Dominion Fuel Board

Second Progress Report

1923 - 1928

Publications of the Fuel Board

Interim Report of the Dominion Fuel Board, 1923 (English and French editions).

Central and District Heating, Possibilities of Application in Canada, by F. A. Combe, 1923 (English and French editions).

Coke as a Household Fuel in Central Canada, by J. L. Landt, 1925 (English and French editions).

Smoky River Coal Field, by James McEvoy, 1925 (English).

Why You Should Insulate Your Home, by G. D. Mallory, 1927 (English and French editions).

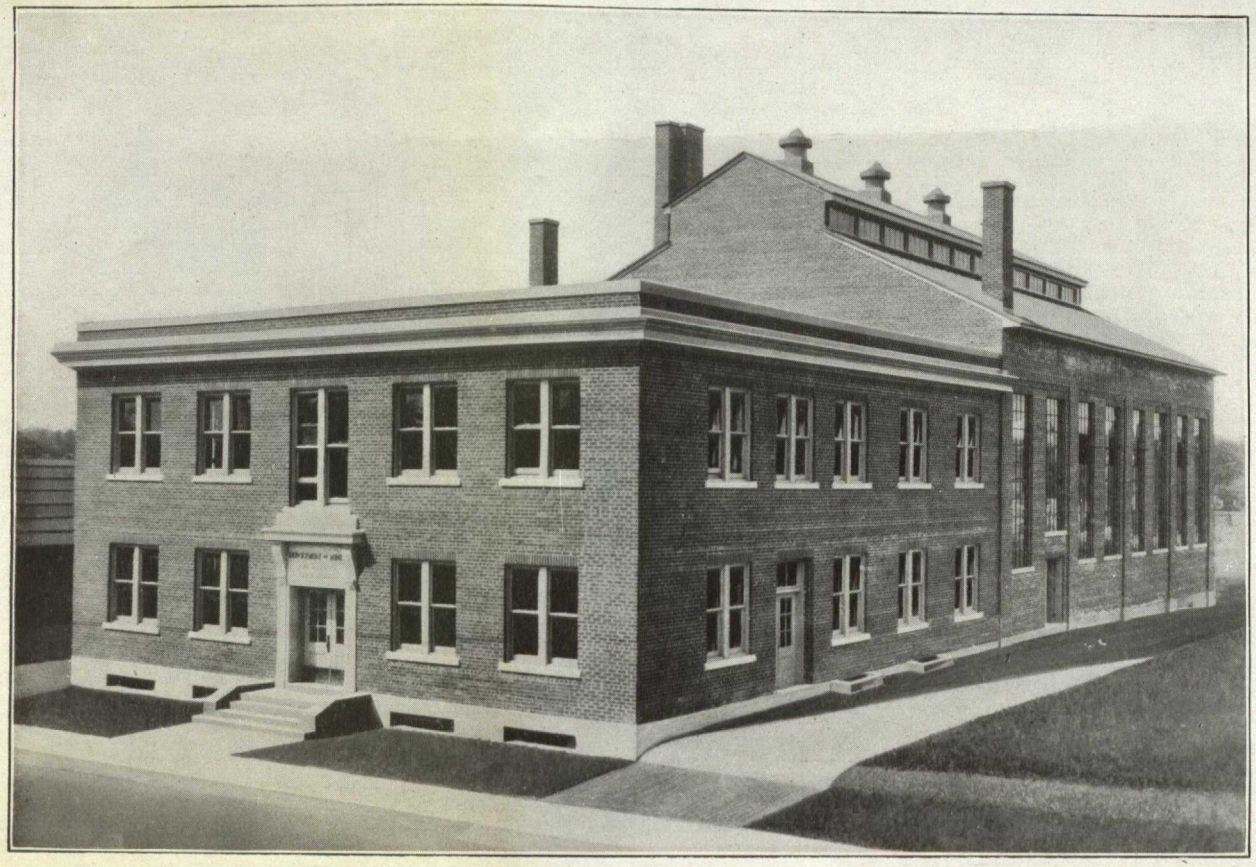
Cards bearing instructions on How to Burn Coke (English and French copies).

Publications of Mines Branch, Department of Mines, in co-operation with Dominion Fuel Board:

Coking Experiments on Coals from the Maritime Provinces, by B. F. Haanel and R. E. Gilmore, 1926 (English).

Tests of Various Fuels to determine their Relative Heating Efficiency, by E. S. Malloch and C. E. Baltzer, 1927 (English).

Instructions for Burning Coal, Coke, and Peat, 1927 (English and French copies).



Fuel Research Laboratory, Department of Mines, Ottawa.

Second Progress Report of the Dominion Fuel Board 1923-1928

OTTAWA: CANADA
1928

No. 10

Dominion Fuel Board

Charles Camsell, Deputy Minister of Mines.....Chairman

John McLeish, Director, Mines Branch, Department of Mines.....Vice-Chairman

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OTTAWA, ONT., August 20, 1928.

The Honourable CHARLES STEWART,
Minister of Mines,
Ottawa, Ont.

SIR,—I have the honour to transmit herewith the Second Progress Report on the work of the Dominion Fuel Board, covering the period from 1923 to 1928.

I have the honour to be, Sir,

Your obedient servant,

CHARLES CAMSELL,
Deputy Minister of Mines,
Chairman of Dominion Fuel Board.

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Preface

The Dominion Fuel Board, composed of officials representing departments of the Government already engaged in the study of fuels and fuel problems, had assigned to it the duties of advising upon, extending, and supplementing the studies and investigations already in progress, looking to the solution of those problems.

In 1923, shortly after its creation, the Board published an interim report, briefly stating its organization and purpose, the fuel situation in Canada, the problems encountered, and the various phases of these problems that seemed worthy of investigation.

At that time the main problem was one of supply. The provinces of Ontario and Quebec, having on several occasions experienced an actual shortage of fuel, were greatly concerned over the lack of an assured supply of fuel, as well as over the growing cost of anthracite and the probability of even that supply being cut off. Though the replacement of anthracite in central Canada was believed to be the major problem, there had arisen a strong national demand for a maximum of Canadian fuel independence instead of reliance on the United States for 50 per cent of the coal used. In order, however, to establish this independence on an economic basis serious difficulties have to be overcome.

Since 1923 the Board has undertaken a number of broad investigations that have contributed materially to the solution of the problem of an adequate supply of fuel, and in part at least to the solution of the other problem of national independence.

In 1928 an altered situation exists, and as in the case of nearly all coal-producing countries the major problem is now one of markets for native coals. There is now a superabundance of both foreign and native fuels for all purposes. Coke, British anthracite, low volatile coals, and fuel oil, are strong competitors of American anthracite in the household fuel trade, and the range of Alberta and Maritime coals is being extended through special provisions. Ontario and Quebec, though still using large quantities of American anthracite, are no longer entirely dependent on this fuel. the producers of which are fighting here to retain a declining market, as they are in their own country.

Although the use of alternative fuels has contributed to a reduced dependence upon American coals, the problem of Canada's complete

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fuel independence is still unsolved. The geographic handicap consequent on the location of our largest markets far from our great producing fields, but in close proximity to those of the United States, is one difficult to overcome.

The Dominion Fuel Board can not assume as its function the formulation of a national fuel policy, for this is a prerogative of government, and any such policy, so far as it concerns complete fuel independence, must be determined largely by questions of national expediency, based, however, upon the most complete and accurate knowledge of all technical and economic facts obtainable. The Board is endeavouring to secure and correlate these facts.

The most important point still to be determined is the cost of transporting coal to Ontario and Quebec from Alberta and the Maritime Provinces, and to the Board of Railway Commissioners has been assigned the duty of determining this point by actual test.

All the available technical data having been secured the economic aspect of the problem still has to be faced, and on this aspect great diversity of opinion prevails.

Manifestly, coal cannot be hauled 2,000 miles from Alberta to Ontario at a cost lower than that of carrying it 500 miles to the same market from Pennsylvania and Virginia. Nevertheless, it has been maintained that the advantages to Canada of increased use of her transportation facilities, increased output of her mines, and consequent greater employment of labour, would more than compensate for the difference in transportation costs. The problem is one on which economists hold strongly divergent views and on which the Board is seeking further light.

The present report reviews briefly what the Board has done; states the present fuel situation; and shows the possibilities that are opening up through technical investigation and research for the more efficient and diversified uses of coal.

The Board desires to express its appreciation of the courtesy and co-operation that have been received from Parliamentary committees, government departments, research organizations, and all those engaged in the production and merchandising of coal, from whom much valuable information has been received.

CHARLES CAMSELL,
Chairman.

OTTAWA, CANADA,
August 20, 1928.

Second Progress Report
of the
Dominion Fuel Board, 1923-1928

Organization and Function

THE Dominion Fuel Board was organized on the recommendation of the Minister of Mines under authority of an Order in Council dated November 25, 1922. After holding some thirty meetings and making a careful survey of the whole situation, an Interim Report, already referred to in the preface, was prepared in May, 1923, to which reference may be made for details of organization and function. The Board has met as frequently as its investigations and matters such as legislation and inquiries referred to it by the Minister required. At the end of March, 1928, a total of one hundred and eight formal meetings had been held. The Board has sought and secured the assistance and advice of engineers of national and international reputation. Through its members and the departments which they represent, it is keeping in close contact with fuel authorities and with fuel developments, investigations, and research in progress in all parts of the world. It is acting in a consulting, advisory, and correlating capacity in respect to the Federal Government's studies and activities in fuel and related investigations, and is charged with the administration of Federal legislation designed to assist the Canadian coal industry.

The Canadian Fuel Situation

The fuel situation in Canada from the point of view of the problems arising therefrom as it appeared in 1923 was briefly but clearly stated in the Fuel Board's Interim Report. The situation and its problems as seen in 1918 and 1919 were even more fully discussed in the final report of the Fuel Controller, Mr. C. A. Magrath, published in 1919.

The publications of the Geological Survey contain, as a result of geological exploration, a vast fund of information respecting the occurrence, character, and extent of Canada's coal resources, and on the basis of this information an estimate was made in 1913 of the quantity of these resources as then known. The Mines Branch of the Department of Mines has been engaged since 1907 in a continuous study of the character of Canadian coals, of the methods used in cleaning, carbonizing, burning, etc., and of the quantity and character of the products obtained from the carbonizing of coal with a view to using this product with greater efficiency.

The Dominion Bureau of Statistics and the various Mines Departments of the coal-producing provinces publish annually comprehensive statistics of the production, distribution, and trade in coal.

The annual records of coal produced and trade have recently been supplemented by a survey showing the quantities of various types of fuels now being used for domestic (household) purposes and for the heating of large buildings in Ontario and Quebec.

Canada possesses an abundant supply of coal estimated in quantity in terms of a million million tons, or sufficient to supply requirements for many hundred years. The geographic distribution of this supply in the Maritime Provinces in the east and in Saskatchewan, Alberta, and British Columbia in the west is such that the central populous and industrial provinces of Ontario and Quebec have found it more convenient to secure the greater part of their requirements from the United States coal fields of Ohio, Pennsylvania, and Virginia. For many years over 50 per cent of the coal used in Canada has been imported from the United States.

In 1927, out of a total coal consumption in Canada of 35·6 million tons, 16·3 million tons of bituminous and lignite coal were obtained from Canadian sources and 19·3 million tons of coal were imported. The imports included 15·2 million tons of bituminous coal and 4·1 million tons of anthracite.

AVAILABLE COAL RESERVES OF CANADA

(In Millions of Tons)

(Estimated by the Geological Survey, 1913)

Province	Metric tons	Province	Metric tons
Nova Scotia	9,719	Alberta	1,072,627
New Brunswick	151	British Columbia	76,035
Ontario	25	Yukon	4,940
Manitoba	160	North West Territories	4,800
Saskatchewan	59,812	Arctic islands	6,000

Total reserves, all Canada..... 1,234,269

CANADA'S COAL BALANCE SHEET

(In Millions of Net Tons)

—	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Production	14·9	13·7	16·9	19·0	15·2	17·0	13·6	13·1	16·5	17·4
Exports	1·8	2·1	2·5	1·9	1·8	1·6	0·8	0·8	1·0	1·1
Imports—										
Bituminous	16·9	12·4	15·9	13·5	10·3	15·8	12·5	12·5	13·8	15·2
Anthracite	4·8	4·9	4·9	4·6	2·7	5·2	4·1	3·8	4·2	4·1
Consumption	34·8	28·8	32·7	31·0	26·0	36·0	29·2	28·5	32·0	35·6

Dependence of Ontario and Quebec on United States Anthracite

The disturbing conditions in 1923 were the extent to which the people of Ontario and Quebec had come to depend upon United States anthracite coal for domestic purposes; the general belief that this was the only available fuel suitable for this purpose; the limited reserve available in the United States, estimates as low as 35 years' supply having been made; the growing cost of the fuel; the interruption to supplies that had been experienced in 1902-1903, at various times during the war, and again in 1922; and the consideration by United States Congress of legislation that would place an embargo on the output of anthracite.

The extent of Canada's dependence upon imported coal has already been shown in the "Coal Balance Sheet" table. The dependence of Ontario and Quebec is more definitely shown in the following table:

IMPORTATIONS OF UNITED STATES COAL INTO ONTARIO AND QUEBEC

(In Millions of Net Tons)

——	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Into Ontario—										
Anthracite.....	3·62	3·44	3·24	3·07	1·64	3·14	2·68	2·23	2·51	2·12
Bituminous.....	13·01	9·25	12·34	10·71	9·45	14·01	10·74	9·88	11·70	12·75
Into Quebec—										
Anthracite.....	1·84	1·38	1·54	1·31	0·79	1·61	1·09	0·90	1·25	0·95
Bituminous.....	4·23	2·67	3·50	2·68	1·32	2·92	1·53	2·53	1·79	1·57

Ample Supplies of United States Bituminous Coal

In contradistinction to the anthracite situation, there are ample supplies of bituminous coal in the United States. Reserves are estimated at 1,314,000 million tons. The mines have an annual capacity 300 million tons in excess of the country's needs, whereas Canada's imports of this fuel are only 15 million tons a year. The bituminous fields and the anthracite fields are equally as near the Ontario and Quebec markets. Barring labour and transportation difficulties, there is little doubt that Ontario and Quebec can continue to secure large supplies of this coal as long as Canadian coal cannot be made economically available.

Change in Situation Since 1923

Since 1923 there has been continuous application to the program of finding fuels to replace United States anthracite for domestic purposes and of demonstrating the efficiency with which such fuels can be used and their entire suitability for domestic use. Not only have the imports of United States anthracite into Ontario and Quebec been reduced from 4·75 million tons in 1923 to 3·07 million tons in 1927, but the proportion of United States anthracite used in these provinces for domestic purposes has fallen from 87 per cent in 1923 to only about 61 per cent in 1926, and probably less in 1927.

Alberta coals, available in Ontario as yet only in experimental quantities, have been accepted by many consumers as a suitable fuel. The production of by-product coke as a domestic fuel, the introduction into Canada of British anthracite, and the utilization of low volatile semi-bituminous coals for domestic heating are new sources of supply, which in 1927 in Ontario and Quebec provided the equivalent of 1,500,000 tons of American anthracite. The actual lessening of dependence on American anthracite in the acute fuel area is illustrated by a comparison of imports of that fuel into Ontario and Quebec for the years 1923 and 1927, and the growth in use of replacement fuels.

ONTARIO AND QUEBEC

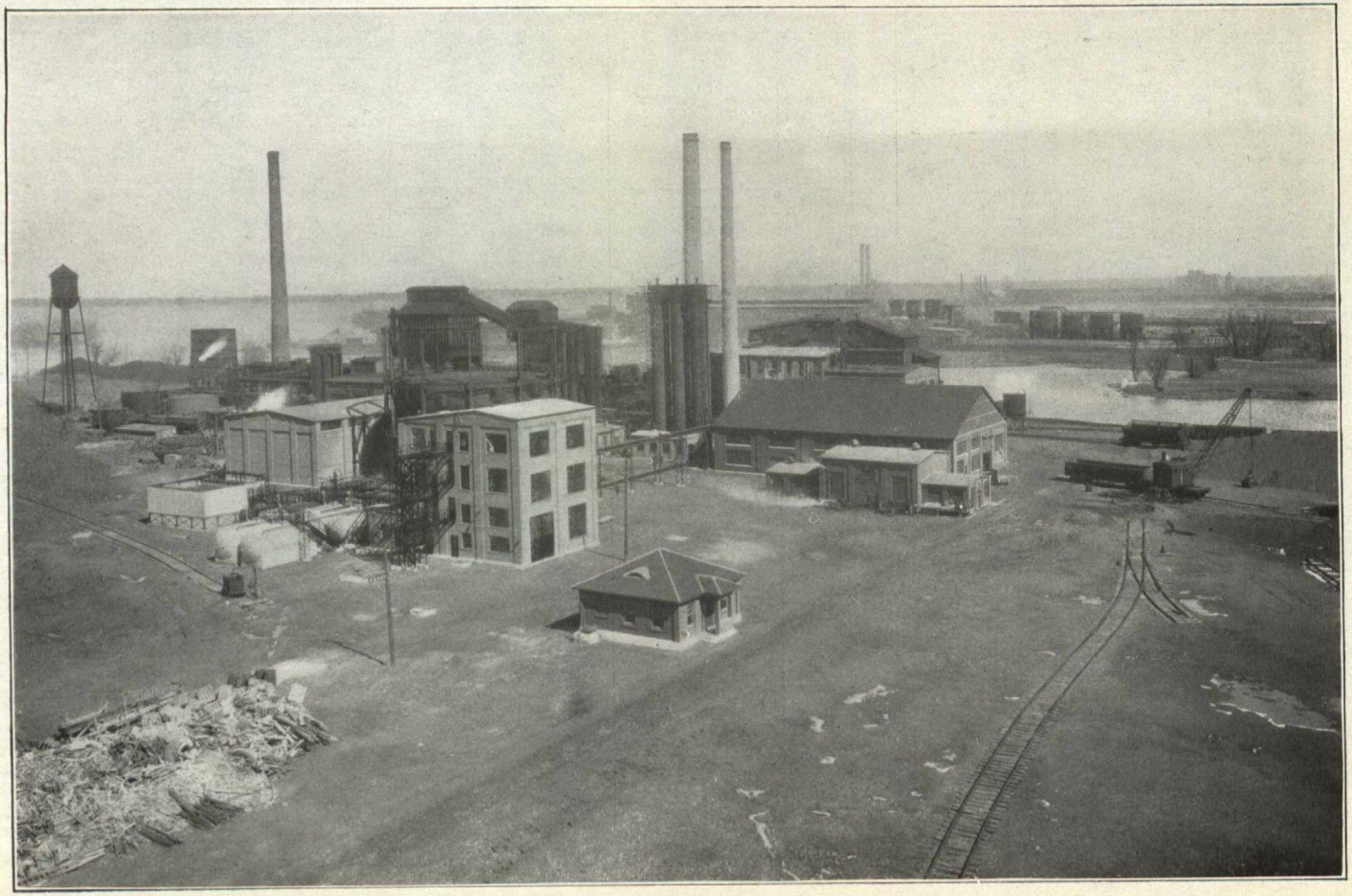
(Net Tons)

——	1923	1927
Imports of American anthracite.....	4,753,873	3,073,033
Imports of British anthracite.....	207,282	720,203
Coke consumed for domestic heating....	270,000	812,000
Low volatile coals.....	180,000	386,000

In addition to the above group of smokeless fuels, there has been a decided trend toward the use of high volatile bituminous coals for domestic purposes, chiefly for the heating of large buildings. Present indications are that considerably over 1,000,000 tons a year are thus consumed in Ontario and Quebec. The use of fuel oil is also to be noted as a factor of influence in diversifying the domestic fuel supply.

National Fuel Costs Reduced

The use of these replacement fuels is not only a guarantee against a recurrence of domestic fuel shortage, it ensures a measure of economy to the consumer. A comparison of cost as against that of Pennyslvania anthracite, on an efficiency basis, reveals a public saving of $17,000,000 during the past five years. Much of the success in introducing these fuels and demonstrating their qualities has been accomplished by the dissemination of literature describing proper methods of burning in the standard types of furnaces employed for household heating.



General view of a typical by-product coke oven plant.

The advent of a variety of fuels has established competitive conditions in a market that had been monopolistic in character for many years. The strong, but unjustified, predilection for American anthracite held through long use of that fuel is being steadily overcome by the recognition of the value and use of other domestic-purpose fuels.

Investigation of the Problem of Reducing Canadian Dependence Upon American Anthracite

At the outset, the Fuel Board applied itself to a survey of the whole problem of imported domestic-purpose fuels. Consideration was given to the progress already made in Manitoba in replacing American anthracite by Alberta domestic coals, and to steps that had been taken by Canadian dealers to import British anthracite. It was, first, necessary to find suitable domestic-purpose fuels to displace Pennsylvania anthracite in the acute fuel area, and to this end the Board instituted searching inquiry.

Coke as a Household Fuel

The Board was impressed with the possibilities of relieving the fuel situation by substituting by-product coke for anthracite. The scheme was commendable because in addition to providing an efficient domestic fuel at reasonable cost there was the possibility of using Canadian bituminous coals in the manufacture of the coke. There were, also, the great bituminous coal reserves of the United States from which coal for coking purposes could be imported into those areas not now being served by our own fuels. Coking of bituminous coal for this purpose would involve marketing the by-products, mainly the gas. Subsequent to an inspection by members of the Board of some of the larger coking plants in the United States, it was decided to undertake an investigation to determine whether it would be commercially feasible for private interests to establish by-product recovery ovens at suitable points in the acute fuel area.

For this investigation the Board engaged the services of Mr. J. L. Landt, an engineer of wide and varied experience not only in investigations of this kind, but in the building and operation of plants for the manufacture of by-product coke. Mr. Landt, in 1923 and 1924, made a survey of the conditions in and around the cities of Quebec, Montreal, Ottawa, Toronto, Hamilton, London, and Port Colborne. His report, "Coke as a Household

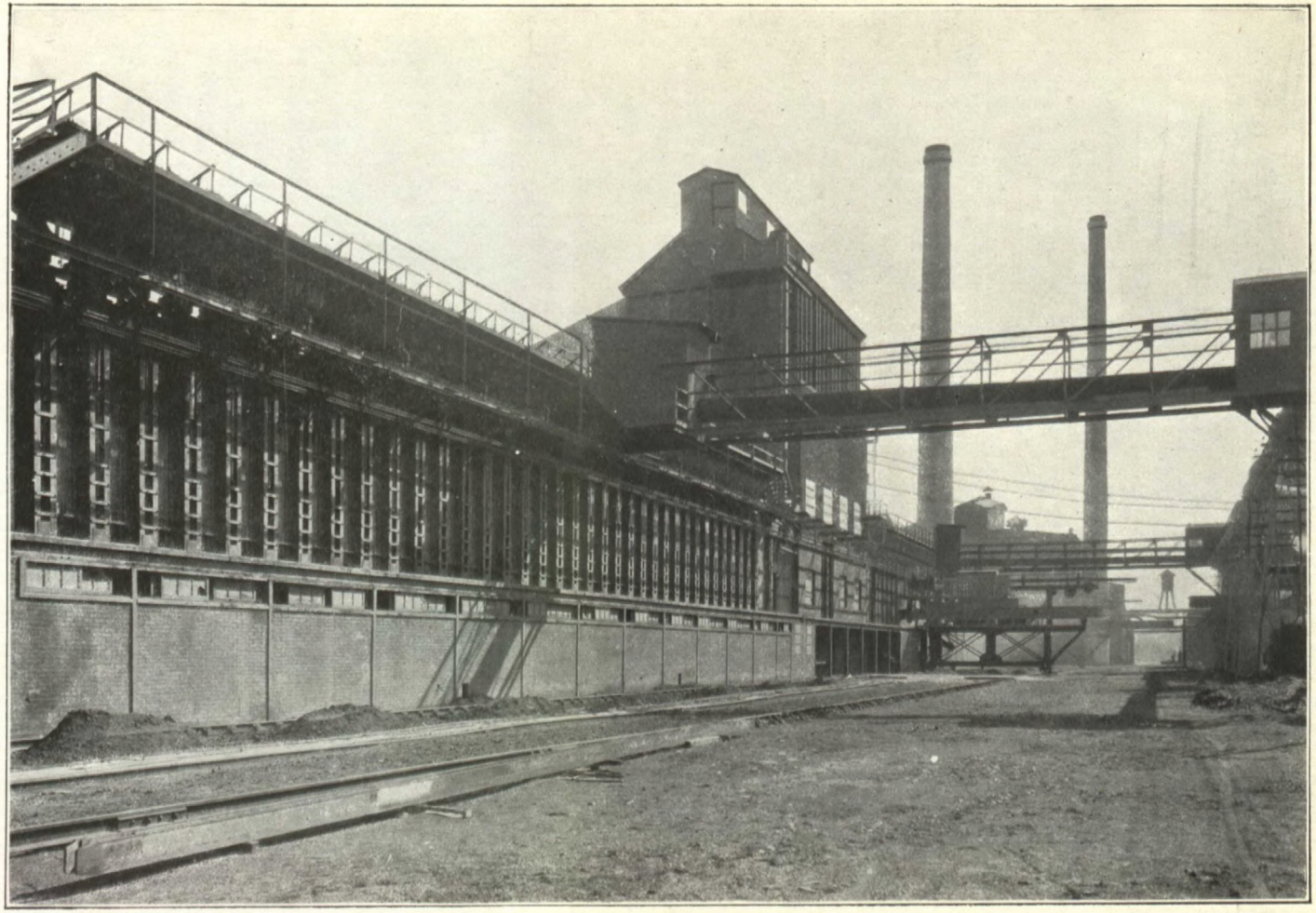
Fuel in Central Canada," indicated that conditions were favourable and the time opportune for the erection of coking plants at a number of points, and that if plants were built at those suitable points it would be possible to produce enough coke to displace up to 35 per cent of our importations of American anthracite. The quantity of coke that could be manufactured profitably would be governed by certain factors, chief of which is a market for the gas.

Since this investigation, a large by-product coking plant has been established at Hamilton, Ontario, and a similar development has been completed at Montreal. Three large steel manufacturers operating by-product coke oven plants have installed screening appliances in their coking plants in order to supply suitably sized coke for the domestic market. The use of coke as a domestic fuel has also been stimulated by the publication by the Mines Branch of the results of investigations, referred to elsewhere, of the relative efficiency of burning various types of fuels in standard heating equipment, by the wide distribution of instructional literature on how to burn coke and other fuels, and by the recent legislation entitled "Domestic Fuel Act, 1927."

The results achieved indicate that the introduction of by-product coke has been a very effective measure in the solution of our domestic fuel problem. As already indicated, the use of coke for domestic heating in Ontario and Quebec has increased 200 per cent since 1923. Appreciation by the public of the efficiency of this fuel is rapidly increasing. Coke or carbonized coal is a most satisfactory fuel for domestic purposes and the Fuel Board is of the opinion that this fuel will eventually be that most extensively used to replace anthracite.

Increased Use of British Anthracite

Prior to 1922 British anthracite was seldom seen in Canada. The interruption of American anthracite supplies during that year gave an opportunity to the British producers to enter our markets. Certain advantages in shipping rates from Great Britain to Canada over American competitors for the anthracite markets in St. Lawrence River points, and the circumstances of our domestic fuel situation, were drawn to the attention of Welsh coal operators. By the close of 1922 there had been imported into Canada 180,000 tons of Welsh anthracite. The following year importations of Scotch anthracite also were added to this trade.



Typical coke oven batteries.

As a source of fuel from beyond our own borders, the anthracite fields of Great Britain are proving at the present time an important factor in helping to solve our domestic fuel problem. The coal is of a quality superior to Pennsylvania anthracite and the Board has advocated its use and co-operated in the development of its movement to our markets. A question of importance in connexion with this trade is the exportable surplus that will be available for shipment to Canada each year. The annual production of Welsh anthracite ranges from 4 million to 5 million tons, about half of which is consumed in Great Britain. From a commencement of 180,000 tons in 1922, shipments to Canada, increasing each year, amounted to over 500,000 tons in 1925. The prolonged strike in the coal mines of Great Britain in 1926 restricted exportations that year, but in 1927 the movement was more than restored, 788,000 tons being forwarded. Distribution of the British anthracite brought to Canada is chiefly in the city of Montreal and adjacent territory; relatively small consignments go to New Brunswick and Nova Scotia. The establishment of equipment and facilities for marketing this coal in Canada, together with availability of ships for transportation at favourable rates, are assurance that the movement will be a continuous one.

Low Volatile Coals

Low volatile coals furnished another source from which fuel supplies might be drawn to replace Pennsylvania anthracite. A study was made of the practicability of using the low volatile, or smokeless coals, of the United States for household heating in Canada. These are high-grade coals, equal in heating efficiency to American anthracite, and, like the other substitutes mentioned, can be used in our present heating equipment. They are of semi-bituminous rank, but on account of low volatile content are free from the objectionable features of smoke and soot which usually accompany the burning of bituminous coals. Through an investigation of the coal fields of Pennsylvania, West Virginia, and Kentucky, the Board obtained a report on areas supplying coal suitable for the purpose in view, with details of production, transportation, and cost to the consumer. Tests were made of the relative heating efficiency as compared with other fuels with which these coals could be burned in standard house heating equipment.

Large reserves, satisfactory burning and heating qualities, and a lower cost to the consumer than the cost of anthracite justified the conclusion that these low volatile coals were acceptable as substitutes for American anthracite. In eastern and middle-western cities of the United States low volatile coals have become strong competitors with anthracite for domestic heating. Since their introduction into Canada for that purpose domestic consumption of these coals in the acute fuel area has risen to nearly 400,000 tons a year.

Wood Fuel

Consumption of wood as a household fuel in Canada approximates one cord per head of population and, therefore, constitutes a very important item in Canada's fuel problem. For this reason the Board considered it advisable that an investigation be made of the present and of the probable future use of wood in southern Ontario, the heart of the acute fuel area. The region covered contains over 90 per cent of the population of the province.

Wood has a lower fuel value than coal and on account of its bulk costs more to transport. It cannot be shipped economically any great distance. The investigation showed that the use of wood as a primary fuel is confined to the rural districts, and to the towns and villages adjacent to sources of supply. It is quite apparent from the information gathered that there has been, for the past two decades, a continuous shrinkage in the wood volume on farmers' wood lots, which constitute the main sources of supply. To such an extent has depletion proceeded that old pine stump and split rail fences now constitute, in places, a considerable item in fuel wood supply, and in extreme cases even roadside and hedgerow trees are being felled for this purpose.

This depletion in woodlot supplies is not attributable primarily to fuel wood demands, because the acreage under woodlot is generally adequate to provide for rural requirements. The trouble has been due to lack of foresight and care, principally due to grazing of live stock, which has served to prevent seed germinating, kill out seedlings, and injure standing timber.

Based on the last census returns, it is evident that the use of wood in the area covered by the investigation exceeds that of coal by a slight margin. The present trend in the use of fuels

is, however, towards coal and oil, and when it is considered that wood is today the principal household fuel in the localities previously mentioned, it may be anticipated that this increased demand for coal will add considerably to Canada's national fuel problem.

Experience elsewhere indicates that the rehabilitated woodlots of such run-down character as those found on the majority of southern Ontario farms will require fifteen to twenty years of the most expert supervision, and only a meagre yield of from one-quarter to one-half of the normal producing capacity can be realized in the interval. The woodlot owner of southern Ontario has, in the main, still to be educated in the proper methods of woodlot management. Such education can be made effective only through a series of years, so that under normal conditions there seems to be little prospect of marked improvement in fuel production from woodlots in the immediate future.

Peat as an Auxiliary Fuel

The areas throughout Canada overlain by peat bogs have been estimated to comprise 37,000 square miles, of which the provinces of Manitoba, Ontario, Quebec, and New Brunswick have 12,000 square miles, with an average depth of 6 feet. Apart from wood and the low-grade lignites of the James Bay slope, peat is the only natural fuel known to occur in the coalless area of Ontario and Quebec. The Department of Mines has investigated and mapped a large acreage of peat bogs, some of which are strategically situated for shipment of fuel to points in the acute fuel area.

A Joint Committee of the Dominion and Ontario Governments conducted experiments at Alfred, Ontario, on the production of peat fuel, with successful results. During the past year the Department of Mines has erected new machinery at the bog at Alfred for the purpose of manufacturing peat on a commercial scale, along the lines recommended by the Joint Committee. The plant is now being operated and it is expected that during the summer of 1928 some 15,000 tons of air-dried machine peat will be placed on the market.

Though peat cannot be placed in the same class as anthracite for heating in the winter months, it nevertheless can be used to advantage as an auxiliary fuel and makes a satisfactory fuel for domestic furnaces in the spring and autumn and for use in grates and cook stoves at all seasons.

Fuel Oil

As a fuel for both domestic and industrial purposes, crude oil has developed into quite an important factor in the general fuel situation. In the coast cities of British Columbia imported oil has been for some years a strong competitor with coal. More recently fuel oil has come into prominence as an industrial and domestic fuel in other parts of Canada. During 1926 the quantity of fuel and gas oils representing the apparent consumption in Canada was reported as 299,000,000 gallons, of which 12,000,000 gallons were used for gas making, the remainder presumably being used as fuel.

A survey of the distribution in Ontario and Quebec of fuel oil for domestic purposes in 1926 showed a total distribution of over 28,000,000 gallons, which would displace approximately 200,000 tons of coal.

Natural Gas

Large discoveries of natural gas in Alberta are providing a fuel supply of considerable importance for domestic heating and for industrial use. In Ontario, however, the natural gas fields as well as the oil fields appear to be nearing depletion, and natural gas consumption is being restricted almost entirely to domestic purposes.

The quantity of natural gas used for domestic purposes in Ontario in 1926 is estimated at 5,727,597 thousand cubic feet, or sufficient to displace about 229,000 tons of coal.

Manufactured Gas

Manufactured gas has long been used for cooking purposes and in the larger centres substantial beginnings are being made in the use of gas for house heating purposes.

The quantity used for domestic purposes in Ontario and Quebec during 1927 is estimated at 10,250,000 thousand cubic feet, a quantity sufficient to displace about 205,000 tons of coal. The heating value of manufactured gas marketed is much less than that of natural gas.

Investigation of the Problem of Developing an All Canadian Fuel Supply

The survey of the general Canadian fuel situation showed an import in 1927 of 4·1 million tons of anthracite and 19·3 million tons of bituminous coal. The success achieved in finding such suitable domestic purpose fuels as British anthracite, coke, and low volatile coals to replace United States anthracite has not contributed very greatly to reducing Canada's dependence upon imported fuels. The next move, therefore, was to investigate the possibility of effecting a wider range of utilization for Maritime Province coals in Quebec and Ontario, and the possibility of marketing Alberta coal in those provinces in large quantities. The Government has by various means, such as tariffs, special freight rates, subventions on transportation, direct assistance to coking plants, etc., endeavoured to stimulate this interprovincial coal trade.

Maritime Province Coals

Nova Scotia coal, with the advantage of water transportation, already has a large market in Montreal and other St. Lawence River ports, and is also marketed in Ontario as far west as Ottawa and Cochrane. The coal thus forwarded is chiefly for industrial purposes, although considerable quantities are now used for the heating of large buildings. For some years coal from the Maritime Provinces has been utilized in the central heating plant of the Dominion Government buildings at Ottawa. The coal of the Maritimes is bituminous and largely high volatile and in the raw state is unpopular with householders who have been accustomed to using anthracite. The possibility of bringing eastern coal into the acute fuel area as a replacement for American anthracite appeared to depend on its suitability for use in coke ovens making domestic coke and domestic gas, and these problems were, therefore, investigated.

Coking Experiments on Maritime Province Coals

To ascertain whether the coals could be manufactured into domestic coke acceptable to householders, the Fuel Board, in co-operation with the Fuel Testing Division of the Department of Mines, conducted a series of tests on coals from both Nova Scotia and New Brunswick.

The first stage of the investigation comprised a survey of the coals as mined and the collection of representative samples for examination in the Fuel Testing laboratories. Next, coking tests on representative samples were made in the commercial by-product recovery ovens at Hamilton, Ontario. The third stage comprised special burning tests on the cokes produced from these samples.

As a result of the investigation, it was found that a satisfactory coke resulted from the coking of certain coals alone, whereas in other cases the coke was improved by a blending of coals. As good coke was obtained in fifteen out of sixteen commercial blending tests made, it was concluded that both Nova Scotia and New Brunswick coals can be used for the production of domestic coke. However, most of the Maritime coals, and especially the New Brunswick coals which are high in ash and sulphur, require to be washed or otherwise cleaned, to reduce the ash and sulphur contents, before coking.

Alberta Coal

The higher grades of Alberta bituminous coals and those locally termed "Domestic Coals" have proved entirely satisfactory in the west for domestic house heating purposes. Their suitability for use in standard heating equipment has been fully demonstrated by the Alberta Government, as well as by burning tests conducted under the auspices of the Fuel Board by the Department of Mines. The "Domestic Coals" have one disadvantage in that they are distinctly of a lower heating value than anthracite or coke. The fact that these are available in enormous quantities, however, has appeared to justify the most searching inquiries as to the economic possibilities of their transportation to the "Acute Fuel Area."

Existing freight rates absolutely preclude the commercial movement of this coal to Ontario. In 1923, however, the President of the Canadian National railways named a special freight rate of $7 a ton for movement of a limited quantity of Alberta domestic coal for experimental purposes in the household heating equipment in use in Ontario. About 10,000 tons were thus forwarded. Further experimental shipments, amounting to 18,000 tons, were sent in 1925 under special arrangements between the Dominion and Alberta Governments and the Canadian National railways; and again during the winter of

1926, the Ontario Government and the Canadian National railways concluded arrangements whereby 75,000 tons were forwarded to Ontario in view of a threatened shortage of anthracite owing to the coal miners' strike in the Pennsylvania fields. During this strike, which lasted from September 1, 1925, to February 17, 1926, the Fuel Board made an inventory in the acute fuel area of stocks of coal on hand as well as future shipments of assured delivery, and advised the Government that though there was not danger of serious shortage until some time in the month of February, it would become necessary if the strike were to continue much beyond that time to take steps toward bringing a considerable quantity of Alberta domestic coal to eastern Canada.

The coal that has been forwarded, as above stated, received a wide distribution in Ontario. In nearly all cases consumers returned favourable reports as to its qualities as shown in practical burning tests.

The problem of determining actual freight costs was referred by the Government to the Board of Railway Commissioners. The members of the Board were not unanimous in their conclusions and the Government has in 1928 provided for further assisted extensive movement of Alberta coal to Ontario for a period of three years in order to determine more definitely the actual cost of transportation. (See further under legislation.)

Alberta Coal Areas Investigated for Anthracite

A reported occurrence of anthracite in Smoky River and Sheep River areas of Alberta was investigated. It was considered that if anthracite were commercially procurable, reliable data on the subject should be obtained. Mr. James McEvoy, mining engineer and geologist, was engaged by the Board to investigate and report on the areas. Mr. McEvoy's report, which was published by the Fuel Board under the title "The Smoky River Coal Field," stated that there is no anthracite known to occur in the areas stated, but there is a large tonnage of high-grade bituminous coal, one notable 14-foot seam grading in places, by analysis, as semi-anthracite. This seam will give a superior steam coal, but it is not notably better than the other high-grade bituminous coals already being produced in Alberta in the qualities desirable for domestic use, namely a clean fuel and freedom from smoke and soot.

Coking Qualities of Western Coals

The Fuel Testing Division of the Department of Mines has undertaken a survey of the coking qualities of western coals in order to ascertain if western bituminous coals can be obtained with coking qualities equal to American or other imported coals. The object of this survey is to show the feasibility of the utilization of western bituminous coals in areas such as Winnipeg, where American bituminous coals are now imported for the manufacture of coke. Results so far obtained indicate that certain western bituminous coals compare very favourably with American coking coals now imported into western Canada for the manufacture of coke and gas in the by-product recovery coke oven. The cost at which the coals can be laid down at the coking plants will naturally determine which shall be used.

Electrical Energy and the Utilization of Waterpower in Place of Fuel

Canada, and central Canada in particular, has large developed and undeveloped resources in waterpower. As at November 1, 1927, it is estimated that the available 24-hour power at ordinary minimum flow exceeds 20 million horsepower and there existed a total installation in developed plants of slightly under 5 million horsepower. Taking into account the relationship between installation and available 24-hour power, this total installation represented slightly more than 11 per cent of the present recorded waterpower resources. Ontario and Quebec are estimated to have nearly 14 million horsepower available, with approximately 4 million horsepower installation in developed plants.

AVAILABLE AND DEVELOPED WATERPOWER IN CANADA

(As supplied by Dominion Water Power and Reclamation Service)

Province	Available 24-hour horsepower, 80 p.c. efficiency of utilization		Turbine installations h.p.
	At ordinary minimum flow h.p.	At ordinary 6-months flow	
British Columbia	1,931,000	5,103,500	473,062
Alberta	390,000	1,049,500	34,107
Saskatchewan	542,000	1,082,000	35
Manitoba	3,309,000	5,344,500	255,125
Ontario	5,330,000	6,940,000	1,827,088
Quebec	8,459,000	13,064,000	2,165,443
New Brunswick	87,000	120,800	47,231
Nova Scotia	20,800	128,300	65,702
Prince Edward Island	3,000	5,300	2,274
Yukon and North West Territories	125,200	275,300	13,199
	20,197,000	33,113,200	4,883,266

The relationship of developed waterpower to the coal situation is strikingly illustrated in a comparison of the growth of turbine installation and coal consumption.

From 1886 to 1913 the toal coal consumption of Canada increased in a fairly regular manner in proportion to population, and in 1913 the total reached 31,583,000 tons or 4·2 tons per capita. The consumption of 32,000,000 tons for 1926, or 3·3 tons per capita, is 21 per cent less per capita than for 1913.

It has been computed that the coal saved by waterpower installation operated in Canada during 1926 amounted to 17,000,000 tons, and of this amount 11,300,000 tons were saved by hydro Central Electric stations. At 6 tons per installed horsepower, the coal equivalent of the full capacity of waterpower now developed in Canada would be in excess of 27,000,000 tons per annum.

House Heating by Electricity Impracticable at Present

Although electricity is economically used for industrial and transportation purposes, the Fuel Board is of the opinion that, except in an auxiliary capacity, electricity for house heating is not practicable on a large scale under present conditions.

Extensive developments, however, may be anticipated in the utilization of the off peak load for the generation of steam and its storage in accumulators for use as required during the 24 hours. Appreciable economies in the use of solid fuels are being effected by the use of electricity for cooking purposes and auxiliary heating. It has been computed that with anthracite at $17 a ton and electricity at 0·425 cents a kw. hour the costs would balance without considering the saving of labour.

Oils and Natural Gas

Although Canada has large resources of oil-shale and bituminous sand which may in the future form the basis of industries for recovery of products generally obtained from crude petroleum, oil from our own petroleum resources has never provided an appreciable amount of fuel.

Large discoveries of natural gas in Alberta are providing a fuel supply of considerable importance for local heating and industrial use, but the natural gas fields in Ontario, like the oil fields in that area, appear to be nearing depletion.

Investigations on the Utilization of Fuels

Relative Heating Values of Various Fuels

An investigation was undertaken at the Fuel Testing station in 1924 and 1925 by the Department of Mines in co-operation with the Fuel Board to ascertain the relative heating value of various fuels when used for heating purposes. Standard hot-water heaters were used for the tests because of the ease with which the amount of heat delivered by the burning fuel to the water could be measured.

The duration of each test varied from 40 to 120 hours and was so determined that approximately 1,000 pounds of fuel would be consumed. The actual useful heat transmitted to a cooling system was accurately measured, as were also the heat losses from the furnace through the ash pit and the flue gases.

The fuels selected for test were representatives of those available in Canada for domestic use and included British and American anthracites, by-product and gas coke, various types of Alberta coals, and low volatile bituminous coal.

The result of these tests as published shows wide variations in the heating values of the fuels tested and indicates the importance that should be attached to heating values when considering the relative costs of fuels.

[1]THE RELATIVE VALUES OF VARIOUS FUELS TESTED, COMPARED WITH AMERICAN ANTHRACITE AND BASED ON POUNDS OF FUEL FIRED PER THERM (100,000 B.T.U.) DELIVERED TO THE COOLING-WATER OF THE SYSTEM

No.	Fuel	Quantity of fuel fired per therm (100,000 B.T.U.) delivered to the cooling-water								Equivalent tonnage to 10 tons of American anthracite
		Values for each of the tests selected for charting and tabulation							Average value	
1	American anthracite	10·95	11·44	10·80	12·36	.....	.....	.....	11·39	10·00
2	Welsh anthracite	9·60	9·78	9·48	9·35	9·57	.....	.....	9·56	8·39
3	Scotch semi-anthracite	9·44	9·57	9·68	10·24	.....	.....	.....	9·73	8·54
4	Gas coke	11·45	11·20	10·93	10·82	10·96	11·36	11·76	11·21	9·84
6	By-product coke No. 2	10·18	10·34	10·25	10·57	.....	.....	.....	10·33	9·07
7	By-product coke No. 3	*10·50	10·91	11·16	10·83	.....	.....	.....	10·85	9·53
8	By-product coke No. 4	*10·83	*10·23	*11·38	.....	.....	.....	.....	10·81	9·49
9	American smokeless, semi-bituminous No. 1	10·97	10·91	10·72	11·30	.....	.....	.....	10·97	9·63
10	American smokeless, semi-bituminous No. 2	10·55	11·20	11·03	11·25	.....	.....	.....	11·01	9·67
11	Alberta semi-bituminous	11·18	11·34	11·19	11·39	.....	.....	.....	11·27	9·89
12	Alberta sub-bituminous No. 1	13·89	15·27	14·90	14·99	.....	.....	.....	14·76	12·96
13	Alberta sub-bituminous No. 2	15·04	15·18	15·82	16·16	.....	.....	.....	15·55	13·65
14	Alberta sub-bituminous No. 3	14·46	16·08	16·26	16·98	.....	.....	.....	15·94	13·99
15	Alberta domestic No. 1	16·03	1 ·30	16·98	18·25	.....	.....	.....	17·14	15·05
16	Alberta domestic No. 2	16·34	17·51	17·18	16·76	.....	.....	.....	17·45	15·32
17	Alberta domestic No. 3	16·56	16·81	16·56	18·12	.....	.....	.....	17·01	14·93
18	Alberta domestic No. 4	16·53	7·34	17·45	18·73	.....	.....	.....	17·51	15·37
19	Alberta domestic No. 5	18·73	18·90	19·19	19·42	.....	.....	.....	19·06	16·73
21	Air-dried, machine peat	*25·00	.....	.....	.....	.....	.....	.....	25·00	21·95

*Denotes tests of short duration.

[1]Mines Branch, Department of Mines, Pub. No. 671—Investigation of Fuels and Fuel Testing, 1925, p. 63.

MAP SHOWING COAL FIELDS IN CANADA AND UNITED STATES

Scale of Miles
100 50 0 100 200 300 400 500 600 700 800

Legend
- Anthracite & Semi-anthracite
- Bituminous
- Sub-bituminous & Lignite

ALASKA
YUKON
NORTH WEST TERRITORIES
HUDSON BAY
PACIFIC OCEAN
ATLANTIC OCEAN
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
COAST OF LABRADOR
COALSPUR
BRAZEAU
CANMORE
EDMONTON
DRUMHELLER
VICTORIA
VANCOUVER
FERNIE
LETHBRIDGE
REGINA
WINNIPEG
SPOKANE
WASHINGTON
IDAHO
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
DULUTH
OREGON
WYOMING
NEBRASKA
IOWA
CALIFORNIA
NEVADA
UTAH
COLORADO
KANSAS
ILLINOIS
MISSOURI
ARIZONA
NEW MEXICO
OKLAHOMA
TEXAS
ARKANSAS
LOUISIANA
MISSISSIPPI
TENNESSEE
KENTUCKY
POCAHONTAS
WEST VIRGINIA
VIRGINIA
N. CAROLINA
SOUTH CAROLINA
GEORGIA
ALABAMA
FLORIDA
COCHRANE
PT. ARTHUR
FT. WILLIAM
SUDBURY
NORTH BAY
QUEBEC
MONTREAL
OTTAWA
KINGSTON
TORONTO
HAMILTON
WINDSOR
TOLEDO
SANDUSKY
COLUMBUS
CLEARFIELD
PITTSBURGH
SCRANTON
LOGAN
HAMPTON ROADS
NEW BRUNSWICK
FREDERICTON
PORTLAND
MAINE
VERMONT
MASS.
NEW YORK
NOVA SCOTIA
HALIFAX
SYDNEY
CAPE BRETON
PR. EDWARD
Montreal to Swansea 2923 m.
To Montreal 1870 m.
To Montreal 898 m.
To Portland 560 m.

Prepared by
Natural Resources Intelligence Service
Dept. of the Interior
Ottawa, Canada

Central and District Heating

Centralization of heating appears to offer opportunities for economies by the use of low-grade fuels in the place of the more expensive high-grade fuels, by the more efficient burning of fuels, and by reduction in cost of delivery of coal and removal of ash. It has also distinct advantages in the matter of cleanliness, convenience, and elimination of smoke.

The Fuel Board engaged Mr. F. A. Combe, consulting engineer of Montreal, to investigate and report upon central and district heating and the possibilities of its application in Canada.[1]

The object of the investigation was to secure and furnish general information on the subject of central and district heating; to give a brief résumé of what has been done in other countries, with descriptions of typical installations; and to discuss economic factors governing the possible extent of its application in Canada.

For the purpose of securing reliable and complete information and to supplement and confirm data gathered from personal work and experience, Mr. Combe visited, and studied the operation of, fifteen representative district heating utilities in the United States, and ten district and central heating systems in Canada. Considerable additional information was secured also by correspondence with and questionnaires from Europe, United States, and Canada, and a general survey was made of conditions obtaining in Canada and the northern United States having a bearing upon the matter: as climate, heating requirements, available fuels, power resources, favourable territory, etc.

As a result of this investigation the Fuel Board concluded:

That central heating of groups of institutional buildings and community heating of residential properties have shown the economies and benefits to be derived from these methods, and that such systems may and will be adopted profitably to an increasing extent.

That though the increased use of district heating or the supply of heat as a public utility in sections of cities and towns may be looked for in the future, their introduction in any particular locality should be preceded by a detailed and careful study of local conditions and of all the factors bearing upon the

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[1]Combe, F. A.: "Central and District Heating, Possibilities in Canada"; Dominion Fuel Board, Pub. No. 3.

problem in order that there may be reasonable assurance of financial success; and that the benefits to be derived by consumers are not so much a saving in cost of service, but rather a greatly increased value of service in respect to convenience, relief from the handling of coal and ashes, increased cleanliness, etc., the total value of which it is extremely difficult to determine in terms of dollars.

The Fuel Board believes that, for a full utilization of available resources, consideration must be given to possible co-ordination in production and use of different forms of energy, such as the establishment of central steam stations acting in conjunction with hydroelectric developments for the supply of light, heat, and power.

It is hoped that the information contained in this report will be of interest and value to municipalities, institutions, and others, and will encourage the wider application of this method of heating.

Insulation of Houses

The better building and the insulation of houses has recently been given much wider attention, as an important contributary method in the more efficient utilization of fuels. The subject has been studied and investigated to a considerable extent in northern Europe; and in Canada is being investigated experimentally by the University of Saskatchewan under the auspices of the Research Council.

The Fuel Board, with the co-operation of the Natural Resources Intelligence Services of the Department of the Interior, has been accumulating information on the subject with a view to directing public attention to the economies and advantages to be derived from house insulation.

The first of a series of pamphlets, prepared by Mr. G. D. Mallory, has been issued under the title "Why You Should Insulate Your Home" and has been given wide distribution. It is to be followed by others containing general information on house insulation and allied subjects.

Low-temperature Carbonization of Bituminous Coals

Investigations pertaining to the carbonization of Canadian coals, conducted in the Fuel Testing laboratories prior to 1923, and reported in different Mines Branch publications,[1] were confined to the lower-grade non-coking coals, namely, the brown lignites of Saskatchewan, and the black lignites and sub-bituminous coals of Alberta, and were carried out according to low-temperature carbonization methods. During 1923 and 1924 considerable attention was paid to the bituminous coking coals of Nova Scotia and New Brunswick, the results of a special investigation, by B. F. Haanel and R. E. Gilmore, being reported under the title of "Coking Experiments on Coals from the Maritime Provinces."[2] This investigation comprised coking experiments on a small-laboratory scale and large-scale tests on car lots in commercial by-product ovens, all of which were carried out according to the high-temperature method used in the city gas and coke industry. In view of the widespread interest in the development of low-temperature methods for the recovery of maximum yields of tar oils, and the production of a suitable coke, attention, during 1925, was paid to the examination of typical bituminous coals according to low-temperature carbonization principles. Only three coking coals (two Canadian and one foreign) have been examined to date, but in order to study the reactions taking place at different temperatures and under different conditions, a series of carbonization tests on each coal was conducted at maximum temperatures of 400°, 500°, and 600° C., according to the regular laboratory low-temperature method, and on one of the coals at several temperatures, first in the presence of steam, and then with recirculation of the uncondensed gases. The two Canadian coals used were "Minto" coal from New Brunswick and "Sydney" coal from Nova Scotia. Tests were made, for the purposes of comparison, on a standard gas coal, namely "Westmoreland" coal from Pennsylvania.

Altogether, 32 carbonization tests were carried out, duplicate runs being made on the same coal at the same temperature by the same method of carbonization. The results of these tests are given as a series of tables and referred to in detail in the discussion.[3]

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[1]Mines Branch, Dept. of Mines, Canada, Sum. Repts. 1918 and 1919, and "Investigations of Fuels and Fuel Testing for 1921, 1922, and 1923."

[2]Mines Branch, Dept. of Mines, Canada, "Investigations of Fuels anf Fuel Testing, 1924."

[3]Mines Branch, Dept. of Mines, Canada, Pub. No. 671, "Investigations of Fuels and Fuel Testing," pp. 64-102.

Low-temperature carbonization and hydrogenation of coals have in the past few years provided most attractive research problems for a large number of investigators in both Europe and the United States, and as a result numerous processes have been devised, some of which have been carried through to the commercial stage. The large undeveloped fuel resources of Canada have led many of those interested to look upon Canada as the logical country in which to exploit some of these processes. It seems timely, therefore, to state just what the fuel problems of Canada are in this respect and what may be achieved by treating solid fuels at low temperature.

The efforts of the Fuel Board have been directed toward safeguarding the domestic fuel supply, so that a shortage arising from industrial disorganization will not place the people of Canada in a precarious situation. With this objective in view, the manufacture of by-product coke as a substitute fuel has been strongly urged, inasmuch as the bituminous coal mines in Canada and the United States are capable of supplying a far larger quantity of coal than is available in the anthracite fields. By-product coke has proved a most desirable and efficient substitute for anthracite and it has been possible to establish successful coking plants at certain points in Canada where there is a market for the gas. Low-temperature carbonization on the other hand produces only a small quantity of gas, but a greater yield of tar oils than when coals are coked in the by-product recovery coke oven. The credits that can be obtained by the two processes, therefore, from gas, light oils, tar oils, and ammonium sulphate, together with the suitability and cost of the domestic fuel produced, are the factors which will eventually decide which of the two processes may be expected to be the more profitable. At the present time, the low price of tar oils, that have merely a fuel oil value, would appear to throw the economic balance in favour of the by-product recovery or high-temperature process.

A number of the more important plants in France, Germany, and Great Britain for low-temperature carbonization and for the hydrogenation of coal were visited in 1927 by the Minister of Mines in company with the chairman of the Fuel Board.

They report [1] that

"conclusions as to the status of low temperature carbonization were reached, not only as a result of our own observations, but after discussion of the problem with a number of engineers interested in the carbonization of coal. These conclusions are, first of all that extraordinary interest is being shown in developing processes, particularly in Great Britain and Germany, where, in one case the production of a smokeless fuel is the object aimed at, and in the other the maximum yield of oil and other by-products from the coal. The majority of the processes are still being experimented with on a laboratory scale. Other operations are being conducted on what is known as the technical scale, using a single unit, and two or three have passed through these stages and are being or are about to be applied on a commercial scale. Secondly, that though rapid progress is being made in the development of methods of low-temperature carbonization and success in certain of the plants seems assured, particularly where special conditions obtain, the opinion prevails fairly generally that none of these plants has been working sufficiently long on a commercial scale to definitely prove out all the factors that enter into successful commercial operation. Exception must, however, be made on this score to a process which has been in operation on the brown coals of Germany for many years and which is applied at a number of places mainly for the production of wax. In addition it seems unlikely that any one system will ever be adopted as applicable to all coals and all conditions to the exclusion of all other systems. It is certain that the type of retort to be adopted in any particular case will depend on the object aimed at and the quality of coal available.

In Canada, as in other sparsely populated and not intensively industrialized countries, the problem of applying any of these methods is not as easy of solution as in countries like Great Britain, France, and Germany, where there is a density of population and a consequent availability of markets close at hand capable of using the products obtained.

However, as a result of the investigations valuable information was gained and connexions made which will permit officers of the Department of Mines to keep in close touch with the progress of development, so that advantage may be taken of these developments if they should prove applicable to conditions in Canada."

The report also refers to plants for the liquefaction of coal, and concludes

"that in considering the application of coal liquefaction to Canada two things must be borne in mind. First, it is likely that prices of crude well petroleum are as low now as they are ever likely to be and as time goes on the tendency will be for these prices to rise. Second, that coal liquefaction methods are in their infancy and that with experience and improvements of technique in manufacture costs are much more likely to fall than to rise.

These considerations make it highly desirable that the progress of development of coal liquefaction in Germany should be carefully watched so that advantage may be taken of these developments if they should prove applicable to Canadian conditions."

Other Investigations on Utilization

The Department of Mines has conducted a number of investigations and tests (in addition to those already mentioned) that have shed much light on the question of fuel utilization. Among these may be mentioned: friability tests on various

[1] "Low Temperature Carbonization and Coal Liquefaction in Europe," by Honourable Charles Stewart, Can. Min. Jour., Dec. 9, 1927.

fuels sold in Canada to show which of the better known fuels are liable to produce excessive fines; examination of typical cokes sold in Canada as household fuels, to determine the quality of the different cokes on the market; and effects of exposing Canadian lignite to atmospheres of different humidities.[1] An investigation under way at the present time is a fuel power survey for the purpose of learning how our fuels are being utilized in industry. The use of coal in the pulverized state for steam raising was studied in detail some years ago[2]. The present status of the art of burning coal in the pulverized state which had been somewhat refined will, it is hoped, be investigated by the Mines Branch in the very near future.

Necessity for Continued Investigations

The necessity for continued study of fuels and fuel problems will probably continue as long as does the mining of coal. For the immediate future the Fuel Board is charged with the administration of the Domestic Fuel Act and other legislation designed to assist the development of an all Canadian coal supply. A new fuel research laboratory is now being completed for the Department of Mines, which it is expected will be one of the best equipped laboratories of its kind on the continent, and the Fuel Board will associate itself with the Department in a systematic study of Canadian fuels. The equipment will include large-scale apparatus for preparing and cleaning coal, for carbonizing coal at both high and low temperatures, for recovering and treating the gases, oils, and by-products from carbonization, for briquetting carbonized residues or screenings, for burning fuel in the pulverized form or otherwise in industrial boilers, and for burning various fuels in domestic or house heaters. Provision will be made for studies in the liquefaction of coals.

The Board will continue to explore the possibilities for the economic development of a greater Canadian coal production for domestic and foreign consumption.

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[1]Mines Branch, Dept. of Mines, Canada, Repts. Nos. 644 and 671, "Investigation of Fuels and Fuel Testing, 1924 and 1925."

[2]Mines Branch, Dept. of Mines, Canada, Rept. No. 564, "Preparation, Transportation, and Combustion of Powdered Coal," by John Blizard, 1921.

The great importance of coal as a national asset is emphasized by the Honourable Mr. Stewart, who states[1]:

"In conclusion it may be said that as a result of our observations in Europe one thing stands out clearly and forcibly, namely, that coal is a far more valuable asset today to any country possessing it than it was to the last generation and it will be still more valuable to the coming generations. It is not only the source of heat and power, but it is becoming the raw material upon which a great variety of chemical industries are being and will be based. Germany is proving that electric energy, hydrogen, and coal are the most important factors in the production of synthetic materials on a large scale, and with vision, courage, and technical skill our coal resources may be made the cause of bringing new life and industries to those parts of Canada in which these resources lie and incidentally to the whole of Canada. This idea is well worth consideration by our people in the Maritime Provinces and British Columbia, where coal resources are favourably situated on the sea board, as well as by the people of Alberta and Saskatchewan."

Legislation and Other Government Action

As a supplement to the report on the Board's activities, it has been thought desirable to review the legislation and other Government measures, both federal and provincial, of the past few years, designed to assist the development of the Canadian coal industry.

These measures are not reviewed chronologically, but according to the character of the action taken, viz.: *(a)* assistance toward the transportation of coal; *(b)* tariff changes; *(c)* assistance toward coking of coal (Domestic Fuel Act, 1927); *(d)* investigations and inquiries by Commissions and Committees.

Subvention on Transportation of Canadian Coal 1924-1925

In the fiscal year 1924-1925, the Federal Government voted the sum of $200,000 for the purpose of assisting in the transportation of Canadian coal to Ontario and Quebec. The Minister of Mines was authorized by Order in Council P.C. 1537, dated September 3, 1924,

"to direct the payment out of this sum for the purpose of assisting in the transportation of coal mined in eastern Canada and brought by vessel to Quebec, Montreal, or other St. Lawrence ports, and thence trans-shipped by railways operated subject to the Railway Act of 1919 to stations in the provinces of Quebec and Ontario to which through rates are published and filed with the Board of Railway Commissioners for Canada, of one-fifth of a cent per ton per mile from the port of trans-shipment to destination from time to time in the case of each shipment thereof to the railway or railways transporting said coal."

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[1] "Low Temperature Carbonization and Coal Liquefaction in Europe," by Honourable Charles Stewart, Can. Min. Jour., Dec. 9, 1927.

The Minister was also authorized

"to direct the payment out of the said vote for the purpose of assisting in the transportation of bituminous coal mined in eastern Canada and transported wholly by rail on railways subject to the Railway Act of 1919 to stations in the provinces of Quebec and Ontario west of River du Loup of one-fifth of a cent per ton per mile from the place of shipment to point of destination from time to time, in the case of each shipment thereof, to the railway or railways transporting said coal."

The total amount to be paid on a single shipment of coal under the above authorization was not to exceed the sum of fifty cents a net ton, nor were payments to be made on shipments of coal to points where in the opinion of the Minister of Mines, Canadian coal was not in competition with American coal.

The subvention was administered by the Fuel Board and remained in force for seven months, assistance being granted to movement of 42,000 tons of Maritime Province coal.

Board of Railway Commissioners Inquiry into Cost of Moving Western and Eastern Coal, 1926

Order in Council, P.C. 225, 13th February, 1926

"The Committee of the Privy Council having had under consideration the desirability from a national standpoint of taking steps looking towards stimulating the development of the coal resources of Canada and supplying so far as practical Canada's coal requirements from Canadian mines, submits as follows:

That on account of the distance to be traversed between the coal mining areas in western Canada and the large consuming centres in Ontario the element of the cost of transportation of coal mined in Western Canada is of paramount importance. There appears, however, to be good reason to believe that so far at all events as the movement of coal from producing points in Western Canada to consuming points in Ontario is concerned, the cost of the same would be very considerably reduced if this movement takes place at a time of the year when the rolling stock of the railways is not mobilized for the transportation of the grain crop of Western Canada, and it appears desirable that the cost of transportation thereof for seasonal movement as above-mentioned should be ascertained.

The Committee, therefore, advise that the Board of Railway Commissioners for Canada be requested to immediately enquire and report to the Government upon the question of the cost of transportation of coal per ton in full capacity train load quantities for such seasonal movement as above mentioned from producing points in Western Canada to consuming points in Ontario, such enquiry and report to show as nearly as practicable the particular cost of such movement, both exclusive and inclusive of the costs that would have to be incurred by the railways in any event and whether any extra or additional coal movement take place as the result of special rates or not, and both exclusive and inclusive of the element of profit to the transportation companies; to the end that the Government shall be informed as nearly as may be what rate or rates per ton for the transportation by railways of coal from producing points in Western Canada to consuming points in Ontario would pay the actual cost of the said movement (both exclusive and inclusive of overhead, superintendence, and allowance for operating pro it) respectively (a) from an operating standpoint and eliminating the costs that would have to be incurred in any event as above mentioned, and (b) inclusive of the same."

The report of the Railway Commission on the inquiry, which was submitted to the Government in September, 1927, was not in the nature of a judgment. It stated that after full consideration and study of the evidence and exhibits placed before the Board, figures were arrived at that furnished the best answer the Board could give to the various phases of the inquiry submitted in the Order in Council. The opinion of the three members of the Board who conducted the inquiry, however, was not unanimous. That of the Chief Commissioner and the Assistant Chief Commissioner set:

The out-of-pocket cost at	$ 7 22	a ton
The inclusive cost (i.e. inclusive of overhead and superintendence)	10 07	"
Inclusive cost, plus the element of profit	12 20	"

In the opinion of Commissioner Oliver, the out-of-pocket cost may be said to be $6.50 a ton. As to inclusive cost, and inclusive cost plus profit, Commissioner Oliver declared himself unable to draw definite conclusions from the evidence submitted.

ORDER IN COUNCIL, P.C. 226, 13TH FEBRUARY, 1926

"The Committee of the Privy Council having had under consideration the desirability from a National standpoint of Canada's coal requirements being supplied so far as practicable from Canadian mines, and it appearing of importance in this regard that the costs of transportation of coal mined in Nova Scotia and New Brunswick to consuming points in Quebec and Ontario, moving at a time of year when the water route for the same by way of the River St. Lawrence is closed to navigation, should be ascertained.

The Committee, therefore, advise that the Board of Railway Commissioners for Canada be requested to immediately enquire into and report to the Government upon the question of the cost of transportation per ton in full capacity train load quantities for such seasonal movements as above mentioned, from producing points in Nova Scotia and New Brunswick to consuming points in Quebec and Ontario; such enquiry and report to show as nearly as practicable the actual costs of such movement.

Both inclusive and exclusive of overhead and superintendence and allowances for profit (a) from an operating standpoint and eliminating the costs that would have to be incurred by the railways in any event whether any additional coal movement takes place or not, and also exclusive of any operating profit thereon; and (b) exclusive of the said overhead and superintendence cost, but inclusive of a reasonable operating profit thereon."

The report of the Railway Commission on this question has not yet been announced.

Proposed Test of Rail and Lake Movement of Alberta Coal, 1928

The Federal Government appropriations for the fiscal year 1927-1928 included the sum of $15,000

"to provide for a trial shipment of Alberta domestic coal to be made by rail and lake under the supervision of the Dominion Fuel Board in order to ascertain the possibilities of moving Alberta coal in large volume with modern loading and unloading facilities, provided one-third of the total cost of the movement is borne by other governmental, municipal, or private organizations."

The proposal was brought to the attention of Provincial Governments interested, but no application was received for responsible co-operation in the test movement.

Test Movements of Alberta Coal, to Determine Transportation Cost, 1928-29-30

In view of the importance of the question of encouraging an all-Canadian coal movement, and of the difference of view expressed in the minority report of the Board of Railway Commissioners in their finding of the out-of-pocket cost of transporting Alberta coal to Ontario, the Federal Government, by Order in Council P.C. 439, dated March 16, 1928, provided for further test movements with a view to arriving at what would appear to be a reasonable freight rate a ton for this traffic. The test movement is to be undertaken under the following conditions, namely:

"(a) That a temporary rate of $6.75 per ton be established to be effective for not less than three months in each year during the period of the test movement.

(b) That the cost of the movement under consideration be supervised by the Board of Railway Commissioners of Canada.

(c) That the cost of the movement be carefully checked by representatives selected by both the coal interests and the railways.

(d) That a detailed report of the representatives checking the cost of this movement shall be furnished the Board of Railway Commissioners for their consideration and that the full Board of Railway Commissioners, after hearing the parties interested, will determine from the evidence submitted to them what is a reasonable rate per ton, having in mind all the factors which in the national interest, may properly be taken into consideration.

(e) That as the movement is a seasonal one and for a short period in each year, it is desirable that the test should extend for a period of three years in order that the Board of Railway Commissioners may have conclusive evidence of costs before them to enable them to give judgment.

(f) That at the end of each seasonal movement and pending a final decision, the Board of Railway Commissioners be authorized—to name what amount if any over and above the rate of $6.75 per ton the Board estimates to be due the railways in the light of the information secured during the season, and to certify to the Minister of Mines the total sums of money due to each Railway Company in connexion therewith."

Test Movements of Maritime Province Coals to Determine Transportation Costs, 1928-29-30

By Order in Council P.C. 539 dated March 30, 1928, the Federal Government authorized test movements of Nova Scotia and New Brunswick coal, during a period of three years, to points in Quebec and Ontario, for a purpose similar to the experiment inaugurated with respect to Alberta coal.

The Order in Council provides for assistance toward two types of test movement, namely:

(A) Transportation of coal wholly by rail during the season when navigation of St. Lawrence river is closed.
(B) Rail transportation inland from St. Lawrence ports of water-borne coal.

In the all-rail test movement, maximum temporary rates, during the period mentioned, on coal mined in Nova Scotia and in New Brunswick, and carried to points in the province of Quebec, are to be $3 a ton and $2.10 a ton, respectively.

In the test movement of water-borne coal, it is provided that coal mined in eastern Canada and carried by vessel to St. Lawrence ports and thence trans-shipped by the railways to points in the provinces of Quebec and Ontario where United States coals compete, be carried from the point of trans-shipment at a temporary rate of one-fifth of a cent a ton a mile less than the rate which would otherwise be applicable. This reduction, however, not to exceed 75 cents a ton.

In both instances the cost of the movement will be supervised by the Board of Railway Commissioners for Canada, and will be carefully checked by representatives selected both by the coal interests and the railways. After receiving the reports of the representatives checking the cost and hearing the parties interested, the Board of Railway Commissioners are requested to determine from the evidence submitted what, in their opinion, is a reasonable rate a ton, having in mind all the factors which in the national interest may properly be taken into consideration.

Pending a final decision, the Board of Railway Commissioners are authorized to name what amount, if any, over and above the rates a ton specified in regard to the all-rail movement are estimated to be due the railways, and to certify to the Minister of Mines the total sums of money due to each railway company. In regard to water-borne coal the payment to the railways, pending a final decision, is to be the difference between the rate received by the railways under the provisions of the

Order in Council and the rate otherwise applicable, such payments to be made by the Dominion Fuel Board upon authorization by the Minister of Mines.

Tariff Changes

Drawback of Duty on Bituminous Coal Imported for By-product Coking, 1925

Memorandum No. 50, Revised, of the Department of Customs and Excise, dated May 14, 1925, relating to the annual budget presented by the Minister of Finance, contained the following amendment to Tariff Item 1049:

"Subject to Drawback of 99 per cent—bituminous coal when imported after the twenty-fourth day of March, 1925, by proprietors of by-product recovery coke ovens and converted into coke at their by-product recovery coke ovens. Provided that no drawback shall be paid under this item on coal converted into coke at a gas retort plant or at a plant using any other process than the by-product coke process, also provided that drawback payable under this item is in lieu of drawback payable under any other item."

Levelling of Tariff Rates on Bituminous Coal, 1925

The memorandum above mentioned also instructed collectors of Customs and Excise that with respect to Tariff Item 588 an amendment deemed to have come into force March 25, 1925, fixed the duty to be levied a ton on bituminous coal imports as follows:

——	British preferential tariff	Intermediate tariff	General tariff
	cts.	cts.	cts.
Bituminous coal (including slack)	35	45	50

The former rates, in force from November 30, 1906, to March 25, 1925, were:

——	British preferential tariff	Intermediate tariff	General tariff
	cts.	cts.	cts.
Bituminous coal, round and run of mine	35	45	53
Bituminous coal such as will pass through a $\frac{3}{4}$-inch screen	10	12	14

Change in Regulations Regarding Coal for Ships Bunkers

Circular No. 554-C of the Department of Customs and Excise, dated December 31, 1926, instructed Collectors of Customs and Excise as follows:

"Referring to Circular No. 364-C: you are hereby advised that, under the provisions of the Customs Act, Section 103, the Minister of Customs and Excise has been pleased to order that, from and after the 1st day of January, 1927, coal shall not be delivered out of warehouse duty free as ships' stores for any vessel clearing from the port of Montreal, in the Province of Quebec, or from any port east thereof.

You are further advised that, in future, drawback will not be paid on coal delivered for vessels clearing from the port of Montreal or from any port east thereof."

Assistance toward Manufacture of Coke, Domestic Fuel Act, 1927

For the twofold purpose of assisting the Canadian coal mining industry and at the same time relieving the domestic fuel situation, Chapter 52, 17 George V, of the Federal Government, assented to April 14, 1927, provides for assistance applicable to the erection of by-product coking plants whose primary object is to produce a suitable domestic coke manufactured from Canadian coal.

The terms of the Act provide an annual subsidy payment over a period not exceeding fifteen years, of 4 per cent of the cost of the plant in the case of a private corporation; and 5 per cent of the cost in the case of municipal ownership. It was recognized that a blending of coals is necessary in order to produce the best grades of domestic coke and, to assure the production of such, allowance is made for an admixture with American coal up to 30 per cent of the latter. To be entitled to the full subsidy, 70 per cent of the total coal used must be Canadian coal. If less than 50 per cent Canadian coal is used no subsidy is payable.

Administration of the Act has been assigned to the Fuel Board. The first agreement for assistance under the Act has been with the Nova Scotia Tramways and Power Company, in respect to a coking plant in the city of Halifax.

Investigations by Committees and Commissions

Special Committee of the House of Commons during Session of 1921, Respecting Future Fuel Supply of Canada

The House of Commons, on March 23, 1921, adopted the following resolutions:

"That, in the opinion of this House, the future fuel supply of Canada should be considered by Parliament, and that a Special Committee of the House of Commons should be forthwith appointed to inquire into all matters pertaining thereto, with power to send for persons, papers and records, to examine witnesses under oath and to report from time to time."

The Committee held twenty-six sessions and examined thirty-seven witnesses.

Among the subjects dealt with in the investigation were the following:

The fuel resources of Canada according to Provinces;
The production of coal in Canada and the distribution thereof;
The importation and distribution of United States coal;
Transportation of coal by rail and by water throughout Canada;
Industrial and domestic fuel;
Coal substitutes, with reference to waterpowers, electricity, peat, coke, gas, oil-shales, and the carbonization of lignites.

The report[1] of the Committee points out that the limited time at the disposal of the Committee did not permit a thorough investigation in all its phases of the problem of Canada's future fuel supply, but sufficient evidence was secured to warrant, in the opinion of the Committee, making the following recommendations to the House:

"(1) The vital importance of the fuel supply of the people of any country admits of no argument, but to the people of Canada with its rigorous climate, fuel is one of the chief essentials of life. This being so, your Committee are of the opinion that, in view of the difficulties that our people have experienced during recent years in securing their necessary supply of coal, and in view of the possibility and even probability that the same adverse conditions may be repeated at intervals in the future, it is, in our opinion, most desirable that there should be an officer of the Government appointed for the purpose of keeping in close touch with the fuel situation of Canada. This officer, so far as federal authority may permit, should be clothed with sufficient powers to enable him to cope with any emergency that may arise, in order that our people may not be subjected to unnecessary suffering and inconvenience resulting from an insufficient supply of fuel for domestic or industrial purposes. 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.

(2) That our water powers should be developed to the greatest possible extent in order to supply hydro-electric energy to industrial plants.

(3) The electrification of railways located in districts which cannot be economically served by Canadian coal might solve the fuel difficulty there and is worthy the attention of the railways affected.

[1]Report printed by Order of Parliament, 1921.

(4) That the transportation of coal by water is an important factor in the cost of coal to the consumer and that, therefore, everything possible tending to reduce the cost of transportation by water should be done.

(5) That people should be encouraged to use domestic coal, coke, peat and briquettes when obtainable, instead of imported anthracite.

(6) That all consumers, and particularly domestic consumers, should be urged to purchase their coal in the early summer when transportation facilities are at their best for the distribution of coal and that transportation companies be asked to assist in accomplishing this end by granting a substantial reduction in freight rates at such seasons.

(7) That Canadian coal operators be urged to produce and store at suitable points in Quebec, Ontario, and Manitoba, large quantities of coal, with a view to the production or manufacture of coke for domestic fuel and as a substitute for imported anthracite and also for the production of the by-products thereof.

(8) That a campaign of publicity be maintained for the purpose of educating the people of Canada to the need of using Canadian coal wherever possible to do so, and to inform them of the best methods of using the various fuels for both domestic and industrial purposes, in order to obtain the greatest possible efficiency and increase the demand for our national products."

Special Committee of the Senate of Canada on The Fuel Supply of Canada—1923

On motion of the Honourable Mr. McLennan, on March 8, 1923, a Special 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 twenty-six witnesses.

The report[1] of the Committee in dealing with Canada's chief fuel problem, that of coal supplies for Ontario and Quebec, recommended 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 of: (*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.

[1]Report printed by Order of Parliament, 1923.

Dealing with the economic phase of the problem, the report of the Committee stated:

"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."

The Committee also recommended 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. It was also recommended that every legitimate encouragement should be given to the further development of waterpowers throughout Canada.

The Committee expressed the opinion that the Governments interested should consider the advisability of making still further efforts to demonstrate more fully the feasibility or non-feasibility of producing from the peat bog at Alfred, Ontario, a suitable peat for domestic use or industrial purposes, which will compete successfully with other fuels now in use.

It was also felt by the Committee that an anomaly existed in respect of the tariff which imposed a duty of 53 cents a ton on coal imported into Canada and used for the production of gas and coke, whereas coke was admitted to Canada free of duty.

House of Commons Select Standing Committee on Mines and Minerals Investigation of Canadian Fuel Supply, 1923

On March 19, 1923, the following resolution which had been introduced in the House of Commons, was referred to the Select Standing Committee on Mines and Minerals:

"That in the opinion of this House, the time has arrived for Canada to have a National Policy in relation to its coal supply and that no part of Canada should be left dependent on a United States coal supply. And that the whole question of fuel supply for Canada, together with the question of costs, transportation, desirable interprovincial action and other means whereby Canada may be self-sustaining and self-supplying as regards fuel, and to inquire into the necessity and possibility of supplying substitutes for coal be referred to the Standing Committee on Mines and Minerals and that said Committee report to the House."

The report[1] of the Committee which was submitted to the House contains the following observations and recommendations by the Committee:

"Your Committee has heard much evidence from various parts of Canada on every phase of the questions submitted to it in said resolution.

One statement may be made without any hesitation, that is, that it is absolutely necessary that every step possible should and must be taken at once by Canada through its Government, its transportation companies, its coal operators and manufacturers of other fuels, to make Canada independent of other countries for its fuel supply.

The economic question alone should move all Canadians to put forth every exertion to attain this object. Canada cannot for long continue paying to foreign countries millions of dollars yearly for fuel and hope to maintain its economic independence. One has only to consider this for a short time to see where such a condition will ultimately land us. Yet another consideration along this line is the fact that the United States, our chief source of supply, could not last year give Canada the usual supply, and many cases of extreme hardship and suffering were brought to the attention of the Committee through lack of domestic fuel. No fault, however, can be found with the United States Fuel Control Board for this shortage, as they treated Canada fairly; but a note of warning was sent out by the Fuel Board last winter, which should be taken to heart by Canadians. That was in effect that Canada could not hope in the future to get the usual supply of anthracite from the United States.

Your Committee is able to point out from the evidence adduced that Canada has ample resources of coal for all purposes for ages to come. The chief sources of supply are in Nova Scotia, New Brunswick, Alberta and British Columbia. One fact struck your Committee very forcibly, that is that a large percentage of the population of Central Canada have strange delusions regarding Canadian coal. They think we have no suitable domestic coal.

What is wanted in this connection is propaganda, an advertising throughout Canada of the true value of Canadian coal and in this connection your Committee would like to point out that up until two years ago the fuel needs of Winnipeg were supplied to the extent of 85 per cent by United States anthracite. Through the continued efforts of the Alberta Government and coal operators, 90 per cent of the Winnipeg coal needs are now supplied from Alberta.

Your Committee suggests that the Department of Mines, through its Intelligence Branch, should at once undertake an educational campaign as to the necessity of national fuel supply for Canada and the value of Canadian coal as domestic fuel and the proper method of using such coal.

Your Committee also investigated transportation costs in connection with coal. Many expert witnesses were called and some considerable volume of evidence taken. The views expressed were very divergent and inconsistent. The witnesses independent of the railways gave evidence of the possibility of a fairly fair freight rate on coal from Alberta to Central Canada.

The railway companies were asked for a rate from Alberta to Ontario centres. Formerly the rate was about $13 per ton. The Canadian National quoted a rate of $9 per ton in trains of fifty car-loads, for the months of May, June and July, with a similar decrease in rates from Maritime points. The C.P.R. state that the actual cost of carrying coal from Lethbridge to Ontario points in 46-ton car-loads is $9.90 per ton. The operators of Western Canada maintain that the rates quoted make any large movement of coal from Western Canada to Ontario impracticable.

Your Committee is forced to the conclusion that the rates quoted will in no way assist in solving Canada's fuel problem. A proportionate railway rate from the mines of Nova Scotia will not assist in any large movement of coal to Montreal or points farther west.

[1]Report printed by Order of Parliament, 1923.

Your Committee recommends that the Minister of Mines call immediately at some central point a conference of coal operators, representatives of transportation companies, representatives of the various Provincial Governments and of the Federal Government, with a few members of the Committees of the House of Commons and Senate dealing with the fuel question. It is hoped that much good may come from such a conference and strong efforts made by the interests concerned to assist in the matter of an independent supply of fuel for Canada, which is one of the most important and far-reaching questions facing the Canadian people to-day.

Your Committee also investigated the question of coke as a domestic fuel. The general trend of evidence in this connection goes to show that coke is as good, as clean, and as valuable a domestic fuel as is the very best anthracite. Coking plants in the large centres of Canada might assist largely in solving the domestic fuel supply.

Your Committee further recommends that the Government undertake an independent investigation immediately, through whatever channels it deems best, to ascertain the actual cost of carrying coal from eastern and western points to Central Canada. We believe that our National Railway should carry fuel at cost in this crisis, and your Committee suggests that the rates quoted are not cost rates but much higher.

Your Committee also heard evidence on the peat proposition, and is convinced that peat as a spring, summer or autumn fuel is very valuable. The Department of Mines has done much research work in this connection, but very little peat is being used in Canada, although it seems there are large resources.

Some difference of opinion exists between the officials of the Mines Department and certain outside interests as to the best method of treating peat for fuel purposes, particularly by the Graham method. Your Committee, therefore, recommends to the Government that $1,250 be granted for the purpose of investigating this method, provided that Mr. Graham contributes an equal amount for the same purpose, the investigation to be carried on by one engineer or expert from the Mines Branch, another appointed by Mr. Graham, and a third independent expert.

Your Committee submits herewith minutes of proceedings and evidence, and recommends that the same be printed in blue book form and as an appendix to the Journals of the House, also that Rule 74 be suspended in connection therewith."

House of Commons Special Committee Investigating Coal Resources of Canada January-July Session of Parliament, 1926

By resolution of the House of Commons, on March 15, 1926, a Committee of Members of the House was appointed to investigate Canada's present sources of supply of anthracite and bituminous coal, the dependability of such sources, and whether the price paid by the Canadian consumer is fair and reasonable; and to inquire as to the methods of mining and delivering Canadian coal in the best and cheapest way to all parts of the Dominion, for the purpose of giving employment to our workmen, freight to our transportation companies, and thus effecting a saving of money now spent for this commodity in other countries.

The Committee held fifteen meetings, examined twenty-eight witnesses, and held a conference at which were the Premiers of New Brunswick and Ontario, the Minister of Lands and Mines of New Brunswick, the Attorney General of Nova Scotia, the Attorney General of Manitoba, and the Provincial Treasurer of Ontario.

In order to avoid duplication of evidence the Committee had before them the report of the Senate Committee, 1923, on the Fuel Supply of Canada, and also the proceedings of the House of Commons Committee on Mines and Minerals, 1923, on the Canadian Fuel Supply.

In their report, the Committee expressed the opinion that although much valuable evidence and important data had been obtained, their investigation had, through lack of time, not covered the situation as fully as the Committee had hoped. The Committee was also of the opinion that this investigation ought to be resumed and continued at as early a date as possible next session of parliament.

At their last meeting the Committee agreed to report[1] for the consideration of the House and the Government the following recommendations:

"(1) Trial shipments of western coal—That trial shipments of Alberta domestic coal be made by rail and lake under the supervision of the Dominion Fuel Board in order to ascertain the possibilities of moving Alberta coal in large volume with modern loading and unloading facilities;

(2) Legislation—That such legislation be enacted as will encourage the production of domestic coke from Canadian coal and to make Canada as far as possible, independent of foreign sources of supply of domestic fuel;

(3) Co-operation with the Provinces—That the Government invite the co-operation of the Provinces in the establishment of standards of quality, and regulations governing the shipment and marketing of coal and coke;

(4) Dominion Fuel Board—That the Dominion Fuel Board which has greatly assisted in the effort to solve Canada's fuel problem be encouraged to continue and enlarge its work;

(5) Duty on Coal—That the duty of 50 cents per ton, now imposed on bituminous slack coal be extended to apply to anthracite small coal, known to the trade as "Buckwheat and Pea Coals";

(6) Assistance to production of Maritime coal—That the Government consider the question of granting some assistance to encourage the enlargement of the markets of Maritime coal;

(7) Exemption of duty—That the exemption from duty on foreign coal for bunkering ocean going ships be withdrawn;

(8) Coal handling facilities—That the Harbour Commissions of Montreal, Toronto and Hamilton be asked to co-operate in arranging better coal handling facilities at their ports in order that dispatch may be effected in unloading and loading coal from boats entering their harbours, and that the said Harbour Commissions be asked to make substantial reductions in harbour dues on Canadian coal;

(9) Transportation cost—That the Railway Commission be asked to ascertain and report upon the cost of carrying coal from the Alberta mines to Port Arthur and Fort William;

(10) Assisting test and rail movement—That early consideration be given by the Government as to the advisibility of renewing the vote in the estimates for the purpose of assisting the rail movement of Canadian coal, of which the unexpended balance was $180,000;

[1]Report printed by Order of Parliament, 1926.

(11) Coal bunkering facilities at Vancouver—That before sanctioning any scheme by the Harbour authorities of Vancouver to erect public coal bunkering facilities, that the matter should be very carefully considered as regards what effect such might produce on the coal mines of Vancouver Island inasmuch as coal might be brought in as ballast from other countries at such a low price as would result disastrously to the local coal mines;

(12) Increasing Freight haul—That it would be advisable to have an investigation and report made by the officials of the Canadian National Railways upon the possibility of materially increasing the average freight train load, either by improvements to the line in gradients or otherwise, or by increase in traction power with a view to reducing the cost of the rail haul from Alberta to the head of the lakes, and also upon the cost of effecting such improvements."

Lignite Utilization Board of Canada, 1918–1924

In 1917, due to the fuel stringency then existing in Canada, the Research Council appointed a Fuel Committee to study the western lignite problem. This Committee called into consultation representatives of those Dominion Government departments especially connected with fuels, namely, the Department of Mines and the Commission of Conservation. As a result of these consultations the two departments mentioned made certain investigations and special reports bearing upon the question of the utilization of lignite for domestic use by carbonizing and briquetting. This Fuel Committee then recommended to the Research Council that a commercial demonstration of this process be made. In turn the Research Council recommended appropriate action to the Government.

A Lignite Utilization Board was created by joint action of the Dominion Government and the Governments of the provinces of Manitoba and Saskatchewan. The members of the Board were R. A. Ross, Montreal, Chairman; J. M. Leamy, Winnipeg; and the Honourable J. A. Sheppard, Moosejaw. The objective laid down by Order in Council was to demonstrate the commercial feasibility of producing from Saskatchewan lignite coal a carbonized briquette for domestic consumption.

Approximately $1,000,000 was expended in the construction of a large carbonizing and briquetting plant at Bienfait, Saskatchewan, and in the experimental operation thereat two different methods of carbonizing were tried out.

In March, 1924, the Board issued a report[1] describing in detail its operations and the results secured. The report stated that a technical process had been completely demonstrated, but that it still remained to demonstrate the commercial feasibility of producing a carbonized lignite briquette for domestic consumption.

No further appropriations were made, however, since the process demonstrated was not that for which the plant had been originally designed and its commercial demonstration would have required a very large additional expenditure on capital account.

In 1927 the plant was disposed of to Western Dominion Collieries, Limited, who intend to try out on a substantial scale the utilization of Saskatchewan coal in retorts of Lurgi design for the production of a carbonized domestic fuel.

Peat Committee, appointed jointly by the Governments of the Dominion of Canada and the Province of Ontario, 1918-1924

Another investigation prompted by the fuel shortage which confronted Canada in 1917, had as its objective the determination of the feasibility of utilizing, for domestic purposes, the large fuel resources lying dormant in the numerous peat bogs favourably situated throughout the more populated portions of Ontario and Quebec.

Early in 1918, by Orders in Council,[2] a Joint Peat Committee was appointed, financed equally by the Federal Government and the Government of Ontario, to conduct an investigation concerning ways and means for converting the peat content of Canadian bogs into a marketable fuel. The personnel of the Committee were: Arthur A. Cole, Mining Engineer, Temiskaming and Northern Ontario Railway Commission, Chairman; Robert A. Ross, Consulting Engineer, Montreal; Roland C. Harris, Commissioner of Works, Toronto; B. F. Haanel, Chief of Fuels and Fuel Testing Division, Department of Mines, Ottawa, Member and Honorary Secretary.

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[1]First General Report of the Lignite Utilization Board of Canada.

[2]Report of the Committee of the Privy Council approved by his Excellency the Governor General on 24th April, 1918, P.C. 966. Order in Council approved by His Honour the Lieutenant Governor of Ontario, dated 19th April, 1918.

Although the feasibility of manufacturing air-dried peat fuel in Canada had been previously demonstrated by the Mines Branch of the Federal Department of Mines in 1910-11, nevertheless, conditions as regards labour and other important cost factors had changed materially in the interval, and no means had been devised or were actually available for production of fuel on an effective scale under the changed conditions. This necessitated, therefore, a fresh investigation having for its main objective the development of automatic machinery for carrying out economically the operations required in the several stages of the manufacture of peat fuel according to the air-dried machine peat process, which, it was well known at that time, was the only economic process for manufacturing the fuel.

For carrying out its investigation, the Committee obtained a suitable bog, situated at Alfred, Ontario, where peat machines were assembled and given a thorough trial under, as nearly as possible, regular working conditions. Research work was also carried on at the Fuel Testing station of the Mines Branch, Ottawa, which had as its objective the determination of the effect of varying degrees of pulping on the rate of drying and physical properties of the raw peat, and the density and other characteristics of the fuel produced.

At the end of 1920 the Committee reported to the two Governments, recommending the building of a plant combining the best features of two systems, viz., the Anrep system and the Moore system, which had been experimented with. The final report[1] of the Committee, which contains an exhaustive résumé of the subject, was published by the Mines Branch of the Federal Department of Mines, in 1926.

Alberta Coal Commission, 1925

By order of the Lieutenant Governor of Alberta a Commission was appointed on December 1, 1924, to conduct an inquiry and report upon the coal mining industry of that province. The Commissioners so appointed were H. M. E. Evans, Chairman, R. G. Drinnan, and F. Wheatley.

[1]Final Report of Peat Committee, Mines Branch, Dept. of Mines, Canada, Pub. No. 641.

The terms of reference included:

(a) Coal mining titles;
(b) Capitalization, investment, and the financial history and position of operators;
(c) Costs, income, and profits and losses;
(d) Production;
(e) Transportation, storage, and distribution of product;
(f) Marketing, selling prices, methods of use and by-products;
(g) Coal reserves, conservation, and waste of coal;
(h) Mine workmen, wages, and working conditions, earnings, living costs and conditions, housing conditions, and educational facilities;
(i) Mining conditions, mining methods, use of labour-saving devices, and provisions for safety of workmen;
(j) Labour relations;
(k) Conditions elsewhere and particularly in competitive field;
(l) Legislation affecting the industry in Alberta and elsewhere.

The report of the investigation, which was published in 1926, indicated a very exhaustive investigation into the subjects mentioned. Among the recommendations were:

A Mines Department of the province of Alberta;
A Coal Industry Advisory Council;
As gradual remedies for over-development, enforcing the terms of present leases and withholding new leases until warranted;
To avoid further complications, the immediate suspension of all general coal mining regulations of the Dominion Government pending the final decision as to the transfer of coal mining rights to the province and thereafter pending the determination by the province of its policy;
As to the operation of mines, enforcement on all mines, irrespective of size, of proper methods of mining.

Recommendations were also included appealing to co-operation among the dealers and consumers in regard to more uniform marketing, and also recommendations having to do with other local matters relating to the industry.

Royal Commission Investigating The Coal Mining Industry of Nova Scotia, 1925

This Commission was appointed by the Lieutenant Governor of Nova Scotia on October 31, 1925. The personnel were Sir Andrew Rae Duncan, Chairman, Rev. Dr. H. B. McPherson, and Mr. Hume Cronyn.

Matters falling under the terms of reference were:

(1) Causes of recurring disputes and friction;
(2) Wage rates, earnings, etc.
(3) Inequalities between classes of mine workers;
(4) Conditions affecting mine workers in the course of their employment;
(5) Social and domestic conditions;
(6) Costs of production, transportation, distribution, and marketing;
(7) Capitalization, general financial organization, and cost of management;
(8) Utilization of coal for coke.

The report of the Commission, which was printed by order of the Nova Scotia Government in 1926, presented recommendations with regard to general terms and conditions of employment, settlement of day to day questions, arrangement of pit schedules, and in regard to treatment of general wage fluctuations. Attention was also directed to social and domestic conditions and amenities generally of several of the larger mining communities.

It was recommended that the Provincial Government should enter into active co-operation with the Dominion Fuel Board for the purpose of exploring the possibility of an immediate development in the establishing of coking plants, that would use Nova Scotia coals, at certain points in the provinces of Quebec and Ontario.

Royal Commission on Maritime Claims, 1926

His Excellency the Governor General by Order in Council P.C. 505, dated April 7, 1926, provided for an inquiry by a Commission into Maritime Province grievances, and as a result of such inquiry the making of such specific recommendations as in the opinion of the Commissioners would result in affording relief from the conditions complained of.

The Commissioners so appointed were Sir Andrew Rae Duncan, Chairman, Hon. W. B. Wallace, and Professor Cyrus MacMillan.

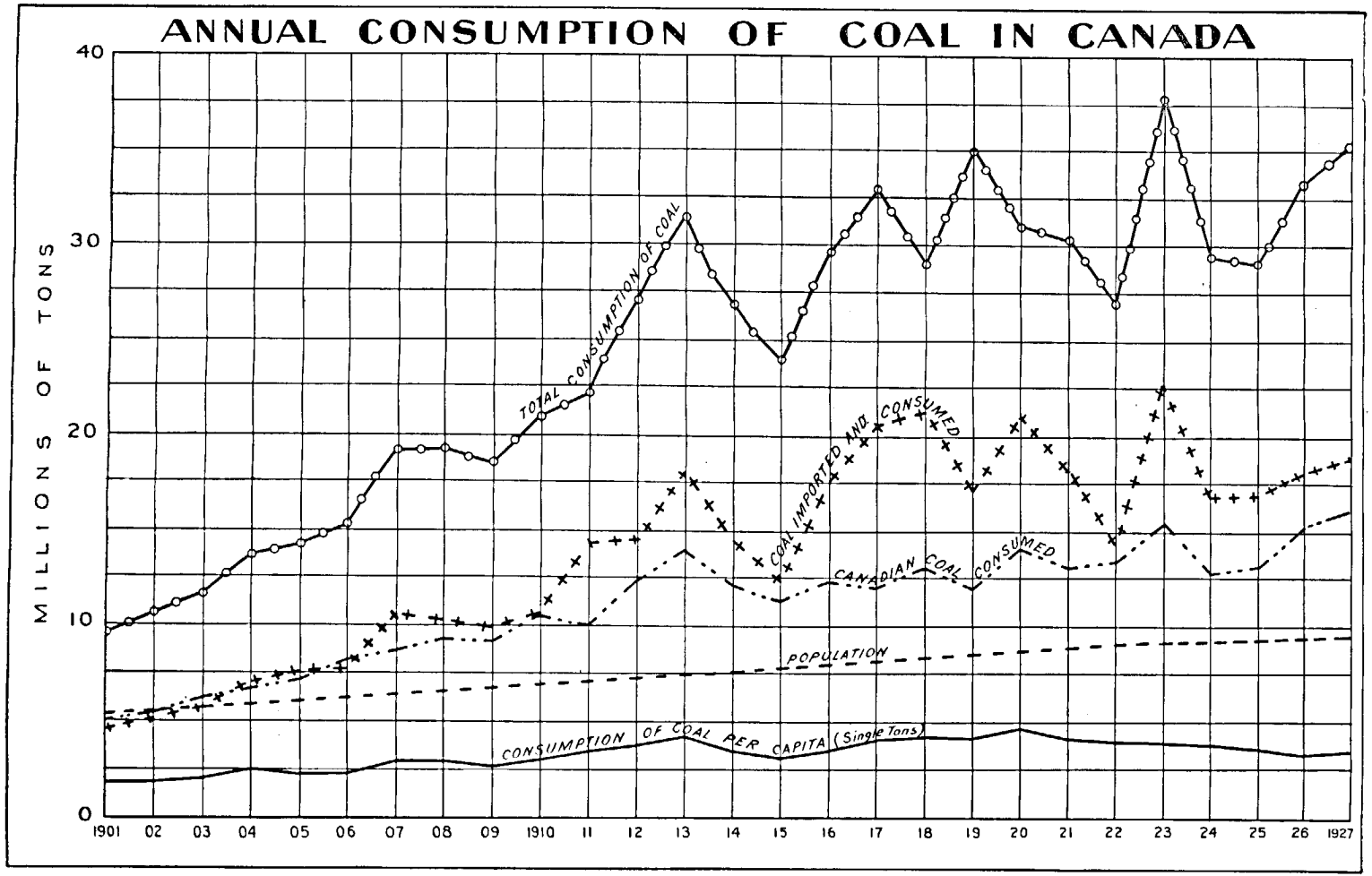
In regard to coal, the Commission heard evidence bearing on the question of Nova Scotia coals in the St. Lawrence markets, a complaint in this respect being in connexion with the short haul mileage rates charged by the railways for the western furtherance from Montreal of water-borne coal. The Committee pointed out in their report that this point is obviously a subject matter properly to be dealt with by the railways and by the Railway Commission.

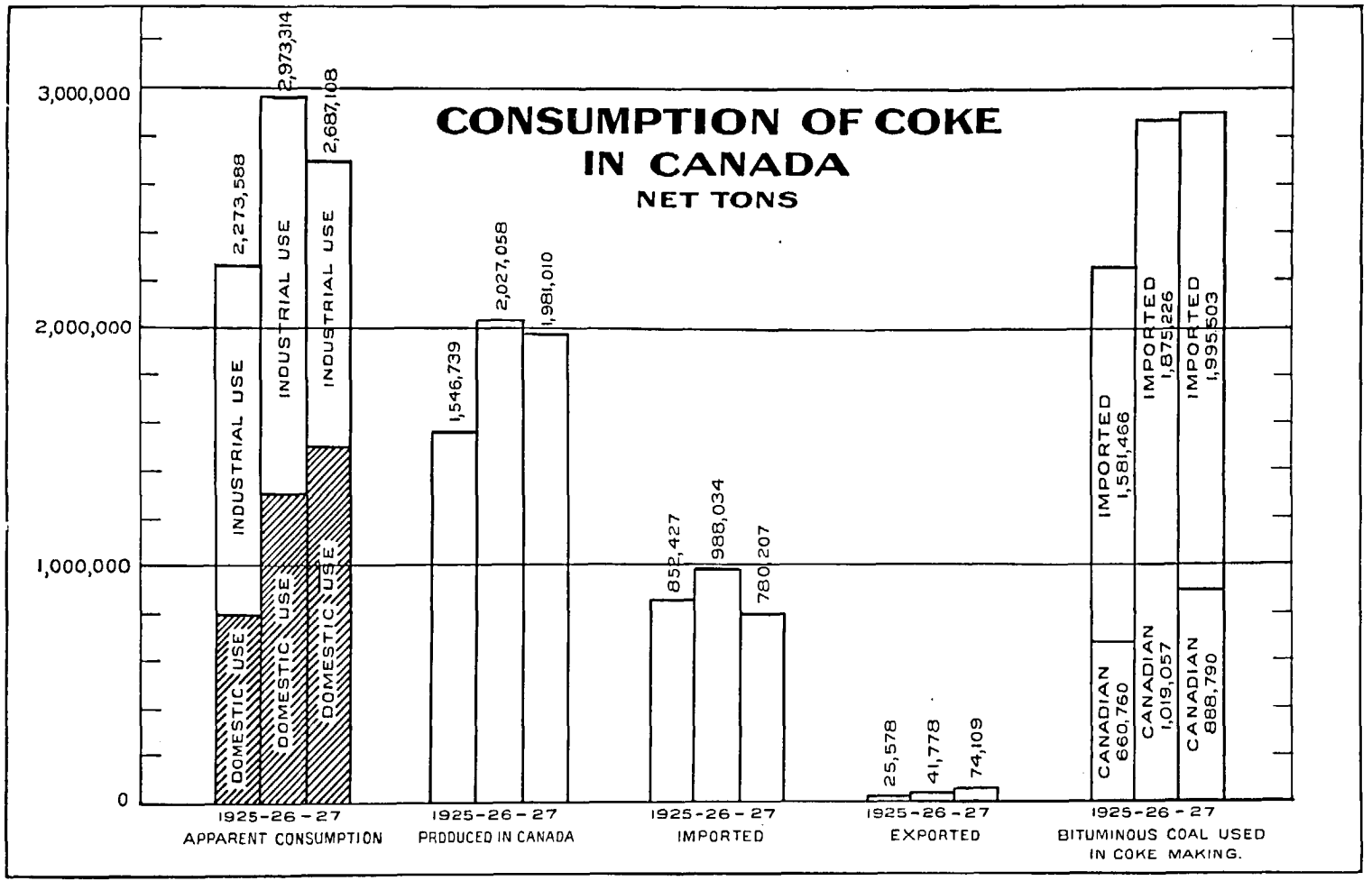
The Committee, in their report, supported the recommendation made by the Special Parliamentary Committee, 1926, that early consideration be given by the Government to the advisability of renewing the subvention, as made in 1924, payable to the railway companies conditional upon a reduction of the then existing rates for carrying coal.

In the matter of establishing coking plants which would receive assistance from the Dominion Government for the coking of Canadian coal, the Commission felt that it was of serious moment to the coal industry in the Maritime Provinces, and basing their recommendation on the Fuel Board's views of this question, urged that practical steps to that end be taken by the Federal authorities. The Domestic Fuel Act, heretofore mentioned, was the implementation of this recommendation.

The Commission also recommended that the Tariff Advisory Board be asked to give consideration to the question of the Customs tariff on coal, anthracite, and coke.

The report of the Commission was printed at the Dominion Government Printing Bureau in 1926.


ANNUAL CONSUMPTION OF COAL IN CANADA
MILLIONS OF TONS
40
30
20
10
0
TOTAL CONSUMPTION OF COAL
COAL IMPORTED AND CONSUMED
CANADIAN COAL CONSUMED
POPULATION
CONSUMPTION OF COAL PER CAPITA (Single Tons)
1901 02 03 04 05 06 07 08 09 1910 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 1927


CONSUMPTION OF COKE
IN CANADA
NET TONS
3,000,000
2,000,000
1,000,000
0
2,273,588
2,973,314
2,687,108
INDUSTRIAL USE
DOMESTIC USE
1,546,739
2,027,058
1,981,010
852,427
988,034
780,207
25,578
41,778
74,109
IMPORTED
1,581,466
IMPORTED
1,875,226
IMPORTED
1,995,503
CANADIAN
660,760
CANADIAN
1,019,057
CANADIAN
888,790
1925-26-27
APPARENT CONSUMPTION
1925-26-27
PRODUCED IN CANADA
1925-26-27
IMPORTED
1925-26-27
EXPORTED
1925-26-27
BITUMINOUS COAL USED
IN COKE MAKING.

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1928

DOMINION FUEL BOARD

CHART SHOWING

SUPPLY AND DISTRIBUTION OF COAL IN CANADA

ALSO IMPORTATIONS FROM

UNITED STATES AND GREAT BRITAIN

1923 TO 1927

All Figures are short tons

LEGEND

PRODUCED IN CANADA

IMPORTED:-
- FROM OTHER PROVINCES
- FROM GREAT BRITAIN
- FROM UNITED STATES

EXPORTED:-
- TO OTHER PROVINCES
- TO OTHER COUNTRIES
- AVAILABLE FOR CONSUMPTION

This chart is based on the following formula :-

Production + (Imports from Other Provs. + Imports from Great Britain + Imports from United States) − (Exports to Other Provs. + Exports to Other Countries) = Available for Consumption

ALBERTA

	1923	1924	1925	1926	1927
	107 6,854,290	— 5,189,729	— 5,869,031	— 6,503,705	— 6,329,366	Ant. Bit.
	18,054	23,485	34,553	28,145	40,927	Bit.
	— 1,110	— 1,209	30 1,175	— 1,515	— 1,324	Ant. Bit.
	1,934,086	1,828,766	1,956,739	2,091,668	2,253,654	Bit.
*	605	435	926	631	585	Bit.
	107 4,938,763	— 3,385,222	30 3,947,094	— 4,441,066	— 4,717,378	Ant. Bit.

* *Exports From Alberta are routed mainly via B.C. ports and so are not shown here but included in B.C. exports.*

BRITISH COLUMBIA & YUKON

	1923	1924	1925	1926	1927
	2,823,619	2,194,788	2,742,982	2,614,035	2,737,009	Bit.
	108,739	110,922	121,002	128,806	185,979	Bit.
	— 1	— —	— 18	4,992 768	3,766 25	Ant. Bit.
	174 20,254	687 49,043	228 57,912	210 42,896	46 33,444	Ant. Bit.
	62,151	50,989	78,514	78,498	93,128	Bit.
	838,017	383,135	507,543	431,071	515,140	Bit.
	174 2,052,399	687 1,922,422	246 2,336,575	5,202 2,277,239	3,812 2,348,189	Ant. Bit.

SASKATCHEWAN

	1923	1924	1925	1926	1927
	438,100	479,118	471,965	439,803	469,908	Bit.
	1,251,542	1,214,201	1,336,657	1,339,378	1,479,253	Bit.
	2,291 1,607	1,720 2,561	702 1,732	464 1,887	484 2,141	Ant. Bit.
	219,937	223,737	230,811	204,728	234,889	Bit.
	11,510	4,728	7,418	6,096	6,295	Bit.
	2,291 1,459,802	1,720 1,467,415	702 1,572,125	464 1,570,244	484 1,710,118	Ant. Bit.

MANITOBA & HEAD OF LAKES

	1923	1924	1925	1926	1927
	784,948	738,077	744,569	801,055	851,933	Bit.
	138,414 2,462,838	123,510 2,047,522	85,164 932,006	78,800 1,314,367	95,168 1,638,245	Ant. Bit.
	8,213	3,617	3,971	4,652	5,487	Bit.
	138,414 3,239,573	123,510 2,781,982	85,164 1,672,604	78,800 2,110,790	95,168 2,484,691	Ant. Bit.

ONTARIO
(Excepting Head of Lakes)

	1923	1924	1925	1926	1927
	77,766	28,077	32,793	77,289	27,419	Bit.
	2,244	8,095	20,564	12,589	10,494	Ant.
	3,059,964 11,717,298	2,591,710 8,833,935	2,182,717 9,100,462	2,444,280 10,531,095	2,113,072 11,663,542	Ant. Bit.
	877	—	—	600	410	Bit.
	3,062,208 11,794,187	2,599,805 8,862,012	2,203,281 9,133,255	2,458,674 10,607,784	2,123,566 11,690,551	Ant. Bit.

QUEBEC

	1923	1924	1925	1926	1927
	1,540,284	1,655,767	811,764	1,968,546	2,307,185	Bit.
	205,058 2,37,496	229,142 39,842	478,223 38,264	207,869 3,065	719,682 140,267	Ant. Bit.
	1,611,351 2,922,991	1,090,571 1,525,516	896,946 2,530,661	1,253,246 1,793,990	952,837 1,572,692	Ant. Bit.
	3	9,005	11	675	91	Bit.
	1816,409 4,700,770	1,319,713 3,212,120	1,375,169 3,380,678	1,544,590 3,764,926	1,672,519 4,020,053	Ant. Bit.

NOVA SCOTIA

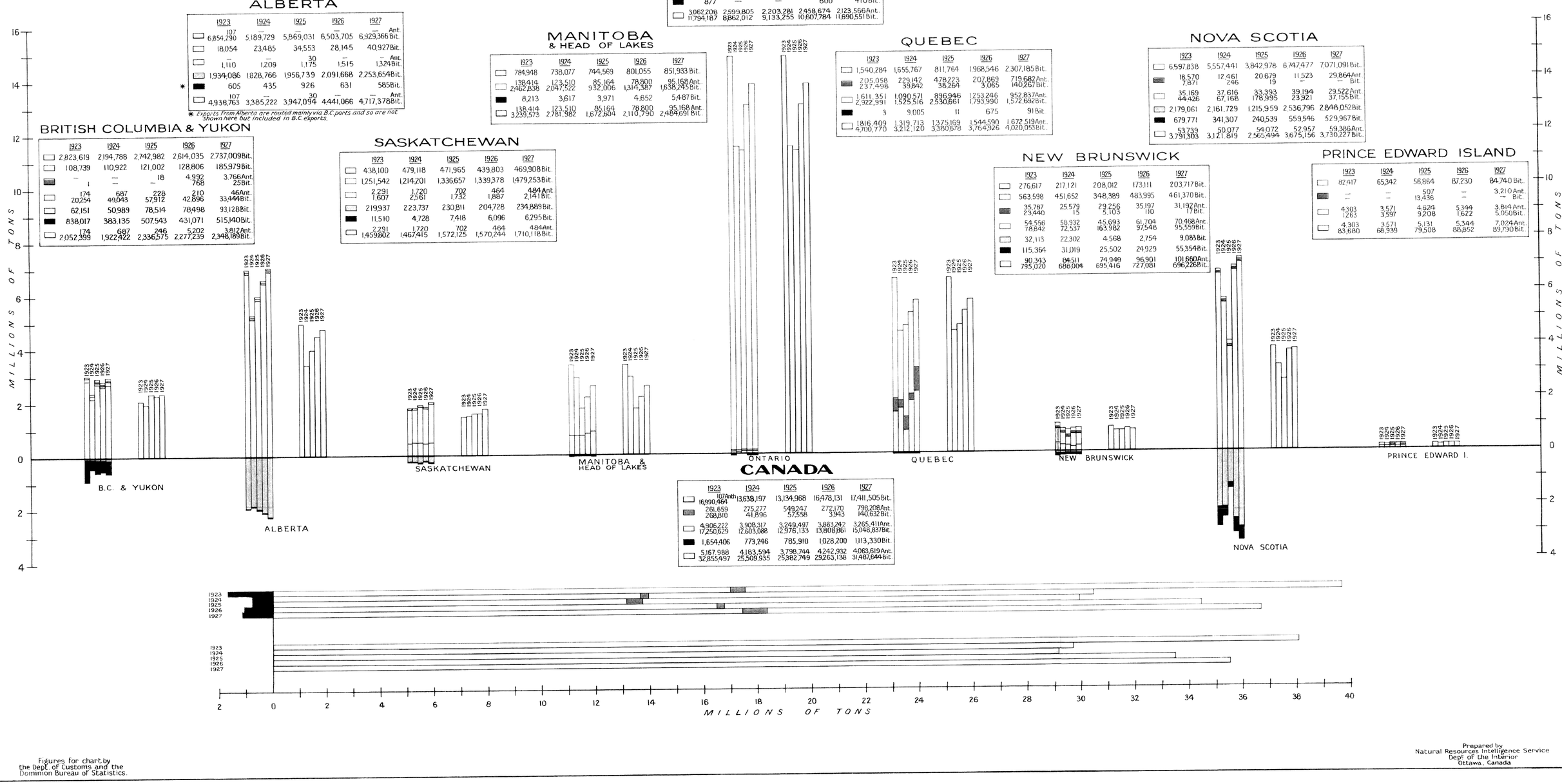
	1923	1924	1925	1926	1927
	6,597,838	5,557,441	3,842,978	6,747,477	7,071,091	Bit.
	18,570 7,871	12,461 246	20,679 19	11,523 —	29,864 —	Ant. Bit.
	35,169 44,426	37,616 67,168	33,393 178,995	39,194 23,921	29,522 37,155	Ant. Bit.
	2,179,061	2,161,729	1,215,959	2,536,796	2,848,052	Bit.
	679,771	341,307	240,539	559,546	529,967	Bit.
	53,739 3,791,303	50,077 3,121,819	54,072 2,565,494	52,957 3,675,156	59,386 3,730,227	Ant. Bit.

NEW BRUNSWICK

	1923	1924	1925	1926	1927
	276,617	217,121	208,012	173,111	203,717	Bit.
	563,598	451,652	348,389	483,995	461,370	Bit.
	35,787 23,440	25,579 15	29,256 2,103	35,197 110	31,192 17	Ant. Bit.
	54,556 78,842	58,932 72,537	45,693 163,982	61,704 97,548	70,468 95,559	Ant. Bit.
	32,113	22,302	4,568	2,754	9,083	Bit.
	115,364	31,019	25,502	24,929	55,354	Bit.
	90,343 795,020	86,511 688,004	74,949 695,416	96,901 727,081	101,660 696,226	Ant. Bit.

PRINCE EDWARD ISLAND

	1923	1924	1925	1926	1927
	82,417	65,342	56,864	87,230	84,740	Bit.
	— —	— —	507 13,436	— —	3,210 —	Ant. Bit.
	4,303 1,263	3,571 3,597	4,624 9,208	5,344 1,622	3,814 5,050	Ant. Bit.
	4,303 83,680	3,571 68,939	5,131 79,508	5,344 88,852	7,024 89,790	Ant. Bit.



CANADA

	1923	1924	1925	1926	1927
	107 Anth 16990,464	13,638,197	13,134,968	16,478,131	17,411,505	Bit.
	261,659 268,810	275,277 41,896	549,247 57,558	272,170 3,943	798,208 140,632	Ant. Bit.
	4,906,222 17,250,629	3,908,317 12,603,088	3,249,497 12,976,133	3,883,242 13,808,861	3,265,411 15,048,837	Ant. Bit.
	1,654,406	773,246	785,910	1,028,200	1,113,330	Bit.
	5,167,988 32,855,497	4,183,594 25,509,935	3,798,744 25,382,749	4,242,932 29,263,138	4,063,619 31,487,644	Ant. Bit.

Figures for chart by the Dept. of Customs and the Dominion Bureau of Statistics.

Prepared by
Natural Resources Intelligence Service
Dept of the Interior
Ottawa, Canada

COAL FREIGHT RATES

IN FORCE OCTOBER, 1928

COMPILED WITH THE CO-OPERATION OF CANADIAN NATIONAL AND CANADIAN PACIFIC RAILWAYS

U.S.A. COAL FIELDS (BITUMINOUS)

Pittsburgh to

	Miles		Miles	
Belleville	390	$ 3 74	Massena	295	$ 3 07
Buffalo	174	2 24	Montreal	477	4 38
Cobourg	350	3 74	Ottawa	500	4 28
Guelph	315	3 64	Owen Sound	398	3 94
Hamilton	230	3 14	Prescott	300	3 51
Hawkesbury	490	4 45	Quebec	370	5 35
Huntington	380	4 38	Rouse Point	425	4 23
Kingston	405	4 04	Shawinigan Falls	530	4 79
London	390	3 64	Toronto	275	3 24

Greensburg to

	Miles		Miles	
Belleville	499	$ 3 74	Massena	897	$ 3 34
Buffalo	270	2 24	Montreal	720	4 10
Cobourg	450	3 74	Ottawa	633	4 01
Detroit	318	2 60	Owen Sound	508	3 94
Guelph	440	3 64	Prescott	551	3 24
Hamilton	349	3 14	Quebec	881	5 08
Hawkesbury	693	4 20	Rouse Point	688	3 98
Huntington	504	4 10	Shawinigan	814	4 52
Kingston	549	4 01	Toronto	386	3 24
London	425	3 64	Windsor	320	3 30

PENNSYLVANIA AND OHIO COAL TO BUFFALO, DETROIT, AND CANADIAN POINTS

Connelsville, Pa., to

	Miles	
Buffalo	325	$2 39
Detroit	373	2 60
Quebec	936	5 21
Montreal	765	4 23
Toronto	431	3 39
Hamilton	393	3 29
Windsor	327	3 30

Bellaire, Ohio, to

	Miles	
Buffalo	340	$ 2 24
Detroit	329	2 10
Quebec	951	6 04
Montreal	780	4 94
Toronto	446	3 24
Hamilton	408	3 14
Windsor	342	2 80

From Clearfield

	Miles		Miles	
Montreal	561	$ 4 01	Hamilton	253	$ 3 28
Cochrane	759	6 57	Toronto	291	3 38
Cornwall	492	3 92	Timmins	763	6 57
Hawkesbury	531	4 10	Renfrew	526	4 54
Kingston	388	4 27	Sherbrooke	612	4 55
North Bay	507	4 87	Valleyfield	415	4 01
Ottawa	473	3 92			

WEST VIRGINIA COAL FIELDS TO U.S. AND CANADIAN POINTS

Wheeling to

	Miles	
Buffalo	336	$ 2 24
Detroit	361	2 60
Hamilton	404	3 14
Quebec	947	6 04
Montreal	776	4 94
Toronto	442	3 24
Windsor	363	3 30

Bluefield to

	Miles	
Buffalo	738	$ 3 48
Detroit	506	2 85
Hamilton	702	4 25
Quebec	1,244	6 85
Montreal	1,074	5 75
Toronto	740	4 25
Windsor	508	3 55
Ottawa	970	5 75

Charleston to

	Miles	
Buffalo	621	$ 3 28
Detroit	389	2 60
Quebec	1,127	6 60
Montreal	957	5 50
Toronto	623	4 00
Hamilton	585	4 00
Windsor	391	3 30

West Virginia, Kentucky, and Pennsylvania Coal for Shipment up the Great Lakes

New River, Pocahontas, etc., to Toledo and Sandusky	$ 2 06
Kanawha, Logan, and Kentucky to Toledo and Sandusky	1 81
Pittsburgh to Toledo and Sandusky	1 46

West Virginia Coal Fields and Kentucky Coal Fields to Hampton Roads

New River, Pocahontas, etc., to Hampton Roads (Tidewater)	$ 2 25
Kanawha and Logan, etc., to Hampton Roads	2 34
Kentucky Division to Hampton Roads	2 43

Current Ocean Rates by Chartered Vessels

Hampton Roads to New York	$ 0 75
Hampton Roads to New England	0 85
Hampton Roads to Montreal, 1,619 miles	0 90—1 10
Swansea to St. Lawrence ports	1 50—2 50

MARITIME PROVINCES COAL FIELDS TO ONTARIO AND QUEBEC

	Miles		Miles		Miles		Miles		Miles	
Maccan to Quebec	547	$ 2 30	to Montreal	670	$ 3 10	to Ottawa	786	$ 4 40	to Toronto	1,004	$ 6 00	to Hamilton	1,043	$ 6 10
Springhill "	538	2 30	"	661	3 10	"	775	4 40	"	995	6 00	"	1,034	6 10
Westville "	627	2 60	"	769	3 30	"	885	4 60	"	1,103	6 20	"	1,142	6 30
Thorburn "	635	2 60	"	777	3 30	"	893	4 60	"	1,111	6 20	"	1,150	6 30
Point Tupper "	721	3 20	"	862	3 80	"	978	5 10	"	1,196	6 70	"	1,235	6 80
Sydney "	823	3 20	"	964	3 80	"	1,080	5 10	"	1,298	6 70	"	1,337	6 80
Minto "	406	3 50	"	492	2 60	"	603	3 10	"	832	4 60	"	872	4 80

ALBERTA COAL FIELDS TO POINTS IN ONTARIO

	Miles		Miles		Miles		Miles		Miles	
Brazeau to Cochrane	1,749	$ 10 60	to North Bay	1,987	$ 11 70	to Toronto	2,281	$ 13 50	Evansburg to Cochrane	1,634	$ 10 10	to North Bay	1,873	$ 11 20
Heatburg "	1,602	10 00	"	1,841	11 10	"	2,135	12 90	Tofield "	1,529	9 60	"	1,768	10 70
Coalspur "	1,731	10 30	"	1,980	11 40	"	2,264	13 20	Beynon "	1,574	9 80	"	1,813	10 90

Evansburg to Toronto, 2,167 miles, $13.00. Tofield to Toronto, 2,061 miles, $12.50. Beynon to Toronto, 2,107 miles, $12.70.

	Miles			Miles			Miles			Miles	
Blairmore to White River	1,511	$ 9 20	+$1 50 car	Lethbridge to White River	1,427	$ 8 90	Medicine Hat to White River	1,326	$ 8 60	Canmore to White River	1,561	$ 9 40
Blairmore to Sudbury	1,813	10 50	"	Lethbridge to Sudbury	1,730	10 20	Medicine Hat to Sudbury	1,628	9 90	Canmore to Sudbury	1,863	10 70
Blairmore to Toronto	2,073	12 70	"	Lethbridge to Toronto	1,989	12 40	Medicine Hat to Toronto	1,888	12 10	Canmore to Toronto	2,123	12 90
Drumheller to White River	1,545	9 20		Drumheller to Sudbury	1,847	10 50				Drumheller to Toronto	2,107	12 70

BITUMINOUS COAL

From Montreal

	Miles		Miles	
Cochrane	611	$ 4 00	Toronto	334	$ 2 90
Cornwall	68	1 00	Timmins	601	4 38
Hawkesbury	78	1 00	Actonvale	54	1 00
Kingston	175	1 50	Drummondville	65	1 20
North Bay	340	2 90	St. Johns	28	0 90
Ottawa	116	1 30	Sherbrooke	101	1 30
Renfrew	171	2 00	Valleyfield	43	1 00

U.S.A. ANTHRACITE

Scranton, Lehigh, Wyoming Mines to

	Miles	Egg, stove. nut	Pea	Buckwheat No. 1	Smaller sizes
Montreal	405	$ 4 42	$ 4 06	$ 3 73	$ 3 06
Ottawa	439	4 67	4 31	3 91	3 23
Quebec	575	4 93	4 67	4 55	3 77

	Miles	Prepared sizes	Smaller sizes
Buffalo		$ 2 93	$ 2 48
Windsor	622	4 54	4 09
London	510	4 40	3 95
Hamilton	430	3 87	3 42
Toronto	470	4 08	3 63

ALL NET TONS

STATEMENT SHOWING THE DISTRIBUTION OF FUELS SOLD FOR DOMESTIC PURPOSES DURING CALENDER YEAR 1926 —IN ONTARIO AND QUEBEC

(FUELS SOLD FOR THE HEATING OF PUBLIC BUILDINGS, OTHER THAN INDUSTRIAL, ALSO INCLUDED)

(According to returns received direct from coal dealers)

(SHORT TONS)

Subdivision, district, or area	Port Arthur, Fort William, Sault Ste. Marie	Sudbury, Cobalt, Cochrane	Kincardine, Orillia, Parry Sound	Windsor, London, Woodstock, Goderich	Brantford, Niagara Falls, Guelph	Toronto (York, Halton and Peel counties)	Peterborough, Belleville, Kingston	Brockville, Ottawa, Pembroke	Total, Ontario	Hull, Ville Marie, and western Quebec	Three Rivers, Shawinigan Falls, Grand'Mère	Island of Montreal	Valleyfield, St. Johns, Sherbrooke	Lévis, Rimouski,	Quebec city and lake St. John	Total, Quebec
Municipalities covered	10	19	66	125	104	73	62	68	527	10	32	22	82	19	12	177
Dealers: Reporting sales	28	32	88	244	203	197	113	123	1,028	9	41	239	123	23	25	460
ANTHRACITE COAL—																
United States*	24,461	26,249	70,073	294,232	393,944	766,520	148,637	223,783	1,947,899	7,613	35,909	436,173	83,432	12,392	86,400	661,919
United States†	263	318	534	3,842	26,311	29,429	2,968	7,576	71,241	1,690	1,585	78,368	5,386	2,970	5,955	95,954
British*		450				10,136	495	19,623	30,704	353	863	118,011	17,657	557	13,646	151,087
British†					61			1,467	1,528		6	22,618	289		2,305	25,218
Dutch and German*								a 242	a 242			b 1,927	c 111			2,038
BITUMINOUS COAL—																
U.S. Steam	37,189	16,091	19,843	112,714	107,772	277,369	32,540	62,914	666,432	1,141	17,791	198,325	18,658	3,622	42,940	282,477
U.S. Smokeless	34,504	13,690	4,340	47,362	37,941	220,493	7,080	7,254	372,664	104	252	10,411	1,562	241	585	13,155
CANADIAN COAL—																
Alberta—																
Sub-bituminous a	718	32		348	98	b 136			b 1,332							
Domestic (Drumheller)	6,049	1,021	2,166	5,988	6,094	3,038	2,557	1,036	27,949							
" (all other points) c	d 1,133	137	556	943	797	290	931	203	d 4,990			403				403
Nova Scotia—Bituminous								24,000	24,000		e 2,028	151,740	5,804	f 3,270	51,960	214,802
CANADIAN	7,900	1,190	2,722	7,279	6,989	3,464	3,488	25,239	58,271		2,028	152,143	5,804	3,270	51,960	215,205
BY-PRODUCT COKE—																
Besco—N.S.								3,908	3,908		1,374	52,208	2,142	613	4,072	60,409
H. B-P. Co.—Ham., Ont.		869	2,940	7,306	53,255	17,027	5,323	6,270	92,990			298	26			324
Stelco—Ham., Ont.		100	1,770	3,163	24,878	12,011	1,770	2,857	46,549			125				125
Soo—Ont.	30,458	1,735	135	31	350	12,628	65	2,045	47,445			5,000				5,000
Other	50			12,146					12,196			418				418
CANADIAN	30,508	2,704	4,843	22,646	78,483	41,666	7,158	15,080	203,088		1,374	58,049	2,168	613	4,072	66,276
United States	4,868	423	11,788	103,294	67,043	180,484	14,461	16,721	399,082	910	18	1,458	33			2,419
German										250	215	7,281				7,746
British or Scotch												264	26			290
IMPORTED	4,868	423	11,788	103,294	67,043	180,484	14,461	16,721	399,082	1,160	233	9,003	59			10,455
GAS COKE—																
Ontario			1,373	12,029	3,490	60,688	353	18,062	95,995	50						50
Quebec								245	245	183	1,086	31,307	1,302	54	154	34,086
British							30		30		206	1,372				1,578
German											125		23			148
United States				738					738			210				210
			1,373	12,767	3,490	60,688	383	18,307	97,008	233	1,417	32,889	1,325	54	154	36,072
OTHER FUELS—																
Briquettes—																
Canadian			100	101	54	17,915	13		18,183							
United States	622		500	1,395	1,773	3,503	34		7,827			633	310			943
British (Welsh)						214		1,514	1,728	340	94	2,552	238		184	3,408
Charcoal—Canadian			5	20	1,987	7,158		542	9,712		2	15,711	79		f 131	15,923
Cannel coal—United States	187	100	280	3,367	2,104	9,532	890	1,264	17,724	3	85	1,606	91	50	138	1,973
TOTAL ABOVE FUELS	140,502	61,215	116,401	609,019	727,952	1,628,571	218,147	401,526	3,903,333	12,637	61,639	1,138,419	137,169	23,769	208,470	1,582,103
ELECTRIC ENERGY—Kw. hours	33,681,000	13,318,000	24,490,000	99,742,000	122,421,000	158,266,000	12,953,000	67,021,000	531,892,000							231,333,000
FUEL OIL—Imp. gallons									12,225,000							15,909,000
MANUFACTURED GAS—M cu. ft.	23,131		24,768	296,572	64,275	4,511,723	174,660	265,224	6,400,353			3,542,657	52,000		255,000	3,849,657
NATURAL GAS—M cu. ft.			650	3,977,395	1,749,552				5,727,597							

*Domestic sizes. †Buckwheat and smaller sizes. a: Of which 112 tons are Dutch coal. b: Of which 1,106 tons are Dutch coal. c: All Dutch coal.

a: From Coalspar, Foothills, and Saunders. b: Includes small tonnage of bituminous from Brûlé. c: Principally from Evansburg, Wabamum, Edmonton, Clover Bar, Carbon, Three Hills, and Lethbridge. d: Includes a small tonnage from Saskatchewan. e: Of which 28 tons are from New Brunswick. f: Of which 41 tons are from New Brunswick.

f: Very small portion only; balance included with Island of Montreal.

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