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DEPARTMENT OF MINES
HON. W. A. GORDON, MINISTER — CHARLES CAMSELL, DEPUTY MINISTER

MINES BRANCH
JOHN MCLEISH, *Director*

DIVISION OF FUELS AND FUEL TESTING
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COMPILED BY
J. H. H. Nicolls and C. B. Mohr

OTTAWA
J. O. PATENAUDE
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1935

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CONTENTS

ANALYSES OF COALS AND OTHER SOLID FUELS, 1932, 1933, and 1934

The solid fuel analyses compiled here are those of samples of general interest received during 1932 and 1933 and up to June 30, 1934, and in most cases only such data as were requested by the persons submitting the samples are shown. They are tabulated under the three following group headings:—

(1) Coals and other solid fuels occurring in Canada.

(2) Coal samples submitted by the Department of Pensions and National Health.

(3) Miscellaneous solid fuels.

The first group of fuels (Table I) contains a number of "mine" or "prospect" samples. Many of these were collected by technical officers of either the Federal or Provincial governments. The "mine" samples were procured from deposits already under development; the "prospect" samples from deposits as yet undeveloped. A number of "commercial" samples occur in the first group; each of these is considered to be indicative of the corresponding product as shipped from the mine.

As a general rule "mine" and "prospect" samples contain less ash and have higher calorific values than would the corresponding "commercial" samples. This is due to the fact that, in ordinary mining practice, it is very difficult to exclude impurities as thoroughly as would be done in collecting the small "mine" samples. Therefore, in using the following tables in connection with the sale or purchase of coal, care should be taken to note whether the samples are "mine" or "commercial" (the latter term including "slack", "run-of-mine", and the various sizes of screened coal), and to judge therefrom whether any particular coal as shipped from the mine could reasonably be expected to have as good an analysis as that given in the table. It should also be realized that, generally speaking, "slack" coal will contain more moisture and ash and have a lower calorific value than the corresponding screened coal, and that "run-of-mine" coal will be intermediate between the two.

The second group of fuels (Table II) consists entirely of bituminous coals purchased by the Department of Pensions and National Health for use in the heating plants of its various hospitals. These include both Canadian and United States coals. They are all "commercial" samples, and consist principally of "slack" coal. The samples were collected entirely by the engineers at the various heating plants, following instructions sent out by their headquarters after consultation with the staff of the Fuel Research Laboratories. According to the procedure employed in reporting

these samples to the Department of Pensions and National Health, only the moisture contents (which may vary with weather conditions) are shown on the "as-received" basis, the remainder of the analyses being reported on the "dry" basis in order to simplify comparisons between the different coal samples.

The third group of fuels (Table III) consists of imported coals, such as are sold by local dealers for heating either private residences or public buildings, or for various industrial purposes. In addition, it includes a number of cokes obtained from manufacturers, importers, or dealers. These are all "commercial" samples. Finally, the third group contains some processed fuels, including petroleum coke and various kinds of briquettes (which are now available to a greater extent than previously), hardwood charcoal and various kinds of firewood.

Wherever possible, the exact date of sampling is given, or at least the month during which the sample was taken. However, in some few cases this information was not available, and the dates upon which the samples were received at the laboratory are shown.

The following notes explain abbreviations in the tables, and may be of assistance in studying them.

(a) Figures in columns "R" refer to fuels as received; in columns "AD" to air-dried fuels; and in columns "D" to those dried at 108°C. It may be generally accepted that the fuels were analysed as received, except in the instances where the "AD" columns are included. In such cases the fuels were analysed following air-drying in the standard apparatus.[1] The analyses of the high-moisture "slack" coals do not include the "AD" column, since this information was not considered to be of any particular interest, although it is obvious that the fuels could not have been ground for analyses without previous drying.

(b) The "coking properties" described were obtained by heating one-gramme samples in closed platinum crucibles during the determination of volatile matter. The terms "non-coking" ("non-agglomerating"), "poor", "fair", or "good", are used to indicate general coking properties, and serve to differentiate between the non-coking or poorly coking coals, and those that will produce oven coke that will grade as fair or better. They do not necessarily predict correctly the grade of coke that can be produced commercially.

[1] Report of Scientific and Industrial Research Council of Alberta, 1923, p. 30.

TABLE I

Analyses of Solid Fuels Occurring in Canada

NOVA SCOTIA

	Dominion Steel and Coal Corporation, Limited, Montreal — Coal samples from the Sydney area, supplied to:—											
	Penitentiary at St. Vincent de Paul, Que.		Industrial Plant, Hull, Que.		Industrial Plant, Ottawa, Ont.		Department of National Defence at Ottawa				Department of Public Works	
Sample No	13229		11234		10630*		12432		12433		12628	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	2·1	....	2·0	....	2·3	....	4·4	....	2·2	....	2·0	....
Ash..... "	8·3	8·5	8·4	8·6	5·8	5·9	7·3	7·6	7·5	7·7	8·2	8·4
Volatile matter..... "	33·4	34·1	31·9	32·6	35·3	36·2	32·8	34·3	32·9	33·6	33·2	33·8
Fixed carbon..... "	56·2	57·4	57·7	58·8	56·6	57·9	55·5	58·1	57·4	58·7	56·6	57·8
Ultimate Analysis—												
Carbon.....per cent	....	....	....	....	77·6	79·5	....	....	....	....	....	....
Hydrogen..... "	....	....	....	....	5·3	5·2	....	....	....	....	....	....
Ash..... "	....	....	....	....	5·8	5·9	....	....	....	....	....	....
Sulphur..... "	4·0	4·1	3·4	3·5	1·5	1·5	2·7	2·8	2·8	2·9	2·8	2·8
Nitrogen..... "	....	....	....	....	1·7	1·7	....	....	....	....	....	....
Oxygen..... "	....	....	....	....	8·1	6·2	....	....	....	....	....	....
Calorific Value—												
Calories per gramme, gross	7,570	7,730	7,575	7,730	7,820	8,010	7,245	7,575	7,650	7,825	7,570	7,725
B.T.U. per pound, gross	13,620	13,910	13,640	13,910	14,070	14,410	13,040	13,640	13,770	14,080	13,630	13,910
Fuel ratio	1·70		1·80		1·60		1·70		1·75		1·70	
Carbon-hydrogen ratio	....	....	....	....	14·6	15·4	....	....	....	....	....	....
Coking properties	Good		Good		Fair		Fair		Good		Good	
Softening temperature of ash.....°F.	....		....		1970		2000		1990		1920	
Designation of coal	.....		.....		Prepared run-of-mine		"Besco", Sydney Mines		"Old Sydney", Sydney Mines		.....	
Kind of sample	Commercial; 200 tons		Commercial....		Commercial; 3 cars		Commercial; 30 tons		Commercial; 1 ton		Commercial	
Taken by	Departmental employees		.....		Staff of Fuel Research Laboratories		Departmental employees.....					
Date of sampling	June, 1934.....		Oct. 5, 1932.....		April, 1932.....		September, 1933		.....		December, 1933	

*Screen analysis of sample No. 10630 (square screen openings), per cent: On 2″=10·6, 2″ to 1″=33·2, 1″ to ¾″=16·2, ¾″ to ½″=7·7, ½″ to ¼″=12·3, ¼″ to ⅛″=7·2, per ⅛″=12·8.

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NOVA SCOTIA—Continued

—	Dominion Steel and Coal Corporation, Limited, Montreal "Steam lump" coal from the Sydney area, supplied to the Mines Branch Laboratories, Ottawa, through the Department of Public Works													
Sample No.	10664		11521		11662		12028		12567		12716		12787	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture...per cent	2·8	....	2·1	....	2·1	....	2·0	....	1·9	....	4·0	....	3·1	....
Ash... "	8·7	9·0	8·1	8·3	8·4	8·6	8·6	8·8	9·1	9·3	8·7	9·0	9·0	9·3
Volatile matter... "	35·8	36·8	33·6	34·3	35·1	35·8	32·8	33·5	35·4	36·1	33·0	34·4	31·6	32·6
Fixed carbon... "	52·7	54·2	56·2	57·4	54·4	55·6	56·6	57·7	53·6	54·6	54·3	56·6	56·3	58·1
Ultimate Analysis—														
Sulphur...per cent	2·4	2·5	1·9	1·9	2·5	2·6	2·5	2·6	2·2	2·3	3·5	3·6	2·1	2·2
Calorific Value—														
Calories per gramme, gross	7,430	7,645	7,615	7,780	7,520	7,680	7,610	7,765	7,565	7,710	7,385	7,695	7,555	7,800
B.T.U. per pound, gross...	13,370	13,760	13,710	14,010	13,540	13,820	13,700	13,980	13,620	13,880	13,290	13,850	13,600	14,040
Fuel ratio	1·45		1·70		1·55		1·75		1·50		1·65		1·80	
Coking properties	Fair		Good		Good		Good		Good		Good		Good	
Softening temperature of ash...°F											1985		2190	
Screen analysis (square screen openings)...per cent					On 2"	=39·2	On 2"	=38·6	On 2"	=38·0	On 2"	=20·0	On 2"	=19·8
					2 " to 1½"	=17·7	2 " to 1½"	=14·8	2 " to 1½"	=20·6	2 " to 1½"	=12·7	2 " to 1½"	=15·4
					1½" to 1 "	=16·5	1½" to 1 "	=11·4	1½" to 1 "	=15·4	1½" to 1 "	=15·6	1½" to 1 "	=26·7
					1 " to ¾"	= 8·9	1 " to ¾"	= 7·3	1 " to ¾"	= 8·4	1 " to ¾"	=14·6	1 " to ¾"	= 9·2
					¾" to ½"	= 5·5	¾" to ½"	= 7·8	¾" to ½"	= 6·5	¾" to ½"	=13·2	¾" to ½"	=11·1
					per ½"	=12·2	per ½"	=20·1	per ½"	=11·1	per ½"	=23·9	per ½"	=17·8
Kind of sample	Commercial													
Taken by	Staff of Fuel Research Laboratories													
Date of sampling	April 1 to 14, 1932		During November, 1932		During February, 1933		During April, 1933		During November, 1933		During January, 1934		During March, 1934	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NOVA SCOTIA—Continued

—	Dominion Steel and Coal Corporation, Limited, Montreal Coal samples from the Sydney area supplied to:—																			
	Mines Branch Laboratories, Ottawa, through the Department of Public Works												Central Heating Plant, Dept. of Public Works, Ottawa		Provincial Parliament Buildings, Toronto, Ont.	
Sample No	10676		11433		11584		11755		12620		12756		12546		11609*	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—																
Moisture.....per cent	7·2	....	6·1	....	3·8	....	8·5	....	5·5	....	7·1	....	2·5	....	5·8	....
Ash..... "	7·5	8·1	7·2	7·7	8·0	8·3	7·4	8·1	8·0	8·4	7·8	8·4	8·7	9·0	7·6	8·1
Volatile matter..... "	29·7	32·0	31·7	33·7	31·8	33·1	30·2	33·0	32·9	34·8	30·8	33·2	32·1	32·9	31·1	33·0
Fixed carbon..... "	55·6	59·9	55·0	58·6	56·4	58·6	53·9	58·9	53·6	56·8	54·3	58·4	56·7	58·1	55·5	58·9
Ultimate Analysis—																
Sulphur.....per cent	2·2	2·4	2·6	2·8	2·8	2·9	2·4	2·7	2·8	3·0	2·8	3·0	3·2	3·2	2·7	2·9
Calorific Value—																
Calories per gramme, gross.....	7,155	7,710	7,255	7,730	7,435	7,725	7,060	7,715	7,290	7,715	7,275	7,830	7,580	7,780	7,265	7,710
B.T.U. per pound, gross.....	12,880	13,880	13,060	13,910	13,380	13,900	12,700	13,890	13,120	13,890	13,100	13,100	13,650	14,000	13,080	13,880
Fuel ratio.....	1·85		1·75		1·75		1·80		1·65		1·75		1·75		1·80	
Coking properties.....	Good		Good		Good		Good		Good		Good		Good		Good	
Softening temperature of ash.....°F											2030				1875	
Screen analysis (square openings).....per cent					On $\frac{2}{4}$" = 1·0 $\frac{2}{4}$" to $\frac{1}{2}$" = 3·1 $\frac{1}{2}$" to $\frac{1}{4}$" =18·7 $\frac{1}{4}$" to $\frac{1}{8}$" =26·8 per $\frac{1}{8}$" =50·4		On 1" = 0·5 1" to $\frac{3}{4}$" = 2·2 $\frac{3}{4}$" to $\frac{1}{2}$" = 5·4 $\frac{1}{2}$" to $\frac{1}{4}$" =23·4 $\frac{1}{4}$" to $\frac{1}{8}$" =23·4 per $\frac{1}{8}$" =45·1	On 1" = 1·5 1" to $\frac{3}{4}$" = 5·3 $\frac{3}{4}$" to $\frac{1}{2}$" =10·3 $\frac{1}{2}$" to $\frac{1}{4}$" =26·7 $\frac{1}{4}$" to $\frac{1}{8}$" =18·0 per $\frac{1}{8}$" =38·2	On $\frac{3}{4}$" = 1·3 $\frac{3}{4}$" to $\frac{1}{2}$" = 3·5 $\frac{1}{2}$" to $\frac{1}{4}$" =21·3 $\frac{1}{4}$" to $\frac{1}{8}$" =25·5 per $\frac{1}{8}$" =48·4			On $\frac{3}{4}$" = 1·0 $\frac{3}{4}$" to $\frac{1}{2}$" = 2·7 $\frac{1}{2}$" to $\frac{1}{4}$" =19·9 $\frac{1}{4}$" to $\frac{1}{8}$" =26·6 per $\frac{1}{8}$" =49·8	
Designation of coal.....	Slack														$\frac{3}{4}$-inch nut slack	
Kind of sample.....	Commercial															
Taken by.....	Staff of Fuel Research Laboratories												Departmental employees		C. E. Baltzer, F.R.L.	
Date of sampling.....	April 16 to 30, 1932		During November, 1932		During January, 1933		During March, 1933		During December, 1933		During February, 1934		November, 1933		February 7, 1933	

*Ash analysis of sample No. 11609, per cent: Silica, 28·4; ferric oxide, 34·7; alumina, 15·9; calcium oxide, 7·3; magnesium oxide, 1·0; sulphur trioxide, 9·1; phosphorus pentoxide, 0·2.

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NOVA SCOTIA—Continued

—	Dominion Steel and Coal Corporation, Limited, Montreal						"Indian Cove" coal		"Bras d'Or" coal		"Inverness" coal	
	Dominion No. 12 colliery, Victoria seam, New Waterford, Sydney area		Same coal cleaned in a Baum wet washery at the steel plant, Sydney		Washed New Waterford coal delivered in Montreal		Supplied to the Department of Public Works					
Sample No.	10812*		10902		11106		12650		12651		12640	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	2·1	....	2·0	....	2·2	....	3·2	....	3·9	....	5·5	....
Ash..... "	5·3	5·4	2·6	2·6	2·9	3·0	12·4	12·8	9·4	9·8	17·5	18·5
Volatile matter..... "	35·8	36·6	37·4	38·2	37·5	38·3	36·1	37·3	33·4	34·7	34·7	36·7
Fixed carbon..... "	56·8	58·0	58·0	59·2	57·4	58·7	48·3	49·9	53·3	55·5	42·3	44·8
Ultimate Analysis—												
Carbon.....per cent	79·2	81·0	81·3	82·9	....	....	....	....	....	....	....	....
Hydrogen..... "	5·4	5·2	5·6	5·5	....	....	....	....	....	....	....	....
Ash..... "	5·3	5·4	2·6	2·6	....	....	....	....	....	....	....	....
Sulphur..... "	1·8	1·9	1·6	1·7	1·3	1·4	7·4	7·7	5·6	5·8	5·3	5·6
Nitrogen..... "	1·6	1·7	1·7	1·8	....	....	....	....	....	....	....	....
Oxygen..... "	6·7	4·8	7·2	5·5	....	....	....	....	....	....	....	....
Calorific Value—												
Calories per gramme, gross	7,860	8,040	8,110	8,280	....	....	6,765	6,990	7,020	7,305	5,840	6,180
B.T.U. per pound, gross	14,150	14,470	14,600	14,900	....	....	12,180	12,580	12,640	13,150	10,510	11,130
Fuel ratio	1·60		1·55		1·55		1·35		1·60		1·20	
Carbon-hydrogen ratio	14·7	15·5	14·5	15·1	....	....	....	....	....	....	....	....
Coking properties	Good		Good		Good		Fair		Good		Poor	
Softening temperature of ash.....°F.	1945		2140		2285		2470		2175		2245	
Kind of sample	Commercial, 4,000 tons		Commercial									
Taken by	Employees of coal company						Departmental employees					
Date of sampling	Summer of 1932				August, 1932		December, 1933					

*Screen analysis of sample No. 10812 (square screen openings), per cent: On $\frac{3}{4}$″=9·2, $\frac{3}{4}$″ to $\frac{1}{2}$″=9·8, $\frac{1}{2}$″ to 0·185″=39·2, 0·185″ to 0·065″ (10-mesh or $\frac{1}{16}$″)=22·1, per 0·065″=19·7.

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NOVA SCOTIA—Concluded

—	Coals from Pictou area												"Springhill" coal supplied to the Department of Public Works	
	"Melford, Pictou" *coal, supplied to the Department of Public Works		"Acadia" coal											
			Supplied to Naval Service, Dept. of National Defence		Supplied to Department of Public Works									
Sample No.	12637		12540		12635		12638		12639		12641		12642	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	4·4	....	2·5	....	2·3	....	1·7	....	1·8	....	1·7	....	2·3	....
Ash..... "	15·0	15·7	14·7	15·1	9·3	9·5	15·0	15·3	16·6	16·9	16·9	17·2	6·5	6·6
Volatile matter... "	29·2	30·5	25·0	25·6	32·0	32·8	28·3	28·8	27·5	28·0	27·8	28·3	31·8	32·6
Fixed carbon..... "	51·4	53·8	57·8	59·3	56·4	57·7	55·0	55·9	54·1	55·1	53·6	54·5	59·4	60·8
Ultimate Analysis—														
Sulphur.....per cent	1·4	1·5	0·9	0·9	1·9	2·0	1·6	1·6	1·1	1·1	1·1	1·1	1·5	1·6
Nitrogen..... "	....	....	1·9	1·9	....	....	....	....	....	....	....	....	....	....
Calorific Value—														
Calories per grm., gross...	6,515	6,820	7,020	7,200	7,450	7,630	7,045	7,170	6,725	6,850	6,810	6,930	7,670	7,855
B.T.U. per lb., gross.....	11,730	12,270	12,640	12,960	13,410	13,730	12,680	12,900	12,110	12,330	12,260	12,470	13,810	14,140
Fuel ratio.....	1·75		2·30		1·75		1·95		1·95		1·95		1·85	
Coking properties.....	Poor		Good		Good		Fair		Fair		Fair		Good	
Softening temperature of ash.....°F.	2415		2700+		2125		2420		2430		2580		2100	
Designation of coal.....	.....		Lump.....		.....									
Kind of sample.....	Commercial.....													
Taken by.....	Departmental employees.....													
Date of sampling.....	Dec. 1933.....		Nov. 1933.....		Dec. 1933.....									

*Probably from Milford colliery, Greenwood Coal Company, Ltd., Coalburn, Thorburn.

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NEW BRUNSWICK

—	Beersville mine, Kent county, through Department of Public Works		King coal mines, Chipman				"Minto" coal			
			From deep shaft		Shoal, or stripping, coal		Supplied to penitentiary at St. Vincent de Paul. Que.		Supplied to industrial plant in Montreal	
Sample No	13268		12281		12282		12952		12265	
Moisture condition	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—										
Moisture.....per cent	6·1	....	1·4	....	1·5	....	0·9	....	2·0	....
Ash..... "	8·8	9·4	8·9	9·0	11·8	12·0	17·6	17·8	12·8	13·0
Volatile matter..... "	36·6	39·0	36·6	37·1	35·7	36·2	30·1	30·4	31·5	32·2
Fixed carbon..... "	48·5	51·6	53·1	53·9	51·0	51·8	51·4	51·8	53·7	54·8
Ultimate Analysis—										
Sulphur.....per cent	5·6	6·0	4·2	4·3	6·5	6·6	8·6	8·7	5·2	5·3
Calorific Value—										
Calories per gramme, gross	7,005	7,460	7,710	7,815	7,350	7,465	6,595	6,600	....	....
B.T.U. per pound, gross	12,610	13,430	13,870	14,070	13,230	13,440	11,870	11,980	....	....
Fuel ratio	1·35		1·45		1·45		1·70		1·70	
Coking properties	Fair		Fair		Fair		Good		Fair to good	
Softening temperature of ash.....°F.	2110		....		....		....		2180	
Kind of sample							Commercial			
Taken by			Mine operator				Departmental employees.			
Date of sampling	June, 1934		August, 1933				March, 1934		July, 1933.	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NEW BRUNSWICK—Concluded

—	"Minto" coal supplied to the Department of Public Works													
Sample No.	12624		12625		12627		12629		12634		12636		12652	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	1·0	....	1·1	....	1·1	....	0·9	....	0·9	....	1·0	....	1·0	....
Ash..... "	17·9	18·1	16·8	17·0	12·8	12·9	14·5	14·6	16·0	16·2	12·9	13·1	17·5	17·7
Volatile matter... "	30·9	31·2	31·7	32·0	32·7	33·1	32·0	32·3	31·0	31·3	32·7	33·0	31·5	31·8
Fixed carbon..... "	50·2	50·7	50·4	51·0	53·4	54·0	52·6	53·1	52·1	52·5	53·4	53·9	50·0	50·5
Ultimate Analysis—														
Sulphur.....per cent	6·5	6·6	7·1	7·1	6·7	6·7	6·0	6·1	6·8	6·9	7·4	7·5	7·5	7·5
Calorific Value—														
Calories per gramme, gross	6,925	6,995	6,970	7,045	7,325	7,405	7,155	7,220	7,025	7,085	7,220	7,290	6,830	6,900
B.T.U. per pound, gross...	12,470	12,590	12,540	12,680	13,190	13,330	12,880	13,000	12,650	12,760	12,990	13,120	12,290	12,420
Fuel ratio	1·65		1·60		1·65		1·65		1·70		1·65		1·60	
Coking properties	Good		Good		Good		Good		Good		Good		Good	
Softening temperature of ash.....°F.	1990		2050		1950		1950		1950		2040		1975	
Kind of sample	Commercial													
Taken by	Departmental employees													
Date of sampling	December, 1933													

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

ONTARIO

—	Peat from deposit between Chesterville and Morewood, Dundas county		Peat from Beverly bog, lot 28, con. 7, Beverly township, Wentworth county		Peat from a bog at Muirkirk, Oxford township, Kent county		Peat from Mountjoy township, near Timmins; from south half of lot 9, con. 3				Fusain selected from Onakawana lignite from the Abitibi river
Sample No	11120		12270		12555		12606		12607		11386
Moisture condition	R	D	R	D	R	D	R	D	R	D	D
Proximate Analysis—											
Moisture.....per cent	14·1	....	68·2	....	8·9	....	8·8	....	9·1	....	....
Ash..... "	2·7	3·2	6·7	21·0	10·3	11·3	5·7	6·3	2·7	3·0	9·7
Volatile matter..... "	54·4	63·3	....	....	56·3	61·8	58·8	64·5	61·3	67·4	34·3
Fixed carbon..... "	28·8	33·5	....	....	24·5	26·9	26·7	29·2	26·9	29·6	56·0
Ultimate Analysis—											
Sulphur.....per cent	....	....	0·4	1·4	0·3	0·3	....	....	....	....	2·3
Nitrogen..... "	....	....	0·7	2·2	....	....	....	....	....	....	....
Calorific Value—											
Calories per gramme, gross.....	4,745*	5,530	....	....	4,585	5,035	....	....	....	....	....
B.T.U. per pound, gross.....	8,540	9,950	....	....	8,250	9,060	....	....	....	....	....
Fuel ratio.....	0·53		....		0·43		0·45		0·44		1·65
Forms of sulphur, per cent of total sulphur....											†
Kind of sample.....	Prospect, air-dried		Prospect.....								.....
Location in deposit.....	.....		From 43 holes along cross-lines running from bases 7 and 8		.....		Bulk of deposit.		Edges of bog....		.....
Taken by.....	Private individuals.....										Staff of F. R. L.
Date of sampling.....	Summer of 1932		Season of 1933.....								November, 1932

*Corrected for sulphur assumed to be 0·1 per cent. † Sulphate, 16·4; pyritic, 69·3; organic, 14·3.

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

ALBERTA

—	Blackfoot Indian mine, on reserve, 11 miles S.E. of Cluny, Gleichen area			Coal, believed to come from Drumheller area, supplied to the Department of National Defence, Winnipeg.			Hinton Collieries, Limited, Hinton, Prairie Creek area			McGillivray Creek Coal and Coke Company, Limited, Carbondale mine, Coleman, Crowsnest area			
Sample No	12189			11527			11062			11570		11571	
Moisture condition	R	AD	D	R	AD	D	R	AD	D	R	D	R	D
Proximate Analysis—													
Moisture.....per cent	17·8	15·8	....	16·8	15·8	....	5·9	5·7	....	1·6	....	2·8	....
Ash..... "	7·5	7·6	9·1	9·9	10·0	11·9	11·9	11·9	12·6	12·3	12·5	15·2	15·6
Volatile matter..... "	31·5	32·3	38·4	30·2	30·6	36·3	34·4	34·5	36·6	24·6	25·0	24·0	24·7
Fixed carbon..... "	43·2	44·3	52·5	43·1	43·6	51·8	47·8	47·9	50·8	61·5	62·5	58·0	59·7
Ultimate Analysis—													
Carbon.....per cent	....	....	....	....	....	....	67·2	67·4	71·5	75·3	76·6	71·0	73·1
Hydrogen..... "	....	....	....	....	....	....	5·2	5·2	4·9	4·4	4·3	4·5	4·3
Ash..... "	....	....	....	....	....	....	11·9	11·9	12·6	12·3	12·5	15·2	15·6
Sulphur..... "	0·4	0·4	0·5	0·6	0·6	0·7	0·4	0·4	0·4	0·7	0·7	0·6	0·6
Nitrogen..... "	....	....	....	....	....	....	1·4	1·4	1·5	1·2	1·2	1·2	1·2
Oxygen..... "	....	....	....	....	....	....	13·9	13·7	9·1	6·1	4·7	7·5	5·2
Calorific Value—													
Calories per gramme, gross	5,305	5,435	6,455	5,285	5,345	6,350	6,680	6,695	7,100	7,310	7,425	6,920	7,125
B.T.U. per pound, gross	9,550	9,780	11,620	9,510	9,620	11,430	12,020	12,050	12,780	13,160	13,360	12,460	12,830
Fuel ratio		1·35			1·45			1·40			2·50		2·40
Carbon-hydrogen ratio	....	....	....	....	....	....	12·8	12·9	14·7	17·0	17·6	15·9	17·1
Coking properties		Non-coking			Non-coking			Poor			Fair		Fair
Softening temperature of ash.....°F		....			....			2300			....		....
Designation of coal	.....			"Drum lump".....			Run-of-mine.....			.....			
Kind of sample	Mine.....			Commercial.....			Commercial.....			Mine.....			
Location in mine	Face of main entry S.W.			.....			.....			No. 2 seam, No. 5 slope south, counter entry		No. 4 seam, No. 8 entry, No. 3 pillar	
Taken by	Official of Department of Interior, Calgary			Departmental employees			Forest ranger, Board of Railway Commissioners			B. R. MacKay, Geological Survey			
Date of sampling	June 20, 1933.....			January, 1933.....			July 27, 1932.....			August 1, 1932.....			

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

ALBERTA—Continued

—	Canmore Coal Company, Limited, Canmore, Cascade area													
Sample No.	12746		12747		12748		12749		13226		13227		12599	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	1·1	....	1·4	....	0·9	....	1·1	....	1·0	....	1·4	....	1·1	....
Ash..... "	4·0	4·1	5·8	5·9	4·3	4·4	4·1	4·2	5·3	5·4	9·1	9·2	9·5	9·6
Volatile matter... "	15·2	15·3	13·4	13·6	15·1	15·2	13·4	13·6	13·8	13·9	14·7	14·9	18·7	18·9
Fixed carbon..... "	79·7	80·6	79·4	80·5	79·7	80·4	81·4	82·2	79·9	80·7	74·8	75·9	70·7	71·5
Ultimate Analysis—														
Carbon.....per cent	86·5	87·5	84·6	85·7	86·6	87·3	87·0	87·9	....	....	....	....	....	....
Hydrogen..... "	4·1	4·0	4·1	4·0	4·2	4·2	4·1	4·0	....	....	....	....	....	....
Ash..... "	4·0	4·1	5·8	5·9	4·3	4·4	4·1	4·2	....	....	....	....	....	....
Sulphur..... "	0·7	0·7	0·8	0·8	0·7	0·7	0·7	0·7	0·6	0·6	0·7	0·7	0·9	0·9
Nitrogen..... "	1·5	1·5	1·7	1·7	1·5	1·5	1·3	1·3	....	....	....	....	....	....
Oxygen..... "	3·2	2·2	3·0	1·9	2·7	1·9	2·8	1·9	....	....	....	....	....	....
Calorific Value—														
Calories per gramme, gross.....	8,265	8,355	8,035	8,145	8,310	8,385	8,300	8,390	8,075	8,165	7,710	7,815	7,800	7,885
B.T.U. per pound, gross...	14,870	15,040	14,460	14,660	14,960	15,090	14,940	15,100	14,540	14,700	13,870	14,070	14,040	14,190
Fuel ratio.....	5·25		5·90		5·25		6·05		5·80		5·10		....	
Carbon-hydrogen ratio.....	21·0	21·6	20·8	21·6	20·5	21·0	21·3	22·0	....	....	....	....	....	....
Coking properties.....	Agglomerate		Agglomerate		Agglomerate		Agglomerate		Poor		Poor		Poor	
Softening temperature of ash.....°F	....		....		....		....		....		....		2620	
Designation of coal.....	.....		.....		.....		.....		Domestic lump.		Steam slack....		Briquettes	
Kind of sample.....	.....		.....		.....		.....		.....		.....		Commercial	
Location in mine.....	Stewart seam...		Carey seam....		No. 2 Morris seam		No. 1 Morris seam		.....		.....		.....	
Taken by.....	Mine operators.....												Ottawa dealer	
Date of sampling.....	January, 1934.....								April, 1934.....				December, 1933	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

ALBERTA—Concluded

—	Mountain Park Collieries, Limited, Mountain Park, Mountain Park area						Cadomin Coal Company, Limited, Cadomin, Mountain Park area					
	Supplied to Department of National Defence at Winnipeg		Supplied to industrial plant at Vancouver				Supplied to industrial plant at Vancouver		Supplied to Fuel Research Laboratories			
Sample No	11217		11230		11899		11889		12830		12834	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	1·3	....	1·1	....	4·8	....	4·5	....	1·6	....	1·7	....
Ash..... "	13·9	14·1	5·9	6·0	11·4	12·0	10·1	10·5	8·4	8·5	8·2	8·3
Volatile matter..... "	27·0	27·4	28·6	28·9	27·6	29·0	25·2	26·4	27·9	28·4	28·1	28·6
Fixed carbon..... "	57·8	58·5	64·4	65·1	56·2	59·0	60·2	63·1	62·1	63·1	62·0	63·1
Ultimate Analysis—												
Carbon.....per cent	....	....	....	....	73·4	77·2	74·5	78·1	79·8	81·1	79·9	81·3
Hydrogen..... "	....	....	....	....	5·0	4·7	5·0	4·7	5·0	4·9	4·8	4·7
Ash..... "	....	....	....	....	11·4	12·0	10·1	10·5	8·4	8·5	8·2	8·3
Sulphur..... "	0·5	0·5	0·2	0·2	0·4	0·4	0·4	0·5	0·3	0·3	0·3	0·3
Nitrogen..... "	....	....	....	....	1·1	1·1	1·1	1·1	1·1	1·2	1·1	1·2
Oxygen..... "	....	....	....	....	8·7	4·6	8·9	5·1	5·4	4·0	5·7	4·2
Calorific Value—												
Calories per gramme, gross	7,175	7,270	8,060	8,145	7,205	7,565	7,325	7,670	7,755	7,880	7,760	7,890
B.T.U. per pound, gross	12,920	13,080	14,500	14,660	12,970	13,620	13,180	13,810	13,960	14,180	13,960	14,210
Fuel ratio	2·15		2·25		2·05		2·40		2·25		2·20	
Carbon-hydrogen ratio	....	....	....	....	14·6	16·3	14·9	16·6	16·1	16·7	16·5	17·3
Coking properties	Fair		Good		Good		Good		Good		Good	
Softening temperature of ash .....°F.	2670		2265		2520		2700+		2670		2450	
Designation of coal	Run-of-mine								Air-cleaned at nearby plant.			
Kind of sample	Commercial								5 tons in each case.			
Location in mine									Shaft mine	Tunnel mine.		
Taken by	Departmental employees.				Staff of Fuel Research Laboratories.				Mine operators.			
Date of sampling	Sept., 1932		Aug., 1932		Mar., 1933				April, 1934			

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

NORTHWEST TERRITORIES

—	Lignite samples from Great Bear lake													
	From Boulder point, 15 miles west of Etacho point		From Douglas bay, near Etacho point											
Sample No.	10589		11253			11254			11256			11257		
Moisture condition	R	D	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Proximate Analysis—														
Moisture.....per cent	35·8	....	45·5	20·7	....	48·0	20·4	....	50·4	19·4	....	49·1	18·0	....
Ash..... "	4·1	6·4	5·6	8·2	10·4	4·6	7·1	8·9	4·7	7·7	9·5	8·2	13·3	16·2
Volatile matter.... "	29·3	45·6	24·1	35·1	44·2	22·8	34·9	43·9	21·6	35·1	43·6	21·2	34·1	41·6
Fixed carbon..... "	30·8	48·0	24·8	36·0	45·4	24·6	37·6	47·2	23·3	37·8	46·9	21·5	34·6	42·2
Ultimate Analysis—														
Carbon.....per cent	....	....	....	....	....	32·9	50·4	63·3	32·2	52·3	64·9	....	....	....
Hydrogen..... "	....	....	....	....	....	7·3	5·2	3·6	7·6	5·4	4·0	....	....	....
Ash..... "	....	....	....	....	....	4·6	7·1	8·9	4·7	7·7	9·5	....	....	....
Sulphur..... "	0·3	0·4	0·2	0·3	0·3	0·2	0·3	0·3	0·2	0·3	0·3	0·4	0·6	0·8
Nitrogen..... "	....	....	....	....	....	0·5	0·8	1·1	0·5	0·7	0·9	....	....	....
Oxygen..... "	....	....	....	....	....	54·5	36·2	22·8	54·8	33·6	20·4	....	....	....
Calorific Value—														
Calories per gramme, gross	3,980	6,205	3,005	4,375	5,515	2,890	4,425	5,560	2,965	4,810	5,970	2,890	4,650	5,675
B.T.U. per pound, gross....	7,170	11,170	5,410	7,870	9,930	5,200	7,970	10,010	5,330	8,660	10,750	5,200	8,370	10,220
Fuel ratio	1·05		1·25			1·10			1·10			1·00		
Carbon-hydrogen ratio	....	....	....	....	....	4·5	9·8	17·5	4·2	9·7	16·2	....	....	....
Coking properties	Non-coking		Non-coking			Non-coking			Non-coking			Non-coking		
Softening temperature of ash.....°F.	2310		2205			2285			2205			....		
Kind of sample	Prospect													
Location in deposit	8-foot seam, about 20 ft. below 3- to 4-foot seam and 25 feet above water level.		5-foot 6-inch top of 16-foot 3-inch seam.			8 feet 6 inches; next lower section of seam.			13 feet of brown lignite from 20-foot 9-inch seam.			4 feet of lignite with some clay.		
Taken by	Private individual.		D. F. Kidd, Geological Survey											
Date of sampling	Mar., 1932		Summer of 1932											

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA

	Corbin Collieries, Limited, Corbin, Crowsnest Pass area								Crow's Nest Pass Coal Company, Limited, Fernie, Michel mine, Michel, Crowsnest Pass area					
	No. 4 mine		No. 6 mine		No. 3 mine									
Sample No.	10914		10915		12090		12503		10865		10866		10867	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	2·0	....	2·3	....	6·1	....	1·9	....	2·0	....	1·7	....	1·7	....
Ash..... "	16·0	16·3	16·4	16·8	14·2	15·1	17·8	18·1	6·7	6·8	14·3	14·6	7·1	7·2
Volatile matter... "	22·8	23·3	21·1	21·6	22·7	24·2	4·3	4·4	23·0	23·5	20·7	21·0	24·1	24·5
Fixed carbon..... "	59·2	60·4	60·2	61·6	57·0	60·7	76·0	77·5	68·3	69·7	63·3	64·4	67·1	68·3
Ultimate Analysis—														
Carbon.....per cent	71·6	73·1	71·2	73·0	....	....	76·9	78·3	80·9	82·5	74·0	75·2	79·7	81·1
Hydrogen..... "	4·1	4·0	4·2	4·0	....	....	0·6	0·4	4·9	4·7	4·5	4·4	5·0	4·9
Ash..... "	16·0	16·3	16·4	16·8	....	....	17·8	18·1	6·7	6·8	14·3	14·6	7·1	7·2
Sulphur..... "	0·2	0·2	0·2	0·2	0·4	0·4	0·3	0·3	0·6	0·7	0·6	0·6	0·5	0·5
Nitrogen..... "	1·1	1·1	1·1	1·1	....	....	1·0	1·1	1·4	1·5	1·2	1·2	1·4	1·5
Oxygen..... "	7·0	5·3	6·9	4·9	....	....	3·4	1·8	5·5	3·8	5·4	4·0	6·3	4·8
Calorific Value—														
Calories per gramme, gross	6,845	6,985	6,865	7,030	6,735	7,175	6,145	6,260	7,900	8,065	7,235	7,360	7,930	8,070
B.T.U. per pound, gross...	12,330	12,570	12,350	12,650	12,130	12,910	11,060	11,270	14,220	14,520	13,020	13,250	14,270	14,520
Fuel ratio.....	2·60		2·85		2·50		....		2·95		3·05		2·80	
Carbon-hydrogen ratio.....	17·3	18·3	17·1	18·2	....	....	....	....	16·6	17·4	16·5	17·2	15·8	16·5
Coking properties.....	Agglomerate		Agglomerate		Fair		....		Good		Good		Good and swollen	
Softening temperature of ash.....°F	2700+		2490		2680		....		2700+		2700+		2700+	
Designation of coal.....	.....		.....		"Fine".....		"Natural coke" from zone 25 × 15 × 10 feet		.....		.....		.....	
Kind of sample.....	Mine.....													
Location in mine.....	135-foot seam; 10 west crosscut, A level		74-foot seam; at raise from No. 4 heading lower to No. 4 crosscut, 2½ heading upper		Lower bench....		Mammoth seam, upper showing		Upper No. 3 seam; east level, main tunnel		Lower No. 3 seam; from tunnel to seam 50 yards from west main level		No. 2 seam; off main tunnel	
Taken by.....	B.R. MacKay, Geological Survey				Company's engineer		B.R. MacKay.....							
Date of sampling.....	June 29, 1932.....				May, 1933.....		August, 1933....		June 15, 1932....		June 16.....		June 17	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA—Continued

—	Crow's Nest Pass Coal Company, Limited, Fernie—Michel mine, Michel, Crowsnest Pass area															
Sample No.	10868		10869		10870		10871		10872		10873		10874		10913	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—																
Moisture.....per cent	2·1	....	1·7	....	1·4	....	1·6	....	3·1	....	2·5	....	2·6	....	2·4	....
Ash..... "	10·8	11·0	13·4	13·6	6·6	6·7	5·8	5·9	5·2	5·3	13·7	14·0	5·1	5·2	7·1	7·3
Volatile matter..... "	21·6	22·1	23·1	23·5	24·7	25·0	24·4	24·8	24·1	24·9	21·6	22·2	23·9	24·5	21·4	21·9
Fixed carbon..... "	65·5	66·9	61·8	62·9	67·3	68·3	68·2	69·3	67·6	69·8	62·2	63·8	68·4	70·3	69·1	70·8
Ultimate Analysis—																
Carbon.....per cent	76·7	78·4	74·3	75·6	81·2	82·3	81·9	83·3	81·2	83·7	74·0	75·9	81·5	83·7	79·8	81·8
Hydrogen..... "	4·8	4·6	4·7	4·6	4·8	4·7	5·1	5·0	5·1	4·9	4·6	4·5	4·9	4·7	4·7	4·6
Ash..... "	10·8	11·0	13·4	13·6	6·6	6·7	5·8	5·9	5·2	5·3	13·7	14·0	5·1	5·2	7·1	7·3
Sulphur..... "	0·5	0·6	0·4	0·4	0·7	0·7	0·4	0·4	0·4	0·5	0·6	0·6	0·6	0·7	0·6	0·6
Nitrogen..... "	1·3	1·3	1·4	1·4	1·3	1·3	1·6	1·6	1·4	1·5	1·3	1·3	1·6	1·6	1·4	1·4
Oxygen..... "	5·9	4·1	5·8	4·4	5·4	4·3	5·2	3·8	6·7	4·1	5·8	3·7	6·3	4·1	6·4	4·3
Calorific Value—																
Calories per gramme, gross.....	7,435	7,600	7,250	7,370	7,980	8,090	8,075	8,210	7,970	8,225	7,170	7,355	7,905	8,120	7,780	7,975
B.T.U. per pound, gross.....	13,380	13,680	13,050	13,270	14,360	14,570	14,540	14,780	14,350	14,800	12,910	13,240	14,230	14,610	14,000	14,350
Fuel ratio.....	3·05		2·70		2·75		2·80		2·80		2·90		2·85		3·25	
Carbon-hydrogen ratio.....	16·0	16·9	16·0	16·6	17·0	17·6	16·2	16·8	16·0	17·1	16·0	17·1	16·7	17·8	16·8	17·8
Coking properties.....	Good		Good		Good, swollen		Good, swollen		Good, swollen		Good		Good		Good	
Softening temperature of ash....°F.	2700+		2700+		2700+		2700+		2700+		2700+		2700+		2700+	
Kind of sample.....	Mine.....															
Location in mine.....	No. 5 seam; east level off counter slope.		No. A seam; from crosscut between main east level and counter level, and 60 feet in counter to main tunnel.		No. B seam; face of main west level.		No. 1 seam; across face of counter.		No. 9 seam; lump sample taken in No. 9 off No. 8 main haulage.		No. 7 seam; about 800 ft. in new No. 7 tunnel.		No. 8 seam; 50 ft. in No. 2 room, B incline.		No. 4 seam; main tunnel.	
Taken by.....	B. R. MacKay, Geological Survey.....															
Date of sampling.....	June 18, 1932....		June 20.....				June 21.....		June 23.....				June 24.....		July 6.....	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA—Continued

—	Crow's Nest Pass Coal Company, Limited, Fernie—Michel colliery, Michel, Crowsnest Pass area																	
Sample No.	10925		10924		10923		10922		10921		10926		11226		11870	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—																
Moisture.....per cent	1·2	....	1·5	....	1·5	....	1·1	....	1·1	....	1·4	....	0·8	....	3·4	....
Ash..... "	6·5	6·6	11·5	11·6	7·2	7·3	11·8	11·9	11·2	11·3	10·2	10·3	5·4	5·4	6·5	6·7
Volatile matter..... "	26·1	26·4	23·4	23·8	24·7	25·1	23·5	23·7	21·4	21·7	23·7	24·1	26·7	26·9	26·4	27·3
Fixed carbon..... "	66·2	67·0	63·6	64·6	66·6	67·6	63·6	64·4	66·3	67·0	64·7	65·6	67·1	67·7	63·7	66·0
Ultimate Analysis—																
Carbon.....per cent	....	....	....	....	....	....	....	....	....	....	....	....	....	....	78·5	81·4
Hydrogen..... "	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5·1	4·8
Ash..... "	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6·5	6·7
Sulphur..... "	0·7	0·8	0·4	0·5	0·4	0·4	0·4	0·4	0·8	0·8	0·7	0·7	0·6	0·7	0·6	0·6
Nitrogen..... "	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1·4	1·5
Oxygen..... "	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7·9	5·0
Calorific Value—																
Calories per gramme, gross.....	7,925	8,025	7,435	7,550	7,890	8,020	7,470	7,555	7,610	7,700	7,560	7,670	8,060	8,130	7,780	8,060
B.T.U. per pound, gross.....	14,270	14,450	13,390	13,590	14,200	14,440	13,450	13,600	13,700	13,870	13,610	13,800	14,510	14,630	14,010	14,510
Fuel ratio.....	2·55		2·70		2·70		2·70		3·10		2·75		2·50		2·40	
Carbon-hydrogen ratio.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	15·5	16·8
Coking properties.....	Good		Good		Good		Good		Good		Good		Good		Good	
Softening temperature of ash.....°F.	2290		2700+		2525		2700+		2700+		2700+		2325		2350	
Designation of coal.....	Through 2-inch screen.....															
Kind of sample.....	.....												Commercial: supplied to industrial plant at Vancouver.			
Location in mine.....	B seam.....		Top section of A seam.		Bottom section of A seam.		No. 1 seam.....		No. 3 seam.....		No. 8 seam.....		.....			
Taken by.....	Mine operators.....												.....		Staff of Fuel Research Laboratories.	
Date of sampling.....	July, 1932.....												June, 1932.....		Mar., 1933.....	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA—Continued

—	Crow's Nest Pass Coal Company, Limited, Fernie, Michel colliery, Michel, Crowsnest Pass area											
	Supplied to industrial plant at Brandon, Man.				Supplied to industrial plant at Winnipeg, Man.		Samples of about 100 pounds sent to Fuel Research Laboratories					
Sample No	12055		12056		12903		12092		12093		12094	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	1·1	....	1·0	....	2·2	....	1·0	....	0·9	....	0·8	....
Ash..... "	8·7	8·8	6·6	6·6	9·3	9·5	7·1	7·2	6·1	6·2	7·8	7·9
Volatile matter..... "	27·1	27·4	26·3	26·6	24·2	24·8	26·1	26·3	25·7	25·9	22·4	22·6
Fixed carbon..... "	63·1	63·8	66·1	66·8	64·3	65·7	65·8	66·5	67·3	67·9	69·0	69·5
Ultimate Analysis—												
Sulphur.....per cent	0·6	0·6	0·6	0·6	0·4	0·4	0·6	0·6	0·4	0·4	0·7	0·8
Calorific Value—												
Calories per gramme, gross	7,715	7,800	8,025	8,110	....	....	....	....	....	....	....	....
B.T.U. per pound, gross	13,890	14,040	14,450	14,600	....	....	....	....	....	....	....	....
Fuel ratio	2·30		2·50		2·65		2·55		2·60		3·10	
Coking properties	Good		Good		Good		Good		Good, swollen		Good, swollen	
Softening temperature of ash.....°F	2185		2500		2980		2450		2425		2700+	
Designation of coal	Nut		Pea		....		Coal between 1½ and ¼ inches, suitable for blacksmithing					
Kind of sample	Commercial											
Location in mine	....				No. 1 seam		B (mine) seam.		No. 1 seam (mine)		No. 3 seam (mine)	
Taken by	Staff of Fuel Research Laboratories				....		Mine operators					
Date of sampling	April, 1933				April, 1934		May, 1933					

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA—Continued

—	Crow's Nest Pass Coal Company, Limited, Fernie, Coal Creek colliery, Coal Creek, Crowsnest Pass area								From deposit at Short's creek, 7 miles west of Okanagan lake	
	No. 1 east mine				No. 2 mine		No. 3 mine			
Sample No	11224		11225		11222		11223		10758	
Moisture condition	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—										
Moisture.....per cent	1·5	....	1·6	....	1·7	....	1·4	....	2·3	....
Ash..... "	10·4	10·5	6·8	6·9	4·7	4·8	8·2	8·3	7·1	7·3
Volatile matter..... "	22·2	22·6	23·9	24·3	25·1	25·5	22·3	22·6	33·0	33·8
Fixed carbon..... "	65·9	66·9	67·7	68·8	68·5	69·7	68·1	69·1	57·6	58·9
Ultimate Analysis—										
Carbon.....per cent	78·9	80·1	82·1	83·4	83·7	85·1	81·2	82·3	76·4	78·2
Hydrogen..... "	4·7	4·6	5·0	4·9	5·1	5·0	4·7	4·6	5·5	5·3
Ash..... "	10·4	10·5	6·8	6·9	4·7	4·8	8·2	8·3	7·1	7·3
Sulphur..... "	0·3	0·4	0·3	0·4	0·4	0·4	0·5	0·5	0·5	0·5
Nitrogen..... "	1·3	1·3	1·3	1·3	1·3	1·3	1·2	1·3	1·4	1·4
Oxygen..... "	4·4	3·1	4·5	3·1	4·8	3·4	4·2	3·0	9·1	7·3
Calorific Value—										
Calories per gramme, gross	7,640	7,760	8,035	8,165	8,110	8,250	7,790	7,900	7,720	7,905
B.T.U. per pound, gross	13,750	13,970	14,460	14,700	14,590	14,850	14,030	14,220	13,890	14,230
Fuel ratio	2·95		2·85		2·75		3·05		1·75	
Carbon-hydrogen ratio	16·7	17·3	16·5	17·1	16·4	17·0	17·5	18·0	13·9	14·6
Coking properties	Good		Good		Good		Good		Good	
Softening temperature of ash.....°F	2300		2280		2155		1885		2090	
Kind of sample	Mine								Prospect	
Location in mine	Face of main east dips		No. 1 seam, face of tunnel, face of main haulage		No. 3 room off No. 2 incline		No. 4 room, No. 8 slope		30 feet from surface outcropping	
Taken by	B.R. MacKay, Geological Survey								Private individuals at Vernon	
Date of sampling	July 8, 1932								May, 1932	

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA—Continued

—	"Sunrise" coal from Princeton, supplied to Department of National Defence at Victoria			"Coalmont" coal supplied to industrial plant at Vancouver		Middlesboro Collieries, Limited, Merritt, Nicola area				"Normandale"* coal supplied to industrial plant at Vancouver	
						No. 2 south mine					
Sample No	12824			11990		12727		12728		12095	
Moisture condition	R	AD	D	R	D	R	D	R	D	R	D
Proximate Analysis—											
Moisture.....per cent	20·5	19·2	....	11·2	....	7·1	....	8·3	....	3·5	....
Ash..... "	8·9	9·1	11·3	12·7	14·4	8·6	9·3	11·5	12·6	15·0	15·6
Volatile matter..... "	28·8	29·3	36·2	31·5	35·4	37·7	40·5	35·5	38·7	29·5	30·5
Fixed carbon..... "	41·8	42·4	52·5	44·6	50·2	46·6	50·2	44·7	48·7	52·0	53·9
Ultimate Analysis—											
Carbon.....per cent	....	....	....	60·9	68·6	....	....	....	....	68·9	71·4
Hydrogen..... "	....	....	....	5·3	4·5	....	....	....	....	5·1	4·8
Ash..... "	....	....	....	12·7	14·4	....	....	....	....	15·0	15·6
Sulphur..... "	0·4	0·5	0·6	0·4	0·5	0·5	0·5	0·5	0·5	1·9	2·0
Nitrogen..... "	....	....	....	1·1	1·2	....	....	....	....	1·7	1·7
Oxygen..... "	....	....	....	19·6	10·8	....	....	....	....	7·4	4·5
Calorific Value—											
Calories per gramme, gross	5,230	5,315	6,575	5,910	6,655	6,760	7,275	6,420	6,995	6,755	7,000
B.T.U. per pound, gross	9,410	9,570	11,840	10,630	11,980	12,170	13,100	11,550	12,590	12,160	12,600
Fuel ratio	1·45			1·40		1·25		1·25		1·75	
Carbon-hydrogen ratio	....	....	....	11·5	15·1	....	....	....	....	13·5	14·7
Coking properties	Non-coking			Agglomerate		Agglomerate		Agglomerate		Good	
Softening temperature of ash.....°F	....			2625		....		....		2095	
Designation of coal						Freshly mined lump		Lump coal from tipple			
Kind of sample	Commercial									Commercial	
Taken by				Staff of F. R. L.		Mine operators					
Date of sampling	April, 1934			March, 1933		December, 1933				May, 1933	

*Presumably from the Nicola area.

TABLE I—Continued

Analyses of Solid Fuels Occurring in Canada—Continued

BRITISH COLUMBIA—Concluded

	Canadian Collieries (Dunsmuir), Limited, Nanaimo, Nanaimo area		Western Fuel Corporation of Canada, Limited, Nanaimo		Canadian Collieries (Dunsmuir), Limited, Cumberland, Comox area											
	Supplied to industrial plant at Vancouver															
Sample No	11228		11227		11966		11229		11820		11949		11959			
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D		
Proximate Analysis—																
Moisture.....per cent	5·8	....	9·2	....	7·1	....	2·2	....	5·8	....	6·5	....	6·7	....		
Ash..... "	11·5	12·2	12·5	13·7	11·2	12·1	13·7	14·0	13·4	14·3	10·2	10·9	6·2	6·6		
Volatile matter... "	36·4	38·7	34·5	38·0	36·2	39·0	29·3	29·9	29·4	31·2	31·2	33·4	31·1	33·4		
Fixed carbon..... "	46·3	49·1	43·8	48·3	45·5	48·9	54·8	56·1	51·4	54·5	52·1	55·7	56·0	60·0		
Ultimate Analysis—																
Carbon.....per cent	....	....	....	....	67·9	73·1	....	....	68·3	72·5	....	....	74·1	79·5		
Hydrogen..... "	....	....	....	....	5·7	5·2	....	....	5·0	4·7	....	....	5·5	5·1		
Ash..... "	....	....	....	....	11·2	12·1	....	....	13·4	14·3	....	....	6·2	6·6		
Sulphur..... "	0·8	0·8	0·8	0·9	0·7	0·8	1·1	1·1	1·4	1·5	1·6	1·7	1·1	1·2		
Nitrogen..... "	..	.....	....	....	1·3	1·4	....	....	1·0	1·0	....	....	1·1	1·1		
Oxygen..... "	....	....	....	....	13·2	7·4	....	....	10·9	6·0	....	....	12·0	6·5		
Calorific Value—																
Calories per gramme, gross	6,755	7,175	6,415	7,070	6,735	7,255	7,040	7,200	6,730	7,150	6,920	7,405	7,465	8,005		
B.T.U. per pound, gross...	12,160	12,920	11,550	12,720	12,120	13,060	12,670	12,960	12,110	12,870	12,460	13,330	13,440	14,410		
Fuel ratio.....	1·25		1·25		1·25		1·85		1·75		1·65		1·80			
Carbon-hydrogen ratio.....	....	....	....	....	12·0	14·0	....	....	13·5	15·5	....	....	13·5	15·6		
Coking properties.....	Fair		Fair		Fair		Good		Good		Good		Good			
Softening temperature of ash.....°F.	About 2175		2250		2320		2410		2400		2215		2410			
Designation of coal.....	Ladysmith washed slack		Nanaimo, Douglas, and Ladysmith washed slack		Washed Western		No. 4 mine, pea coal		Comox.....		Washed Comox.		Double washed Comox			
Kind of sample.....	Commercial.....															
Taken by.....	.....				Staff of Fuel Research Laboratories.		.....		Staff of Fuel Research Laboratories.....							
Date of sampling.....	Sept., 1932.....				Mar., 1933.....		Sept., 1932.....		Mar., 1933.....							

TABLE I—Concluded

Analyses of Solid Fuels Occurring in Canada—Concluded

YUKON TERRITORY

	Tantalus Butte mine*		"Float coal" samples from the head of Johnston creek, tributary to the Crow river					
Sample No	12504		12729		12730		12731	
Moisture condition	R	D	R	D	R	D	R	D
Proximate Analysis—								
Moisture, per cent	6·0	....	1·5	....	1·3	....	1·1	....
Ash, "	9·0	9·5	2·5	2·6	2·1	2·1	2·2	2·2
Volatile matter, "	31·2	33·2	9·0	9·1	9·7	9·8	15·3	15·5
Fixed carbon, "	53·8	57·3	87·0	88·3	86·9	88·1	81·4	82·3
Ultimate Analysis—								
Carbon, per cent	69·6	74·1	....	....	....	....	....	....
Hydrogen, "	5·2	4·8	....	....	....	....	....	....
Ash, "	9·0	9·5	....	....	....	....	....	....
Sulphur, "	0·3	0·4	1·1	1·1	0·7	0·7	0·6	0·6
Nitrogen, "	1·0	1·0	....	....	....	....	....	....
Oxygen, "	14·9	10·2	....	....	....	....	....	....
Calorific Value—								
Calories per gramme, gross	6,555	6,980	7,740	7,860	8,095	8,210	7,985	8,070
B.T.U. per pound, gross	11,800	12,560	13,930	14,150	14,570	14,780	14,380	14,530
Fuel ratio	1·70		9·65		8·95		5·30	
Carbon-hydrogen ratio	13·4	15·5	....	....	....	....	....	....
Coking properties	Agglomerate		Non-coking		Non-coking		Non-coking	
Softening temperature of ash, °F	2330		....		....		....	
Kind of sample	Mine		Prospect					
Location in mine	8-foot 3-inch section of 7- to 14-foot seam							
Taken by	H. S. Bostock, Geological Survey		Private individuals					
Date of sampling	Season of 1933							

*Probably mine operated by Five Fingers Coal Company at or near Carmacks

TABLE II

Analyses of Coal Samples Submitted by the Department of Pensions and National Health

Described as "Dominion", Sydney area, Nova Scotia coal

—	Slack																¾-inch nut slack	
	Delivered to Camp Hill hospital, Halifax, N.S.																	
Sample No.	10685	10762	10850	11174	11370	11439	11524	11605	11660	11773	12031	12107	12137	12292	12445	12505	12600	12623
Moisture (as received) per cent	5·4	5·5	2·7	4·7	5·7	3·6	4·1	3·6	5·0	5·6	5·8	3·3	4·5	4·5	5·8	5·5	5·6	6·0
Dry Basis—																		
Ash.....per cent	5·4	8·0	7·4	8·4	10·7	6·0	10·8	8·2	6·7	9·4	8·7	6·1	7·3	6·6	9·2	8·1	10·6	8·2
Volatile matter..... "	35·6	33·3	34·0	33·8	33·3	36·0	32·8	34·0	34·5	33·0	33·2	35·2	35·0	35·7	33·4	33·6	32·6	33·5
Fixed carbon..... "	59·0	58·7	58·6	57·8	56·0	58·0	56·4	57·8	58·8	57·6	58·1	58·7	57·7	57·7	57·4	58·3	56·8	58·3
Sulphur..... "	2·2	2·4	2·8	2·3	3·0	2·1	3·9	2·3	2·1	2·5	2·4	1·8	1·9	2·0	2·6	2·4	2·5	2·7
Calories per gramme, gross.	8,080	7,750	7,760	7,590	7,370	7,980	7,430	7,725	7,860	7,645	7,735	7,930	7,850	7,900	7,685	7,755	7,600	7,775
B.T.U. per pound, gross....	14,540	13,950	13,970	13,670	13,270	14,360	13,370	13,910	14,150	13,760	13,920	14,280	14,130	14,220	13,840	13,960	13,690	14,000
Softening temperature of ash.....°F	.....	.....	.....	.....	.....	.....	2050	2090	2090	2140	2140	2130	2090	2060	2070	2040	2050	2040
Number of tons represented by sample.....	197	86	65	60	61	180	208	108	216	210	155	75	50	50	66	31	246	168
Date of delivery.....	April 2–28, 1932	May 6–27	June 8–28	Aug. 10–12	Oct. 19	Nov. 4–28	Dec. 8–28	Jan. 5–26, 1933	Feb. 1–28,	Mar. 7–30	April 8–21	May 13	June 22–23	Aug. 21–22	Sept. 16–18	Oct. 26	Nov. 1–29	Dec. 14–28
	¾-inch nut slack; delivered to Camp Hill hospital					Slack; delivered to hospital at Ste. Anne de Bellevue, Que.												
Sample No.	12717	12758	12792	13054	13228	10761	10787	10903	10904	10905	11181	11200	11236	11262	11371	11377	11438	11526
Moisture (as received) per cent	4·6	5·0	5·1	4·5	4·7	4·4	4·8	4·2	4·0	4·3	4·4	4·6	3·7	6·1	3·5	3·1	2·2	7·7
Dry Basis—																		
Ash.....per cent	7·5	8·8	8·1	8·4	7·4	8·2	5·7	10·1	8·7	8·4	8·9	10·5	9·6	9·2	6·9	10·1	7·3	8·9
Volatile matter..... "	33·9	33·3	33·9	33·9	34·5	33·5	37·1	32·0	33·2	33·0	33·4	32·0	32·0	32·7	34·5	32·0	33·6	32·7
Fixed carbon..... "	58·6	57·9	58·0	57·7	58·1	58·3	57·2	57·9	58·1	58·6	58·7	57·5	58·4	58·1	58·6	57·9	59·1	58·4
Sulphur..... "	2·5	2·6	2·4	2·4	2·2	3·4	1·8	3·2	2·6	2·7	3·1	3·0	3·1	2·9	2·6	3·7	3·0	2·8
Calories per gramme, gross..	7,745	7,755	7,740	7,740	7,820	7,830	7,950	7,540	7,715	7,710	7,735	7,480	7,640	7,660	7,895	7,670	7,925	7,645
B.T.U. per pound, gross.....	13,940	13,960	13,930	13,930	14,080	14,100	14,310	13,570	13,890	13,880	13,920	13,470	13,750	13,790	14,210	13,810	14,270	13,760
Softening temperature of ash.....°F	2170	2140	1990	2060	2010	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2030
Number of tons represented by sample.....	206	64	199	166	110	390	413	404	419	417	396	385	389	403	395	394	410	371
Date of delivery.....	Jan. 4–20, 1934	Feb. 8–9	Mar. 1–21	April 4–27	May 14–29, 1934	May 14–28, 1932	May 23–June 4	June 7–14	June 15–24	June 27–July 4	Aug. 18–Sept. 6	Aug. 30–Sept. 10	Sept. 15–30	Oct. 1–15	Oct. 23–29	Nov. 1–12	Nov. 15–29	Dec. 20–31

TABLE II—Continued

Analyses of Coal Samples Submitted by the Department of Pensions and National Health—Continued

	Described as "Dominion", Sydney area, Nova Scotia coal																	
	Slack; delivered to hospital at Ste. Anne de Bellevue, Que.															2-inch nut slack; delivered to Christie St. hospital, Toronto, Ontario		
Sample No.	11537	12122	12123	12434	12435	12465	12466	12548	12549	12646	12647	12648	12649	13267	13269	11383	11489	11520
Moisture (as received) per cent	4·0	4·5	4·3	4·2	4·5	2·3	3·9	7·1	6·6	3·8	4·0	4·1	4·2	4·2	4·1	6·8	3·5	5·8
Dry Basis—																		
Ash.....per cent	8·5	9·6	9·4	8·6	9·0	9·0	9·0	9·4	9·9	8·8	8·6	8·1	8·7	7·7	7·9	9·5	7·3	10·0
Volatile matter..... "	32·7	32·4	32·2	36·1	35·8	33·1	33·2	33·7	33·5	33·5	33·6	33·8	33·4	34·5	33·7	32·0	33·5	31·4
Fixed carbon..... "	58·8	58·0	58·4	55·3	55·2	57·9	57·8	56·9	56·6	57·7	57·8	58·1	57·9	57·8	58·4	58·5	59·2	58·6
Sulphur..... "	2·8	3·3	3·3	1·9	2·0	3·3	2·8	3·7	3·9	3·0	3·0	2·9	3·1	2·8	2·8	3·3	3·2	3·3
Calories per gramme, gross.	7,815	7,645	7,675	7,605	7,550	7,670	7,615	7,660	7,600	7,660	7,700	7,730	7,635	7,840	7,800	7,600	7,910	7,565
B.T.U. per pound, gross.....	14,070	13,760	13,810	13,690	13,590	13,800	13,710	13,790	13,680	13,790	13,860	13,910	13,740	14,110	14,040	13,680	14,230	13,620
Softening temperature of ash.....°F.	2100	2060	2030	2120	2100	2120	2150	1965	1950	2145	2150	2210	2230	1990	1990	.....	.....	2040
Number of tons represented by sample.....	378	400	360	377	389	391	389	396	388	385	379	387	305	386	425	500	273	520
Date of delivery.....	Dec. 20, 1932–Jan. 3, 1933	May 19–June 1	June 1–14	Aug. 15–Sept. 1	Sept. 1–15	Sept. 1–26	Sept. 26–Oct. 1	Oct. 9–26	Oct. 26–Nov. 4	Nov. 26–30	Dec. 2–12	Dec. 12–22	Dec. 22–31	May 17–June 4	May 30–June 13, 1934	Nov. 14–17, 1932	Dec. 6–7	Dec. 16–22.
	2-inch nut slack; delivered to Christie St. hospital									Slack; delivered to Westminster hospital, London, Ontario.								
Sample No.	11538	11607	11610*	11659	11736	12070	12284	12444	12489	11121	11182	11204	11232	11237	11259	11317	11390	.....
Moisture (as received) per cent	4·1	6·1	5·0	6·7	5·3	4·7	3·6	3·2	4·0	4·4	4·4	5·0	5·1	5·8	5·1	4·6	7·7	.....
Dry Basis—																		
Ash.....per cent	10·3	9·9	9·5	11·0	9·3	10·6	9·4	8·8	8·1	10·2	10·8	10·8	10·9	10·0	10·6	11·0	11·7	.....
Volatile matter..... "	31·3	32·3	32·9	31·6	32·3	32·2	32·2	32·7	32·9	32·3	31·3	31·4	31·2	31·4	31·4	30·8	31·8	.....
Fixed carbon..... "	58·4	57·8	57·6	57·4	58·4	57·2	58·4	58·5	59·0	57·5	57·9	57·8	57·9	58·6	58·0	58·2	56·5	.....
Sulphur..... "	3·4	3·4	3·7	3·4	3·1	3·3	3·3	3·6	3·5	2·6	2·7	2·8	2·9	3·0	3·3	3·1	3·1	
Calories per gramme, gross.	7,555	7,650	7,685	7,560	7,580	7,500	7,680	7,725	7,795	7,475	7,430	7,375	7,440	7,520	7,535	7,465	7,340	.....
B.T.U. per pound, gross.....	13,600	13,770	13,830	13,610	13,650	13,500	13,820	13,910	14,030	13,450	13,380	13,270	13,390	13,540	13,570	13,440	13,220	.....
Softening temperature of ash.....°F.	2035	2055	1865	2210	2040	1990	2040	2025	1940	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of tons represented by sample.....	400	470	Stock	396	480	539	210	195	345	309	463	399	317	320	322	410	393	.....
Date of delivery.....	Jan. 10–11, 1933	Feb. 1–3	Sampled Feb. 7	Feb. 21–23	Mar. 22	May 16–23	Aug. 14	Sept. 15	Oct. 10	Aug. 18–20, 1932	Aug. 30–Sept. 3	Sept. 8–15	Sept. 16–24	Sept. 28–Oct. 5	Oct. 7–14	Oct. 15–25	Nov. 8–15	....

*Ash analysis, per cent: silica, 31·0; ferric oxide, 35·2; alumina, 16·3; calcium oxide, 7·0; magnesium oxide, 1·1; sulphur trioxide, 7·6; phosphorus pentoxide, 0·2

TABLE II—Continued

Analyses of Coal Samples Submitted by the Department of Pensions and National Health—Continued

	Described as run-of-mine coal from W. Benton Evans, Minto, N.B.				Described as run-of-mine coal from Welton and Henderson, Limited, Minto					Described as slack from The Minto Coal Company, Limited, Minto; delivered to hospital at Ste. Anne de Bellevue, Quebec	
	Delivered to Lancaster hospital, St. John, N.B.										
Sample No	11126	11518	11523	11566	11804	12447	12545	12613	12726	12953	13053
Moisture (as received)...per cent	1·5	3·1	4·4	5·3	2·8	4·1	5·9	7·7	.....	4·2	7·1
Dry Basis—											
Ash...per cent	14·1	17·8	17·6	17·7	18·2	17·7	20·6	15·2	19·3	20·5	22·9
Volatile matter... "	33·5	31·7	31·5	31·8	31·2	32·2	31·1	31·8	31·1	30·7	29·7
Fixed carbon... "	52·4	50·5	50·9	50·5	50·6	50·1	48·3	53·0	49·6	48·8	47·4
Sulphur... "	7·2	7·4	8·7	7·5	8·3	5·9	6·3	5·5	6·3	5·4	5·8
Calories per gramme, gross	7,130	6,830	6,775	6,840	6,955	6,835	6,630	7,005	6,580	6,525	6,420
B.T.U. per pound, gross	12,830	12,300	12,190	12,310	12,520	12,310	11,940	12,610	11,850	11,740	11,560
Softening temperature of ash...°F.	.....	1970	1980	1950	2150	1980	2010	2240	1985	1990	1990
Number of tons represented by sample	44	45	45	47	44	42	46	47	46	275	35
Date of delivery	Aug. 24, 1932	Nov. 16	Dec. 31	Jan. 18, 1933	April 10	Sept. 20, 1933	Nov. 9	Dec. 18	Feb. 3, 1934	Mar. 22, 26, 1934	March and April 1934; stock-pile sample

	Described as "Greenhill" or "Bellevue" ⅝-inch slack, from the Crowsnest Pass area, Alberta						Described as "Cadomin" slack from the Mountain Park area, Alberta					
	Delivered to Deer Lodge hospital, Winnipeg, Man.											
Sample No	11125	11214	11444	11612	11706	11772	12464	12556	12612	12667	12753	12782
Moisture (as received)...per cent	3·0	5·3	5·2	2·0	2·4	1·7	2·4	3·1	2·8	3·4	2·2	2·3
Dry Basis—												
Ash...per cent	14·8	15·7	10·7	13·0	13·6	14·0	13·6	11·5	11·2	10·5	10·0	10·6
Volatile matter... "	26·0	25·7	28·4	24·9	23·3	24·6	26·3	27·0	26·1	26·8	26·7	26·7
Fixed carbon... "	59·2	58·6	60·9	62·1	63·1	61·4	60·1	61·5	62·7	62·7	63·3	62·7
Sulphur... "	0·6	0·5	0·8	0·5	0·4	0·6	0·2	0·3	0·4	0·3	0·3	0·3
Calories per gramme, gross	7,215	7,115	7,600	7,470	7,300	7,355	7,410	7,590	7,730	7,685	7,740	7,790
B.T.U. per pound, gross	12,990	12,810	13,680	13,440	13,140	13,240	13,340	13,670	13,910	13,840	13,930	14,030
Softening temperature of ash...°F.	.....	.....	.....	2700+	.....	2650	2700+	2700+	2700+	2700+	2700+	2760
Number of tons represented by sample	49	98	208	96	131	113	67	107	127	101	141	133
Date of delivery	Aug. 17–18, 1932	Sept. 1–22	Nov. 1–30	Jan. 1–31, 1933	Feb. 1–28	Mar. 23–30	Sept. 1–30, 1933	Nov. 6–14	Dec. 13–14	Jan. 18, 1934	Feb. 20–22	Mar. 26–28

TABLE II—Concluded

Analyses of Coal Samples Submitted by the Department of Pensions and National Health—Concluded

—	Slack* from the Sewickley seam, Pursglove mine, Pursglove, West Virginia, U.S.A.; delivered to hospital at Ste. Anne de Bellevue, Quebec	Described as ¾-inch nut slack from the Maiden mine, Maidsville, West Virginia; delivered to Westminster hospital, London, Ontario							
Sample No.	12780	12279	12280	12283	12289	12309	12436	12443	12450
Moisture (as received) per cent	2·1	6·7	7·8	7·7	5·2	5·2	4·4	3·3	6·8
Dry Basis—									
Ash "	13·9	9·5	9·8	10·1	10·3	10·1	10·5	11·3	10·9
Volatile matter "	32·9	35·3	34·7	33·8	33·9	33·8	33·9	33·7	36·2
Fixed carbon "	53·2	55·2	55·5	56·1	55·8	56·1	55·6	55·0	52·9
Sulphur "	4·1	2·1	2·7	3·4	3·5	3·5	3·6	3·1	3·2
Calories per gramme, gross	7,220	7,575	7,625	7,575	7,550	7,595	7,485	7,380	7,505
B.T.U. per pound, gross	12,990	13,640	13,730	13,630	13,590	13,670	13,470	13,290	13,510
Softening temperature of ash°F.	2100	1985	1960	1990	1980	2000	1995	2060	1975
Number of tons represented by sample	291	311	322	457	530	611	686	410	425
Date of delivery	Mar. 16, 1934	Aug. 5-9, 1933	Aug. 10-12	Aug. 14-19	Aug. 21-28	Aug. 29-Sept. 5	Sept. 7-14	Sept. 15-21	Sept. 25-28

*Dealer's description of coal.

—	Described as "Yatesboro" slack, from Yatesboro, Pennsylvania, U.S.A.; delivered to Christie St. hospital, Toronto, Ont.													
Sample No.	10626	10669	10753	10764	11112	11258	12559	12602	12617	12673	12750	12775	12954	13193
Moisture (as received)....per cent	6·7	5·6	4·2	8·0	4·2	5·6	4·2	4·3	5·2	6·3	6·5	8·5	7·7	5·4
Dry Basis—														
Ash....per cent	8·3	8·4	7·3	7·5	7·6	7·1	8·4	7·9	8·3	7·8	8·1	8·4	7·0	7·5
Volatile matter.... "	31·5	29·9	31·6	31·4	32·3	31·3	32·2	32·8	32·2	32·2	32·1	32·0	32·3	32·4
Fixed carbon.... "	60·2	61·7	61·1	61·1	60·1	61·6	59·4	59·3	59·5	60·0	59·8	59·6	60·7	60·1
Sulphur.... "	2·3	1·9	1·7	2·3	2·0	2·3	2·1	2·1	2·1	2·2	1·8	1·8	1·6	1·8
Calories per gramme, gross....	7,660	7,750	7,830	7,780	7,875	7,795	7,740	7,700	7,635	7,690	7,720	7,730	7,780	7 745
B.T.U. per pound, gross....	13,790	13,950	14,100	14,000	14,180	14,030	13,930	13,860	13,750	13,840	13,890	13,910	14,000	13,940
Softening temperature of ash....°F.	....	....	....	....	....	....	2150	2140	2160	2095	2275	2240	2200	2200
Number of tons represented by sample	387	480	238	180	384	420	469	440	440	540	463	746	586	413
Date of delivery....	Mar. 31, 1932	April 21	May 23	May 30	Aug. 3–5	Oct. 13, 1932	Nov. 9, 1933	Dec. 1	Dec. 21	Jan. 15, 1934	Feb. 5–16	Feb. 23	April 3–9	May 7

TABLE III

Analyses of Miscellaneous Solid Fuels

BRITISH ANTHRACITIC COALS

—	Welsh anthracite shipped to Ottawa											
Sample No.	12152		12543		11369		12501		12562		12563	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	3·0	....	1·8	....	2·3	....	1·6	....	1·5	....	3·9	....
Ash..... "	5·6	5·8	4·7	4·7	5·3	5·4	4·0	4·1	5·4	5·5	4·3	4·5
Volatile matter..... "	7·9	8·1	7·7	7·9	....	....	7·8	7·9	7·7	7·8	7·9	8·3
Fixed carbon..... "	83·5	86·1	85·8	87·4	....	....	86·6	88·0	85·4	86·7	83·9	87·2
Fuel ratio	10·55		11·10		....		11·15		11·15		10·55	
Softening temperature of ash.....°F.	....		....		....		2280		2350		....	
Screen analysis (square screen openings).....per cent	....		....		On 0·525″=9·0, 0·525″ to 0·371″=32·2, 0·371″ to 0·263″=29·0, 0·263″ to 0·131″=19·1, 0·131″ to 0·065″=5·0, per 0·065″=5·7		....		....		On $\frac{3}{4}$″=5·5, $\frac{3}{4}$ to $\frac{1}{2}$″=33·7, $\frac{1}{2}$″ to $\frac{1}{4}$″=56·3, $\frac{1}{4}$″ to $\frac{3}{8}$″=2·5, per $\frac{1}{8}$″=2·0	
Designation of coal	French nuts....		Pea.....		No. 1 buckwheat.....							
Kind of sample	Commercial....											
Taken by	Ottawa dealer..		Private individuals.....									
Date of sampling	July, 1933.....		Nov., 1933.....		Nov., 1932.....		Oct., 1933.....		Nov., 1933.....			

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BRITISH ANTHRACITIC COALS—Continued

—	Welsh anthracite										Scotch anthracite	
	Shipped to Ottawa		Shipped to Montreal		Shipped to Ottawa							
Sample No	12564		12538		11539		11567		11603		12151	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	3·2	....	6·3	....	1·0	....	2·9	....	3·1	....	3·7	....
Ash..... "	4·2	4·4	4·3	4·5	3·9	3·9	3·6	3·7	3·7	3·8	5·9	6·1
Volatile matter..... "	6·8	7·0	7·7	8·3	8·2	8·3	8·1	8·4	8·0	8·3	6·5	6·8
Fixed carbon..... "	85·8	88·6	81·7	87·2	86·9	87·8	85·4	87·9	85·2	87·9	83·9	87·1
Ultimate Analysis—												
Carbon.....per cent	....	....	....	....	....	....	....	....	....	....	84·3	87·6
Hydrogen..... "	....	....	....	....	....	....	....	....	....	....	3·3	3·0
Ash..... "	....	....	....	....	....	....	....	....	....	....	5·9	6·1
Sulphur..... "	....	....	0·9	0·9	....	....	....	....	0·9	1·0	0·6	0·6
Nitrogen..... "	....	....	....	....	....	....	....	....	....	....	1·6	1·7
Oxygen..... "	....	....	....	....	....	....	....	....	....	....	4·3	1·0
Calorific Value—												
Calories per gramme, gross	....	....	....	....	....	....	....	....	8,040	8,300	7,625	7,915
B.T.U. per pound, gross	....	....	....	....	....	....	....	....	14,470	14,940	13,720	14,250
Fuel ratio	12·65		10·55		10·55		10·50		10·60		12·85	
Carbon-hydrogen ratio	....	....	....	....	....	....	....	....	....	....	25·4	29·0
Softening temperature of ash.....°F.	....		2335		....		....		....		....	
Screen analysis (square screen openings).....per cent	On $\frac{3}{4}$″=0·8, $\frac{3}{4}$″ to $\frac{1}{2}$″=33·5, $\frac{1}{2}$″ to $\frac{1}{4}$″=61·1, $\frac{1}{4}$″ to $\frac{1}{8}$″=1·7, per $\frac{1}{8}$″=2·9		....		On 0·185″=7·5, 0·185″ to 0·065″=48·4, 0·065″ to 0·033″=20·6, 0·033″ to 0·0164″=11·9, 0·0164″ to 0·0058″=8·4, per 0·0058″=3·2		On 0·185=3·2, 0·185″ to 0·065″=41·8, 0·065″ to 0·033″=23·3, 0·033″ to 0·0164″=12·7, 0·0164″ to 0·0058″=12·1, per 0·0058″=6·9		....		....	
Designation of coal	No. 2 buckwheat.		Screenings								Cobbles	
Kind of sample	Commercial											
Taken by	Private individuals				Staff of Fuel Research Laboratories, from consignment for briquetting tests.						Ottawa dealer	
Date of sampling	November, 1933				Jan. 18, 1933		Jan. 25		Feb. 4		July, 1933	

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BRITISH ANTHRACITIC COALS—Concluded

—	Welsh anthracitic coal												Scotch anthracitic coal			
	Supplied to Department of Public Works		Shipped to Ottawa								Supplied to Department of National Defence at St. John, N.B.		Shipped to Ottawa			
Sample No.	12626		12781*		11578		12554		12566		12603		12525		12065	12066
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R D	R D
Proximate Analysis—																
Moisture.....per cent	0·8	....	1·2	....	1·8	....	1·2	....	1·4	....	4·5	....	0·6	....	2·5	2·8 ....
Ash..... "	5·5	5·6	6·5	6·6	5·7	5·8	7·7	7·8	7·3	7·4	10·4	10·8	8·4	8·4	7·1 7·3	5·7 5·9
Volatile matter..... "	8·8	8·8	8·8	8·9	9·2	9·4	9·8	9·9	10·4	10·5	10·3	10·8	12·5	12·6	11·4 11·6	10·6 10·9
Fixed carbon..... "	84·9	85·6	83·5	84·5	83·3	84·8	81·3	82·3	80·9	82·1	74·8	78·4	78·5	79·0	79·0 81·1	80·9 83·2
Ultimate Analysis—																
Sulphur.....per cent	1·0	1·0	....	....	....	....	....	....	....	....	0·8	0·9	1·2	1·2	0·7 0·7	0·6 0·7
Calorific Value—																
Calories per gramme, gross...	8,000	8,070	....	....	....	....	....	....	....	....	7,170	7,510	7,870	7,915	....	....
B.T.U. per pound, gross.....	14,400	14,520	....	....	....	....	....	....	....	....	12,910	13,510	14,170	14,250	....	....
Fuel ratio	9·65		9·45		9·05		8·30		7·80		7·30		6·30		6·95	7·60
Coking properties	Non-coking		Non-coking		....		Non-coking		Agglomerate		Non-coking		Agglomerate		....	....
Softening temperature of ash..°F	2360		....		2255		....		....		2345		2400		....	....
Designation of coal	....		Nos. 1 and 2 buckwheat.		No. 1 buckwheat.		Cobbles		No. 1 buckwheat.		Slack		No. 1 buckwheat.		.....	
Kind of sample	Commercial										Commercial; 100 tons		Commercial			
Taken by	Departmental employees		Private individuals				Members of Mines Branch technical staff				Departmental employees		Private individual		Ottawa dealer	
Date of sampling	Dec., 1933		Mar., 1934		Jan., 1933		Nov., 1933		Dec., 1933				Nov., 1933		May, 1933	

*Screen analysis of sample No. 12781 (square screen openings), per cent: On 0·185″ (4-mesh)=39·0, 0·185″ to 0·093″ (8-mesh) =37·0, per 0·093″ =24·0.

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

ANTHRACITE COALS FROM PENNSYLVANIA, U.S.A.

—	"Mahanoy"		"Locust Mountain"		"Shamokin"		"Lykens Valley"		"Blue" anthracite			
Sample No.	12006		12005		12003		12004		10931		13007*	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	3·3	....	3·2	....	2·2	....	1·9	....	3·8	....	4·4	....
Ash..... "	8·1	8·4	8·3	8·6	11·5	11·8	11·8	12·1	8·5	8·8	9·0	9·4
Volatile matter..... "	3·7	3·8	5·4	5·6	6·5	6·7	7·8	7·9	5·6	5·9	5·2	5·4
Fixed carbon..... "	84·9	87·8	83·1	85·8	79·8	81·5	78·5	80·0	82·1	85·3	81·4	85·2
Ultimate Analysis—												
Carbon.....per cent	84·0	86·9	....	....	80·0	81·7	80·5	82·1	....	....	....	....
Hydrogen..... "	2·3	2·0	....	....	3·0	2·8	3·0	2·8	....	....	....	....
Ash..... "	8·1	8·4	....	....	11·5	11·8	11·8	12·1	....	....	....	....
Sulphur..... "	0·6	0·6	0·8	0·9	0·8	0·9	0·7	0·7	0·8	0·8	....	....
Nitrogen..... "	0·8	0·8	....	....	1·1	1·1	1·1	1·1	....	....	....	....
Oxygen..... "	4·2	1·3	....	....	3·6	1·7	2·9	1·2	....	....	....	....
Calorific Value—												
Calories per gramme, gross	7,255	7,505	7,405	7,645	7,275	7,435	7,325	7,460	7,245	7,530	....	....
B.T.U. per pound, gross	13,060	13,510	13,330	13,760	13,100	13,380	13,190	13,430	13,040	13,550	....	....
Fuel ratio	22·70		15·25		12·20		10·10		14·65		15·55	
Carbon-hydrogen ratio	36·9	44·0	....	....	26·9	29·4	26·8	28·8	....	....	....	....
Softening temperature of ash.....°F.	2700+		2700+		2700+		2155		2700+		.....	
Weight per cubic foot.....pounds	....		....		....		....		51·25		.....	
Screen analysis (square screen openings).....per cent	....		....		....		....		On $1\frac{1}{2}$″=1·5, $1\frac{1}{2}$″ to 1″=5·2, 1″ to $\frac{3}{4}$″=15·5, $\frac{3}{4}$″ to $\frac{1}{2}$″=37·6, $\frac{1}{2}$″ to $\frac{1}{4}$″=33·5, $\frac{1}{4}$″ to $\frac{1}{8}$″=4·1, per $\frac{1}{8}$″=2·6		†3″ to $2\frac{1}{2}$″=10·6, $2\frac{1}{2}$″ to 2″=62·0, 2″ to $1\frac{1}{2}$″=20·4, $1\frac{1}{2}$″ to 1″=4·4, 1″ to $\frac{1}{2}$″=1·2, per $\frac{1}{2}$″=1·4	
Designation of coal	Hard, white-ash		Medium free-burning		Free-burning, white-ash		Free-burning, red-ash		Pea		Egg	
Kind of sample	Commercial										Commercial; $\frac{1}{2}$ ton	
Taken by	Ottawa dealers											
Date of sampling	April, 1933								July, 1932		April, 1934	

*The analysis shown is actually calculated from the partial analysis of composite sample No. 13007, in conjunction with the analyses of 4 sized component samples.

†Screen analysis of sample No. 13007 (round screen openings), per cent: $3\frac{1}{4}$″ to $2\frac{7}{16}$″=68·7, $2\frac{7}{16}$″ to $1\frac{5}{8}$″=26·0, $1\frac{5}{8}$″ to $\frac{13}{16}$″=3·7, $\frac{13}{16}$″ to $\frac{9}{16}$″=0·3 per $\frac{9}{16}$″=1·3.

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

ANTHRACITE COALS FROM PENNSYLVANIA, U.S.A.—Concluded

—	"Pittston" or "Erie" coal from the Scranton area						Special pea and buckwheat anthracite					
Sample No	13103		13104		13105		12551		12552		12553	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	2·6	....	2·8	....	2·2	....	2·2	....	2·6	....	2·2	....
Ash..... "	9·7	10·0	9·1	9·4	9·6	9·8	7·3	7·4	7·7	7·9	12·7	13·0
Volatile matter..... "	5·2	5·3	5·0	5·1	5·4	5·5	6·4	6·6	5·4	5·6	5·8	5·9
Fixed carbon..... "	82·5	84·7	83·1	85·5	82·8	84·7	84·1	86·0	84·3	86·5	79·3	81·1
Ultimate Analysis—												
Sulphur.....per cent	0·6	0·7	0·7	0·7	0·7	0·7	....	....	....	....	....	....
Calorific Value—												
Calories per gramme, gross.....	7,265	7,460	7,320	7,535	7,365	7,530	....	....	....	....	....	....
B.T.U. per pound, gross.....	13,080	13,430	13,180	13,560	13,260	13,550	....	....	....	....	....	....
Fuel ratio.....	15·90		16·60		15·40		13·10		15·55		13·70	
Softening temperature of ash.....°F.	2900		2810		2850		2600		2200		2310	
Weight per cubic foot.....pounds	51·0		52·0		52·8		....		....		....	
Screen analysis (square screen openings).....per cent	On 2″=73·5, 2″ to 1½″=14·7, 1½″ to 1″=8·0, 1″ to ¾″=1·5, ¾″ to ½″=1·0, per ½″=1·3		On 2″=16·9, 2″ to 1½″=64·0, 1½″ to 1″=15·1, 1″ to ¾″=1·6, ¾″ to ½″=1·1, per ½″=1·3		On 2″ to 1½″=1·6, 1½″ to 1″=60·4, 1″ to ¾″=27·6, ¾″ to ½″=7·9, per ½″=2·5							
Designation of coal	Egg		Stove		Nut		White-ash, clinkering		Red-ash, non-clinkering		Red-ash, clinkering	
Kind of sample	Commercial											
Taken by	Ottawa dealer						Superintendent, Fuel Research Laboratories					
Date of sampling	April, 1934						January, 1932		March, 1932		November, 1933	

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

LOW-VOLATILE BITUMINOUS COALS FROM THE UNITED STATES

—	"Pocahontas", Beckley seam, West Virginia		Vincent mine, Upper Freeport seam, Reedsville, West Virginia		"Berwind" coal, upper Kittanning or C Prime seam, Windber, Cambria, or Somerset county, Pennsylvania				"Penker" coal from Cambria county, Pennsylvania; presumably from lower Kittanning (Miller or B) seam at Portage			
	Supplied to industrial plant in Montreal		Supplied for institution at Ottawa		Supplied through Ottawa dealer to Fuel Research Laboratories				Supplied to school buildings at Ottawa			
Sample No.	11109		10851		12763		12955		11122 11123 11124		11212	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	1·4	....	2·7	....	1·1	....	4·2	....	1·5	....	1·3	....
Ash..... "	5·4	5·4	9·3	9·6	8·6	8·7	8·1	8·4	6·3	6·4	6·1	6·2
Volatile matter..... "	17·6	17·9	16·9	17·3	17·0	17·2	16·5	17·3	20·8	21·1	20·3	20·5
Fixed carbon..... "	75·6	76·7	71·1	73·1	73·3	74·1	71·2	74·3	71·4	72·5	72·3	73·3
Ultimate Analysis—												
Carbon.....per cent	....	....	....	....	....	....	78·5	81·9	....	....	....	....
Hydrogen..... "	....	....	....	....	....	....	4·6	4·4	....	....	....	....
Ash..... "	....	....	....	....	....	....	8·1	8·4	....	....	....	....
Sulphur..... "	0·7	0·7	0·7	0·8	1·8	1·9	2·0	2·1	1·6	1·6	1·6	1·6
Nitrogen..... "	....	....	....	....	....	....	1·4	1·4	....	....	....	....
Oxygen..... "	....	....	....	....	....	....	5·4	1·8	....	....	....	....
Calorific Value—												
Calories per gramme, gross.....	....	....	7,645	7,860	7,900	7,985	7,635	7,970	8,045	8,165	7,950	8,055
B.T.U. per pound gross.....	....	....	13,760	14,150	14,220	14,370	13,740	14,340	14,480	14,700	14,310	14,500
Fuel ratio.....	4·30		4·20		4·30		4·30		3·45		3·55	
Carbon-hydrogen ratio.....	....	....	....	....	....	....	17·0	18·9	....	....	....	....

(*Analyses of these samples continued overleaf*)

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

LOW-VOLATILE BITUMINOUS COALS FROM THE UNITED STATES—Continued

—	"Pocahontas", Beckley seam, West Virginia	Vincent mine, Upper Freeport seam, Reedsville, West Virginia	"Berwind" coal, upper Kittanning or C Prime seam, Windber, Cambria, or Somerset county, Pennsylvania		"Penker" coal from Cambria county, Pennsylvania; presumably from lower Kittanning (Miller or B) seam at Portage	
	Supplied to industrial plant in Montreal	Supplied for institution at Ottawa	Supplied through Ottawa dealer to Fuel Research Laboratories		Supplied to school buildings at Ottawa	
Coking properties	Good	Good	Good	Good	Good	Good
Softening temperature of ash....°F.	2700+	2700+	2595	2305	....	....
Screen analysis (square screen openings)....per cent	....	....	....	On 2″=5·7, 2″ to $1\frac{1}{2}$″=4·1, $1\frac{1}{2}$″ to 1″=3·1, 1″ to $\frac{3}{4}$″=1·9, $\frac{3}{4}$″ to $\frac{1}{2}$″=3·1, $\frac{1}{2}$″ to $\frac{1}{4}$″=11·6, $\frac{1}{4}$″ to $\frac{1}{8}$″=18·9, per $\frac{1}{8}$″=51·6		
Designation of coal	....		Sized lumps	Slack	....	
Kind of sample	Commercial			Commercial; $\frac{1}{2}$-ton	Commercial	
Taken by	Plant operator	Private individual	Ottawa dealer	Staff of F.R.L.	Superintendent or staffs of buildings	
Date of sampling	Aug., 1932	July, 1932	Mar., 1934	April, 1934	Aug., 1932	Sept., 1932

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

LOW-VOLATILE BITUMINOUS COALS FROM THE UNITED STATES—Concluded

—	Crown mine, Cambria county, Pennsylvania				"Hughes", Pennsylvania		"Lilly Keystone", Pennsylvania				"Old Keystone Lily"	
	Presumably from lower Kittanning (Miller or B) seam. Cambria county, Pennsylvania											
	Supplied to school buildings at Ottawa				Shipped to Ottawa						Shipped to the province of Quebec	
Sample No	12267		12437		12101		12100		12102		12463	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	1·7	....	1·9	....	1·3	....	1·2	....	1·3	....	1·0	....
Ash..... "	6·3	6·4	6·1	6·2	6·5	6·7	6·1	6·2	7·6	7·7	6·0	6·1
Volatile matter..... "	20·9	21·3	21·1	21·5	18·8	19·0	18·9	19·1	18·3	18·5	18·6	18·8
Fixed carbon..... "	71·1	72·3	70·9	72·3	73·4	74·3	73·8	74·7	72·8	73·8	74·4	75·1
Ultimate Analysis—												
Sulphur.....per cent	1·8	1·8	1·5	1·5	1·1	1·1	0·7	0·7	0·8	0·8	0·9	0·9
Calorific Value—												
Calories per gramme, gross.....	7,940	8,080	8,025	8,180	....	....	....	....	....	....	....	....
B.T.U. per pound, gross.....	14,300	14,550	14,450	14,720	....	....	....	....	....	....	....	....
Fuel ratio.....	3·40		3·35		3·90		3·90		4·00		4·00	
Coking properties.....	Good		Good		Good, swollen		Good, swollen		Good, swollen		Good	
Softening temperature of ash.....°F.	....		....		2700+		2700+		2700+		2700+	
Designation of coal.....	.....				Blacksmith coals.....							
Kind of sample.....	Commercial.....											
Taken by.....	Superintendent or staffs of buildings				Ottawa dealers.....						.....	
Date of sampling.....	July, 1933.....		Sept., 1933.....		June 6, 1933.....						Oct., 1933.....	

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BRITISH BITUMINOUS COALS

—	New Lount Collieries, Ltd., Leicestershire, England		Glapwell colliery near Chesterfield, Derbyshire, England				Dinnington colliery, Barnsley seam, Sheffield, Yorkshire, England				Maltby Main colliery, near Rotherham, Yorkshire	
Sample No.	10810		10786		11136		11183		11398		11184	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	9·8	....	2·4	....	3·5	....	3·9	....	4·2	....	3·2	....
Ash..... "	5·2	5·8	2·5	2·6	3·3	3·4	3·6	3·7	5·6	5·8	4·4	4·6
Volatile matter..... "	35·1	38·9	35·5	36·4	35·3	36·6	34·2	35·6	33·1	34·6	33·4	34·5
Fixed carbon..... "	49·9	55·3	59·6	61·0	57·9	60·0	58·3	60·7	57·1	59·6	59·0	60·9
Ultimate Analysis—												
Carbon.....per cent	69·2	76·7	80·1	82·1	78·4	81·2	78·2	81·4	76·5	79·9	78·1	80·7
Hydrogen..... "	5·6	4·9	5·5	5·4	5·5	5·3	5·5	5·3	5·4	5·1	5·4	5·2
Ash..... "	5·2	5·8	2·5	2·6	3·3	3·4	3·6	3·7	5·6	5·8	4·4	4·6
Sulphur..... "	1·3	1·5	2·0	2·0	2·0	2·0	1·1	1·2	1·2	1·3	1·5	1·5
Nitrogen..... "	1·4	1·6	1·8	1·9	1·6	1·7	1·8	1·8	1·7	1·8	1·7	1·7
Oxygen..... "	17·3	9·5	8·1	6·0	9·2	6·4	9·8	6·6	9·6	6·1	8·9	6·3
Calorific Value—												
Calories per gramme, gross.....	6,705	7,435	8,010	8,210	7,750	8,030	7,680	7,995	7,595	7,925	7,740	8,000
B.T.U. per pound, gross.....	12,070	13,380	14,420	14,780	13,950	14,450	13,830	14,390	13,670	14,270	13,930	14,400
Fuel ratio.....	1·45		1·70		1·65		1·70		1·70		1·75	
Carbon-hydrogen ratio.....	12·4	15·5	14·5	15·2	14·2	15·2	14·3	15·6	14·3	15·7	14·6	15·6
Coking properties.....	Poor		Good		Good		Good		Good		Good	
Softening temperature of ash.....°F.	2030		2205		2100		2700+		2490		2345	
Weight per cubic foot.....pounds	....		....		....		....		45·5		....	

Screen analysis (square screen openings).....per cent	....	....	....	....	On $\frac{3}{4}$"=3·5, $\frac{3}{4}$" to $\frac{1}{2}$"=18·9, $\frac{1}{2}$" to $\frac{1}{4}$"=56·0, $\frac{1}{4}$" to $\frac{1}{8}$"=10·8, per $\frac{1}{8}$"=10·8	....
Designation of coal.....	Non-coking singles*	Washed gas doubles and washed gas singles	Washed doubles	Washed doubles	Washed singles.	Washed doubles
Kind of sample.....	Commercial.....		Commercial; supplied to Ottawa industrial plant	Commercial....	Commercial; supplied to Ottawa industrial plant	Commercial.
Taken by.....	.....	Blended at Fuel Research Laboratories	Staff of F.R.L.	.....	Staff of Fuel Research Laboratories	.....
Date of sampling.....	June, 1932.....		Aug. 20 to 23, 1932	Sept., 1932.....	Nov. 24, 1932...	Sept., 1932.....

*Size roughly $\frac{3}{4}$" to $\frac{1}{2}$"

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BRITISH BITUMINOUS COALS—Continued

—	Aldwarke Main and Rotherham Main collieries, Parkgate, Silkstone, and Swallowwood seams, Rotherham, Yorkshire, England		Denaby and Cadeby Main colliery, Barnsley and Parkgate seams, northeast of Rotherham		Glass Haughton and Castleford collieries, Castleford, Yorkshire		Priestman collieries, Whinfield Works, Rowlands Gill, Durham, England				"Henderson", English coal, as used for tugs and dredges at Sorel, Que.	
Sample No.	11186		11185		10783		11616		11617		11372	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	2·5	....	4·5	....	3·3	....	2·1	....	2·4	....	1·9	....
Ash..... "	2·6	2·6	3·0	3·2	2·8	2·9	6·3	6·4	6·8	7·0	2·4	2·4
Volatile matter..... "	34·5	35·4	33·7	35·3	34·4	35·6	28·1	28·7	27·5	28·2	30·4	31·0
Fixed carbon..... "	60·4	62·0	58·8	61·5	59·5	61·5	63·5	64·9	63·3	64·8	65·3	66·6
Ultimate Analysis—												
Carbon.....per cent	....	....	....	....	79·4	82·1	80·3	82·0	....	....	....	....
Hydrogen..... "	....	....	....	....	5·5	5·3	5·0	4·8	....	....	....	....
Ash..... "	..	....	....	....	2·8	2·9	6·3	6·4	....	....	....	....
Sulphur..... "	1·3	1·3	1·1	1·1	1·7	1·8	0·9	0·9	0·8	0·8	0·8	0·8
Nitrogen..... "	....	....	....	....	1·8	1·8	1·4	1·5	....	....	....	....
Oxygen..... "	....	....	....	....	8·8	6·1	6·1	4·4	....	....	....	....
Calorific Value—												
Calories per gramme, gross.....	8,040	8,250	7,710	8,075	7,945	8,215	7,950	8,125	7,820	8,020	8,290	8,450
B.T.U. per pound, gross.....	14,480	14,850	13,880	14,530	14,300	14,790	14,320	14,620	14,080	14,430	14,920	15,210
Fuel ratio.....	1·75		1·75		1·75		2·25		2·30		2·15	

Carbon-hydrogen ratio	....	....	14·4 15·5	16·2 16·9	....	....
Coking properties	Good	Fair	Fair	Good	Good	Fair
Softening temperature of ash.....°F.	2230	2250	2245	2700	2700+	....
Designation of coal	Washed doubles	Washed doubles	Washed gas singles, 1″ x ½″	Unscreened gas coal	Unscreened coking coal	.....
Kind of sample	Commercial					
Date of sampling	July 22, 1932....	Sept. ,1932.....	June, 1932.....	February, 1933..	.....	Oct. 31, 1932.

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BRITISH BITUMINOUS COALS—Concluded

—	Kinneil colliery, Easter Main seam, Bo'ness, West Lothian, Scotland						"Polk Emmet" Scotch coal		Plean collieries, Plean, Stirlingshire, Scotland		Scotch "Navigation" bituminous coal, shipped to Ottawa	
Sample No	11397		12678		12679		12677		11618		12506	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	6·2	....	1·6	....	1·6	....	1·8	....	1·8	....	8·8	....
Ash..... "	6·9	7·4	4·8	4·8	5·7	5·8	4·2	4·3	3·8	3·8	8·1	8·9
Volatile matter..... "	31·2	33·3	33·5	34·1	33·6	34·1	35·8	36·5	29·3	29·9	32·7	35·8
Fixed carbon..... "	55·7	59·3	60·1	61·1	59·1	60·1	58·2	59·2	65·1	66·3	50·4	55·3
Ultimate Analysis—												
Carbon.....per cent	73·9	78·8	....	....	....	....	80·1	81·5	81·9	83·3	....	....
Hydrogen..... "	5·5	5·1	....	....	....	....	5·4	5·3	5·2	5·1	....	....
Ash..... "	6·9	7·4	....	....	....	....	4·2	4·3	3·8	3·8	....	....
Sulphur..... "	0·6	0·6	0·5	0·5	0·4	0·5	0·8	0·8	0·7	0·8	0·7	0·8
Nitrogen..... "	1·6	1·7	....	....	....	....	1·6	1·7	1·7	1·8	....	....
Oxygen..... "	11·5	6·4	....	....	....	....	7·9	6·4	6·7	5·2	....	....
Calorific Value—												
Calories per gramme, gross	7,270	7,750	7,830	7,960	7,800	7,930	7,935	8,080	8,120	8,270	6,930	7,605
B.T.U. per pound, gross	13,090	13,950	14,100	14,320	14,040	14,270	14,290	14,550	14,620	14,890	12,480	13,690
Fuel ratio	1·80		1·80		1·75		1·60		2·20		1·55	
Carbon-hydrogen ratio	13·5	15·5	....	....	....	....	14·9	15·5	15·8	16·4	....	....
Coking properties	Fair		Good		Good		Good		Good		Fair	
Softening temperature of ash.....°F.	2700+		2700+		2700+		2700+		2700+		2700+	
Weight per cubic foot.....pounds	46·8		....		....		....		....		....	

Screen analysis (square screen openings)...per cent	On $1\frac{1}{2}''$ =3·5, $1\frac{1}{2}''$ to $1''$=16·1, $1''$ to $\frac{3}{4}''$=20·2, $\frac{3}{4}''$ to $\frac{1}{2}''$=30·3, $\frac{1}{2}''$ to $\frac{1}{4}''$=21·2, $\frac{1}{4}''$ to $\frac{1}{8}''$=6·6, per $\frac{1}{8}''$=2·1	....	....	....	....	....
Designation of coal	Washed doubles	Coals recommended for gas producers			Coking coal	
		Washed doubles; mainly bright coal with dull bands	Washed singles; mainly bright coal with dull bands	Washed doubles; mainly dull coal, banded with bright		
Kind of sample	Commercial; supplied to Ottawa industrial plant	Commercial				
Taken by	Staff of Fuel Research Laboratories					Ottawa dealer
Date of sampling	Nov. 23, 1932	June, 1933			Feb., 1933	Oct., 1933

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BITUMINOUS COALS FROM THE UNITED STATES

—	"Morgan" coal from West Virginia		Coal from "Morgan No. 1" or "Mona" mine, West Virginia		"National" coal from Morgantown, Monongalia, county, West Virginia				"National" coal from West Virginia		Sumner No. 3 mine, Pittsburgh seam, Brownsville, Fayette county, Pennsylvania		"Maple Sterling" coal from Greene county, Pennsylvania	
	Supplied to school or hospital buildings in Ottawa										Supplied to Fuel Research Laboratories for coking tests		Supplied to school buildings in Ottawa	
Sample No.	12644		11318		11211		12439		12645		13133		12438	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	5·1	....	3·5	....	1·5	....	1·8	....	6·0	....	2·3	....	2·0	....
Ash..... "	9·4	9·9	8·0	8·3	7·2	7·4	7·7	7·8	9·0	9·6	8·6	8·8	9·1	9·3
Volatile matter... "	32·6	34·4	33·8	35·0	35·3	35·8	35·3	36·0	34·7	36·9	33·2	33·9	36·5	37·2
Fixed carbon..... "	52·9	55·7	54·7	56·7	56·0	56·8	55·2	56·2	50·3	53·5	55·9	57·3	52·4	53·5
Ultimate Analysis—														
Carbon.....per cent	....	....	....	....	....	....	....	....	....	....	75·0	76·8	....	....
Hydrogen..... "	....	....	....	....	....	....	....	....	....	....	4·9	4·7	....	....
Ash..... "	....	....	....	....	....	....	....	....	....	....	8·6	8·8	....	....
Sulphur..... "	2·3	2·5	2·9	3·0	2·3	2·3	2·6	2·7	3·0	3·2	1·4	1·4	3·0	3·1
Nitrogen..... "	....	....	....	....	....	....	....	....	....	....	1·7	1·8	....	....
Oxygen..... "	....	....	....	....	....	....	....	....	....	....	8·4	6·5	....	....
Calorific Value—														
Calories per gramme, gross	7,205	7,595	7,400	7,670	7,830	7,950	7,660	7,800	7,195	7,655	7,530	7,710	7,500	7,655
B.T.U. per pound, gross...	12,970	13,670	13,320	13,810	14,090	14,310	13,790	14,040	12,950	13,780	13,550	13,870	13,500	13,780
Fuel ratio	1·60		1·60		1·60		1·55		1·45		1·70		1·45	
Carbon-hydrogen ratio.....	....	....	....	....	....	....	....	....	....	....	15·5	16·3	....	....

Coking properties	Good	Good	Good	Good	Good	Good	Good
Softening temperature of ash....°F.	2320	2030	....	....	2250	2580	....
Screen analysis (square screen openings)...per cent	....	....	....	....	....	On 2″=8·2, 2″ to 1″=22·6, 1″ to $\frac{3}{4}$″ =13·7, $\frac{3}{4}$″ to $\frac{1}{2}$″= 15·5, $\frac{1}{2}$″ to $\frac{1}{4}$″= 15·1, $\frac{1}{4}$″ to $\frac{1}{8}$″= 7·5, per $\frac{1}{8}$″=17·4	....
Designation of coal						Run-of-mine	
Kind of sample	Commercial					Commercial; 3 tons	Commercial
Taken by	Consulting analyst, with assistance of representative	Plant engineer	Superintendent or staffs of buildings.		Consulting analyst, with assistance of representative	Staff of F.R.L.	Superintendent or staffs of buildings
Date of sampling	Jan. 8, 1934	Nov., 1932	Sept., 1932	Sept., 1933	Jan. 9, 1934	May 17, 1934	Sept., 1933

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BITUMINOUS COALS FROM THE UNITED STATES—Continued

—	"Lincoln Gas" coal from Washington county, Pennsylvania				Banning mine, Pittsburgh seam, Fayette or Westmoreland county, Pennsylvania				Hutchinson mine, Pittsburgh seam, Westmoreland county		"Westmoreland" (gas) coal	
	Supplied to the Department of National Defence at Toronto				Supplied to industrial plant at Montreal		Supplied to Fuel Research Laboratories for coking tests		Supplied to industrial plant at Ottawa			
Sample No	12537		12715		11107		12884		13272		11165	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	2·9	....	2·7	....	1·5	....	2·0	....	2·1	....	1·9	....
Ash..... "	9·3	9·6	6·7	6·9	6·7	6·8	6·7	6·9	7·6	7·7	7·0	7·1
Volatile matter..... "	35·7	36·8	37·4	38·4	33·3	33·8	32·9	33·5	32·3	33·0	33·8	34·5
Fixed carbon..... "	52·1	53·6	53·2	54·7	58·5	59·4	58·4	59·6	58·0	59·3	57·3	58·4
Ultimate Analysis—												
Carbon.....per cent	....	....	....	....	....	....	....	....	77·2	78·9	78·7	80·3
Hydrogen..... "	....	....	....	....	....	....	....	....	5·2	5·1	5·4	5·2
Ash..... "	....	....	....	....	....	....	....	....	7·6	7·7	7·0	7·1
Sulphur..... "	1·6	1·6	1·7	1·8	0·8	0·8	1·0	1·0	1·0	1·0	1·1	1·2
Nitrogen..... "	....	....	....	....	....	....	....	....	1·6	1·7	1·7	1·8
Oxygen..... "	....	....	....	....	....	....	....	....	7·4	5·6	6·1	4·4
Calorific Value..												
Calories per gramme, gross.....	7,405	7,620	7,530	7,745	....	....	7,835	7,995	7,755	7,925	7,780	7,935
B.T.U. per pound, gross.....	13,330	13,720	13,560	13,940	....	....	14,100	14,390	13,960	14,260	14,010	14,280
Fuel ratio.....	1·45		1·40		1·75		1·80		1·80		1·70	
Carbon-hydrogen ratio.....	....	....	....	....	....	....	....	....	14·8	15·5	14·7	15·4

Coking properties	Good	Good	Good	Good	Good	Good
Softening temperature of ash °F.	2220	2140	2700+	2740	2610	2700+
Screen analysis (square screen openings) per cent	....	....	....	....	On 3″=5·0, 3″ to 2″=7·4, 2″ to 1½″=7·7, 1½″ to 1″=9·2, 1″ to ¾″=5·0, ¾″ to ½″=3·2, ½″ to ¼″=13·1, ¼″ to ⅛″=11·9, per ⅛″=37·5	....
Designation of coal	1¼-inch bituminous lump				Minus 4-inch slack	
Kind of sample	Commercial					
Taken by	Departmental employees		Plant operator	Staff of Fuel Research Laboratories		
Date of sampling	November, 1933	January, 1934	August, 1932	April, 1934	June, 1934	August, 1932

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

BITUMINOUS COALS FROM THE UNITED STATES—Concluded

—	McIntyre mine, upper and lower Freeport seams, Indiana county, Pennsylvania		Kent mine, upper and lower Freeport seams, Indiana county		Nordic mine, Reynoldsville area, Pennsylvania		"Pennsylvania Gas" coal		"Pittsburgh, Champion Lump" coal		"Wilkeson" coal from Pierce county, Washington	
	Supplied to industrial plant at Montreal		Supplied to Fuel Research Laboratories for coking tests		Supplied to Department of National Defence at Toronto		Supplied to industrial plant at Ottawa		Supplied to industrial plant at Brandon, Man.		Shipped to British Columbia	
Sample No	11108		12935		11128		10655		12052		11794	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture...per cent	1·4	....	1·6	....	1·6	....	2·5	....	1·9	....	1·6	....
Ash... "	7·2	7·3	8·1	8·3	9·4	9·6	7·1	7·3	6·2	6·3	11·6	11·8
Volatile matter... "	30·3	30·7	30·0	30·4	26·0	26·4	33·6	34·4	34·5	35·2	26·2	26·7
Fixed carbon... "	61·1	62·0	60·3	61·3	63·0	64·0	56·8	58·3	57·4	58·5	60·6	61·5
Ultimate Analysis—												
Carbon...per cent	....	....	78·1	79·4	....	....	76·8	78·8	78·7	80·2	....	....
Hydrogen... "	....	....	5·2	5·1	....	....	5·3	5·1	5·3	5·2	....	....
Ash... "	....	....	8·1	8·3	....	....	7·1	7·3	6·2	6·3	....	....
Sulphur... "	1·0	1·0	0·9	0·9	2·1	2·1	1·1	1·1	0·8	0·9	0·5	0·5
Nitrogen... "	....	....	1·5	1·5	....	....	1·5	1·5	1·7	1·7	....	....
Oxygen... "	....	....	6·2	4·8	....	....	8·2	6·2	7·3	5·7	....	....
Calorific Value—												
Calories per gramme, gross	....	....	7,790	7,920	7,710	7,835	7,695	7,890	7,805	7,950	7,575	7,695
B.T.U. per pound, gross	....	....	14,020	14,260	13,880	14,100	13,850	14,200	14,050	14,310	13,630	13,850
Fuel ratio	2·00		2·00		2·45		1·70		1·65		2·30	
Carbon-hydrogen ratio	....	....	15·0	15·6	....	....	14·6	15·3	14·7	15·3	....	....

Coking properties	Good	Good	Good	Good	Good	Good
Softening temperature of ash.....°F.	2700+	2810	....	2575	2700+	2700+
Weight per cubic foot.....pounds	....	....	....	47·8	....	....
Screen analysis (square screen openings).....per cent	....	1½" to 1"=36·8, 1" to ¾"=24·2, ¾" to ½"=19·2, ½" to ¼"=11·0, ¼" to ⅛"=1·6, per ⅛"=7·2	....	On 2"=30·1, 2" to 1"=40·0, 1" to ¾"=8·1, ¾" to ½"=4·8, ½" to ¼"=6·3, ¼" to ⅛"=3·7, per ⅛"=7·0	....	....
Designation of coal.....	.....	Stoker size.....	Bituminous smokeless	On ¾-inch screen	.....	Washed slack...
Kind of sample.....	Commercial.....					
Taken by.....	Plant operator..	Staff of F.R.L..	Departmental employees	Staff of Fuel Research Laboratories		.....
Date of sampling.....	Aug., 1932.....	April 30, 1934...	Aug. 27, 1932....	April 14, 1932...	April, 1933.....	Mar., 1933

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	British coke, "Priestman's Nuts"	British coke		"La Salle", Koppers coke from Montreal, Quebec	Semet-Solvay coke from Detroit, Michigan	Coke made by electrical carbonization process at Detroit
	Shipped to Montreal	As shipped to Canada		Supplied to industrial plant at Ottawa		
Sample No	11127	11564	11589	12752	12777	12459
Moisture condition	R D	R D	R D	R D	R D	R D
Proximate Analysis—						
Moisture.....per cent	0·9	0·2	0·3	0·3	0·6	0·7 ....
Ash..... "	6·8 6·9	6·3 6·3	7·2 7·2	9·2 9·2	7·7 7·8	7·5 7·5
Volatile matter..... "	1·6 1·6	0·8 0·8	0·8 0·8	2·0 2·0	1·7 1·7	2·3 2·3
Fixed carbon..... "	90·7 91·5	92·7 92·9	91·7 92·0	88·5 88·8	90·0 90·5	89·5 90·2
Ultimate Analysis—						
Sulphur.....per cent	0·7 0·7	0·8 0·8	0·8 0·8	0·7 0·7	0·6 0·6	0·6 0·6
Calorific Value—						
Calories per gramme, gross	7,305 7,370	7,230 7,240	7,045 7,065	7,230 7,250	7,340 7,380	7,165 7,215
B.T.U. per pound, gross	13,150 13,270	13,010 13,030	12,680 12,720	13,010 13,050	13,210 13,290	12,890 12,990
Softening temperature of ash.....°F.	2700+	2665	2620	2590	2500	....
Designation of fuel	80% 1½- to 1-inch			Foundry coke		
Kind of sample	Commercial; 5000 tons	Commercial				
Taken by				Plant operator		
Date of sampling	Aug., 1932	Jan., 1933		Feb., 1934	Mar., 1934	Oct., 1933

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	By-product coke manufactured from Michel, British Columbia, coal, in Koppers ovens at Winnipeg, Manitoba								Petroleum coke screenings, supplied to Fuel Research Laboratories for briquetting tests		Briquettes made from Welsh anthracite screenings*, with petroleum asphalt, at Fuel Research Laboratories, and supplied to Toronto contractors for tests		Hardwood charcoal breeze manufactured in plant at Fassett, Quebec	
Sample No.	12770		12771		12772		12773		10857		12547		10670	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	0·7	....	0·6	....	1·0	....	0·5	....	1·8	....	2·2	....	4·4	....
Ash..... "	9·3	9·4	8·3	8·4	8·8	8·9	8·6	8·6	0·7	0·7	3·7	3·8	7·0	7·3
Volatile matter... "	1·6	1·6	1·8	1·8	2·0	2·0	1·1	1·1	12·4	12·6	13·3	13·6	20·2	21·2
Fixed carbon..... "	88·4	89·0	89·3	89·8	88·2	89·1	89·8	90·3	85·1	86·7	80·8	82·6	68·4	71·5
Ultimate Analysis—														
Carbon.....per cent	....	....	....	....	....	....	....	....	....	....	....	....	73·8	77·2
Hydrogen..... "	....	....	....	....	....	....	....	....	....	....	....	....	3·6	3·3
Ash..... "	....	....	....	....	....	....	....	....	....	....	....	....	7·0	7·3
Sulphur..... "	0·6	0·6	0·6	0·6	0·7	0·7	0·6	0·6	1·6	1·6	0·9	1·0	Trace	Trace
Nitrogen..... "	....	....	....	....	....	....	....	....	....	....	....	....	0·7	0·7
Oxygen..... "	....	....	....	....	....	....	....	....	....	....	....	....	14·9	11·5
Calorific Value—														
Calories per gramme, gross	....	....	7,060	7,105	....	....	7,170	7,210	8,455	8,610	8,110	8,295	6,780	7,100
B.T.U. per pound, gross...	....	....	12,710	12,790	....	....	12,910	12,980	15,220	15,500	14,600	14,930	12,200	12,770
Softening temperature of ash.....°F.	2280		2150		2150		2380		1900		....		....	
Weight per cubic foot, pounds	....		....		....		....		....		....		15·5	
Screen analysis (square screen openings)...per cent	....		....		....		....		....		....		On $\frac{1}{2}$"=6·9, $\frac{1}{2}$" to $\frac{1}{4}$"=20·4, $\frac{1}{4}$" to $\frac{1}{8}$"=24·1, $\frac{1}{8}$" to 0·078"=12·7, 0·078" to 0·046"=10·9, 0·046" to 0·016"=13·4, per 0·016"=11·6	
Kind of sample	Commercial												Commercial; 15 bags	
Taken by	Oven operator								Staff of Fuel Research Laboratories				Plant operator	
Date of sampling	Feb. 27, 1934....		Feb. 28.....		Mar. 1.....		Mar. 2.....		July 12, 1932....		Nov., 1933.....		April, 1932	

*See samples Nos. 11539, 11567, and 11603, Table III, p. 29.

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	"Dibble Petro-Blox" briquettes, made in Toronto from petroleum coke with cement binder		"Welscot" briquettes, made in Toronto from Welsh and Scotch anthracite screenings with petroleum pitch binder		"Burn-Rite Specials", briquettes made in Toronto				"Package Full" briquettes made in Hamilton, Ont., probably principally from Pocahontas coal with cement binder		"Coalettes", briquettes made in Waterloo, Ont., from Pocahontas slack with cement binder	
					From Pocahontas slack with petroleum pitch		From coke and Pocahontas screenings with petroleum pitch					
Sample No	11220		12453		12454		12455		12458		12456	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	2·8	....	1·7	....	1·9	....	1·8	....	1·4	....	2·5	....
Ash..... "	4·6	4·7	8·4	8·6	6·0	6·1	8·5	8·7	14·6	14·8	14·2	14·6
Volatile matter..... "	12·4	12·8	16·8	17·1	15·8	16·1	17·0	17·3	17·2	17·5	18·6	19·1
Fixed carbon..... "	80·2	82·5	73·1	74·3	76·3	77·8	72·7	74·0	66·8	67·7	64·7	66·3
Ultimate Analysis—												
Sulphur.....per cent	0·9	0·9	0·9	0·9	0·9	0·9	0·9	0·9	0·7	0·7	0·5	0·5
Calorific Value—												
Calories per gramme, gross.....	8,280	8,520	7,590	7,720	8,020	8,180	7,565	7,705	7,215	7,315	7,150	7,330
B.T.U. per pound, gross.....	14,900	15,330	13,670	13,900	14,430	14,720	13,620	13,870	12,990	13,170	12,870	13,200
Softening temperature of ash.....°F.	2650		....		....		....		....		....	
Date.....	Sept., 1932.....		Autumn of 1933.....									

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	"Coalettes", briquettes made in Waterloo, Ont. from petroleum coke, with cement binder		"Nick's Blox" briquettes, made in Windsor, Ont., from Pocahontas coal and petroleum coke, with cement binder		"Thermets" (ovoid) briquettes made in Vancouver, B.C., from coke breeze and Coalmont coal, with pitch binder		"Ambricoal" briquettes, made at Lykens, Pennsylvania, from washed Lykens Valley anthracite, with farinaceous and petroleum asphalt binder		'Ford" briquettes made at Iron Mountain, Michigan, from charcoal with starch		"Berwind" briquettes, made at Superior, Wisconsin, from low-volatile bituminous coal, with pitch binder	
Sample No	12457		11221		12037		12616		12618		12619	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	1·2	....	1·3	....	4·1	....	1·3	....	2·8	....	1·2	....
Ash..... "	14·8	15·0	9·6	9·7	15·8	16·4	10·5	10·6	5·2	5·3	6·8	6·9
Volatile matter..... "	17·3	17·5	15·3	15·5	25·4	26·5	13·2	13·3	19·2	19·7	21·9	22·2
Fixed carbon..... "	66·7	67·5	73·8	74·8	54·7	57·1	75·0	76·1	72·8	75·0	70·1	70·9
Ultimate Analysis—												
Sulphur.....per cent	0·9	0·9	0·8	0·9	0·7	0·7	0·8	0·8	0·1	0·1	0·8	0·8
Calorific Value—												
Calories per gramme, gross.....	7,315	7,405	7,805	7,910	6,490	6,765	7,525	7,625	7,250	7,450	8,120	8,215
B.T.U. per pound, gross.....	13,170	13,330	14,050	14,230	11,680	12,180	13,540	13,730	13,050	13,410	14,610	14,790
Softening temperature of ash.....°F.	....		2030		2325		2180		2640		2330	
Date.....	Autumn of 1933.		Sept., 1932.....		April, 1933.....		Dec., 1933.....					

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	"Kleen-Blox" briquettes, made in the United States from Montana lignite with coal-tar pitch binder		"Sunglo Koalets", small briquettes made at Seattle, Washington, from free-burning coal with asphalt binder		"Diamond Briquets", large briquettes made at Seattle from coking and free-burning coal with asphalt binder		Briquettes, prepared by Lang and Neilson carbonization process from slack (through ½-inch) from New Lount Collieries, Ltd., Leicestershire, Eng.*		"Ovoids", briquettes made from "Sophia Jacoba" anthracite from Westphalia, Germany		"Peco" briquettes, manufactured in Scotland from Irish peat	
Sample No.	12311		12654		12655		10811		11268		11808	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	12·9	....	8·1	....	4·6	....	4·0	....	1·6	....	11·3	....
Ash..... "	6·4	7·4	10·9	11·9	11·9	12·5	6·8	7·1	10·1	10·3	5·7	6·4
Volatile matter..... "	34·4	39·5	37·5	40·8	35·4	37·1	12·2	12·7	11·4	11·6	56·5	63·7
Fixed carbon..... "	46·3	53·1	43·5	47·3	48·1	50·4	77·0	80·2	76·9	78·1	26·5	29·9
Ultimate Analysis—												
Sulphur.....per cent	0·7	0·9	0·6	0·7	0·6	0·7	1·0	1·1	1·1	1·1	0·4	0·5
Calorific Value—												
Calories per gramme, gross.....	6,120	7,025	6,480	7,050	6,920	7,255	7,255	7,555	7,605	7,730	4,535	5,110
B.T.U. per pound, gross.....	11,010	12,640	11,660	12,690	12,460	13,060	13,060	13,600	13,690	13,910	8,170	9,200
Softening temperature of ash.....°F.	....		2550		2700+		2010		2270		....	
Date.....	Sept., 1933.....		Jan, 1934.....				June, 1932.....		Oct., 1932.....		April, 1933.....	

*See sample No. 10810, Table III, p. 36

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	Firewood samples submitted by the Forest Products Laboratories, Department of the Interior, Ottawa, Ont.													
	Hard maple, green		Mainly hard maple, dried or seasoned for 3 years						Hard, sugar maple					
									Wood		Young bark		Old bark	
Sample No.	12108		12071		12091		12212		12294		12295		12296	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—														
Moisture.....per cent	25·6	....	13·5	....	15·2	....	14·5	....	8·4	....	9·5	....	9·1	....
Ash..... "	1·2	1·6	0·9	1·0	1·1	1·3	1·3	1·5	0·8	0·9	6·6	7·3	5·8	6·4
Volatile matter... "	60·1	80·8	70·8	81·8	68·0	80·2	68·1	79·7	75·1	82·0	67·9	75·1	67·1	73·8
Fixed carbon..... "	13·1	17·6	14·8	17·2	15·7	18·5	16·1	18·8	15·7	17·1	16·0	17·6	18·0	19·8
Ultimate Analysis—														
Carbon.....per cent	37·3	50·1	43·2	50·0	42·9	50·7	42·9	50·2	45·6	49·7	....	....	....	....
Hydrogen..... "	7·3	6·0	6·8	6·1	6·9	6·1	6·9	6·2	6·4	6·0	....	....	....	....
Ash..... "	1·2	1·6	0·9	1·0	1·1	1·3	1·3	1·5	0·8	0·9	....	....	....	....
Sulphur..... "	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	0·1	0·1	0·1	0·1
Nitrogen..... "	0·2	0·2	0·1	0·2	0·2	0·2	0·2	0·2	0·1	0·1	....	....	....	....
Oxygen..... "	54·0	42·1	49·0	42·7	48·9	41·7	48·7	41·9	47·1	43·3	....	....	....	....
Calorific Value—														
Calories per gramme, gross	3,635	4,880	4,075	4,705	4,040	4,770	4,005	4,685	4,310	4,705	3,795	4,195	4,175	4,595
B.T.U. per pound, gross...	6,540	8,780	7,330	8,470	7,270	8,580	7,210	8,430	7,760	8,470	6,830	7,550	7,520	8,270
Fuel ratio	0·22		0·21		0·23		0·24		0·21		0·24		0·27	
Carbon-hydrogen ratio.....	5·1	8·4	6·3	8·1	6·3	8·3	6·3	8·2	7·1	8·3	....	....	....	....
Softening temperature of ash.....°F.	Above 2700*		....		....		....		....		....		....	
Date	June 9, 1933.....		May 27, 1933....		June 2, 1933....		July 15, 1933....		Sept., 1933.....					

*Composite sample No. 12261 from tests of green and dry hardwood—ash analysis, per cent: silica, 1·9, ferric oxide, 0·5; alumina, 1·6; calcium oxide, 45·4; magnesium oxide, 3·5; sulphur trioxide, 1·9; carbon dioxide, 30·9; potassium oxide, 12·2; sodium oxide, 0·5; phosphorus pentoxide, 1·3.

TABLE III—Continued

Analyses of Miscellaneous Solid Fuels—Continued

—	Firewood samples submitted by the Forest Products Laboratories, Department of the Interior, Ottawa											
	Yellow birch						Poplar, aspen					
	Wood		Young bark		Old bark		Wood		Young bark		Old bark	
Sample No	12297		12298		12299		12303		12304		12305	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—												
Moisture.....per cent	8·3	....	9·2	....	11·2	....	8·8	....	8·8	....	8·0	....
Ash..... "	2·4	2·7	9·1	10·0	2·4	2·7	2·3	2·5	6·9	7·5	3·1	3·4
Volatile matter..... "	75·3	82·1	64·5	71·1	67·7	76·2	75·8	83·2	69·7	76·5	70·1	76·1
Fixed carbon..... "	14·0	15·2	17·2	18·9	18·7	21·1	13·1	14·3	14·6	16·0	18·8	20·5
Ultimate Analysis—												
Carbon.....per cent	44·1	48·1	....	....	....	....	45·1	49·5	....	....	....	....
Hydrogen..... "	6·3	5·8	....	....	....	....	6·3	5·8	....	....	....	....
Ash..... "	2·4	2·7	....	....	....	....	2·3	2·5	....	....	....	....
Sulphur..... "	Trace	Trace	0·1	0·1	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace
Nitrogen..... "	0·1	0·1	....	....	....	....	0·1	0·1	....	....	....	....
Oxygen..... "	47·1	43·3	....	....	....	....	46·2	42·1	....	....	....	....
Calorific Value—												
Calories per gramme, gross	4,175	4,550	3,805	4,190	4,385	4,935	4,215	4,625	4,085	4,480	4,100	4,455
B.T.U. per pound, gross	7,510	8,190	6,850	7,540	7,890	8,890	7,590	8,320	7,350	8,070	7,380	8,020
Fuel ratio	0·19		0·27		0·28		0·17		0·21		0·27	
Carbon-hydrogen ratio	7·0	8·3	....	....	....	....	7·2	8·5	....	....	....	....
Date	September, 1933											

TABLE III—Concluded

Analyses of Miscellaneous Solid Fuels—Concluded

—	Firewood samples submitted by the Forest Products Laboratories, Department of the Interior, Ottawa																	
	Pine slabs and edgings, green		Pine slabs and edgings, dry				White pine						White spruce					
							Wood		Young bark		Old bark		Wood		Young bark ("Bark of white spruce")		Old bark ("Thick bark of Englemann spruce")	
Sample No.	12119		12133		12138		12300		12301		12302		12306		12307		12308	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—																		
Moisture.....per cent	39·4	....	11·5	....	9·1	....	8·2	....	8·9	....	10·7	....	9·3	....	10·0	....	10·4	....
Ash..... "	1·0	1·7	0·7	0·8	0·8	0·9	1·4	1·5	2·5	2·7	1·0	1·1	0·9	1·0	6·4	7·1	4·0	4·5
Volatile matter..... "	46·9	77·4	73·1	82·5	74·3	81·7	76·5	83·4	70·2	77·1	62·0	69·4	74·3	81·9	61·8	68·7	64·4	71·9
Fixed carbon..... "	12·7	20·9	14·7	16·7	15·8	17·4	13·9	15·1	18·4	20·2	26·3	29·5	15·5	17·1	21·8	24·2	21·2	23·6
Ultimate Analysis—																		
Carbon.....per cent	32·6	53·8	47·1	53·2	47·6	52·4	....	....	....	....	....	....	46·0	50·8	....	....	....	....
Hydrogen..... "	8·1	6·0	6·9	6·3	6·9	6·4	....	....	....	....	....	....	6·5	6·0	....	....	....	....
Ash..... "	1·0	1·7	0·7	0·8	0·8	0·9	....	....	....	....	....	....	0·9	1·0	....	....	....	....
Sulphur..... "	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	0·1	0·1	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace
Nitrogen..... "	0·2	0·3	0·1	0·1	0·1	0·1	....	....	....	....	....	....	0·1	0·1	....	....	....	....
Oxygen..... "	58·1	38·2	45·2	39·6	44·6	40·2	....	....	....	....	....	....	46·5	42·1	....	....	....	....
Calorific Value—																		
Calories per gramme, gross.....	3,040	5,020	4,450	5,025	4,525	4,975	4,585	4,995	4,515	4,960	4,585	5,140	4,300	4,740	4,085	4,540	4,220	4,710
B.T.U. per pound, gross.....	5,470	9,040	8,010	9,050	8,150	8,960	8,250	8,990	8,130	8,920	8,260	9,250	7,740	8,540	7,350	8,170	7,590	8,480
Fuel ratio.....	0·27		0·20		0·21		0·18		0·26		0·42		0·21		0·35		0·33	
Carbon-hydrogen ratio.....	4·0	8·9	6·9	8·5	7·0	8·2	....	....	....	....	....	....	7·2	8·5	....	....	....	....
Softening temperature of ash.....°F.	Above 2700*		....		....		....		....		....		....		....		....	
Date.....	June 17, 1933..		June 23.....		June 30.....		September, 1933.....											

* Composite sample No. 12262 from tests of green and dry pine wood: ash analysis, per cent: silica, 12·3; ferric oxide, 3·6; alumina, 7·1; calcium oxide, 33·3; magnesium oxide, 6·4; sulphur trioxide, 2·8; carbon dioxide, 18·5; potassium oxide, 11·1; sodium oxide, 1·2; phosphorus pentoxide, 2·6.

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