Now, you will have us written on the various points in Ontario?—A. Yes, sir.

Q. Cleaning up that question.—A. Yes, sir.

Q. And as to how far that could be broken up to make it useful. A train of 1,800 tons would of course be a very large trial shipment lot to get into any but the largest places in Ontario. You might tell us how that would be covered?—A. I think our traffic officers have already dealt with that, and I think they have come to some conclusion on it.

Q. You will have that letter written?—A. Yes, sir.

Q. You will also take up the rates on Nova Scotia coal from Quebec (presumably) westbound, coming through the other road and down on your road.—A. You mean west on the Transcontinental, sir?

Hon. Mr. WEBSTER: No, rates from Cape Breton and Nova Scotia mines to the province of Quebec. I think that is what the Chairman has in mind.

The WITNESS: Rail rates from Sydney?

Hon. Mr. WEBSTER: Yes.

By the Chairman:

Q. "Consideration will also be given to the rates on coal from the Maritime provinces, to send the coal all-rail would be foolish in the great majority of cases, because the coal can be hauled by water as far as Quebec, for about one-fifth of the cost, during the season of navigation, and I was in hopes that

you would make a rate from Quebec or Montreal into Ontario, to assist in getting the Canadian coals there, as against American. That is covered in a general way by what Sir Henry says.—A. You mean in conjunction with the water rates?

Q. Yes.—A. To Montreal.

Q. You see, there are discharging plants at Montreal and Quebec in connection with that road. (Am I right in that, Senator?)

Hon. Mr. WEBSTER: Yes.

By the Chairman:

Q. And what would really help the traffic would be a rate from Quebec or Montreal westward into Ontario.—A. That would be a combined water and rail rate.

Q. Now, you would take delivery at Quebec. The collieries have their own tonnage, you see.—A. I see.

Q. They ship a couple of millions of tons there, and anything we could get up by rail would be a help. (Is that a fair statement?)

Hon. Mr. WEBSTER: Yes.

By the Chairman:

Q. I do not see why a similar facility might not be given, if they want to be truly patriotic, to any Welsh coal that came out.

Hon. Mr. WEBSTER: Well, I think that in the meantime it might be applied to the Canadian product. The purpose of our investigation is to see what can be arranged in that way.

The WITNESS: That will be a continuous rate on Maritime province coal for distribution from Quebec or Montreal to Ontario points?

The CHAIRMAN: To Ontario points. Is there any other question?

By Hon. Mr. Laird:

Q. There is just one question I want to ask. Will this proposed cut-off west of Fort William, reducing the mileage by 125 or 150 miles—will this make any difference in your calculations?—A. We have based our calculations on that cut-off, which is now under construction.

By the Chairman:

Q. In the meantime you would absorb any of the freight before that is operating?—A. If there is any movement prior to the completion of that, we would absorb that, yes.

By Hon. Mr. Laird:

Q. By the way, do you know how your mileage compares with the C.P.R. mileage from those Western points?—A. I do not know.

Q. Approximately the same?—A. I do not think there is very much difference between the mileage from their Lethbridge mines to Toronto and our Drumheller mileage. We could check that up, sir, and let you know.

Q. It is only material when you come to require it for the C.P.R.

CANADIAN NATIONAL RAILWAYS,

MONTREAL, QUE., May 19, 1923.

Senator JNO. S. McLENNAN,

Chairman, Senate Committee on Fuel Supply,

Ottawa, Ont.

DEAR SENATOR,—I am writing you in response to your request of Mr. E. P. Mallory, our Director of Statistics, who appeared before your Committee in Ottawa on the 17th instant, that we furnish you with information respecting the special rate quotation on coal from Alberta mines to Ontario points.

[Mr. E. P. Mallory.]

or by any of the people that are commercially interested in that coal, to make a rate to Ontario. We are miners—we are coal miners in Alberta ourselves. We are subject to exactly the same difficulties in Alberta that every other coal miner is. That is, we have a season of the year when our organization has drifted away for lack of employment and lack of demand for coal. Then, of course, we are paying, we have to pay, the same wages, and we have exactly the same expense and overhead to carry all the season, although our mines are idle for quite a long period. For us as a mining company that is a question that has been very difficult; and as to transportation, the President asked me if I would look into the entire question of carrying coal, or getting a wider market for coal, and getting a larger production for our mines, so as to help us to carry the overhead on the mines. The figures that I got out were figures I got out for him. That is the only time the question was brought up to our traffic department.

Q. Could you give us those figures?—A. Oh, yes. Now, you do not want to have a repetition of the evidence that I gave the other day?

Q. No, no, but I think we ought to determine the point about rates.

By Hon. Mr. Laird:

Q. Mr. Lanigan, before you proceed to the question of rates let me interject a question, the answer to which would put us in a better position to consider the question of rates. In the first place, what mine fields does the C.P.R. touch?—A. We touch the Drumheller field, the Edmonton field and the Lethbridge field. With the exception of the mines west of Edmonton, the Brazeau District and up through there, we touch all that mining district in Alberta.

By the Chairman:

Q. And Canmore?—A. And Canmore.

By Hon. Mr. Laird:

Q. That is bituminous coal. The idea is not to bring bituminous coal here.—A. When you get west of Calgary and west of Crow's Nest you get into the bituminous fields.

Q. I understand the proposition is to consider only the bringing in of domestic coal. That would be the Galt coal at Lethbridge, and the Drumheller field.—A. Well, I do not think the Edmonton coal is to be considered. When I say the Edmonton coal I mean the Tofield and the coal of all that district up there—because the percentage of moisture in those coals is very, very high. You see, there is 8.4 per cent of moisture in our Lethbridge-Saunders' Creek coal. Then, as you get north, the percentage of moisture runs higher, and when you get up to Alberta, the Edmonton field—in saying the Edmonton field I mean the Tofield field—you get up as high as 28 per cent of moisture in some cases. I do not know that there is anybody who wants to pay for 28 per cent of moisture when he is buying a ton of coal.

Q. Taking the Lethbridge field now, is there an ample quantity of coal in that field for development?—A. Oh, yes. When I speak of the Lethbridge field I mean Taber and Lethbridge, and the Kipp field.

Q. Could the production of those districts be increased?—A. Oh, the production could be materially increased. We have to stop in our Lethbridge field—we have to drop operations, practically—not altogether, but very largely—as early as at this season of the year.

Q. That covers the domestic coal feature. I understand that your semi-anthracite plant at Banff has been shut down.—A. It has been shut down, yes.

Q. Do you contemplate opening it? Has it been shut down for lack of demand, or what is the reason?—A. We would like to open it, but the trouble

[Mr. W. B. Lanigan.]

is that in Alberta there is more coal than there are people to burn it. When you boil the matter all down, there is the whole trouble. New coal mines are being discovered and new coal fields opened, and the trouble is that there are not enough people.

Q. Does not that largely apply to bituminous coal—steam coal?—A. It also applies to the bituminous coal, with the exception that in the field west of the Crow's Nest—in the Crow's Nest field, where the bituminous coal is produced, it is also a coking coal. Well, we buy a lot of that coal ourselves. It is a clean coal, and the screenings are used to make coke, of which our Consolidated Mining and Smelting Company burns a great deal.

By the Chairman:

Q. Can you tell us about how much of that coke is burned out there?—A. No, I could not.

Q. But it is a very considerable quantity?—A. Oh, yes. You see, unless these people had the means of coking their screenings they could not furnish us with cleaned lump.

Q. That is, in the Crow's Nest.—A. Then we have at Canmore, of course, a very high class of bituminous coal, with a very high fixed carbon.

Q. If I remember correctly, that Canmore coal runs very close to a true anthracite. It goes over 80 per cent in fixed carbon, does it not?—A. It goes very high. I have the Government Report on the Canmore coal.

By Hon. Mr. Laird:

Q. Do I understand that your Banff coal property was closed down for lack of business? Was that the reason?—A. Yes, that is largely the reason.

Q. If you had a larger output would you open it?—A. You see, that coal, Senator, breaks up a great deal and we have to briquette the product, there is such a large percentage of the coal that is broken in mining, and there is such a large percentage of screenings, that unless we find some means of disposing of those screenings by briquetting, it is not profitable. It made a very excellent briquette, but the cost of briquetting it was very high. There are no binders right out there, that we can discover. If we had in our coking field by-product ovens that would give us the tar, for instance.—

By the Chairman:

Q. They coke out there in beehives?—A. In beehives, yes. The trouble there, Mr. Chairman, is this. Of course, as you know, the principal product is gas.

Q. Yes.—A. We have nobody to consume that kind of gas. You will not turn the Beehive oven into an expensive process coking plant when you have practically to waste all the gas.

By Hon. Mr. Webster:

Q. While it may be unprofitable to work at the present time, Mr. Lanigan, yet in case of emergency or fuel crisis in the country it could always be worked?—A. Oh, yes.

Q. Or used to help out. Could it not?—A. Quite right, Senator. All the coal that cannot be disposed of in Alberta, whether it is at Bankhead or at other places, is a potential asset in the earth, for the future. Undoubtedly that country will want power some day. The coal is there if the country wants it, and it is a potential asset just where it is. But the whole trouble just now is that we have no place to consume it.

By the Chairman:

Q. It is our ultimate reserve of coal for all time?—A. Yes.

[Mr. W. B. Lanigan.]

By Hon. Mr. Webster:

Q. Have you also some anthracite fields on your line, Mr. Lanigan?—
A. Yes.

Q. At what points are they?—A. On Shepherd Creek, Mr. Burns, of Calgary, has—I do not know it myself, but from what I have heard—quite an extensive deposit of, I presume, semi-anthracite, something of the same character as the Bankhead coal. It may be a little better.

By the Chairman:

Q. That is not open, though.—A. It is not open, and it will need about 150 miles of railway to open it. But of course it is just like other fields. Why spend the money to open it? It would merely add to the production of Alberta coal, without affording any means of using the coal.

By Hon. Mr. Laird:

Q. To sum up that point that I raised right at the start—the domestic coal fields that the C.P.R. would tap would be the Lethbridge and Drumheller areas? Those would be the two large fields for domestic coal?—A. Yes.

Q. That is what I wanted cleared up before you started on the question of rates.

By the Chairman:

Q. And Canmore would be included too?—A. Oh, yes. Well, we do burn Canmore coal now, you see; and Canmore coal runs up to 78.7 per cent, in the ultimate analysis of fixed carbon.

Q. Yes. The ultimate analysis, according to the figures I have on page 13 of the Report, runs to 85-85-86.—A. I am looking at page 15, on the Canmore coal.

Q. That is your coal. Look at the Canmore-Banff area. Canmore Coal Company: it runs to nearly 14,500 B.T.U.'s. It is a very superior coal. It runs high in fixed carbon. This is on page 85.

Q. It is a very superior coal. They are different seams. That apparently is the basis of it.—A. And the same way with the Brazeau fields. There is a very superior quality of coal in the Alberta mountains.

Q. Can we go on to rates now?—A. I put in some extra copies of the statement I made before the House of Commons Committee. There is one question I did not dwell on, Mr. Chairman, and that is the very high wages paid in Alberta as compared with those of the Maritime Provinces or British Columbia. I am not a coal miner myself; I don't know any reason for it; but there is such a marked difference in the wages—it was given in the Financial Times, and afterwards published in the Calgary papers—that it has made the cost of coal there very high indeed. The railways buy one-third of the output and production.

Q. That is consume—A. Yes, consume. So I sent out on March 26, pursuant to the investigation that the President had asked me to make, to find out what the cost of this coal was at the pit's mouth.

By Hon. Mr. Laird:

Q. That is the domestic coal?—A. That is the domestic coal. Lethbridge quoted us \$6.55; Saunder's Creek \$7; the Drumheller quotation was in three sections; double screened \$5.70, single screened \$4.95; stove size \$4. Taber quoted on double screened \$6.40, on single screened \$5.40; no quotation on run of mine. Edmonton, Clover Bar and Cardiff districts—that is where the Government returns show such an abnormal percentage of moisture, and very low B.T.U.'s—quoted \$3.75, double screened and \$3.50 single screened. Of course, how much they can reduce that price I do not know; but as long as they are

[Mr. W. B. Lanigan.]

paying these wages as compared with the wages in other coal fields, I think it is pretty hard.

The contract miner in Nova Scotia gets \$7.22; on Vancouver Island \$8.20; in Alberta \$9.57. A machine miner gets \$5.77 on Vancouver Island, and \$8.02 to \$9.42 in Alberta. A hand miner gets \$5.05 in Nova Scotia; \$5.42 on Vancouver Island and \$7.50 in Alberta, and so on all the way down. Take the blacksmith: his rate is \$4.85 in Nova Scotia; \$6.05 on Vancouver Island and \$8.14 in Alberta.

Q. What is the explanation given of that?—A. They do not give any explanation.

By the Chairman:

Q. Those are the average daily wages of the miners?—A. Yes.

Q. I think it is the fewer number of days they work per week.—A. A Calgary paper said:

“War between the coal operators and District 18 United Mine Workers of America is considered inevitable over the questions of the wage schedules for the ensuing year. The Union declares that it will accept nothing less than the scale which obtained in the last year, but the operators claim that they cannot continue to do business on the present basis, and that the scale which the men demand is out of all proportion to the cost of living, to the wages that are paid in other Canadian fields and in other Canadian lines of industry.

Appended are the contract rates for the various Canadian coal mining fields, and these give an idea of what the Alberta operators are up against.”

Those are the figures to which I was referring a moment ago.

“All the foregoing rates are for an 8 hour day.”

In some branches the Alberta rate is almost double that in effect elsewhere in Canada, and when the operators have to pay these high wages and also the high freight charges to their outside markets, because of long hauls, the handicap under which they labour is easily understood.”

By Hon. Mr. Webster:

Q. What is the date of that?—A. The date is not given.

Q. Is it recent?—A. Yes, I just cut it out the other day. I am quoting those figures because of what seems to me to be the abnormal price charged at the pit's mouth for Alberta coal, but I am not reflecting on it, because of these high wage costs in the first place, and because they have not a steady mining operation all the time. The men are laid off, particularly in the summer months.

Q. Are there too many operations out there for the demand?—A. Yes.

Q. So, therefore, there are too many miners for the work that is offering?—A. Yes.

Q. With fewer mines working, the miners would get steady employment?—

A. Their employment would be more steady.

Q. And they ought to get the lower rate of wages?—A. Then there is also the feature of storing Alberta coals—that is the domestic coals with the higher percentage of moisture; I am not speaking of bituminous coal, but the domestic coal that has a high percentage of moisture, and some of which will disintegrate under storage conditions, and shrink very materially in transit. I will mention a little incident that occurred to explain this situation. We carry the coal at the tippie weights. Some years ago the consignees were claiming that we were over-charging them in the weight, and our thought was that this coal was being stolen in transit; so I took the precaution to make a test of it. We sealed the car doors at the point of shipment, and I put a few special men just

[Mr. W. B. Lanigan.]

to trace that coal on the way down. When the coal arrived in Winnipeg it was a ton, a ton and a-quarter, and sometimes as high as a ton and a-half short. You can quite understand that the dealer who paid for the freight on the tipple weights and paid for the coal on the tipple weights found a large percentage of his prospective profit gone on this short weight. We pursued the investigation, and we found that in a carload of coal about a ton disappeared.

By the Chairman:

Q. Was that water that had dried out?—A. It shrunk to that extent.

By Hon. Mr. Webster:

Q. What distance had it gone? From what mine was that?—A. I am speaking of all the mines generally.

Q. But the special instance you referred to?—A. Our own mine at Lethbridge. At that time Lethbridge was the principal source.

By the Chairman:

Q. You don't mean that the coal broke down and that there was slack?—A. Oh, no.

Q. Apparently it lost that much water—evaporation?—A. If you will take these Government reports you will find the results of their tests and air drying, and that runs from 3 to 7 per cent.

Q. Loss of weight?—A. Yes. It was by looking at these Government reports that I finally came to the conclusion that there was something wrong. For instance, here is one mine has an air dry of 4.7; another 5.1; another 7.2. Of course, any exposure is going to shrink the coal to that extent. I suppose Senator Webster will know that better than I do.

By Hon. Mr. Webster:

Q. How many days would that car be in transit?—A. Between the time it was loaded at the tipple, if it was a season when there was no particular rush for coal, it might be ten days before the consignee unloaded the car.

Q. If it had been ten days further on the journey, would there be any more shrinkage?—A. I couldn't say. That is a test that has never been made. I just speak of the general result. There were continual claims that there was a shortage of coal as compared with the weights at which it was invoiced, and on which freights were charged.

Q. If that coal is carried to Ontario, there would be a further shrinkage?—A. I don't think carrying it double the mileage would make double the shrinkage.

By Hon. Mr. Laird:

Q. Of course, there is sometimes shrinkage between the dealer's scales and the seller?—A. Yes.

By the Chairman:

Q. I think, Mr. Lanigan, you would take care that your coal would be well weighed?—A. These little claims are a tax on your cost. If you pay a man on a ton of coal you are adding to your cost.

Q. Now if you are ready with your rates. You make up \$9.95 per ton from Lethbridge to Toronto, a distance of 1,990 miles as against 2,126 miles the other way?—A. If you will notice, the Canadian National have taken their figures on 36 tons to the car, and we have based our calculations on 46 tons to the car.

Q. Could you put 46 tons in a box car?—A. Oh, yes.

[Mr. W. B. Lanigan.]

By Hon. Mr. Webster:

Q. Would that be net tons?—A. That would be net tons. Two-thirds of our box cars are 40 ton cars, and under the master builders' rules they can be overloaded 10 per cent. But we have put extra bracing under our cars, and I think the Canadian National have as well, and we permit them to be loaded up to 92,000 pounds, or 46 tons. At the same time I think their calculation of 36 tons is probably nearer correct, in this way: Two-thirds of the cars are 40 tons, and one-third are 30 tons. I do not know what their percentage is, but it is probably something the same.

Q. Can those big cars be readily loaded at the tipples?—A. Yes.

Q. The box cars require certain trimming?—A. We have a box car loader. Of course, if you take nothing else but 40 ton cars you add to your terminal expenses considerably by shunting out nothing but 40 ton cars. They have taken an average load, and I have taken a maximum load.

By the Chairman:

Q. They would take the box cars as they came along, and you are taking the bigger cars?—A. Yes. I have also arrived at my figures by an altogether different process—and in saying this I am not criticizing their manner of arriving at it—because they have taken the ideal train of 50 cars as if it were two trains of 50 cars each loaded with 36 tons carried from their mining district through to Toronto every day. I have never been a believer in the train load cost, because your general train load cost represents the cost of carrying your average train—passenger train, freight train, branch line train, return power, wrecking train—all classes of trains whether they are empty west-bound or loaded east-bound. Then, if you took a 50 car train and started it say from Lethbridge, you would have 175 tons more than a powerful 210 per cent capacity engine would move from Lethbridge, and you would have again more tonnage from Dunmore to return. You would have to drop off some coal at Swift Current on account of the ruling grades; then when you got to Broadview you would have to start picking up some.

By Hon. Mr. Laird:

Q. Drop some off at McLean Hill?—A. Yes, you would have a reducing point. Then at Brandon you would want still more. So, by dropping off cars and putting on cars you would have an average train; not a train of coal, but one of coal and hides and lumber, and dressed meats, and all classes of traffic.

Another thing, the east-bound trains are always loaded trains; that is, they are loaded to the extent of the power of the engine on that particular day; there may be a reduction of 10 per cent due to a slippery rail or weather conditions, or a desire to run trains a little faster, but your engine does not leave the east-bound turnout with less than its tonnage capacity.

Q. Would conditions be different on the Canadian National?—A. They would be different in different sections.

Q. A little better than the C.P.R. grades?—A. East of Winnipeg, I think so, yes.

Q. West of Winnipeg?—A. West of Winnipeg it would be about the same thing.

Q. In other words, you do not think the train load idea a practicable one so far as railway practice is concerned?—A. Like the fellow said when he saw a giraffe: "There ain't no such animal."

Q. Do you think we might be discussing a theory more than what might be a proper practice?—A. Yes, it is a theory, there is no question about that.

[Mr. W. B. Lanigan.]

By Hon. Mr. Laird:

Q. Why would the Canadian National deal with it as a fact and you as a theory?—A. I do not blame the Canadian National at all, and I am not criticizing. The proposition put up to them was a 50 car train fully loaded, and they based their estimates on that, and I think quite correctly.

Q. They must figure they could pull it?—A. No, because in their own evidence they said they would experience exactly the same difficulties that we would experience. Mr. Mallory explained that or Mr. Crombie, I forget which. The fact of the matter is that I do not care to criticize the Canadian National at all; I have a very high opinion of the officials of the Canadian National, and their knowledge of their business, and it is not for me to criticize any of their methods or anything about which they know a great deal more than I do. I find that if I know something about the C.P.R. conditions I am fully occupied.

By Hon. Mr. Webster:

Q. In taking care of your own fuel requirements you do not adopt this train load idea of 1,800 or 2,000 tons— It does not come into general practice?—A. No, it does not come into any practice.

Q. If you don't use it as good business, and an economical way of handling coal, why should it be considered an economical and better way as far as supplying the trade at distant points is concerned?—A. I don't think it is. Of course, if you could be given the haulage capacity of your engine in a train-load at one time at one place, it certainly would produce economy.

Q. If it is constant?—A. If it is a constant movement. Take, for instance, the Virginia railway.

Q. Take the thousands of tons that come from the Delaware and Hudson fields to Montreal, they are divided up and come in other trains?—A. Yes.

By the Chairman:

Q. Still, I think you do see a good many coal trains in the United States?—A. But you have the consumption.

By Hon. Mr. Webster:

Q. I have no doubt that certain railways in the United States having their own cars and handling nothing else but coal do that.—A. Take the coal moved to the lake front in the United States. That coal arrives in trainloads.

Q. And the empties go right back to the collieries?—A. The empties go back loaded with ore from the Lake Superior field. Some go back light, but they have a pretty well balanced traffic—a load of coal out, and a load of ore in.

Q. Are there any coal fields in Canada to which that would apply?—A. Oh, no, and no prospects of it; and there is no place in the United States that I know of where they attempt to carry coal 2,000 miles.

By the Chairman:

Q. Only in small lots. Pocohantas goes all over the place. I have heard of it going down to Texas by all rail, where it is wanted—mostly blacksmith coal.—A. Blacksmith coal. We have taken Pocohantas and carried it as far as the Trail smelter, and some of it goes into Vancouver to-day.

Q. I understood that some went as far as Edmonton?—A. Oh, yes.

By Hon. Mr. Webster:

Q. What is the practise with American coal, both soft and hard, coming into the chief centres of Canada?—A. It comes in in carload lots.

Q. With other merchandise?—A. With other merchandise.

[Mr. W. B. Lanigan.]

By Hon. Mr. Laird:

Q. Not in solid trains?—A. Oh, no. I just wanted to mention the process by which I arrived at my figures. All those figures are only estimates based on previous performance, and they are largely average estimates. What our cost of doing business this year will be, or our profits, I am no more able to tell than Senator Webster is able to tell what his business is going to be able to produce in the way of either loss or profits. No person can tell whether he is going to have a profitable business this year or an unprofitable business; consequently we have to depend on the results we have obtained in previous years.

In 1922 we carried a heavier density of tonnage by some 2,000,000 tons of grain on our western lines than the previous year, and it was the year of largest density of low class traffic we have had for a number of years. Consequently, basing our cost figure on that tonnage, I take the most favourable year of all, and place it on a load car mile. Everything you do in the freight business narrows down to a load car mile. If you shunt an empty car, or carry it, you are doing it in respect of the load somewhere else, and consequently all your expenses have to be brought on the load car mile and the revenue you get for that.

I have found, and it is pretty steady, and it is about the same on other lines in Canada—that is large lines like the Canadian National System, that for every hundred miles we carried a loaded car we carried an empty forty-five miles. If this coal moved to Ontario in the early spring months, it would provoke a 100 per cent empty return on that particular traffic, for the simple reason that those cars have to be repaired, cleaned, and looked after to see that their roofs and sides are not leaking before they can be placed in the grain field ready for the crop by the first day of September. That would mean that as quick as they were emptied, they would have to be assembled into trains and shot back to the west, because by the fifteenth day of August we must have in the grain fields at strategic points from 20,000 to 22,500 empty cars. Those cars are accumulated month by month. The first month after the opening of navigation there are comparatively few cars on the western lines; the next month there are a few more, and the second month after a few more, and by the fifteenth of August we have from 22,000 to 22,500 which represent the empty movement, plus the cars that have been unloaded and made empty in the west, and which are in excess of the requirements of the particular traffic that may be moved at that period. So we transfer from the opening of navigation to the beginning of the grain season, from 15,000 to 18,000 cars from eastern to western lines.

By Hon. Mr. Laird:

Q. You have anticipated the cost of that in your statement of costs?—A. No. In my statement of costs I have figured that for every hundred miles of load traffic there will be forty-five miles of empty traffic.

Q. So your estimate covers that feature?—A. On that basis, if the movement of coal to eastern Canada would produce a higher average of empty mileage, those figures would have to be increased accordingly.

Q. Do you not run solid wheat trains between Winnipeg and Fort William?—A. Some of them undoubtedly are solid wheat trains.

Q. Generally speaking is that not your practise?—A. During the month of October it is pretty nearly solid.

Q. Is that not more economical?—A. It does not make any difference whether it is a solid lumber train or a solid grain train or a mixed train; your load car costs are just the same in one instance as in the other. It is not any cheaper to carry one class of freight than another class of freight, providing there is an equal load in the car.

By the Chairman:

Q. You save shunting, and so on?—A. No, not at all. Suppose we carried nothing at all but wheat, your engines would leave Winnipeg with a solid wheat train. Suppose you carry 50 per cent of wheat and 50 per cent of lumber, you couldn't shunt out the wheat for the sake of saying you are carrying a solid wheat train.

By Hon. Mr. Webster:

Q. I suppose you could handle wheat cheaper than other grades of heavy merchandise?—A. No, I don't think you can handle one class of merchandise cheaper. So far as loading and unloading is concerned, that movement is pretty rapid; that is; during the height of the grain season we have very little delays at the loading point, and of course at the unloading points there is very little delay. In getting up this estimate I would just merely point out one thing. I based it on that, and then our general expenses, as you see, are divided into six general accounts. Our accounts are made up and our statistics are kept according to the direction of the Board of Railway Commissioners and the Dominion Department of Statistics. Our operating accounts are made up on the six main accounts. Your first expenses are your operating expenses, and the statement shows how it is divided up into six main accounts, that is to say, maintenance of way, equipment, traffic, transportation, miscellaneous, and transportation for investment. Then the disposition of these expenses are on five main accounts, such as labour, which takes up 55.14 per cent, material; 24.49, fuel and locomotive supplies, 16.03; taxes, 3.65; claims, .69. Those are percentages of 100. Now, we have divided our expenses between freight and passenger on the basis of the Interstate formula. Then, when you come down to put that on a loaded car, your expenses for maintenance of way will be 20.4, your expenses for maintenance of equipment, 21.7, your traffic will be 2.2, your transportation 49.2, and your general 6.5. Those, again, are percentages. Then I have translated those into actual cost per loaded car mile, based on the estimates that I have already outlined. Now, your maintenance of way structures, which checked up 20.4 per cent, 51.79 of that is for labour and 48.21 is for material; and it brings your total expense of maintenance of way and structure for a loaded car to 4.70 cents per loaded car mile. I have analyzed all the others on that basis, bringing up all your per cent expenses and how they are subdivided; and dividing that by 46 tons, you get your \$9.96 per ton. Now, the Canadian National, as you notice by Mr. Mallory's statement, have taken off their traffic expenses some 78 per cent of their maintenance of way, and other overheads, and they have arrived at a slightly lower figure, about a dollar a ton less, of course on 36 tons; I have done it on 46 tons. Now, for every ton of contents you put in a car, you don't increase your cost of hauling that car to the same extent as you would increase the cost of hauling the freight if you doubled the tare of the car. The actual figure for every extra ton, your expenses will go up 26/100ths. That is, your average loaded car last year was 27.1, and it produced about 18.06 per loaded car mile.

By Hon. Mr. Laird:

Q. That would include way cars, too?—A. That would include all traffic. Well, then, of course one is more expensive than the other, but having arrived at 27 tons for 18.06, all you have to do is to add 26/100ths to get what your 46-ton car would cost, and that would be 23 cents a loaded car mile, based on the fact that your empty cars would not be more than 45 to 100.

By Hon. Mr. Bradbury:

Q. You said those figures were based on estimates; were those all estimates from actual experience?—A. They are based on actual 1922 results, but they

[Mr. W. B. Lanigan.]

are necessarily an estimate of what might be. I could not prophesy what might happen in July or August, any more than I could prophesy that we would have over a million dollars through flood expenses this spring. I might not have been so cocky last winter if I had known that.

Q. You could not even prophesy some of the big profits you got instead of the losses?—A. Well, I don't know where they are. I have heard a great deal about them, but I have not seen them. I don't think it would be a very good thing for this country if we ceased to be profitable.

Q. I agree with you there?—A. I think the C.P.R. is run efficiently, and in a very broadminded way, and I think for the general benefit of the country.

Q. I don't think anybody will dispute that?—A. We cannot be prosperous if the country is not prosperous, but you must remember that our revenues depend on the decisions of the Board appointed by Parliament, and our costs largely depend on market conditions for material, for labour conditions, which are practically set forth.

By Hon. Mr. Webster:

Q. You are not specially interested on the freight rates in the coal fields of Nova Scotia?—A. We are not directly interested. We have a coal field at Minto, New Brunswick, and I may say I have been trying to extend the market for that coal to the best of my ability, and there is a big difference in hauling coal or any other commodity in the direction of your loaded traffic and filling empty cars to come back.

Q. Have you made considerable success in developing the Minto field?—A. We have met with a moderate success. In fact I guess these Parliament buildings are heated with Minto coal. We have a great many cars that go down to New Brunswick, St. John, in the winter time with grain, and if we can get something to put in those cars and bring them back with a load rather than empty, it is a desirable and a cheaper form of transportation than it would be to carry it in the opposite direction, or in the direction of your loaded cars.

Q. What has been your difficulty in developing the Minto field? Is there anything that the Committee should know?—A. No, I don't think so. The Minto field is 841 miles from Toronto, and we made a rate of \$4.50 into Toronto for that coal.

Q. With the effect of increasing the demand?—A. No, I don't think we carried any coal there at all, but we did increase the amount of coal that we put into Montreal, into Ottawa, along the North Shore, and as far west as Kingston.

Q. What rate would you have for Montreal?—A. \$2.75.

Q. How many miles would that be?—A. 501.

Q. A little more than half a cent per ton per mile?—A. Yes; of course they were returning empty cars, and to that extent we carried it. We might do away with the expense of carrying the return car.

Q. Would you care to suggest that half a cent a ton per mile might apply on coal rates from Cape Breton and Nova Scotia to Montreal?—A. I don't think the conditions on the Canadian National are similar to ours. You see, we have got that export business to St. John, and the cars are available within comparatively few miles of Minto.

Q. Would not they have the export business at Halifax?—A. Well, the export business has not materialized at Halifax. They have some export business at St. John, I presume.

The CHAIRMAN: Don't they get steel for return empties?

Hon. Mr. WEBSTER: I judge not, at that rate.

The CHAIRMAN: They have a low rate, I understand.

[Mr. W. B. Lanigan.]

The WITNESS: The rate from Sydney to Montreal is about half a cent; it is 987 miles, at \$4.50 per ton which is about half a cent per ton per mile.

By Hon. Mr. Laird:

Q. This statement you have submitted, do you represent that as the cost of handling coal from the Alberta fields here, \$9.95, or does that include a profit to the company?—A. That includes nothing in the way of profit. It is the actual cost, including many factors that the Canadian National have not included in theirs.

Q. Then, if you were basing a rate from those western fields to Ontario, you necessarily would have to make it higher than that as your estimated cost?—A. Certainly.

Q. So you would say that you could not afford to carry that coal at \$9.96?—A. No, I don't believe in swapping one dollar for another dollar. Just as an ordinary every-day common business man, I don't believe in it.

Q. What is the present rate, to-day?—A. We haven't any rate at all. We have not been asked to make a rate, but if I was asked to make a rate I would make a rate of \$12.40.

Q. That would be the best rate?—A. That would be the same rate on coal as we have on grain for the same distance, exactly; and our grain is, on western lines, 44 per cent of our traffic, and our coal is about 16 per cent of our traffic. Now, our grain is the lowest rate that we have, and the loading of grain runs up as high as 40 tons per car average loading of grain on western lines. You would not get any more than 40 tons of coal on the average car, because you would have to take the cars as they come, according to capacity. So that if you made a rate as low on coal on the long haul from the Alberta fields to Toronto as you make on grain carried exactly the same distance and between the same points, which is admittedly a very low rate indeed, I think you would be only getting a very moderate profit out of it.

Q. What would be the position of the Canadian Pacific Railway, then, in competition with the Canadian National, if the Canadian National made, as they have done, a rate of \$9 a ton? You would let them haul it?—A. Well, to be perfectly candid, I would prefer that they should.

Q. If the Railway Commission established a rate?—A. If the Railway Commission told us to carry it for what they considered a reasonable rate, and they said \$9 was reasonable, we would be obliged to carry it whether we made any money, or lost money.

Q. You would be figuring that you would be losing money by it?—A. Yes, I figure that we would be losing money. The Canadian National admit that by throwing off their traffic expenses and their claims expenses and 78 per cent of the maintenances they get at this cost, which I think is about right, as far as I can judge from the outside.

By Hon. Mr. Bradbury:

Q. How can they do that? How can they throw off the maintenance charges and still carry on?—A. Of course I cannot answer. Sir Henry Thornton is a very able man, and a very able railway man. I don't know.

Q. I suppose you have not told the whole story; that is only three months in the year that that offer stands?—A. Oh yes.

Q. So they would not suffer very much.

By the Chairman:

Q. We have the fact that during those months those cars would be largely idle, and you are giving them some employment?—A. I can give you a good deal of information on that. As I have said before, by the 15th day of August we

have got to have, according to the prospects, from 20,000 to 22,000 cars on our western line to take care of that crop.

By Hon. Mr. Bradbury:

Q. You are speaking of the period when you are moving wheat?—A. I am speaking of the period when we are prepared for the moving of wheat. We start preparing for the movement of wheat on the 1st day of April.

Q. Is there any period when you have very little traffic, a great many of your cars lying idle for say two or three months of the year?—A. No, there is no period of that kind.

Q. This statement that you have filed, I understand, is for the whole 12 months?—A. It includes the whole 12 months.

Q. That would be a fair comparison with what the National propose to do, would it?—A. I don't know.

Q. I mean, if you were asked to give us a rate for the same period of time that the National did, wouldn't you change the figures a little?—A. I don't know that I would. I would not change my figures. Those are the figures that I have given to the President as cost.

Q. But you are figuring on the whole 12 months of the year?—A. I am figuring on the whole 12 months of the year. Now, there is not much variation between one month of the year or another month of the year, as far as cost of carriage is concerned. For instance, your maintenance expenses are very much greater in the summer months than in the winter months, simply because you are doing your repairs, and you are lifting your track, and ballasting, and everything of that kind. Naturally during that period of year the climate permits you to do that, and you cannot do very much of that kind of work in the winter, consequently your summer months are loaded up with maintenance, and consequently your maintenance of way expenses are higher. Then the climatic conditions enable you to carry the maximum on your cars, whereas in the winter months that average is reduced.

Q. How many cars do you move, on an average?—A. We move probably 35,000 cars.

Q. After the crop is moved, are there not a great many of those cars practically idle?—A. We had this year no idle cars on our western lines before the 15th of April.

Q. Couldn't you afford to put some of those in commission in order to move coal at a lower rate?—A. No, because the percentage of average number of empty cars, we had only on the 15th day of April 15 idle car days; on the 1st of May we had 15, and on the 15th of May we had 15.

Q. What happened in May, June and July?—A. That has not occurred yet; it is only the 15th of May, and I am no prophet. Undoubtedly there is a large number of idle cars after the 15th of May on our western lines; but can you take those cars on the 15th day of May and send them east and bring them back—4,000 miles? By that time they need more running repairs; can you bring them back for the crop, so that you have the requisite number of cars on your western lines by the 15th day of August? We could carry a certain percentage of them then, but if you carried those up to the 1st day of July I don't think you would have on your western lines the requisite number of cars to take the first rush that comes—and of course the first rush means marketing by the farmer at the period where he requires his money more than at any other period. I don't know whether Mr. Butler gave any evidence here or not?

The CHAIRMAN: No.

The WITNESS: But he compiled some quite impracticable statistics.

[Mr. W. B. Lanigan.]

The CHAIRMAN: I think we will leave the Commons to deal with that.

The WITNESS: Of course, as far as the rates are concerned, I am the rate-making party on our line, and I am responsible for whatever rates are made. I would not like to recommend that what represents 16 per cent on western lines and probably 22 per cent on eastern lines of traffic should be carried at cost, because I think that is a foolish way of doing business; and I think if you throw off any of your overhead expenses—traffic expenses, claims expenses, maintenance of way expenses—in order to accommodate one line of traffic, you could not very well refuse to do it for other lines of traffic, and certainly not as far as coal is concerned in its movement from Nova Scotia or New Brunswick or any other part of the country, or, for that matter, in connection with the importation of coal from the border. Because, after all, you cannot dictate to any citizen of Canada where he is going to buy what he requires, and when he crosses the border he has a right to ask you to transport that just as cheap as you transport the goods for another customer. He has that under the Act. So that if you make a special rate, lower than what would be a reasonable profit over and above operating costs, from the western provinces to eastern Canada, certainly as far as that particular commodity is concerned, that same scale of charge would have to be applied to all the coal that is carried in either western Canada or in eastern Canada. I noticed in the Winnipeg papers the other day an agitation. The rate was \$4.50 to Winnipeg. The proposed rate is \$9 to Toronto. Toronto is some 1,440 odd miles further on. They said, "If it is \$9 to Toronto, we can presume that the \$4.50 is an unreasonably high rate to Winnipeg." On the other hand, I know that my friend, Sir Thomas Tait, will shortly be in my office saying, "If you can carry it 2,000 miles for \$9, I am only 841 miles of a proposition, and you can carry it for \$2.50, because you are carrying it and returning empty cars." Then of course you have got your wheat man, and wheat represents a very, very large percentage of your traffic, and is a very great interest as far as the west is concerned.

By Hon. Mr. Laird:

Q. The live stock men would want consideration, too?—A. Yes, there is no telling where that will stop. It would bankrupt any carrier, because that would be the measure of the rate. Now, I can understand you going to work and doing something for the general benefit at less than cost. We carry our settlers' effects, for instance, at one-third of our actual cost, but your loss stops with that particular movement. You have carried that man up to the west, you have settled him there at a minimum of cost; it is a good thing for the railway, it is a good thing for the country; he gets on the land, he is a producer of tons for the railway after that, a producer of revenue for the whole country, and consequently that primal loss is a very small thing. Or if you were taking care of some condition that a settler has got to endure in the way of climate or something of that kind, in order to make life easy for him, I think the railroad is quite right in putting its hand into its pocket and subscribing in that direction. But then when it comes to move its ordinary traffic in a business and commercial way that traffic should afford to the railway a reasonable return for its services, and should carry the same burden of overhead expenses that all your other traffic does—no more, and no less.

By Hon. Mr. Webster:

Q. That rule also applies to passengers, and freight rates to immigrants; you carry the immigrants at a lower rate from Montreal and Quebec, I understand?—A. Yes, lower than the usual rate.

By Hon. Mr. Laird:

Q. Then you have harvesters rates?—A. Yes, and rates on seed grain, for instance.

[Mr. W. B. Lanigan.]

Q. And rates on hay to the dry areas?—A. Yes, and rates on hay products out there. In other words, you have got to conduct your railroad business with the same amount of intelligence and the same amount of convenience to the people on your line as any other business has. If a merchant was doing business in one of those areas that suffered from drought years ago whether he liked it or not he had to carry that farmer on his back, probably at a great expense to him. It probably brought him on the verge of bankruptcy.

Q. It brought lots of them into bankruptcy?—A. Well, every man in that country has had to take his share of the disaster. The railway company is not exempt from that share. They are part and parcel of the community they run through, and I think when a time comes of that kind we should carry those people at reduced rates. To tell the truth, we carry a lot of them.

By Hon. Mr. Bradbury:

Q. If the time came when the coal barons of the United States raised the prices to Ontario and made it almost prohibitory to get coal, would you be justified in easing the situation by bringing coal down?—A. You import 1,646,000 tons of anthracite coal into Ontario and Quebec, principally into central Ontario—I may exclude that that goes to the head of the lake. Now, Alberta coal is a good domestic coal; don't make any mistake about that; it is a good coal to fire your furnace, and get very satisfactory results from burning it in your house; no question about that part of it. But, supposing you did not have any anthracite at all, then what would you do? Within 900 miles of the city of Toronto you have Canadian bituminous coal from Nova Scotia. Within 850 odd miles you have New Brunswick coal. New Brunswick coal has a very much larger B.T.U. test, you know, than any of the lignite coals of Western Canada.

Q. How does that compare with Drumheller coal?—A. It is higher in thermal units and has less moisture. Within four hundred miles of Toronto you have United States bituminous coal, and I need not say how many thermal units it contains, or what its tests are. But it is there, and there is no trouble about its production. We have no more interruptions of coal production in Canada by labour troubles or anything of that kind than there are in the States. The percentage is the same. They have trouble on the one side, and we have our trouble. You cannot have any anthracite. There is no anthracite to be got. In Nova Scotia, New Brunswick, and British Columbia we are burning bituminous coal, mind you, for coking purposes; and I am burning it myself in Victoria, B.C. Never burned anything else. Down in New Brunswick and Nova Scotia they never do burn anything else but bituminous to any large extent.

Q. Your idea is that Ontario should burn bituminous coal?—A. It is not a question of what we would let them do or tell them to do. Suppose you are living in Toronto and you cannot get anthracite coal. Now, you can get bituminous coal at from \$6.50 to \$7.10; and you would have to pay at least that for freight from Alberta.

Q. Can they get bituminous coal to-day at that price?—A. We are buying it ourselves—we buy smokeless bituminous coal in the city of Toronto for \$6.50. Now, what are you going to do? You will do just the same as the people in New Brunswick, Nova Scotia and British Columbia are doing. What am I doing in British Columbia? Do you suppose I am burning bituminous coal because I love to burn bituminous coal? I am burning it because it is necessary; and I sweep out my chimney two or three times a year. If I were burning the Alberta coal, what they call the lignite coal, I would probably not have the same percentage of soot in the chimney. That is the only difference. But you adapt yourself to circumstances and you burn the cheapest thing.

Q. You burn what you can get.

Hon. Mr. WEBSTER: We are very much obliged to Mr. Lanigan.

[Mr. W. B. Lanigan.]

JEAN T. OLIGNY, Mechanical Engineer, Montreal, was called and examined.

By the Chairman:

Q. You have a patent process for the manufacture of peat, I understand?

—A. Yes; my patent was granted in December, 1919, and it is for a process which contemplates the manufacture of coal from peat much after the method by which nature makes coal from peat, but in a very brief period of time. I claim that peat made by my process, being smokeless, is superior to all other known fuels, as it has perfect combustion. The prepared peat gives a bright flame and intense heat from the moment of ignition, and leaves no soot, clinkers or cinders, and very little ash. The combustion being even and complete, it requires only half the amount of air to produce perfect combustion. The heat value is given by Prof. Carpenter as follows:—The best anthracite, 14,600 B.T.U.; Oligny prepared peat, 14,200 B.T.U. These figures practically agree with those of Prof. C. L. Norton. Peat prepared by my process shows a carbon content of 92.22. I produce samples of this peat. It will stand rain, and can be stored, but it would not stand rain all winter. These samples are from some that has been made for years, and I have some in my cellar. It does not absorb moisture like the other peat. It is reduced one-half in size by the treatment.

Q. So that this would store about the same as coal, by weight?—A. Very nearly. It is a little more bulky, but not much. It would be about a ton and a quarter of this peat to a ton of coal.

Q. How much peat have you ever made?—A. We made altogether about forty tons while we were making that test and we had peat from different bogs. We got peat from Alfred and some from Farnham and some peat from another bog at Lanoraie. There is a big bog right near the railway. The advantage of that Lanoraie bog is that there is an average of 20 feet of finely decomposed peat at what they call Maple Lake District. It is a very large bog, about seven miles by ten miles.

Q. Who owns that?—A. It belongs to Mr. Boswick; his father was Seigneur of Lanoraie.

Q. Have you made an estimate of what it would cost to make your peat?—A. Yes, when we made our peat it cost between \$2.40 and \$2.50. Of course on that we did not figure wear and tear and the interest on the investment.

Q. That was actually working cost?—A. Yes.

Q. Gathering and manufacturing the peat and getting it into the shape of these samples?—A. Yes.

Q. Is the plant expensive?—A. No, it is not very expensive. There is no fine work about the plant. It is only an endless chain, and the most expensive part of the apparatus is the apparatus that treats the peat. It comprises a compressed air tank holding the solution that carries the current through the peat, and electric batteries, and the anode where the current jumps the gap; the current jumps from there to the cathode. We have tried a good many ways of handling peat by machinery, but it can't be done. The most practical way is with the shovel. We take a piece 8 by 12 by 4 inches thick, and we put it on a board. We put 5 pieces like that on a board. On this board we put the endless chain. I call it a board, but it is like a brickmaker's tray. The chain drives it, and when it passes through that treating apparatus there is one board a little higher, and there is a little trap that opens the electric current and opens the solution at the same time. After it is treated a little wheel cuts out the peat in pieces of 4 inches. Then it is put in the compartment to dry. We use all the top of the bog, which is generally from a foot to eighteen inches of moss. We burn that in the hot-air furnace. This hot air is driven

[Mr. Jean T. Oligny.]

through this compartment where the peat is, and hot air deprives the peat of its moisture. That is the reason that in 36 hours we get it as hard as this sample.

Q. Why are you not going on with it?—A. There was so much prejudice about peat, and so many people had spent a lot of money on peat, fabulous sums of money that everybody is afraid of it.

Q. Would you write for us a statement of what you have done, and include in it that statement you showed me from Mr. Hingston, and send it to us, and we will take the matter into consideration and see what we can do?—A. Yes. You were asking me why we did not go on with it. We are going to go with it now. We are trying to form a company, but it is pretty hard; but some friends told us that if we were to see the Government and explain our plan they might help us to go ahead with it, and it would not cost the Government so much as at Alfred. With about \$10,000 we could put up a demonstration plant, the principal part, the part which treats the peat, and it would be capable of making 100 tons a day. Then if they found that satisfactory, all they would have to do would be to put up the necessary buildings, and the industry would be ready. We can work every day, as we are not dependent on sunlight, but we use electricity. Our peat can be stored without disintegration.

STATEMENT RE EQUIPMENT AND OPERATION—THE OLIGNY PROCESS—
FOR THE TREATMENT OF PEAT

The equipment comprises movable grates 43 inches long by 15 inches wide on which the peat is deposited in bulks measuring 12 inches by 8 inches by 4 inches. These grates loaded with peat are placed on an endless chain conveyor which carries them to the apparatus where the treatment by solutions and electrical charges is made; then the peat, still on the grates, is put through a circular cutter which cuts it in four-inch slices; it is then carried, always by the same conveyor, to the dryers where the loaded grates are deposited. These dryers are conveniently placed on each side of the chain conveyor. This endless chain can also be used to transport the finished product to the storage.

The operation by which the peat is cut up in slices and afterwards passed through our solution is all done automatically without the help of anybody. The treating apparatus comprises one electrical battery, one anode and one cathode. The solution part comprises one steel basin with an automatic tap and an air compressor. The dryer contains several compartments and has the following dimensions: 40 feet by 20 feet by 10 feet in length, width and height. One hot-air furnace feeds alternately four compartments.

COST OF PRODUCTION—BASIS OF 25 TONS DAILY—FINISHED PRODUCT
READY TO BE SHIPPED

4 men to dig out 50 tons a day	\$12.00
3 men (operators) at \$2.50 a day	7.50
2 men on the dryers at \$2.50 a day	5.00
100 gallons of solution at 0.035 per 2 gallons (2 gallons per ton of peat)	35.00
Heating of dryers and power (2 tons)	6.00
1 man for the heating and looking after the solution	3.00
1 foreman (per day)	4.00
Interest and depreciation	2.50
Total	\$75.00

It is to be noted here that the 50 tons of peat are reduced to 25 tons when the peat has been dried, and on account of this the peat equally loses half of its volume, this latter loss being obtained by the destruction of the life or capillary action of the peat.

CORRESPONDENCE AND REPORTS

THE CITY OF NORTH BATTLEFORD, SASK.

OFFICE OF THE SUPERINTENDENT OF UTILITIES,

May 11, 1923.

A. H. HINDS, Esq.,
Chief Clerk of Committees,
The Senate of Canada,
Ottawa.

Re *Central Heating System, North Battleford*

DEAR SIR,—Your communication 19th ult. addressed to the City Clerk has been forwarded to the undersigned for reply.

In accordance with your request the undersigned is forwarding under separate cover a blue print showing location of the City Power Plant and system of underground mains and services, also location of all buildings connected with the system. There are approximately fifty commercial and residential premises being supplied, including upwards of forty hot water systems, steam heated, for use within the buildings, and a number of steam tables, coffee urns, dish washers, etc.

The cost of City Steam Service is more economical than individual service using a private heating plant, as the heating medium is a by-product of the City's Light and Power Station. The price paid for fuel (which is also a by-product of the coal mines) by the city is much lower in price than the class of fuel suitable for use in a private heating plant. Apart from the question of economy there are numerous other benefits, which are obvious, such as cleanliness, sanitation, saving of space, lessened insurance charges and fire risk, uniformity of service, etc.

All Government buildings within the city are supplied with Central Steam Service and considerable steam is used for manufacturing purposes by the local creamery.

In respect of the cost of operation the writer would intimate that a service of this nature, operated in conjunction with a Central Power Station, can be supplied at a minimum of cost, and the total economy of the station is greatly increased as a result of the addition of said utility. Owing to the absolute inability of the largest, most economical, and modern Steam Power Station to utilize the latent heat of the steam in the production of electrical energy, only 14 per cent of the total heat value of the fuel is utilized, the balance is wasted. A large percentage of the steam plants of the world do not obtain an economy of 10 per cent of the heat value, and in excess of 90 per cent is wasted. Unfortunately a portion of the losses is non-preventable, approximating 28 per cent, yet in the modern steam plant operating condensing approximately 58 per cent of the total heat value of the fuel is dissipated in the circulating water of the condensers, and is a total loss. In the case of steam engines and turbines operating non-condensing and exhausting direct to the atmosphere the loss is considerably greater.

The following table is a typical example of operating conditions in a modern power station and clearly shows how the total fuel or B.T.U. value of the coal consumed by the plant is accounted for, viz:—

	Per cent.
Loss of chimney gases (non-preventable).....	24
Condensation in steam pipe to engine (non-preventable)...	2
Friction loss in engine (non-preventable).....	2
Effective horse-power (available for light and power)....	14
Loss in exhaust steam dissipated in circulating water or atmosphere (available for heating purposes).....	58
<hr/>	
Total value of coal supplied to boilers.....	100

It was primarily for the purpose of utilizing the above waste and converting same into a revenue-producing service that the North Battleford Municipal Steam Heating Plant was installed, and since its inception the overall economy of the Power Plant has been enhanced. The heat (latent heat of the steam from the engines) which was formerly dissipated in the circulating water is piped into the heating mains and the revenue therefrom has approximated \$20,000 annually for the municipality and has in addition thereto effected a considerable saving to the consumers and patrons of the plant.

In the opinion of the undersigned if a differential freight tariff was granted by the Board of Railway Commissioners on slack coal which is annually wasted at the mines in colossal quantities, many other municipalities and private power plant owners would be encouraged to use this class of fuel to an extent sufficient to completely eliminate the waste and destruction of same by the mine operators.

Any measures adopted by the Federal Government which may stimulate and encourage the utilization of said by-products of the coal mines will automatically provide additional supplies of the larger sizes of coal for purposes other than the production of steam in Central Stations. Furthermore, the installation of additional Central Heating Plants in the Dominion would save to the community in which same were operated, large quantities of fuel annually now being consumed by individual heating plants of very low efficiency.

Undoubtedly Canada can supply ample fuel to meet her own requirements when the present wasteful methods of utilizing the available supplies of coal are eliminated.

A historical review of the local Municipal Central Heating Plant is enclosed for your persual.

Any additional information you may require in connection with said utility is available upon request.

Your obedient servant,

(Sgd.) M. D. CADWELL,

Superintendent of Utilities.

COST OF HEATING SELF-CONTAINED RESIDENCE, HEATING SEASON, 1922-23

Residence of Dr. Hamelin, 1201 Victoria St.

Cost of heating eight-roomed frame house, fully exposed, inclusive of steam required to supply domestic hot water service and radiation in every room:—

November..	Estimated	\$20 00
December..	"	32 85
January..	"	33 85
February..	"	32 40
March..	"	31 45
April..	"	20 15
		\$170 70

NOTE.—(1) Service was not supplied during November and approximately \$20 should be added for said month.

(2) Rates reduced approximately 12 per cent May 1 last.

CENTRAL HEATING PLANT WILL PROVE VALUABLE ASSET

BRIEF HISTORY REINSTALLATION OF CENTRAL HEATING PLANT
CITY OF NORTH BATTLEFORD, SASK.By M. D. CADWELL, *Superintendent of Utilities*

CENTRAL HEATING PLANT

Central steam heating was first introduced into commercial circles in North Battleford in the summer of 1916 when the steam main was laid from the Power Plant to the new Public Library, which was built that year, located on Main street, 750 feet distant therefrom. The service was so successful that it was decided to extend the system to serve the business section of the city after the close of the war, provided ways and means could be arranged to finance the initial cost of the installation.

A very comprehensive research was conducted by the Superintendent of Utilities for a period covering nearly four years relative to the merits of central heating and its adaptation to local conditions prevailing in North Battleford.

Finally, in the summer of 1920, it was decided that the proposed installation would prove advantageous and profitable to the community and the City Council signified its willingness to proceed at once with the installation, provided the patrons would finance the cost of same. An advance deposit, representing the fixed figure on a unit basis and proportional to the requirements of each consumer was agreed upon, and tenders were called for supply of necessary material.

A portion of the installation was made in the Fall of 1920, but, due to the lateness of the season, less than ten consumers received service during the season of 1920-21.

Meanwhile, materials were received from time to time and in the spring of the present year (1921) practically all supplies requisite for the completion of the system were on the ground prior to the date on which excavation could be commenced.

By the end of September, 1921, thirty consumers were receiving steam service and installation of the distribution system was completed.

The popularity of the service and the ever increasing demand for steam necessitated the installation of a new and larger steam main to supplement the original to a point opposite the Public Library, from which point the main distribution system was commenced in the fall of 1920. This installation has recently been completed and has been operating since November 19, 1921.

The complete installation now comprises over 6,000 lineal feet of piping arranged as below.

UNDERGROUND MAINS

743	lineal feet of	12-inch pipe.
270	" "	10 " "
326	" "	8 " "
920	" "	5 " "
1,218	" "	4 " "
90	" "	3 " "
56	" "	2½ " "

UNDERGROUND SERVICES

131	lineal feet of	4-inch pipe.
407	" "	3 " "
522	" "	2½ " "
147	" "	2 " "
98	" "	1½ " "

UNDERGROUND DRAINS

94	lineal feet of	1½-inch pipe.
55	" "	1¼ " "

6,077 Total lineal feet.

Practically all underground piping is of genuine wrought iron, a considerable portion of which was imported as it is not made in Canada above certain sizes.

All piping is thoroughly insulated and enclosed in circular casing, manufactured in the city of North Battleford and every lineal foot has been graded with an engineer's level and all lines were set with the transit.

Complete and perfect drainage has been provided for all piping placed below the ground level. The estimated life of the plant is 50 years.

The total cost of the system as installed approximates \$40,000 and has been financed by the patrons of the plant in addition to certain lines of credit which were arranged with two of the firms who submitted the lowest tender for a considerable quantity of the materials required.

The complete system was designed by the Superintendent of Utilities and was installed by the employees of that department under his personal supervision.

There are now over fifty commercial and residential premises being supplied with steam service.

During the recent inclement weather, upwards of seventy-five tons (150,000 pounds) of steam were delivered to the patrons every twenty-four hours.

Exhaust steam from the generating units at the Power Plant is used as the source of heat.

While the city of North Battleford now owns and operates a comprehensive and ideal Central Heating Plant, the first municipally-owned plant in Canada to date, it has not cost the ratepayers a single cent and is greatly augmenting the revenue from the utilities.

Meanwhile, the operation of this new utility is being watched by engineers and other interested municipal officials from coast to coast, and it is sincerely hoped that the example set by this municipality will in the near future result in similar installations elsewhere, and that the comfort and convenience now being enjoyed by the patrons of the North Battleford Heating Plant may soon become the privilege of many in other urban centres.

CANADA GAS AND ELECTRIC CORPORATION,

231 TO 265 TENTH STREET, BRANDON, MANITOBA,

May 12, 1923.

A. H. HINDS, Esq.,
Chief Clerk of Committees,
The Senate of Canada,
Ottawa, Canada.

Re Fuel Supply—Central Heating—File No. 675

DEAR SIR,—Canada Gas and Electric Corporation supply Central Steam Heating to practically the entire business district of Brandon, Manitoba. The heating mains are of proper size and arrangement to supply the service to the entire business district. At present 170 customers are receiving the service, the most remote being approximately 2,000 feet from the heating plant.

Heating is measured by the condensating being used in each consumer's premises, by Simplex Condensation Meters.

Rates fixed by Commissioner of Public Utilities for the service are:—

Up to 3,000 pounds per month—	\$1.75	per 1,000 pounds
3,000 to 7,500	1.20	"
7,500 to 15,000	1.00	"
15,000 to 35,000	.95	"
35,000 to 75,000	.90	"
75,000 to 150,000	.85	"
150,000 to 300,000	.84	"
Over 300,000	.83	"

Minimum monthly bill, \$3. No discount.

(NOTE.—The average revenue per 1,000 pounds condensation received from the above schedule of rates is approximately 88 cents as measured delivered.)

Pressure.—Steam pressures of from 3 to 10 pounds are maintained at the station, depending upon outside temperatures and demands.

Supply.—Steam is supplied as demanded from the exhaust of reciprocating engines and live steam through reducing valves.

Service.—Practically every building has abandoned their independent heating plants and during the period of operation since 1912 there never has been a serious shut down or need for steaming up local plants to meet the demands of the customers. The fact that all customers continue to use the service even though rates are altered frequently, depending on coal cost, is evidence that the service and rates are satisfactory.

Losses.—The losses in the transmission of central heating service are rather difficult to obtain for the following reasons:—

1. No accurate means of measuring low pressure steam from reciprocating engines by any time of metering device.
2. Condensating in mains depends on quantity and quality of steam being transmitted, and unless every point of drain of mains is supplied with a meter, the condensation in the mains cannot be determined.
3. Impossible to know condition of insulation of underground mains.

SUGGESTIONS AND RECOMMENDATIONS

1. No new central steam heating system be installed where they cannot be frequently inspected. This can be accomplished by a tunnel system, but is too expensive for practical application, or the mains be installed at front and in basements along line of service where they can be observed and properly insulated and where such heat as is radiated off goes to heat basement of customer, which saves in amount of steam for heating building as compared to the radiation from the mains being lost when buried underground.

2. No new central steam heating system be installed without some provision for collecting and returning the water of condensation from the meters. This should be at least 98 per cent of steam sent out. Advantage of this is return of pure water to boilers, also return of treating water and cleaning boilers, also return water will contain from 100 to 150 degrees of heat, which will save from 3 to 7 per cent of coal necessary to heat this water before returning to boilers.

3. Each customer's heating system be inspected and overhauled so as to determine the efficiency and adequacy of radiation installed and the entire system to be made applicable to that of the Central Heating System.

4. Measuring devices be installed at station, on customers' premises, and in all drain manholes to determine efficiency of entire system.

We are now compiling data relative to amount of all kinds of radiation installed in each building: the cubic space heated, the square feet of glass surface and exposed walls of each building. This will permit us to determine the cost of heating certain space to make comparisons of cost of heating different businesses and institutions and to determine the care which each customer gives to his individual system. The above data is not now available, but I sketch out the above in hopes that it might suggest some ideas that might tend to conserve coal and make for better efficiency and service in the operation of a Central Heating System.

Respectfully submitted.

CANADA GAS AND ELECTRIC CORPORATION,

By JAS. B. HARVEY,

General Manager.

THE CANADIAN INSTITUTE OF MINING AND METALLURGY

MONTREAL, June 7, 1923.

Senator J. S. McLENNAN,
 Chairman of the Fuel Committee,
 The Canadian Senate,
 Ottawa, Ontario.

DEAR SIR,—At a joint meeting of the Fuel Committees of this Institute and of the Engineering Institute of Canada, which were established by their respective Councils for the purpose of studying the fuel problem of the Dominion, it was resolved and unanimously adopted that the following resolution should be forwarded to the Fuel Committee of the Canadian Senate and the House of Commons' Committee on Mines and Minerals.

Resolution:

Whereas it is the opinion of the Fuel Committee of the Engineering Institute of Canada, co-operating with the Canadian Institute of Mining and Metallurgy, at a regular meeting held at Montreal, on Thursday, May thirty-first, nineteen twenty-three, that the most important element in the fuel problem of Canada is the question of transportation, and

Whereas the Fuel Committees of the Senate and the House of Commons are at present studying the fuel problem of Canada,

Be it resolved—

That the Fuel Committees of the Canadian Senate and the House of Commons of Canada be requested to consider the importance of this phase of the fuel problem to the end that they recommend provision of funds and that they appoint a committee of coal transportation and equipment engineering experts to act in consultation with the engineering departments of the transcontinental railways, to determine, both scientifically and experimentally, the greatest extent to which the cost of the transportation of coal from Alberta to Ontario can be reduced.

The above resolution has been referred to the Council of the Canadian Institute of Mining and Metallurgy who have instructed the undersigned to submit the same on the authority of this Institute.

On behalf of my Council, I remain,

Yours faithfully,

G. C. MacKENZIE,
Secretary-Treasurer.

THE ENGINEERING INSTITUTE OF CANADA

176 Mansfield Street,
 MONTREAL, Canada, June 6, 1923.

A. H. HINDS, Esq.,
 Clerk to Committee of Senate,
 Ottawa, Ont.

DEAR SIR,—At a meeting of the Fuel Committee of the Engineering Institute of Canada, which was established by the Council of the Institute for the purpose of rendering assistance in connection with the fuel problem of Canada, after considerable discussion on the various phases of the problem, it was unani-

mously resolved that the following resolution should be forwarded to the House of Commons Committee on Mines and Minerals and the Fuel Committee of the Canadian Senate:

Whereas it is the opinion of the Fuel Committee of the Engineering Institute of Canada, co-operating with the Canadian Institute of Mining and Metallurgy, at a regular meeting held at Montreal, on Thursday, May thirty-first, nineteen twenty-three, that the most important element in the fuel problem of Canada is the question of transportation, and

Whereas the Fuel Committees of the Senate and the House of Commons are at present studying the fuel problem of Canada,

Be it resolved—

That the Fuel Committees of the Canadian Senate and the House of Commons of Canada be requested to consider the importance of this phase of the fuel problem to the end that they recommend provision of funds and that they appoint a committee of coal transportation and equipment engineering experts to act in consultation with the engineering departments of the transcontinental railways, to determine, both scientifically and experimentally, the greatest extent to which the cost of the transportation of coal from Alberta to Ontario can be reduced.

The above resolution was referred to the Council of the Engineering Institute of Canada, on whose instructions and with whose authority the resolution is submitted, having behind it the influence of the Institute throughout Canada.

It has been suggested in connection with carrying out the details of the resolution, which it is strongly hoped will be favourably considered, that the Board of Railway Commissioners of Canada, which as a body already established, might well be considered in carrying out the details of the above suggestion.

On behalf of the Council of the Engineering Institute of Canada, I remain,

Yours faithfully,

(Sgd.) FRASER S. KEITH,

Secretary.

OFFICE OF FUEL CONTROLLER FOR ONTARIO

47 QUEEN'S PARK

TORONTO, Ont., 17th May, 1923.

A. H. HINDS, Esq.,
Chief Clerk of Committees,
The Senate,
Ottawa, Ont.

DEAR SIR,—General C. H. Mitchell, Dean of Applied Science and Engineering, University of Toronto, Mr. R. P. Fairbairn, Deputy Minister of Public Works for Ontario and myself were appointed by the Ontario Government to report upon the adaptability of Alberta coal for use for domestic purposes in Ontario.

We have now made our report which might be of some interest to the special committee of the Senate appointed to consider the question of the fuel supply of Canada.

I enclose herewith a copy of it which can be used in any way the Committee sees fit.

Yours truly,

J. A. ELLIS,

Fuel Controller for Ontario.

The Honourable the Prime Minister,
Province of Ontario.

SIR,—In response to your request we have investigated the adaptability of the Alberta coal which was sent to the Ontario Government by the Government of Alberta and we have the honour to report as follows:—

GENERAL

Upon considering the various methods by which to carry on our investigation, we came to the conclusion that the most desirable and effective way was to carry out some practical trials rather than depend upon laboratory or other scientific tests. We therefore decided, as we intimated to you at our Conference with you on the 3rd of April, to ascertain how this coal would act when burned under domestic conditions in the ordinary house furnaces such as are in Toronto. We believe that the best test consists of its trial use under the conditions in which it would normally be used.

We therefore made plans to issue the coal in small quantities to a number of householders and other users who might volunteer to burn it intelligently under reasonably careful management. These persons were asked to give their opinion by means of a questionnaire as to the performance of their furnaces. We realized when we commenced this investigation that it would be impossible, in the short winter period still left, to obtain information as to its performance in very cold weather. Nevertheless, as the cold spring weather has been of much longer duration than usual, we consider that we have information from these various users that will be a valuable criterion as to the burning and heating qualities of the Alberta coal under normal domestic conditions in this province.

It is to be distinctly understood that this report refers solely to the coal sent to the Ontario Government as samples and it is upon the trial of these samples that our conclusions are drawn.

Three cars of coal were forwarded to the Ontario Government for testing purposes. One car was Drumheller coal, one Saunders Creek and one Pembina. We were informed by the Alberta authorities that the latter coal was best adapted for use in Spencer Heaters and it was therefore distributed for use in these heaters alone. The other two cars contained a little over sixty tons and on April 18, 19 and 20 this coal was distributed almost entirely in half-ton lots to 119 persons who had applied for same.

A charge of \$4 per half-ton was made of which \$2 was refunded on the return of a questionnaire properly filled in. The remaining \$2 per half-ton which was charged just covered the expense of delivery. The cost of delivery was considerably increased because of the coal being in half-ton lots and because those who received it were scattered as widely as possible all over the city of Toronto.

QUESTIONNAIRE

The following is the form of Questionnaire which was sent out to the 119 persons receiving the coal:—

Please fill in the following Questionnaire when you have consumed the Alberta coal now delivered to you, and mail same to J. A. Ellis, Fuel Controller for Ontario, 47 Queen's Park, Toronto, upon receipt of which \$2 refund will be mailed to you.

1. Name
2. Address
3. Quantity received
4. Date received
5. How long coal lasted
6. What was coal burned in?
(Mention whether in hot water furnace, hot air furnace or kitchen range).
7. Number of rooms in house
8. Was coal smoky or otherwise?
9. What good coal did you find in the ashes?
10. How did quantity of ashes compare with ashes from the hard coal which you have been in the habit of using?
11. Was the ash fine?
12. Were there any clinkers or slate?
13. How in your opinion does this coal compare with the hard coal which you have been using?
14. What is your opinion on the heating service of the coal?
15. Have you had any difficulties with this coal, and if so what?
16. Any other comments?

Instructions how to burn the coal were also left with each person. Inspectors visited each residence to see that the furnace, etc., was in order and to give information how to get the best results.

We inspected the coal on its being unloaded from the cars. The Drumheller coal was in excellent condition, it was of a bright appearance and quite clean. It was composed of large lumps and a quantity of smaller size down to about stove size. The Saunders Creek coal appeared to have disintegrated a little more but not very much.

Officials of the Alberta Government carried on a public demonstration for about three weeks in a building at the corner of Bay and Temperance Streets, Toronto. About 200 to 300 people visited this demonstration every day.

ANSWERS TO QUESTIONNAIRE

The answers to the Questionnaire are nearly all very similar. Summarized these answers are as follows:—

With a continuous fire one-half ton of coal lasted from ten to eighteen days or on an average about two weeks. (It must be borne in mind however that the coal was used in comparatively mild weather).

When a fire is started there is a little smoke at first. It is, however, to be noted that a considerable number of people say that it is not smoky at any time. All the answers agree that there is no good coal found in the ashes.

With a very few exceptions all agree that there is much less ashes as compared with the ash from the hard coal which people had been in the habit of using.

All say that the ash is a fine brown ash. With one or two exceptions all say that there are no clinkers or slate.

Nearly all say that the coal compared very favourably with the hard coal which they had been using but that it burns more quickly.

Practically all agree that the coal gives an intense heat and responds very quickly to draught.

Nearly all say that they had no difficulties with the coal, although a few say that they had a little trouble to keep the fire low until the draught was properly regulated.

Quite a number say it is a very good coal for grate use.

It may be of interest to give a few short extracts from some comments which were made with reference to the coal:—

“Alberta coal should take the place of anthracite providing cheaper freight rates could be arranged.”

“Although it looks somewhat like soft coal it is absolutely different in burning, there being none of the heavy black smoke and it keeps on burning so long with a clear heat.”

“I think in some ways it is much ahead of hard coal.”

“No trouble to keep fire all night and kindled beautifully in the morning.”

“I do not think it would go as far as a ton of hard coal but would have greater heat whilst it lasts.”

“In mild weather the difficulty was to keep the heat down.”

“Would estimate twelve tons of Alberta coal as being equal to ten tons of best anthracite.”

“This coal is quicker to act and throws off far more heat than any of the American coals, but it takes a little closer attention to details in regulating your furnace.”

“The furnace requires more attention than with hard coal, but in spite of all drawbacks I find it more satisfactory.”

“We will be pleased if we can get such good coal next winter.”

“The hot water boiler was hot in almost half the time compared with the coal I have had this last winter.”

“I find the coal excellent in the kitchen range and also in the grate.”

“It burns slightly quicker than hard coal.”

“I am prepared to put in a season's supply as soon as I can have it.”

“Fire rapidly kindles and heat intense in a short time of lighting stove or furnace.”

“The fire can be kept quite low and still does not give out like the hard coal.”

“I think it would be good business to have some here for next winter's use if it could be got at the same price as the hard coal.”

“Last winter burned Welsh coal, soft coal and anthracite and would prefer Alberta coal on account of cleanliness and heat.”

“I do not think there ever was so much heat coming from the registers especially with so little coal in the furnace.”

“Gave too hot a fire for mild weather but would be first class in our cold spells.”

“Burned well in our grate and lasted much longer than Cannell coal giving greater heat.”

“Would use this coal in preference to anthracite. The heating value is quicker and greater.”

“This coal is the best I have ever put into the furnace. I can light ten fires with the same amount of wood it takes to light one fire with hard coal.”

“For the open grate it compared equally or better than Cannell coal. No trouble in keeping a fire overnight provided the coal is in large lumps.”

“The ash is soft and very easily disposed of in great contrast to the quantity of clinkers and stone I have been worried with.”

“I believe it would have to be fired more frequently but would require a great deal less attention than anthracite. Out of 1,000 pounds I have 96 pounds of ash.”

“Superior to anthracite in every respect.”

“Kept fire on with small quantity of coal forty-eight hours without any attention.”

"I found this coal very satisfactory and will be pleased to use it in the future if it can be had at a reasonable price."

"Owing to the large amount of gas the coal contains there is apt to be a great loss of heat in the flue gases."

"Coal heats far more quickly than anthracite but is only two-thirds to three-fourths as economical."

"The Alberta coal would be very splendid in cold weather and for open grates."

"For more moderate temperatures it is not so satisfactory as it burns so freely and fiercely."

"It should not be compared with anthracite but with other soft bituminous coals. It is infinitely superior to Cannell coal for grates."

"From the very limited trial I would say that it would answer our purpose equally if not better than the best anthracite." (This was a test in a factory of two floors.)

SCIENTIFIC TESTS

Scientific tests were carried out on one-ton samples of the Drumheller and Saunders Creek coal at the University of Toronto. These were done in the Thermodynamics Laboratory of the Department of Mechanical Engineering under the supervision of Professor R. W. Angus, B.A.Sc., by Mr. H. A. Tuttle, B.A.Sc.

These tests and research were made specially as to the method of burning and the relative value of the coals with respect to each other and in comparison with commercial anthracite such as has been supplied during the past winter, the latter having been in storage in the laboratory bunkers and being the same as was used for various general research and test work done in this laboratory during the university session just closing.

The apparatus used in burning these coals consisted of two hot water and one hot air domestic furnace of standard commercial design. The furnaces and equipment were arranged to measure the heat emitted.

The following general information as to these tests is given for the purpose of indicating the general properties of these two Alberta coals as supplied and for comparison with the ordinary anthracite supplied by dealers here during the past winter.

Analysis on Domestic Furnace Test

	<i>Alberta Drumheller.</i>	<i>Alberta Saunders Creek.</i>	<i>American Anthracite.</i>
Moisture per cent	16.4	8.2	4.1
Volatiles "	24.1	26.5	5.0
Fixed carbon "	55.3	60.6	80.8
Ash "	4.2	4.7	10.1
	100.00	100.00	100.00
B.T.U.'s per pound	10.987	12.512	13.910

(Note that B.T.U. means British Thermal Unit, being the heat required to raise one pound of water through one degree Fahrenheit.)

The high moisture content of the Alberta coals showed noticeably during the early stages of firing and this steaming lasted about an hour and a half after firing, and smoke in small quantities was observed leaving the stack for from one to one and a half hours. The moisture affects the shipping and storage of this coal, as it may disintegrate or slack if exposed to weather too freely.

The Alberta coals are free burning. Flames appear after about fifteen minutes and after about an hour the coal burns with long, smoke-free flames. This is characteristic, and by reason of this a large combustion chamber is

required with ample excess air available. On this account the fire should be kept well down in the firepot of the ordinary furnace and the damper in the fire (upper) door should be open at all times. The draught damper (in the ash pit door) should be closed as soon as permissible. The yellowish smoke was considerable and caused soot, which necessitated periodic cleaning of the gas passages in the furnace.

The method of firing adopted was the standard "alternate firing," i.e. first on one side of the furnace and then on the other. In practice there would be some advantage in keeping a good bed of ashes over a portion of the grate so as to check the draught and keep the fire from burning too rapidly except in very cold weather.

The coal burned to quite a clean ash containing less than 5 per cent by weight of combustion. The ash is very light and bulky and should be handled in covered receptacles to avoid dirt.

(NOTE.—The complete Scientific Test Report will be issued later as an appendix hereto.)

CONCLUSIONS

1. From the above reports and from our own investigation and observation, we are of opinion that Alberta coal of the grades or samples submitted or similar to them would prove a satisfactory substitute for domestic use for American anthracite coal. It would be desirable, however, that only the best grades of such Alberta coal should be shipped to Ontario.

2. The main question, however, is one of price. In our opinion the coal would not be able to compete successfully with American anthracite unless it could be brought to Toronto and delivered to the consumer at a price not exceeding \$12.50 per ton compared with \$15.50 for anthracite.

3. It is a free burning coal with a high volatile content, and for this reason a ton of such Alberta coal would not last as long as a ton of anthracite. We think that about $1\frac{1}{4}$ to $1\frac{1}{3}$ tons of best grade Alberta coal is equivalent to one ton of good quality American anthracite, such as is usually obtained here.

4. If the Alberta coal can be sold in Toronto at the price mentioned, we think every encouragement should be given to it.

TORONTO, May 17, 1923.

(Sd.) C. H. MITCHELL,

Dean, Faculty of Applied Science and Engineering.

(Sd.) R. P. FAIRBAIRN,

Deputy Minister of Public Works for Ontario.

(Sd.) J. A. ELLIS,

Fuel Controller for Ontario.

MONTREAL LIGHT, HEAT AND POWER CONSOLIDATED

MONTREAL May 3, 1923.

Honourable Senator J. S. McLENNAN,
Ottawa, Ont.

MY DEAR SENATOR:

Re Fuel Supply of Canada

I have been following with a great deal of interest the proceedings of your Special Committee on this subject and have no doubt that you will be able to find some solution for the problem, or at least some way of ameliorating the present onerous and costly conditions.

I was particularly interested in reading Mr. W. H. Blauvelt's evidence, as submitted April 25 ultimo. Mr. Blauvelt (page 167 of the printed Proceedings) advocates 99 per cent remission or drawback of duty on coal imported for the purpose of making by-product coke, or making coke in by-product ovens, and I think he is right as far as he goes, as obviously it is unfair, if not illogical, to impose duty on coal converted into coke and at the same time admit coke free as at present. The present condition does not tend to encourage the manufacture of coke for domestic purposes in this country. I think, however, Mr. Blauvelt is too restrictive in his suggested amendment to the tariff in this matter, and I think all coal imported for conversion into coke should have the same remission of duty as he recommends for the coal imported for the purpose of making by-product coke. In this connection our company manufactures considerable coke for domestic purposes; we would manufacture more, and naturally sell it at a less price, if we were remitted the duty that we have to pay for the coal imported for the purpose.

Under the circumstances if you contemplate any recommendations for changes in tariff and are desirous of encouraging the manufacture of coke it would certainly be advisable to remit duty on coal converted into coke regardless of the process, as I am sure, as stated, that this would automatically go a long way towards relieving our present difficulties in regard to domestic fuel supply in Canada.

With kind regards and best wishes for your inquiry and its outcome.

Yours sincerely,

H. S. HOLT,
President.

145 ST. JAMES ST.,
MONTREAL, May 17, 1923.

To the Honourable the Chairman and Members of the Select Standing Committee on Coal Supply.

GENTLEMEN,—In submitting a memorandum to the Committee embracing views with respect to the position of the Canadian Coal Supply and market I wish to premise the statement that neither myself nor any one of the companies with which I am identified in a personal way is or has been engaged in or interested in the business of mine operating or coal producing either in Canada or in the United States. Our relation to the industry is that of merchants and importers whose operations have been confined to the distribution of imported

coal in the territory extending from the city of Quebec to the head of the lakes. Occasionally our distributions have extended into areas beyond those limits.

We, therefore, have nothing whatever to do with creating or controlling the conditions which result either in short supplies or in high prices. Equally with the individual consumer we are the victims of these conditions. In this state of the case it has occurred to me that such presentation of the matter as I could hope usefully to make to the Committee must be confined to that part of the subject which has to do with ways and means by which supplies are presently secured.

Since the territory named contains no coal measures and at the same time constitutes the major industrial and thus the chief fuel consuming area of Canada it is dependent for its supplies upon the facilities of the distributors for securing a steady movement of coal from the producing fields. These facilities are governed by two main factors:—

- (A) The state of labour at the pits, and
- (B) The state of transportation therefrom.

(A)

Disregarding for the moment the coal which comes into the Montreal area, mostly in the season of navigation, from the Lower Provinces' fields it may be said that the territory above mentioned derives its supply both of anthracite and bituminous coal from the states of Pennsylvania, West Virginia and Ohio. Therefore the Canadian consumer in this territory is affected by conditions of labour and transport, as they develop from season to season, outside Canada, that is in the United States. So that, as things stand to-day, agencies altogether beyond our control and even, for the most part, outside the scope of our influence, dominate so important, even vital, a matter as our domestic and industrial fuel supply.

As is well known there has been constant labour unrest in the United States coal fields during and since war years. In 1917 the United States Fuel Controller, Dr. Harry A. Garfield, established a scale of pay for mine operators based upon the findings of an engineering Committee. In common contemplation this war-time scale of wages is the peak; but since the war ended there have been two substantial increases—one in November, 1919, and a still greater one in August, 1920, the latter, under what is called the New York agreement, to continue until April 1, 1924, as respects operatives in the bituminous fields while in the anthracite fields the existing agreement is effective until August 31, 1923.

In the unionized anthracite and bituminous fields a year ago on May 1, a strike was precipitated which was lately described by United States Secretary of Labour as "our greatest industrial strike—the greatest in our history, both as to duration and number of men involved." It continued for $4\frac{1}{2}$ to $5\frac{1}{2}$ months (varying with locality) after which work was resumed on precisely the same wages and working conditions which prevailed when the strike was called. The rigours of this strike situation, as it proceeded, were aggravated on July 1, when the railroad shopmen went out thus increasing the number on strike from about 600,000 as it was in the unionized coal fields to a total of about 1,000,000. The immediate result was a sharp depletion in the coal supplies on hand and a cessation of production in the non-unionized fields—which up to that date were producing at the rate of about 4,000,000 tons per week—due to inability of the railroads to move the production on their lines. The reaction upon industries everywhere was immediate resulting in extensive unemployment extending down through the whole gamut of industry and commerce with ultimate rationing of the domestic as well as the industrial coal supply.

Under direction of the Federal Government the United States Coal Commission of which John Hays Hammond is Chairman, is now conducting a comprehensive survey of conditions of mining, transport and marketing in the entire coal industry in the United States. A staff of over 400 employees is engaged upon this work and the report of the Commission, covering measures recommended for stabilizing the anthracite industry, will be ready for presentation to the President early in July. The Commission's functions are limited to fact-finding and it has no affirmative powers of action. The President also is powerless, except in case of emergency, to act without Congress, which is now in recess until December 4, 1923.

In these circumstances interest is concentrated upon the attitude which will be taken up by John L. Lewis, president of the United Mine Workers of America who is described as "the one man in the entire country who can tell whether or not there will be another suspension of mining after the present agreement expires," that is on September 1, 1923. Suspension of mining in the anthracite fields appears to turn upon the question of renewal of the agreement and that upon what the workers determine to demand in respect to the scale of wages. Mr. Lewis lately returned from Europe, after an absence of some duration. When informed that mine owners and operators had declared that the cost of coal to the consumer could be reduced only by a decrease of wages and when asked if the workers would accept cuts in pay, he answered, "Absolutely no. That is final. The miners of America are out of the habit of accepting wage reductions."

Early in the spring when tentative negotiations between the anthracite operators and the miners failed to produce results, the Operators' Association offered to submit the entire issue of wages and working conditions to an arbitration commission, personnel of which to be selected by President Harding, but Mr. Lewis declined co-operation in any arbitration plan. It would thus appear that the intentions and programmes of the Workers is likely to remain a sealed book until the strategy of their organization suggests the opportune moment for action. In 1902 the American Coal Strike Commission, appointed by President Roosevelt, which settled the great strike of that year, declared this organization to be undesirable; since when it has become recognized as the main factor directing the forces of coal mine labour and thus controlling about 60 per cent of the coal output of the United States. Its strength may be realized when it is stated that its annual revenues from dues of its members reach the sum of \$15,000,000.

The foregoing facts are set forth in order that cognizance may be had of what is impending in the coal mining regions, developments in which should be watched during the next few months.

(B)

The other factor of major importance is the movement or transport of the coal, when raised, forward to points of consumption or of ultimate distribution to dealers. Admittedly the problems involved in this factor are so complex that they are scarcely capable of intelligent discussion by the layman. A capable writer, in a publication of high authority in the United States, has asserted that "in all coal contracts between the producer and consumer the element of transportation, *which neither of them can control*, is the most important factor."

Of the infinite variety of ways in which those concerned in the coal trade and the ultimate consumer also may be affected by the functioning of the transport systems the most familiar and direct is that one into which all railway difficulties in times of stress resolve themselves in the end, namely, car shortage. It is well known that in the most recent year of business depression, 1921, many railroads in the coal states had to build additional side tracks to hold all their

empty coal cars. "Many of them," says the writer already quoted, "were tremendously over developed in car supply and motive power for the demands of that year. Some of them were asked on the shortest notice in the early summer of 1922 to handle the largest tonnage they ever moved. The fuel shortage of the fall and winter of 1922 has been due to a lack of transportation, not of coal."

The present situation in respect to the car supply of the United States is reported to be that loadings of commodities are of unprecedented volume, and have been rising steadily since the beginning of the year. The peak period will be reached in September and October, and will coincide with the seasonal large movement of coal and grain. This would seem to point to the urgent advisability of consumers everywhere taking delivery of and storing all procurable coal during the summer months. This course is also the recommendation of the United States Coal Commission.

MAGNITUDE OF COAL IMPORT TRADE

The magnitude of the problem of securing the needful supplies of anthracite and bituminous coal and of distributing the same in the markets of central Canada cannot be seen in its true perspective unless the figures are presented which show the growth and development of these markets in the present century. The following are taken from official records:—

Consumption of Coal in Canada

Cal. Yr.	Canadian	Imported	Total	Tons per Capita
1901..	4,912,664	4,810,213	9,722,877	1.81
1911..	9,822,749	14,424,949	24,247,698	3.36
1913..	13,450,158	18,132,387	31,582,545	4.19
1921..	13,070,217	18,103,620	31,173,837	3.54

During the past three calendar years the quantities and value in dollars of coal imported into Canada are shown in the following tables:

	Anthracite		Bituminous	
	Tons	Value	Tons	Value
1920..	5,090,767	\$32,647,759	12,552,910	\$27,424,870
1921..	4,839,559	39,058,148	15,407,996	72,339,952
1922..	4,416,255	39,000,610	12,752,059	39,258,115

The last issue of the Canada Year Book contains an analysis showing the distribution of the Canadian output for the year 1920 of anthracite, bituminous and lignite coal available for consumption out of the total tonnage of 16,946,764. There was sent to other provinces from

Nova Scotia and New Brunswick..	1,460,013 tons
Saskatchewan, Alberta and British Columbia..	2,335,783 tons
Total..	3,795,796 tons

Nor must it be overlooked that, while Canada is a heavy importer of coal, her exports, the production of Canada, are also of considerable volume and on a steadily ascending scale since the opening of the century. This is exhibited in the following table of exports:—

	Tons	Value
1905..	1,615,322	\$3,930,802
1910..	1,826,339	5,013,221
1915..	1,512,487	4,466,258
1920..	2,120,138	13,183,666
1921..	2,277,202	16,501,478
1922..	1,953,053	13,182,440

In the years 1911 and 1913 the tonnages averaged higher than in the recent years above shown, but the values were considerably less than half as much. It is also noteworthy that in no one of the war years did either tonnages or values approach the lowest totals of the last three years.

The major deduction which I draw from these figures is that the domestic and industrial fuel needs of central Canada are progressively increasing out of all proportion to the growth of population; and that they will continue increasing despite the phenomenal expansion of hydraulic electrical power and the extensive use of fuel oil.

It must be further obvious, from contemplation of the huge tonnages shown in the foregoing tables, that if sources of supply could be availed of other than those heretofore relied upon vast changes must occur in the entire scheme of Canadian transport.

As before stated by far the largest part of the import tonnages is distributed in the central Canadian market. A not inconsiderable part of the same reaches points of consumption over rail and water routes while all of it is carried from centres of production by railways most of which were built and operated through decades, equipped for this specific service. Only in rare instances is the rail haul as much as 500 miles.

At the centres of distribution have been built up vast storage and handling plants and equipment for degrading and distributing to retailers and the ultimate consumer; all at an incalculable capital outlay.

These facilities, together with large capital for working them, are fully employed in caring for the already developed and existing coal trade of the country, interruption of which cannot be suffered except at grave public and private risk. The importers and distributors of coal in Canada are engaged in a commerce extending to \$100,000,000 per annum.

If new sources of supply can be developed for the ever-increasing needs of the Central Canadian market new agencies and plants for marketing, reinforced by large accessions of new capital, must at the same time be created also. To assert that every public-spirited and patriotic Canadian would welcome such development and applaud every reasonable effort to its attainment is but to utter a truism. It may not be overlooked, however, that known sources of supply in our own country are located at distances from the major points of consumption averaging scarcely less than 2,000 miles either by all rail or under transshipment conditions to water and rail calculated to much augment the cost of shipment. It has become an axiom with transportation experts that no bulk or basic commodity will stand rail carriage a distance exceeding 1,000 miles. This is the basis of the agitation in the Western United States for deepening the St. Lawrence river and canals so as to relieve the primary productions of that region of the all rail haul to the Atlantic seaboard of the United States.

EMBARGOING COAL TO CANADA

The coal trade of the United States with Canada is an important and highly valued factor in the foreign commerce of that country. Nevertheless, the situation of stress in their own domestic and industrial supply, which periodically results from either labour or car shortage difficulties, occasions demand for embargoing the coal movement into Canada at certain seasons. Such a situation existed and such demands were loudly made in the past winter; discussing which the *Journal of Commerce* of New York made this comment:--

“But what if we become so engrossed in our own stupid quarrels among ourselves that production of the fuel is seriously curtailed and then decide that the needs of our own citizens must be met before we will permit any coal to go to Canada? We have not yet reached that

stage of childishness, but it may as well be admitted that we did not fall very far short of it last summer and this winter. Just what Canadian authorities and Canadian consumers can or are likely to do to free themselves from their dependence upon us in this matter is not entirely clear. One important possibility is that some of them may more and more look to Great Britain for their fuel. One thing is certain. If we force our northern neighbours to go elsewhere for their coal we shall have lost a valuable market for our production."

Last autumn the Pennsylvania Fuel Commission, with the consent of the Federal Fuel Administration, agreed upon an allocation to the anthracite consuming markets in the United States of 60 per cent of their usual yearly receipts and upon an allocation of 50 per cent to Canada. Latest figures compiled by the Interstate Commerce Commission of the United States show that the markets in the New England States had received 96,963 tons over their allocation while Canada had received 26,400 tons under. It is noteworthy that the records show the importation into Canada of 4,416,255 tons anthracite in the calendar year 1922 notwithstanding that the industry was tied up by the coal and rail strikes for five months of the year. This total is only a little more than 400,000 tons under the importations of 1921.

For many years prior to 1917 the coal demand of Eastern Canada—the territory east of Brockville and Ottawa—was supplied almost exclusively from Nova Scotia. The war dislocation temporarily interrupted the movement, but from 1919 recovery at the Nova Scotia collieries made it possible to supply increasing quantities, so that now the supply from Nova Scotia is substantially equal to that shipped to the St. Lawrence market in the years before the war.

Increase in consumption, however, as above shown, has required the delivery of very large quantities of fuel coal from the United States to this market. Present indications are that Nova Scotia's production will scarcely overtake the increasing demand for many years to come.

It was confidently expected that the supply of coal from Lower Provinces' collieries this year would be supplemented by British coal, handled in steamers coming to Montreal for grain during the season of navigation. If and when the situation in Europe makes possible the export of coal at prices which will approximate those of the United States product, Great Britain might become a source of supply. At the present time, however, the trouble in the Ruhr in Germany has upset the British market, the available British supply being absorbed by the continental markets at rising prices.

During the year 1922, in the period of the long strike in the mining districts of the United States, a quantity of Nova Scotia coal was transhipped at Montreal to smaller river steamers and supplied to the Grand Trunk Railway on cars at a discharging dock at Toronto. This business was made possible only because of the conditions then existing and the exigency of the railroad which obliged it to pay a higher price in order to secure the coal. Ordinarily there would be a difference of sixty or eighty cents per ton in favour of United States coal, which, per ton, might appear negligible, but which, when figured on a large tonnage, might amount to so considerable a sum as to be a controlling factor.

It has been stated that Alberta coal displaced Pennsylvania anthracite, when they came together in the markets as far east as Winnipeg. If and where this happened it should be noted that the latter could not be secured at the time in quantity to hold the Western market. Over against this also it is of record that at several western points where anthracite was procurable it was sold at from \$22 to \$24 per ton when the Alberta price was \$12 delivered. About 1½ tons of the later equal 1 ton of anthracite.

That a freight rate of \$6 per ton from the Alberta coal fields to Toronto would permit the substitution of this coal for that from the United States has also been alleged. My information is that the selling price at the mines to cover cost and reasonable profit would require to be \$5 per ton, to which add the assumed freight rate, and the cost on cars at Toronto would be \$11. The best grade of $\frac{3}{4}$ -lump coal from the Pittsburgh district would cost, normally, \$3 per net ton at mines, plus freight to border \$2.24, thence to Toronto \$1.15, plus duty and exchange 63 cents—a total delivered cost of \$7. A further fact helpful in the consideration of the problem is that the railways find it feasible to transport United States coal to lake front, thence by vessel to the head of the lakes, when it is transhipped all rail as far west as Winnipeg.

A cognate fact, also of importance, is that between 20,000,000 to 30,000,000 tons of bituminous and approximately 6,000,000 tons of anthracite coal are yearly shipped through Duluth, Superior and Lake Michigan ports into the Northwestern States. The controlling factor in this movement appears to be the water haul with relatively short rail hauls at either end. The figures strongly suggest these Northwestern States as a natural open market for the surplus Western Canada production.

While dictating these observations my attention has been drawn to announcements from Washington which indicate that the United States Coal Commission, above mentioned, would recommend lower railroad rates on anthracite as a means of reducing prices to the consumer. John Hays Hammond, the Chairman, in making the announcement, declared that the Commission is convinced, from its investigation to date that anthracite prices are being held up by existing freight charges the freight rates upon which are disproportionate to those on other commodities. If these reductions are brought about, as recommended by the Commission, the problem of transport from far distant competing fields will be further accentuated. The economic forces which have determined this problem in the past seem certain to continue to operate whatever may be attempted in the direction of introducing artificial or sentimental competition.

I wish, in conclusion, to emphasize that experience everywhere has been uniform that the average householder will not use substitutes for anthracite coal. In time of emergency or abnormal shortage he has no alternative but to accept such fuel as may be available; and this has been found to be the case even with the poorer classes in cities. The reasons are clear: Chimneys and furnaces have been constructed for the use of anthracite almost exclusively, while less attention is needed in handling and stoking and there is relative freedom from dirt and soot and smoke.

The case for anthracite, its history, development, mining and marketing, was ably presented in an address of Vice-President William H. Williams of the Delaware & Hudson Co. (one of the greatest of the coal roads) and reprinted in the Commercial and Financial Chronicle, issue of May 5th inst. To this I respectfully direct the attention of the Committee.

Having noted the many advantages of anthracite over bituminous coal in all domestic uses and in cities where smoke is objectionable Mr. Williams proceeds:

“But, save in those communities in which the use of smoke-producing fuels is forbidden by effective public authority, this advantage would not overcome a materially greater difference in price than that necessarily resulting from present mining conditions. In certain markets there is no advantage over natural gas or oil, and elsewhere by-product coke can be sold at prices which constitute effective competition.

"Anthracite is nowhere a necessity of life in the sense that actual suffering would result if it ceased to be marketed and sold. Even for domestic use, purchasers will pay only a well-defined margin over the price of bituminous coal. The small, or steam sizes, are never sold, save in competition with bituminous coal or coke or fuel oil, or all of them, and this rivalry is simply a matter of dollars and cents of price. The user of anthracite for steam purposes must be convinced that its cost, measured by its efficiency, is no greater than that of the substitutes, the only exception being where smoke is effectively prohibited and the use of anthracite thereby becomes compulsory. Such ordinances, however, are man-made, and protect even these limited markets only while the cost of cleanliness is reasonable.

"It should always be borne in mind that if production of anthracite should wholly cease, it would be easily possible, under present conditions, to mine and produce in this country enough bituminous coal to substitute that fuel in every place and every use to which anthracite is now being put: that this could be accomplished, without opening a single new bituminous mine, by simply working nearer to capacity and more regularly those which now exist."

It may be added that the observation has been frequently made that there is only one real and acceptable substitute for American and that is British Anthracite. Small quantities of the latter have been imported in other seasons with such satisfactory results that, even under conditions prevailing at the moment, it is probable that an increased quantity will be secured this year. An increased movement from year to year seems likely.

Respectfully submitted,

W. L. McDOUGALD.

R. J. MERCUR & CO., LIMITED,

HEAD OFFICE, MONTREAL,

April 26, 1923.

Clerk, Special Committee on Fuel Supply,
The Senate of Canada, Ottawa, Ont.

DEAR SIR:

*Re Arrangements Warranting Construction in Canada of By-product Plants
for the Conversion of Bituminous Coal into Domestic Coke*

Referring to request made of me on April 20th, by the Honourable Senator J. S. McLennan, Chairman of your Committee, I find, after investigating the subject thoroughly, that it would be extremely difficult to make a definite suggestion as to what Government encouragement or assistance would warrant our interests or other capital in constructing by-product coke ovens in Canada and manufacturing by-product domestic coke.

The manufacturer of by-product domestic coke in Canada would have to meet anthracite coal competition. Anthracite coal comes into Canada free of duty, and while bituminous coal, imported into Canada for the manufacture of by-product *metallurgical* coke, comes in free of duty, the same coal brought into Canada for the manufacture of by-product *domestic* coke is subject to a duty of 53 cents per ton, which makes the additional cost of domestic coke about 75 cents per ton over the cost of metallurgical coke.

Putting bituminous coal, used in the manufacture of by-product domestic coke, on the same tariff basis as the coal used in the manufacture of by-product metallurgical coke, would be a first step of encouragement and would not affect the tariff revenue of the Dominion, as every ton of domestic by-product coke manufactured and sold takes the place of an equal tonnage of anthracite coal which enters free of duty.

The construction of by-product coking plants entails not only large capital expenditures, but a balancing of the sale of the entire output.

The local conditions surrounding each such proposed plant would govern so largely the question of its being a paying proposition or not that it appears to me presumptuous to suggest any general plan, particularly as existing tariff policies should not be disturbed or the existing Dominion customs revenues diminished in any way.

I understand that the Hamilton plant of the Hamilton By-product Coke Ovens, Ltd., is prepared to turn at least a portion of their output into domestic coke if the tariff mentioned above is equalized. Might it not be advisable to let the matter stand at that at present, until the actual operating results of this plant prove whether by-product domestic coke can be manufactured and sold in Canada in competition with anthracite coal.

Respectfully submitted,

ROBT. J. MERCUR,
President.

DEPARTMENT OF MINING ENGINEERING,

McGILL UNIVERSITY,

MONTREAL, March 22, 1923.

The Hon. JOHN S. McLENNAN,
Chairman Special Committee on Fuel Supply,
The Senate, Ottawa.

DEAR SENATOR McLENNAN,—In reply to your letter of March 15th regarding my experience with peat fuel I beg to say that I have for many years been very much interested in the peat fuel problem, and have made a somewhat extended study of the subject both as regards the Canadian situation and as regards the European peat industry in so far as it has a bearing on conditions here. I have also personally examined a large number of bogs both in central Canada and the Maritime Provinces, and, finally have made use of the fuel produced from the Alfred bog experimentally in a small way and practically in one or two ton lots for heating my private house and garage.

If your Committee wishes me to appear before it I shall be very glad to do so, and it may be that my extended studies of the fuel situation set forth in my published books on the coals of Canada, etc., may warrant you in asking me to appear. I do not, however, wish to force myself on your Committee, and it may suffice to summarize my views as follows:—

1. *Peat Resources.*—Canada possesses large peat areas in Quebec and Ontario and these occur largely in the more populous districts of the country and contain material suitable for the production of peat fuel of excellent quality.

2. *Possibilities of Manufacture.*—The Canadian climate while apparently unsuitable for open-air manufacture of peat owing to the short summer, is in reality more suitable than certain other countries which at first sight would seem better; the reason being that although our summer season is short, we have at that time of year fewer cloudy and rainy days and a much lower relative humidity than other and apparently more favoured districts. It should therefore be commercially practicable each summer to manufacture large quantities of Canadian peat by mechanical excavation, followed by air drying.

3. *Artificial vs. Natural Drying.*—A somewhat extended study undertaken at the request of one of the departments of the Canadian Government some years ago convinced me then the artificial drying of peat was unlikely to be commercially profitable, and nothing has transpired to make me change this opinion, i.e. to believe that the preliminary drying should be done by artificial rather than natural means. On the other hand it is quite possible that commercial plants may find it desirable to finish that product by a short end period of artificial drying either throughout the whole season when necessary or in the autumn by way of lengthening the season.

4. *Conclusions as re Peat.*—I believe that prepared peat can be produced in quantity from many Canadian bogs at a price and of a quality which will render it very attractive for domestic use, and I believe that the Government should encourage this manufacture by suitable measures until such time as it becomes self-supporting. I do not, however, believe that peat is likely to largely take the place of coal for steam raising or for industrial purposes, and we must therefore look upon peat as an auxiliary rather than a primary fuel.

5. *Anthracite and other American Coals.*—I do not see any reasonable possibility of making Canada economically completely independent of the United States as regards bituminous coal owing to the advantageous position of the American coal fields to central Canada and particularly central Ontario. As regards anthracite, however, the situation is different; the supply of anthracite is insufficient even for the United States needs and the price is bound to rise to higher figures than at present even if shipment to Canada is not prohibited. Under the circumstances it is in my opinion absolutely necessary for Canada to produce its own anthracite substitutes, i.e. smokeless fuels which can be used in the domestic heating furnaces now installed in thousands of houses. Excellent substitutes can easily be produced from bituminous coal of the class found in Nova Scotia and Alberta and there should be no serious difficulty in manufacturing them in sufficient quantity and at a price to enable them to compete with anthracite as far west as say Toronto and as far east as Winnipeg. Anthracite substitute could also be made from lignite, and I am very hopeful of commercial success for the Souris experiment, which if successful means the practical elimination of anthracite from Manitoba, and I hope from western Ontario.

Trusting that the above statements will be of use to your Committee, I am,

Very respectfully yours,

JOHN BONSALL PORTER,
Director.

THE CHATEAU LAURIER,

OTTAWA, August 17, 1920.

B. F. HAANEL, Esq.,
Chief Engineer,
Fuel Testing Division,
Department of Mines,
Ottawa, Ont.

DEAR MR. HAANEL,—Before leaving Ottawa I would like to express to you and through you to the Peat Committee and Mr. E. V. Moore my best thanks for the facilities which have been granted to me to inspect the work on peat winning being carried out at Alfred, and for the very valuable discussion of results obtained which I have had with you.

The Fuel Research Board of the Department of Scientific and Industrial Research (London) have had the question of peat development continuously before them since early in 1917. In 1917 they were considering the problem mainly from the point of view of possible development in Ireland, but at the present time, owing to the shortage of coal and its high cost, it is possible that the solution of the peat winning problem will have application not alone in Ireland, but in Great Britain itself. In July, 1917, the Fuel Research Board set up the Irish Peat Enquiry Committee, to which I acted as Secretary and since the beginning of the year I have acted as Peat Investigation Officer to the Board.

When considering this question we had the advantage of your excellent report "Peat, Lignite and Coal," published by the Department of Mines, and which we consider the most fair-minded, impartial and authoritative review of the subject in the English language.

I think we are all agreed that whatever is to be the future of the peat fuel industry and whether it is to be used for the direct firing of steam boilers as a powdered fuel, or as a producer fuel with or without by-product recovery, that for all these purposes the peat winning problem must be solved so that we can rely on a steady and reliable output of peat fuel at an economic cost which will enable the peat fuel to compete with coal, due regard being paid to the calorific value of the fuel. It is to the solution of that problem that your Committee have addressed themselves at Alfred, and in my opinion with marked success.

That the Fuel Research Board were convinced of the value of the work being carried out here is I think evident from the fact that they have sent me to Canada specially to report on the work carried out at Alfred. I have now spent some time at Alfred, and I think it is only right that I should say that in my opinion the work carried out there is in advance of any work which to my knowledge has been done elsewhere.

That the solution of the peat winning problem is of great importance will be evident when I state that in Ireland alone, with a population of about four million people, we consume seven to eight million tons of peat fuel per annum and that peat fuel satisfied 43 per cent of the total fuel requirements of the country for power, heating and lighting. It is of course at the present time practically used only as a domestic fuel, but if it is to continue to be used for that purpose and to be applied in industry, then the system of mechanically winning the peat must be perfected, as owing to the increased cost of labour and the difficulty of obtaining same, some such system must be utilized.

We have discussed the results obtained at Alfred and I think our ideas are in absolute agreement. During the present season many improvements in the plant have been effected, and even during the last month I have observed two very important additions to the No. 2 plant which have considerably increased

its efficiency. That the plant is not now in its final form we are, I think, all agreed, and we are further agreed as to the direction in which alteration and advance must be made, and further it may be of interest to state that we have come to the same conclusion independently.

I have no hesitation in expressing the opinion that when the plant has been remodelled in the direction indicated that before the end of the next season the Peat Committee will be able to look back to the successful solution of this problem, the difficulty of which is apparent by the fact that it has hitherto baffled all who have attempted its solution. I think, if I may say so, the work of the Committee is on the right lines and that it would be nothing short of a calamity if it were not continued for another year or longer so that the credit of the success would be gained by the country, which, through its Department of Mines, has done so much to aid in the solution of this complex problem.

I wish to again express my thanks for the many courtesies extended to me and to restate my opinion that with the accumulated experience of the past season's working your Committee will attain that success which their efforts merit.

Very sincerely yours,

(Sgd.) PIERCE F. PURCELL,
*Peat Investigation Officer,
Fuel Research Board.*

CANADIAN NATIONAL TELEGRAM

MONTREAL, QUE., 5 May, 1923.

Hon. J. S. McLENNAN,
Hu Ont.

After careful deliberation Canadian National Railways are able to quote rate of nine dollars per ton on the average for Alberta coal moving in train load lots from the coal fields of that province to Ontario. It is understood that in naming this rate it will be applicable only during the months of May, June and July as prior to May adverse weather conditions materially affect the cost of movement and after first of August our equipment is needed for transportation of grain. Similar consideration will also of course be given to the rates on coal from the Maritime Provinces. It is also understood that coal operators at shipping points and distributors in Ontario will co-operate with the railway company to achieve the common object as I am sure will be their desire.

H. W. THORNTON.

BRITISH EMPIRE STEEL CORPORATION LIMITED

MONTREAL, CANADA, 2nd June, 1923.

The Hon. Senator JOHN S. McLENNAN,
Chairman, Fuel Committee of the Senate,
Ottawa.

Dear Senator,—To assist coal production in Canada, with the many great benefits that must follow, I suggest the following as the most effective method.

The Dominion Government should for a period of twenty years undertake to pay a fixed bonus (say 50 cents per ton) on all coal mined in Canada and consumed 900 miles or more from the mine.

This would extend the territory tributary to existing and new mines. It would assist in financing necessary to open new mines, and would increase production of coal. Such increased production might not be sold where it would call for any payment by the Government and if not, would bring good results without any expenditure.

There is ample coal that can be mined and made available for shipment by water to meet the needs of the provinces of Quebec and Ontario. What is required is a market at a price that will permit the development of the coal properties.

Yours very truly,

(Sgd.) R. M. WOLVIN,
President.

BRITISH EMPIRE STEEL CORPORATION LIMITED

MONTREAL, CANADA, 2nd June, 1923.

The Hon. Senator JOHN S. McLENNAN,
Chairman, Fuel Committee of the Senate,
Ottawa.

Dear Senator,—Confirming my conversation Thursday last with reference to a substitute for anthracite coal, I will advise that our investigations have satisfied us that there are certain seams of coal in Nova Scotia producing coal that will make a satisfactory household coke, and that the gas produced from this Nova Scotia coal while coking, can be cleaned and the sulphur removed, so that the gas can be used either for fuel or illuminating purposes.

Coke ovens can be built in Quebec, Montreal and Toronto where sufficient Nova Scotia coal can be cheaply transported by water during the navigation season to provide full year operation of the coke plants. These large cities need the gas produced in the making of coke and the other by-products, tar, creosote, benzol, etc., find a good market in Canada. The coke produced will be used in the cities and shipped to other consuming points in Eastern Canada.

The coal for Toronto should be transhipped in Montreal by rapid discharging specially equipped docks from 1,200-ton ships to the canal vessels now returning without cargo from Montreal to Port Colborne.

It will be necessary for the Canadian Government to assist this new business by bonus on coke produced from Canadian coal or by subsidizing such plants using Canadian coal in a way possibly similar to the Dry Dock Subsidies.

A proper development of these coke ovens would permanently provide a substitute for a large portion of foreign produced anthracite now used in Canada. It would make Canada more self-contained and less dependent upon the United States. It would keep a large amount of money in Canada that is now spent outside and would develop Canadian resources and by increasing the output of coal would assist in reducing the average cost of producing all bituminous coal in Canada.

Yours very truly,

(Sgd.) R. M. WOLVIN,
President.

QUESTIONNAIRE BY DIVISION OF FUEL TESTS, DEPARTMENT OF MINES, OTTAWA

1. During what years have you used Peat Fuel? 1920, 1921 or 1922?
2. Have you given it a fair trial and endeavoured to study its proper use?
3. Has the quality of peat you received been good? If not, what complaint have you regarding it and during what year was it received?
4. Have you used it in the grate, stove, Quebec heater, or furnace?
5. Did you have any difficulty in controlling the fire?
6. What sized fuel did you get the best results from?
7. From practical use do you consider it an economical fuel for domestic use at \$10.00 per ton?
8. How much coal do you usually use during the winter?
9. What amount of coal do you think can economically be replaced by peat?
10. What are your general observations regarding peat fuel?

EXTRACTS from replies sent by those who used peat during the seasons of 1920, 1921 and 1922.

"Peat fuel in my opinion is more economical than hardwood and less bother in lumps. Works well with pea coal in furnace, excellent for starting fire or if fire becomes low to raise again, like it very much at least for moderate weather. J. Mackie."

"Peat fuel in my opinion is more economical than harwood and less bother, it is a good substitute for coal Spring and Fall use; also, a good substitute for wood for kitchen use in the winter, and is good value at \$10.00 per ton. J. J. Ramsay, 118 Frank St."

"It appears to me that reasonably priced and prepared in suitable sizes for range, grate and furnace uses, this fuel could very largely make our great country independent of foreign fuels. While my personal experience is as yet quite limited I hear many favourable remarks about this fuel and from observation, would encourage its immediate development. (Rev.) A. G. Dover, Peterboro, Ont."

"A valuable asset to the fuel resources of Canada; cannot be surpassed for open grate use and is in my opinion preferable to hard coal or soft coal or hard or soft woods for these purposes. Should prove satisfactory for the regular pattern cook-stoves, and probably superior to coal or wood for this purpose. I have seen it used in Quebec heaters—result, excellent, but preferable to use large size after once kindling. The cost is excessive when peat is \$13.00 per ton and good coal (anthracite) is at \$17.50 per ton. The real value of the peat is approximately \$8.75 per ton in this case. W. H. Pretty, M.Sc., F.R.C.Sc., A.M.I.C.E."

"A free burning fuel, lasts as well or better than hard maple, gives a splendid heat, burns right down to a fine powder, a clean splendid fuel for a grate. If I could procure it in proper condition I would gladly purchase a supply every year at \$10.00 when coal is the price it is at present. J. N. Tribble."

"A useful and practical fuel, giving a clean bright fire, little ash and no clinker. Needs close attention to drafts to avoid wasteful use. Piled in basement becomes too dry and I believe improved results would be obtained by keeping it moderately damp by use of hose. H. E. M. Kensit."

"It is clean to handle, burns well, gives good heat, desirable fuel for grate, good for hot water furnace in milder months of winter, far less laborious than coal in matter of handling and ashes. A. H. Anderson."

"Peat fuel is an ideal fuel for all home purposes, grate, cook stoves and medium size furnace. We used it in a hot water Gurney Oxford furnace all through October and November 1921. It lights up easily, burns clean and gives quicker results than coal. It is a very fine fuel and could be used to good advantage in a furnace during the milder months. I have used it personally, therefore can testify to it. Mrs. P. E. Turner, Ottawa."

"I think peat cannot be beaten for domestic use, it is a fuel that burns down to the last and gives a steady heat. It would also do in a furnace for Spring and Fall. Alec. Baker."

"The finest fuel possible for grates, also very good for starting fire in stoves, etc., and for use in furnace during mild weather when a permanent fire is not required. It is excellent as a booster and mixes with any other fuel if not administered in too large quantities. Cecil H. Burns."

"My conclusions from the short time I have been using peat are all in favour of it as a good economical substitute for coal during four out of the eight months we need furnace fuel. At \$10.00 a ton it certainly should prove a great economic factor in relieving the heavy burden our every day people are carrying at present from October until May. Elizabeth Kendry, Peterboro."

"It is especially good on days when the furnace fire does not burn well. I use it with wood and furnace coal as an auxiliary. I think it should be developed as the more one uses it the better it is liked. We may need it badly some years. W. M. Hill."

"I think it is wonderful for Fall and Spring, especially in a furnace when heavy heat during the night is not necessary. Mrs. H. E. White, Peterboro."

"It gives satisfaction. I find it very easy to set the fire in the furnace. This year I hope to save \$100.00 by burning peat. Rev. J. M. Laflamme."

"If peat can be delivered to the consumer in dry solid blocks at the price you suggest and the householder educated to the proper method of using this fuel, I am satisfied that an enormous benefit would accrue to the Canadian industry in developing our natural resources, spending millions in Canada which is now going to the United States, and making Canada more independent of foreign nations. F. W. Pooler, Ottawa."

"It makes a very hot fire if briquettes are dry; for furnace use the briquettes should be larger. Burns somewhat harder than hardwood. At \$10.00 per ton at present it could meet any other fuel on equal footing. E. E. Homey, Peterboro."

"I am very well satisfied. I can say many things in favour of peat. I believe the best size would be from 6 to 8 inches for general use. My experience with coal is far from the best, it is filled with stone and shale, positively fire proof in the greater percentage. R. H. Hunter."

"Peat is a good substitute for coal in the furnace in the Spring and Fall. It is not advisable to shake the dust out too often or it will burn too fiercely in a furnace. In a grate it is no trouble and as good as coal or wood. We prefer it to either. Have burnt nothing but peat during this month (October) and the house was quite comfortable. A. W. Watts."

"I have found it excellent when used in connection with coal briquets and also very useful to aid the fire in the furnace in the morning or any time the fire gets low. I think it would be good substitute to mix with coal for furnace use." D. J. O'Connor."

"I have found it a very satisfactory fuel for the purpose for which I have used it, that is, for grates, cook stoves and starting the furnace and kitchen range, but not for permanent fire. E. H. D. Hall."

"I consider peat fuel to be as 55 per cent to 60 per cent compared to 100 per cent anthracite coal, and for use in the less severe weather, say November and half December and the latter half of March and April, I find it satisfactory. It burns too fast and too hard to keep fire during the night for use during the winter weather. V. L. Lawson, Ottawa."

"A good fuel. I find the best results when used with peat or buck wheat coal. I will be pleased to give any further information if desired."

"It is an excellent fuel, easily lighted, burns well, gives a good heat, not dirty to handle, is perfectly consumed and leaves a small residue of ash." J. L. Payne.

"It is excellent for the range. We use it all winter in that way. In the early Fall and up to the middle of November the house may be kept comfortable by lighting the furnace with peat in the morning and letting it burn out, keeping the range going, then in the evening put on a peat fire in the furnace and let the range out. If cold and frosty a couple of shovel fulls of coal on top will assist during the night." F. J. Wood, Ottawa, Ont.

"For use in grate and kitchen range, it is first class, and superior to coal." G. N. Bobin.

"Excellent for temporary fire in grate, excellent in furnace as kindling to pick up an almost extinct fire. Omar Wilson, M.D., Ottawa.

"Very good in very cold weather when the house is cold to get quick results. A. Drury."

"For all heating and cooking purposes very good, but in the coldest weather and at night when it would get little attention, not so good as coal, owing to the more rapid combustion. C. N. Craik."

"It is a good substitute for hardwood being more convenient than the latter on account of the size of the bricks. It also burns with much less kindling wood than is necessary for hardwood. De Brisay, Ottawa."

"We consider Peat fuel an excellent fuel for the grate. Annie C. Macpherson."

Opinion of Dealers

The dealers who handled the fuel this year were all pleased with the quality and stated that their customers were well satisfied. They nearly all, however, complained of the high freight rates. The concensus of opinion is that peat is excellent for Fall and Spring use in the furnace, a splendid substitute for coal, and can be used all the year round in ranges and in grate fires.

Extracts from answers to Questionnaire sent to Dealers

"Quality good, no complaints, had only 1 car load, could have sold 200 tons more this year. Could handle 300 or 400 tons next year. W. Bingley & Son, Cornwall, Ont."

"Quality very good, sold 2 cars this year. Could have sold 7 or 8 more if no other dealers handling. For the early Fall and Spring it is good fuel, especially for range, not much for furnace. If alone in Cornwall could handle about 10 cars. J. E. Chevrier, Cornwall, Ont."

"Only had 1 car, quality was good, customers were satisfied. Could have sold ten cars this year if available. Consider can sell ten cars next year. Andre Elie, Montreal, P.Q."

"Received about 60 tons, good quality. In most cases it was pronounced very satisfactory for open fire places and for furnaces in moderately cold weather. We have had to refuse a very large number of people on account of not having sufficient. It would appear that were the relative prices of peat fuel, wood, coke and the various coals to remain about the same as now, there should be sale for considerable peat. J. & T. Ballantyne, Ltd. Ottawa."

"The quality seemed to be very good, had no complaints, we think peat is a very good substitute for coal and as the people get more accustomed to burning it, it will have a ready sale. Estate. T. A. Thompson, Iroquois, Ont."

"Received seven cars, good quality, considerable quantity should be used in ranges throughout the year and in furnaces. We consider it an excellent fuel for Fall and Spring burning. Farquhar Robertson, Ltd., Montreal."

"On the whole it was well received by the citizens of Belleville. The Schuster Company, Ltd., Belleville."

"Sold 6 cars. I consider it an excellent fuel, but it is too early to give any definite opinions as to the future market here, as people are only first commencing to use same, but several of my customers say they will not burn wood again if they can get peat. W. E. Yolland, St. Anne de Bellevue, Que."

Extracts from replies to questionnaire sent to individuals other than dealers who bought wholesale

"I shall not be able to answer those questions until the Spring. Meantime I may state that the peat is thoroughly satisfactory. W. M. Goodwin, Mining Engineer, Gardenvale, Que."

"It is well liked here amongst us and probably in the Spring we will order another carload. James Stewart, Postmaster, Kingston."

"So far have not had any complaints but any who used it are highly pleased with it. Could have disposed of another car without any difficulty. T. E. Park, Assistant Postmaster, Hawkesbury, Ont."

"The quality was first class. We received no complaints I am not in the retail business but considering the demand for the fuel that I received I should judge four or five carloads could have been sold in this town this Fall. Capt. William Henry, Prescott, Ont."

"1922 peat is exceptionally good. 1920 and 1921 not nearly so good. A good handy clean fuel for Spring and Fall but I have never tried it out satisfactorily in the very cold winter months in the furnace. The peat manufactured this year should prove much more satisfactory, but to use it in the furnace in the very cold weather would require a great deal more attention than coal. E. McMahon, Ottawa."

"Can use peat comfortably except during excessive cold, say December, January and February. Freight rate too high. Same rate per ton from bog to Braeside as on anthracite from Niagara Gateway. J. Q. Gillies, Braeside, Ont."

"We could certainly sell 3,000 tons a year of this peat at \$1.00 cheaper than the coke in ordinary times; the coke now is sold at \$18.00 a ton and in June last we were selling it at \$9.00 per car load to manufacturers or plants and \$11.50 to the public. We understand that there is much profiteering in this coke business and we think that steps should be taken to prevent it. E. Leger & Cie, Ltd., Montreal."

"With reference to peat fuel for the coming year. I would like to have the sole Agency for Cornwall. I received 1 car this year and had orders for one hundred tons more but you were unable to supply me. Through reports from customers that used same I believe I could handle four or five hundred tons. I am in the coal and wood business and well equipped to handle fuel. W. Bingley, Cornwall, Ont."

FREIGHT RATES

Rates on Sept. 1st 1922. Subject to change. Based on short tons

ALBERTA TO FT ARTHUR & FT WILLIAM

Tulford to Ft Arthur & Ft William	6.40
Clover Bar & Edmonton to Ft A. & Ft W.	6.60
Cardiff	6.70
Webbman	6.80
Evansburg	6.90
Mt Park	7.10
Dinant	6.40
Three Hills	6.60
Drumheller & Wayne	6.60
Saunders	7.30
Brazeau	7.40

FROM WESTERN COAL FIELDS

C.P.R. ALBERTA TO ONTARIO

Cardiff to Newton	12.30
Drumheller (kneehill) to Goderich	12.70
Nacmine to Goderich	12.70
Drumheller to Toronto or Ottawa	12.70

C.N.R. ALTA TO ONT & QUEBEC

Clover Bar to Levis	13.30
Cochran	10.30
Dinant	12.50
Drumheller	9.60
"	12.70
Ottawa (Ft. 6.4.2.3)	12.70
Saunders	10.50
Toifield	9.60

C.N.R. quotation May 7 '22
Drumheller to Toronto \$9

MARITIME PROVINCES

COAL FIELDS

FROM BRITIA TO ONT & QUE.

From	To Quebec	Montreal	Ottawa	Toronto
Maccan	3.00	3.60	4.70	5.50
Springhill	3.00	3.60	4.70	5.50
Wassville	3.50	3.90	5.10	5.70
Stellarton	3.50	3.90	5.10	5.70
Thorburn	3.85	3.95	5.10	5.70
Pt Tupper	3.90	4.20	5.10	5.70
Smith Bros of On.				
Sydney Mines	4.20	4.50	5.10	5.70
Sydney				

U.S.A. COAL FIELDS (ANTHRACITE)

SEPARATION, GROSS VALUE, IN POUNDS TO ONT & QUE.

To	Price	Rate	Smaller
Windsor	\$453	403	408
London	440	394	394
Hamilton	386	341	341
Ottawa	467	433	390
Montreal	442	406	373
Quebec	439	467	455

U.S.A. COAL FIELDS (BITUMINOUS)

PENNSYLVANIA & OHIO TO ONTARIO & QUEBEC

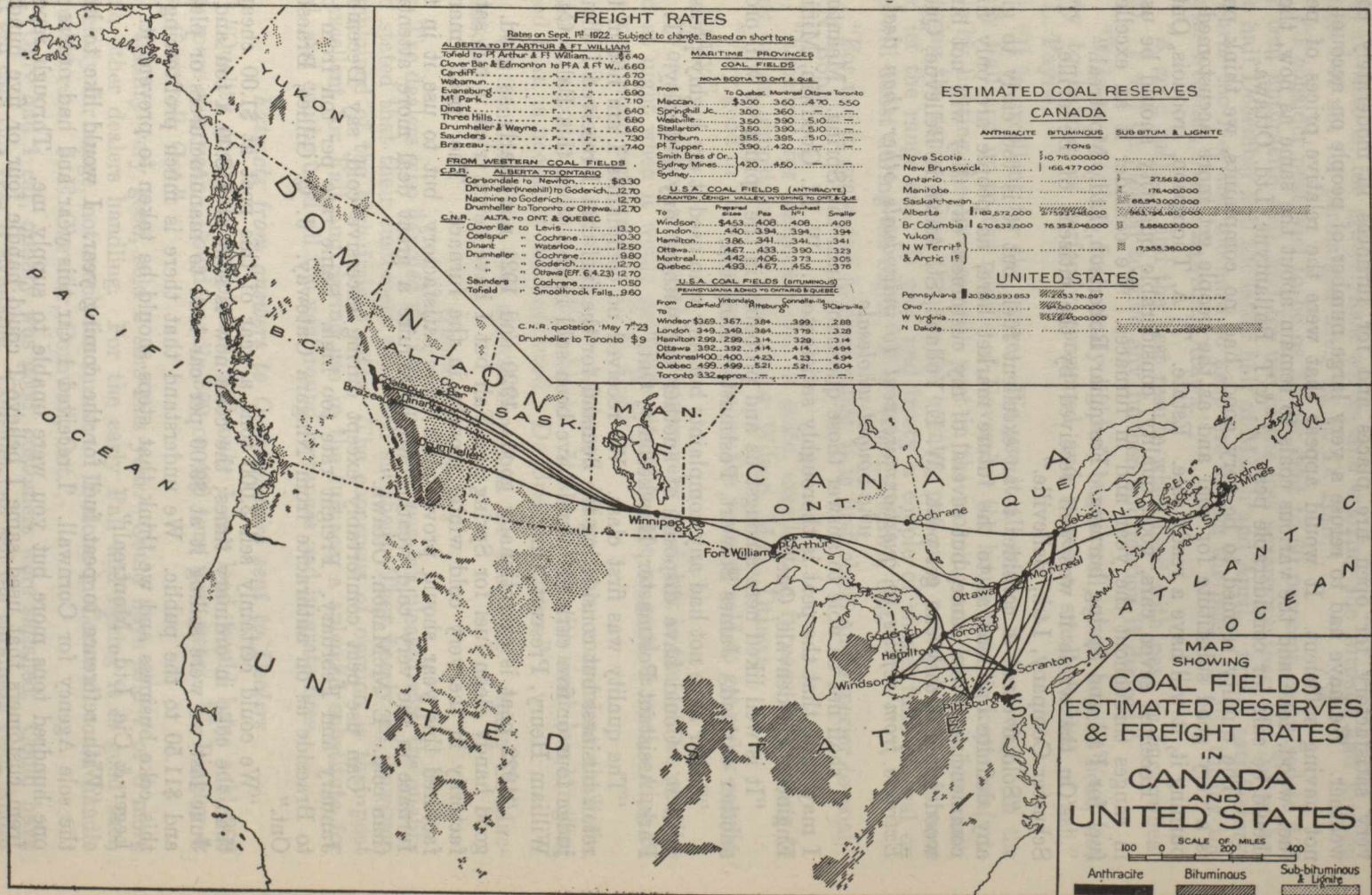
From	Jironda	Connellsville	Charmelle
Windsor	\$369	367	384
London	349	349	384
Hamilton	299	299	314
Ottawa	392	392	414
Montreal	400	400	423
Quebec	499	499	521
Toronto	332 approx		

ESTIMATED COAL RESERVES

	CANADA		
	ANTHRACITE	BITUMINOUS	SUBBITUM & LIGNITE
	TONS		
Nova Scotia	10 715 000 000		
New Brunswick	146 477 000		
Ontario			275 620 000
Manitoba			176 400 000
Saskatchewan			68 393 000 000
Alberta	1 182 372 000	275 939 400 000	843 746 180 000
Br. Columbia	6 70 632 000	76 352 046 000	5 886 300 000
Yukon			
N.W. Terr. & Arctic Is.			17 355 360 000

UNITED STATES

Pennsylvania	20 280 000 000	22 653 761 000	
Ohio		24 500 000 000	
Virginia	25 200 000 000		
N. Dakota			608 514 000 000



MAP SHOWING
COAL FIELDS
ESTIMATED RESERVES
& FREIGHT RATES
IN
CANADA
AND
UNITED STATES

100 0 SCALE OF MILES 200 400

Anthracite Bituminous Sub-bituminous & Lignite

Prepared by R.R.I. Service, Interior Dept.

CHART N° 1 COAL SUPPLY OF CANADA BY PROVINCES OUTPUT & DISTRIBUTION

1922

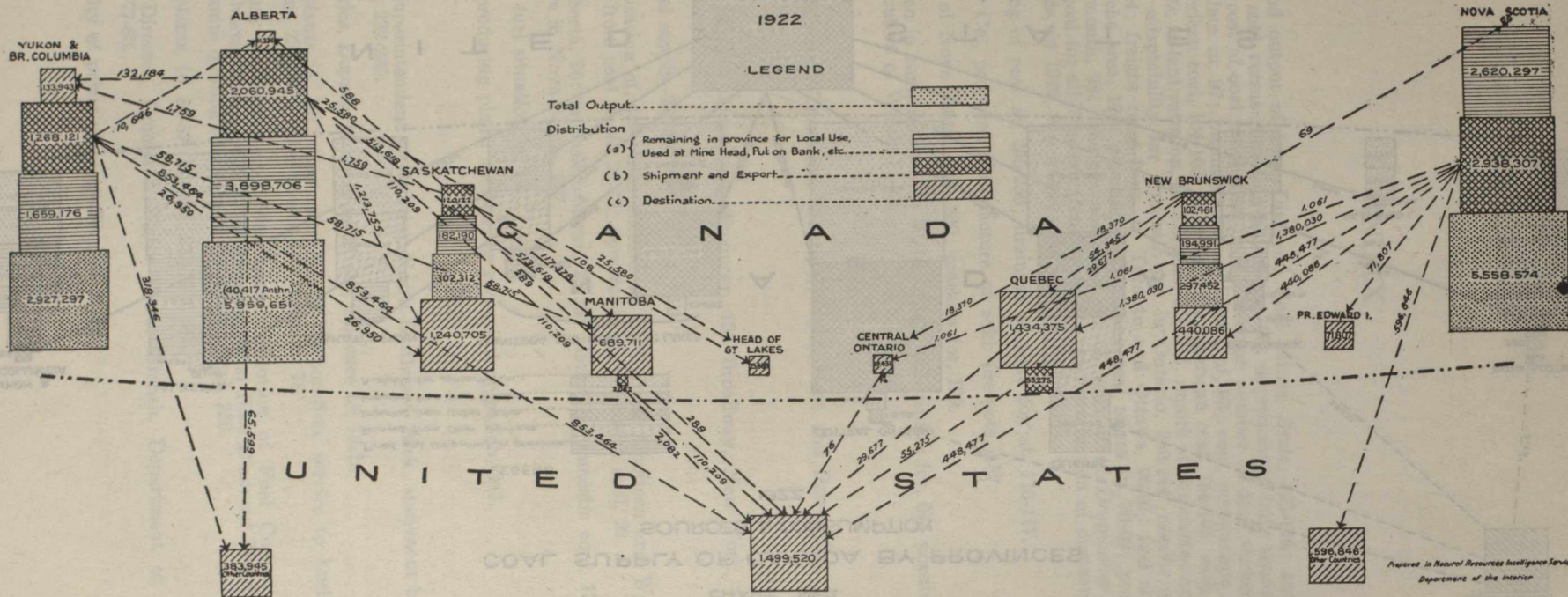
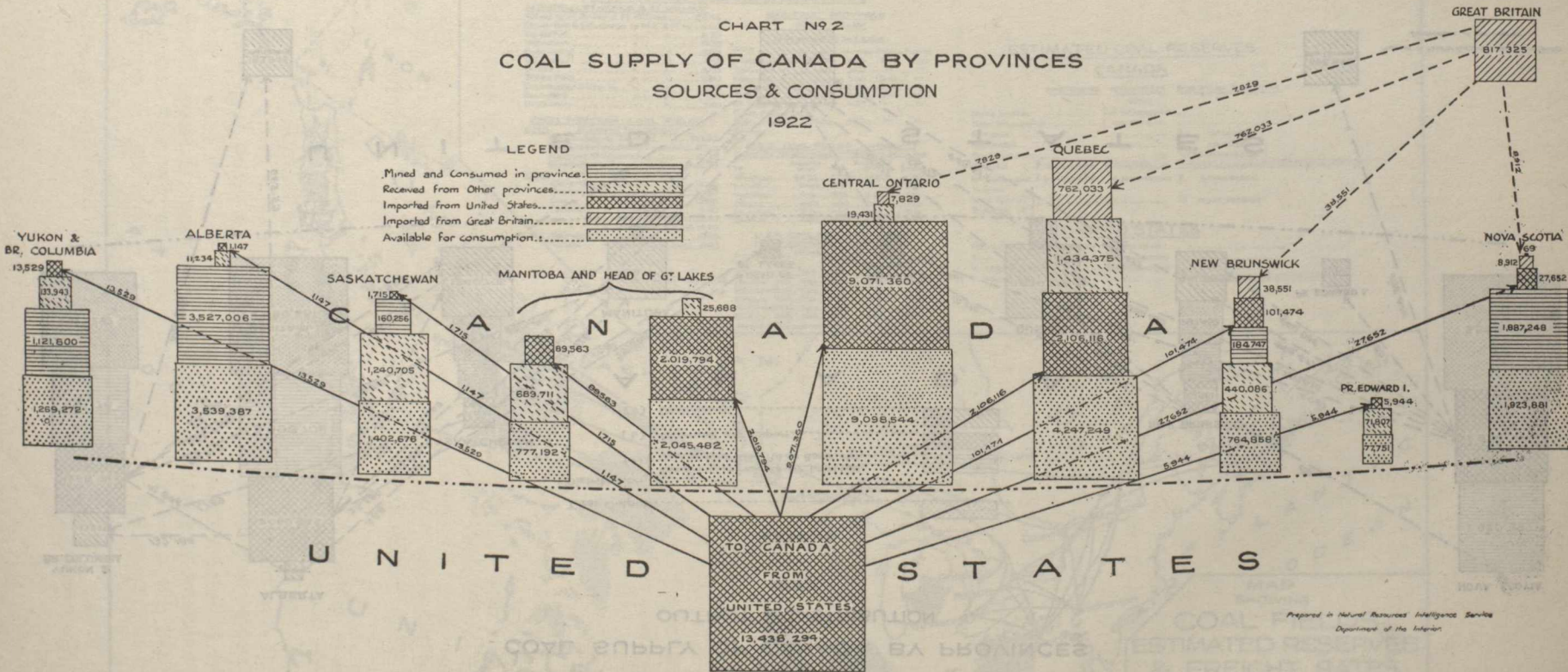


CHART N^o 2
COAL SUPPLY OF CANADA BY PROVINCES
SOURCES & CONSUMPTION
 1922



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