CANADA
DEPARTMENT OF MINES
HON. MARTIN BURRELL, MINISTER; R. G. MCCONNELL, DEPUTY MINISTER.

MINES BRANCH
EUGENE HAANEL, PH.D., DIRECTOR.

BULLETIN No. 25

Analyses of Canadian Fuels

IN FIVE PARTS

PART IV

ALBERTA AND THE NORTHWEST TERRITORIES

COMPILED BY
Edgar Stansfield, M.Sc.
and
J. H. H. Nicolls, M.Sc.

OTTAWA
J. DE LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
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EXPLANATORY NOTES.

The samples of fuel from Alberta and the Northwest Territories collected previous to 1910 were analysed at McGill University by the staff then engaged in a special "Investigation of the Coals of Canada." Early in 1910, however, this work was transferred to the Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, Ottawa; and all subsequent samples have been tested there.

The coal samples are classified according to areas corresponding to the provincial mine inspection districts. In some instances two or more of the smaller districts are grouped to form single areas, which are named after the component districts.

The expressions "anal." and "calc." at the head of any column indicate whether the figures recorded were obtained directly by analysis, or by calculation. The usual practice was to analyse the fuels after air-drying, although, in some cases, determinations were made on samples either in the condition received, or after being completely dried.

Figures in columns "R" refer to fuels as received; in columns "AD" to air-dried fuels; and in columns "D" to those dried at 105° C.

In making the determinations, the necessary calculations were made to give one more significant figure than is reported. All deduced values were calculated before the rounding-off process took place.

A description of the Hoffmann Potash Test is given on page 65 of the Summary Report of the Mines Branch for the year 1916.

A "Commercial" sample of any grade of fuel is one representative of the corresponding product as shipped from any mine.

The "Mine" and "Prospect" samples were collected by technical officers of either the Federal or Provincial governments: the former term being applied to those procured from deposits already under development. "Prospect" samples are apt to be weathered, and may, therefore, only give an indication of the composition of the main body of the deposit.

CONTENTS.

MISCELLANEOUS SAMPLES.

ALBERTA COAL FIELDS.

Crowsnest Pass Area.

Description.	International Coal & Coke Co., Ltd., Coleman. Denison colliery, Sec. 8, Tp. 8, R. 4.										
Sample No.	M34			M234	M2034		M 34 SP			M 2034 SP	
Moisture condition (see note p. 2)	R	AD	D	D	R	D	R	AD	D	R	D
Loss on air-drying %	1·3						1·4				
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.
Proximate analysis:— Moisture %	2·0	0·7	....	....	1·4	....	1·9	0·6	....	2·4	....
Ash %	19·4	19·7	19·8	11·6	20·9	21·2	15·9	16·1	16·2	18·3	18·7
Volatile matter %	24·6	24·9	25·1	26·4	23·3	23·7	23·4	23·7	23·9	22·3	22·9
Fixed carbon %	54·0	54·7	55·1	62·0	54·4	55·1	58·8	59·6	59·9	57·0	58·4
Ultimate analysis:— Carbon %	67·1	68·0	68·5	76·5	....	....	71·2	72·2	72·6	....	....
Hydrogen %	4·2	4·1	4·0	4·3	....	....	4·4	4·3	4·3	....	....
Ash %	19·4	19·7	19·8	11·6	....	....	15·9	16·1	16·2	....	....
Sulphur %	0·4	0·4	0·4	0·4	0·5	0·5	0·5	0·6	0·6	0·5	0·6
Nitrogen %	1·0	1·0	1·0	1·0	....	....	1·0	1·0	1·0	....	....
Oxygen %	7·9	6·8	6·3	6·2	....	....	7·0	5·8	5·3	....	....
Calorific value:— Calories per gram, gross	6380	6470	6510	7320	6360	6450	6820	6920	6960	6570	6730
B. Th. U. per lb., gross	11490	11640	11730	13180	11450	11610	12280	12450	12530	11820	12110
Fuel ratio		2·20		2·35	2·35			2·50		2·55	
Carbon-Hydrogen ratio	16·1	16·7	17·0	17·8	....	....	16·1	16·7	17·0	....	....
Coking properties											
Hoffmann potash test											
Location in mine	No. 2 seam.				No. 2 seam.		No. 4 seam.			No. 4 seam.	
Kind of sample	Commercial—15 tons.				Mine.		Commercial—1 ton.			Mine.	
Quality of coal	Run-of-mine.			Washed coal from M 34 yield 73%	Run-of-mine.		Run-of-mine.			Run-of-mine.	
Taken by	T. Denis, Mines Branch Ottawa.				E. Stansfield.		T. Denis, Mines Branch.			E. Stansfield.	
Date of sampling	May 10, 1908.				July, 1909.		May 10, 1908.			July 27, 1909.	
Remarks											

ALBERTA COAL FIELDS.

Crowsnest Pass Area.

Description.	McGillivray Creek Coal & Coke Co., Ltd., Coleman. Carbondale mine, Sec. 17, Tp. 8, R. 4.			West Canadian Collieries, Ltd., Blairmore. Greenhill colliery, Blairmore. Secs. 2 and 11, Tp. 8, R. 4.					
Sample No.	555			439			551		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	1·7	....	....	0·0	....	....	1·8	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture %	2·5	0·9	....	1·2	1·2	....	2·5	0·7	....
Ash %	17·0	17·3	17·4	19·5	19·5	19·7	11·5	11·7	11·8
Volatile matter %	24·0	24·4	24·6	23·1	23·1	23·4	24·9	25·3	25·5
Fixed carbon %	56·5	57·4	58·0	56·2	56·2	56·9	61·1	62·3	62·7
Ultimate analysis:—									
Carbon %	69·3	70·4	71·0	68·8	68·8	69·6	75·3	76·7	77·2
Hydrogen %	4·4	4·3	4·3	4·6	4·6	4·6	4·6	4·5	4·5
Ash %	17·0	17·3	17·4	19·5	19·5	19·7	11·5	11·7	11·8
Sulphur %	0·7	0·7	0·7	0·5	0·5	0·5	0·6	0·6	0·6
Nitrogen %	0·9	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Oxygen %	7·7	6·3	5·6	5·6	5·6	4·6	7·0	5·5	4·9
Calorific value:—									
Calories per gram, gross	6690	6800	6860	6530	6530	6600	7300	7430	7480
B. Th. U. per lb., gross	12040	12240	12350	11750	11750	11880	13140	13380	13470
Fuel ratio		2·35			2·45			2·45	
Carbon-Hydrogen ratio	15·6	16·4	16·7	14·8	14·8	15·3	16·3	17·1	17·4
Coking properties	very poor coke			small lump of fair coke			good coke with fair amount of swelling		
Hoffmann potash test	....	....	....	....	....	....	....	....	....
Location in mine	No. 2 seam			No. 1 seam, main entry. No. 3 level.			No. 1 seam.		
Kind of sample	Commercial—50 tons.			Mine			Commercial—car load.		
Quality of coal									
Taken by	Provincial mine inspector.			F. Aspinall, provincial mine inspector.			Provincial mine inspector.		
Date of sampling	February 1914. Lab. sample April 19, 1915.			December 1914.			December 1914. Lab. sample April 14, 1915.		
Remarks									

ALBERTA COAL FIELDS.

Crowsnest Pass Area.

Description.	Franco-Canadian Collieries, Ltd., Frank. Sec. 36, Tp. 7, R. 4.								
Sample No.	367			430			557		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	0·0	....	....	0·4	....	....	2·0	....	....
Results obtained by	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture %	1·2	1·2	....	1·3	1·0	....	2·8	0·8	....
Ash %	16·5	16·5	16·7	10·7	10·7	10·8	17·8	18·2	18·4
Volatile matter %	26·0	26·0	26·3	28·4	28·5	28·8	26·2	26·8	27·0
Fixed carbon %	56·3	56·3	57·0	59·6	59·8	60·4	53·2	54·2	54·6
Ultimate analysis:—									
Carbon %	70·6	70·6	71·4	77·1	77·4	78·2	68·0	69·4	70·0
Hydrogen %	4·8	4·8	4·7	5·0	5·0	4·9	4·4	4·3	4·2
Ash %	16·5	16·5	16·7	10·7	10·7	10·8	17·8	18·2	18·4
Sulphur %	0·6	0·6	0·6	0·5	0·5	0·5	0·6	0·6	0·6
Nitrogen %	1·1	1·1	1·1	1·2	1·2	1·2	0·9	1·0	1·0
Oxygen %	6·4	6·4	5·5	5·5	5·2	4·4	8·3	6·5	5·8
Calorific value:—									
Calories per gram, gross	6850	6850	6930	7360	7380	7460	6620	6750	6810
B. Th. U. per lb., gross	12330	12330	12470	13240	13290	13430	11910	12150	12250
Fuel ratio		2·15			2·10			2·05	
Carbon-Hydrogen ratio	14·9	14·9	15·3	15·5	15·6	15·9	15·5	16·2	16·6
Coking properties	fair sized lump of good coke			good solid coke, not much swollen			small lump of fair coke		
Hoffmann potash test	....	....	....	....	....	....	....	....	....
Location in mine	No. 1 or shaft seam			No. 1 or shaft seam, main gangway south.			No. 1 or shaft seam.		
Kind of sample	Mine			Mine			Commercial—car load.		
Quality of coal							Run-of-mine.		
Taken by	A. N. Scott, provincial mine inspector.			F. Aspinall, provincial mine inspector.			F. Aspinall.		
Date of sampling	April 1914			November 1914			Nov. 1914. Lab. sample April 21, 1915.		
Remarks									

ALBERTA COAL FIELDS.

Crowsnest Pass Area.

Description.	Hillcrest Collieries, Ltd., Hillcrest. Sec. 18, Tp. 7, R. 3.								
Sample No.	M 32			M 232	M 2032		884		
Moisture condition (see note p. 2)	R	AD	D	D	R	D	R	AD	D
Loss on air-drying ... %	1·7	....	....	....	....	....	1·0	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture ... %	3·0	1·3	....	....	1·0	....	1·9	0·9	....
Ash ... %	14·8	15·1	15·3	9·8	13·4	13·5	14·0	14·1	14·3
Volatile matter ... %	28·5	28·9	29·3	29·8	29·7	30·0	25·2	25·5	25·7
Fixed carbon ... %	53·7	54·7	55·4	60·4	55·9	56·5	58·9	59·5	60·0
Ultimate analysis:—									
Carbon ... %	68·3	69·5	70·4	77·0	....	....	72·1	72·9	73·5
Hydrogen ... %	4·4	4·3	4·2	4·7	....	....	4·5	4·5	4·4
Ash ... %	14·8	15·1	15·3	9·8	....	....	14·0	14·1	14·3
Sulphur ... %	0·6	0·6	0·6	0·5	0·8	0·8	0·6	0·6	0·6
Nitrogen ... %	1·0	1·0	1·0	1·1	....	....	1·1	1·1	1·1
Oxygen ... %	10·9	9·5	8·5	6·9	....	....	7·7	6·8	6·1
Calorific value:—									
Calories per gram, gross ...	6710	6830	6920	7450	7060	7130	7120	7200	7260
B. Th. U. per lb., gross ...	12080	12290	12450	13410	12700	12830	12820	12950	13070
Fuel ratio ...		1·90		2·00		1·90		2·35	
Carbon-Hydrogen ratio ...	15·5	16·2	16·7	16·4	....	....	15·9	16·3	16·7
Coking properties ...								good coke.	
Hoffmann potash test ...	....	....	....	....	....	....	....	....	....
Location in mine ...							No. 1 seam.		
Kind of sample ...	Commercial—10 tons.				Mine ...		Commercial—30 tons.		
Quality of coal ...	Run-of-mine ...			Washed coal from M 32, yield 82%	Run-of-mine ...				
Taken by ...	T. Denis, Mines Branch.				E. Stansfield ...		Provincial inspector of mines.		
Date of sampling ...	May 4, 1908.				July 29, 1909 ...		Dec. 15, 1915. Lab. sample Nov. 22, 1916.		
Remarks ...									

ALBERTA COAL FIELDS.

Crowsnest Pass Area.

Description.	West Canadian Collieries, Ltd., Blairmore. Bellevue Colliery, Bellevue. Sec. 29, Tp. 7, R. 3.											
Sample No.	M 33			M 233	M 2033		322			549		
Moisture condition (see note p. 2)	R	AD	D	D	R	D	R	AD	D	R	AD	D
Loss on air-drying.....%	0·7	....	....	....	....	....	0·0	....	....	1·8	....	....
Results obtained by.....	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture.....%	0·9	0·2	....	....	1·2	....	1·3	1·3	....	2·7	0·9	....
Ash.....%	15·3	15·4	15·5	12·7	13·9	14·1	17·0	17·0	17·2	18·8	19·1	19·3
Volatile matter.....%	27·4	27·6	27·6	28·4	26·4	26·7	20·8	20·8	21·0	25·5	26·0	26·2
Fixed carbon.....%	56·4	56·8	56·9	58·9	58·5	59·2	60·9	60·9	61·8	53·0	54·0	54·5
Ultimate analysis:— Carbon.....%	70·8	71·3	71·5	75·1	....	....	71·7	71·7	72·6	67·9	69·2	69·8
Hydrogen.....%	4·4	4·4	4·3	4·4	....	....	4·1	4·1	4·0	4·5	4·4	4·3
Ash.....%	15·3	15·4	15·5	12·7	....	....	17·0	17·0	17·2	18·8	19·1	19·3
Sulphur.....%	0·8	0·8	0·8	0·5	0·9	0·9	0·3	0·3	0·3	0·5	0·6	0·6
Nitrogen.....%	1·0	1·0	1·0	1·1	....	....	1·0	1·0	1·1	1·0	1·0	1·0
Oxygen.....%	7·7	7·1	6·9	6·2	....	....	5·9	5·9	4·8	7·3	5·7	5·0
Calorific value:— Calories per gram, gross.	6820	6870	6880	7210	6910	7000	6710	6710	6790	6550	6670	6730
B. Th. U. per lb., gross.	12280	12370	12390	12980	12440	12590	12070	12070	12230	11790	12010	12110
Fuel ratio.....	2·05			2·05	2·20		2·95			2·10		
Carbon-Hydrogen ratio.....	16·1	16·4	16·5	17·0	....	....	17·4	17·4	18·0	15·1	15·9	16·2
Coking properties.....	.....			.....	.....		poor coke			poor coke		
Hoffmann potash test.....	....	....	....	....	....	....	....	....	....	....	....	....
Location in mine.....	No. 1 seam.....			.....	No. 1 seam...		No. 1 seam.....			No. 1 seam.		
Kind of sample.....	Commercial — 10 tons.			.....	Mine.....		Mine.....			Commercial — 35 tons.		
Quality of coal.....	Run-of-mine.....			Washed coal from M 33, yield 86%	Run-of-mine..		.....			Run-of-mine.		
Taken by.....	T. Denis, Mines Branch.			.....	E. Stansfield.		A. N. Scott, provincial mine inspector.			F. Aspinall, provincial mine inspector.		
Date of sampling.....	May 5, 1908.....			.....	July 29, 1909..		January 1914.....			November, 1914. Lab. sample April 12, 1915.		
Remarks.....	.....			.....	.....		.....			.....		

ALBERTA COAL FIELDS.

Crowsnest Pass Area.

Description.	West Canadian Collieries, Ltd., Blairmore. Lille colliery, Lille, Sec. 8, Tp. 8, R. 3.					Leitch Collieries, Ltd., Passburg. Sec. 15, Tp. 7, R. 3.								
Sample No.	M 28			M 2028		M 48			M 2048		305			
Moisture condition (see note p. 2)	R	AD	D	R	D	R	AD	D	R	D	R	AD	D	
Loss on air-drying ... %	0·9	....	....	....	....	0·9	....	....	....	....	0·1	....	....	
Results obtained by	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	
Proximate analysis:—														
Moisture ... %	1·7	0·8	....	1·5	....	1·9	1·0	....	1·1	....	1·1	1·0	....	
Ash ... %	16·1	16·3	16·4	15·5	15·8	17·6	17·7	17·9	17·9	18·1	20·3	20·3	20·5	
Volatile matter ... %	24·6	24·8	25·0	24·9	25·3	26·5	26·7	27·0	28·4	28·7	25·8	25·8	26·1	
Fixed carbon ... %	57·6	58·1	58·6	58·1	58·9	54·0	54·6	55·1	52·6	53·2	52·8	52·9	53·4	
Ultimate analysis:—														
Carbon ... %	70·0	70·6	71·2	....	....	68·6	69·3	70·0	....	....	66·5	66·6	67·3	
Hydrogen ... %	4·4	4·3	4·2	....	....	4·6	4·5	4·4	....	....	4·4	4·4	4·3	
Ash ... %	16·1	16·3	16·4	....	....	17·6	17·7	17·9	....	....	20·3	20·3	20·5	
Sulphur ... %	0·5	0·5	0·5	0·6	0·6	0·6	0·6	0·6	1·4	1·4	1·7	1·7	1·7	
Nitrogen ... %	0·9	0·9	0·9	....	....	1·0	1·0	1·0	....	....	0·9	0·9	0·9	
Oxygen ... %	8·1	7·4	6·8	....	....	7·6	6·9	6·1	....	....	6·2	6·1	5·3	
Calorific value:—														
Calories per gram, gross	6810	6870	6930	6910	7010	6670	6730	6800	6710	6790	6480	6490	6560	
B. Th. U. per lb., gross	12260	12370	12470	12430	12620	12000	12120	2240	12090	12220	11670	11680	11800	
Fuel ratio	2·35			2·30		2·05			1·85		2·05			
Carbon-Hydrogen ratio ...	16·0	16·4	16·8	....	....	15·0	15·4	15·8	....	....	15·1	15·1	15·5	
Coking properties ...	....	....	....	....	....	....	....	....	....	....	small lump of very fair coke			
Hoffmann potash test ...	....	....	....	....	....	....	....	....	....	....	....			
Location in mine ...	No. 1 seam ...			No. 1 seam ...		No. 1 or Byron seam.			No. 1 or Byron seam.		No. 1 seam, main gangway.			
Kind of sample ...	Commercial — 1 ton.			Mine ...		Commercial — 5 tons.			Mine ...		Mine.			
Quality of coal ...	Run-of-mine ...			Run-of-mine ...		Run-of-mine ...			Lumps of slate removed by hand picking.					
Taken by ...	T. Denis, Mines Branch.			E. Stansfield.		T. Denis, Mines Branch.			E. Stansfield.		A. N. Scott, provincial mine inspector.			
Date of sampling ...	May 6, 1908 ...			July 30, 1909.		July 18, 1908 ...			July 29, 1909.		November, 1913.			
Remarks ...	....			....		....			....					

ALBERTA COAL FIELDS.

Canmore-Banff Area.

Description.	Canmore Coal Co., Ltd., No. 2 mine, Canmore. Sec. 29, Tp. 24, R. 10.											
Sample No.	370			371			303			718		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	1·4	....	....	3·5	....	....	0·0	....	....	1·0	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis— Moisture %	2·1	0·7	....	4·4	0·9	....	0·9	0·9	....	1·9	0·9	....
Ash %	7·2	7·3	7·4	15·4	16·0	16·1	5·4	5·4	5·4	6·2	6·3	6·4
Volatile matter %	15·6	15·8	15·9	13·3	13·8	13·9	14·0	14·0	14·1	9·8	9·9	10·0
Fixed carbon %	75·1	76·2	76·7	66·9	69·3	70·0	79·7	79·7	80·5	82·1	82·9	83·6
Ultimate analysis:— Carbon %	....	....	....	....	....	....	85·2	85·2	86·0	82·8	83·6	84·3
Hydrogen %	....	....	....	....	....	....	4·2	4·2	4·1	4·2	4·2	4·1
Ash %	....	....	....	....	....	....	5·4	5·4	5·4	6·2	6·3	6·4
Sulphur %	....	....	....	....	....	....	0·9	0·9	0·9	0·7	0·7	0·8
Nitrogen %	....	....	....	....	....	....	1·3	1·3	1·3	1·6	1·6	1·6
Oxygen %	....	....	....	....	....	....	3·0	3·0	2·3	4·5	3·6	2·8
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	8040	8040	8120	7930	8010	8080
B. Th. U. per lb., gross	....	....	....	....	....	....	14470	14470	14610	14280	14420	14560
Fuel ratio	4·80			5·05			5·70			8·35		
Carbon-Hydrogen ratio	....	....	....	....	....	....	20·5	20·5	21·0	19·5	20·0	20·5
Coking properties	....	....	....	....	....	....	very slight tendency to agglomerate.			forms agglomerate.		
Hoffmann potash test	....	....	....	....	....	....	....	....	....	12		
Location in mine	Carey seam			Sedlock seam, basin slope.			Carey seam			Stewart seam, main gangway.		
Kind of sample							Mine			Mine.		
Quality of coal							Includes two 3-inch bands of dirty coal.			Run-of-mine.		
Taken by	Mine authorities			Mine authorities			F. Aspinall, provincial mine inspector.			J. A. Richards, provincial mine inspector.		
Date of sampling	Spring of 1914			1914			November, 1913			December 4, 1915.		
Remarks												

ALBERTA COAL FIELDS.

Canmore-Banff Area.

Description.	Canmore Coal Co., Ltd., Canmore. No. 1 or old mine. Sec. 29, Tp. 24, R. 10.				The Georgetown Collieries, Ltd., Canmore. Secs. 1 and 6, Tp. 25, R's. 10 and 11.					
Sample No	M 25			M 225	301			354		
Moisture condition (see note p. 2)	R	AD	D	D	R	AD	D	R	AD	D
Loss on air-drying %	0·3	....	....	....	0·0	....	....	2·1	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—										
Moisture %	1·2	0·9	....	....	0·8	0·8	....	2·9	0·9	....
Ash %	12·1	12·2	12·3	5·9	9·6	9·6	9·7	12·3	12·5	12·6
Volatile matter %	17·0	17·0	17·2	16·2	16·8	16·8	16·9	13·1	13·4	13·5
Fixed carbon %	69·7	69·9	70·5	77·9	72·8	72·8	73·4	71·7	73·2	73·9
Ultimate analysis:—										
Carbon %	73·7	74·0	74·6	85·2	80·4	80·4	81·1	76·2	77·9	78·5
Hydrogen %	3·9	3·9	3·8	4·1	4·2	4·2	4·1	4·2	4·1	4·0
Ash %	12·1	12·2	12·3	5·9	9·6	9·6	9·7	12·3	12·5	12·6
Sulphur %	0·8	0·8	0·8	0·7	1·8	1·8	1·8	0·8	0·8	0·8
Nitrogen %	1·6	1·6	1·6	1·7	1·5	1·5	1·5	1·2	1·2	1·2
Oxygen %	7·9	7·5	6·9	2·4	2·5	2·5	1·8	5·3	3·5	2·9
Calorific value:—										
Calories per gram, gross	7250	7270	7340	8000	7570	7570	7640	7180	7330	7390
B. Th. U. per lb., gross	13050	13090	13210	14400	13640	13640	13750	12920	13190	13300
Fuel ratio		4·10		4·80		4·35			5·45	
Carbon-Hydrogen ratio	19·0	19·1	19·6	20·8	19·3	19·3	19·7	18·1	19·2	19·6
Coking properties	....	....	....	....	agglomerates slightly			barely agglomerates		
Hoffmann potash test	....	....	....	....	9–10			....	....	....
Location in mine					No. 3 seam			No. 3 seam		
Kind of sample	Commercial — 10 tons.				Mine			Commercial — 20 tons.		
Quality of coal	Lumps hand-picked, and then remixed with slack			Washed coal from M 25, yield 82%.						
Taken by	T. Denis, Mines Branch.				Provincial mine inspector.			F. Aspinall, provincial mine inspector.		
Date of sampling	April 22, 1908.				November 1913.			November 1913. Lab. sample Mar. 25, 1914.		
Remarks	Operated by H.W. McNeil Co. Ltd. at time of sampling.									

ALBERTA COAL FIELDS.

Canmore-Banff Area.

Description.	Canadian Pacific Railway Company. Natural Resources Department, Calgary. Bankhead colliery, Bankhead. Sec. 19, Tp. 26, R. 11.											
Sample No.	M 23			M 23 SP			M 23 M	M 223 M	M 24		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	D	D	R	AD	D
Loss on air-drying....%	0·5	....	....	0·6	....	....	....	....	1·8	....	....
Results obtained by	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Anal.	Anal.	Calc.	Calc.	Anal.
Proximate analysis:—											
Moisture....%	0·9	0·5	....	1·1	0·5	....	....	....	2·7	0·9	....
Ash....%	12·1	12·1	12·2	15·7	15·8	15·9	14·1	8·9	13·9	14·1	14·3
Volatile matter....%	11·7	11·7	11·8	12·5	12·6	12·6	12·6	12·5	16·6	17·0	17·1
Fixed carbon....%	75·3	75·7	76·0	70·7	71·1	71·5	73·3	78·6	66·8	68·0	68·6
Ultimate analysis:—											
Carbon....%	78·7	79·1	79·4	75·2	75·6	76·0	76·6	81·8	74·2	75·6	76·3
Hydrogen....%	3·6	3·6	3·6	3·7	3·7	3·7	3·6	3·8	3·9	3·8	3·7
Ash....%	12·1	12·1	12·2	15·7	15·8	15·9	14·1	8·9	13·9	14·1	14·3
Sulphur....%	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6
Nitrogen....%	1·0	1·0	1·0	0·9	0·9	0·9	1·0	1·1	1·0	1·0	1·0
Oxygen....%	4·0	3·6	3·2	3·9	3·4	2·9	4·1	3·8	6·4	4·9	4·1
Calorific value:—											
Calories per gram, gross	7330	7360	7400	6970	7010	7040	7270	7760	7080	7210	7280
B. Th. U. per lb., gross	13190	13250	13310	12540	12610	12670	13080	13970	12740	12970	13100
Fuel ratio	6·45			5·65			5·80	6·30	4·00		
Carbon-Hydrogen ratio	21·7	22·0	22·3	20·1	20·5	20·8	21·3	21·5	19·1	20·2	20·7
Coking properties	non-coking			non-coking			non-coking	non-coking	non-coking		
Hoffmann potash test	....	....	....	....	....	....	....	....	....	....	....
Location in mine											
Kind of sample	Commercial — 5 tons.			Commercial — 5 tons.					Commercial — 5 tons.		
Quality of coal	Pea size ¼ to 7/16-inch, over slater and picker.			Buckwheat size 7/16 to 5/16-inch, over slater.			Mixture of M 23 and M 23 SP.	Washed coal from M 23 M, yield 84%.	Coal dust briquetted with about 10% coal tar.		
Taken by	T. Denis, Mines Branch.			T. Denis.					T. Denis.		
Date of sampling	April 21, 1908.			April 21, 1908.					April 20, 1908.		
Remarks											

ALBERTA COAL FIELDS.

Canmore-Banff Area.

Description.	Canadian Pacific Railway, Natural Resources Department, Calgary. Bankhead colliery, Bankhead. Sec. 19, Tp. 26, R. 11.								
Sample No.	772			774			902		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	0·0	....	....	0·1	....	....	0·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture %	0·6	0·6	....	0·6	0·5	....	1·1	0·5	....
Ash %	13·6	13·6	13·7	9·7	9·7	9·8	18·4	18·5	18·6
Volatile matter %	8·8	8·8	8·9	8·2	8·2	8·2	10·0	10·0	10·1
Fixed carbon %	77·0	77·0	77·4	81·5	81·6	82·0	70·5	71·0	71·3
Ultimate analysis:—									
Carbon %	78·2	78·2	78·7	82·2	82·3	82·7	72·7	73·1	73·5
Hydrogen %	3·5	3·5	3·4	3·7	3·7	3·6	3·3	3·3	3·2
Ash %	13·6	13·6	13·7	9·7	9·7	9·8	18·4	18·5	18·6
Sulphur %	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5
Nitrogen %	1·1	1·1	1·1	0·9	0·9	1·0	1·0	1·0	1·0
Oxygen %	3·1	3·1	2·6	3·0	2·9	2·4	4·1	3·6	3·2
Calorific value:—									
Calories per gram, gross	7160	7160	7200	7640	7650	7690	6770	6810	6840
B. Th. U. per lb., gross	12890	12890	12970	13750	13760	13830	12180	12250	12310
Fuel ratio		8·70			9·95			7·10	
Carbon-Hydrogen ratio	22·6	22·6	23·0	22·4	22·4	22·8	21·7	22·1	22·5
Coking properties		non-coking			non-coking			non-coking	
Hoffmann potash test		9			10			....	
Location in mine	No. 0000 seam, B level gangway.			No. 2 seam, C level gangway.					
Kind of sample	Mine			Mine			Commercial—20 tons.		
Quality of coal	Bone coal left in sample, which was probably of lower grade than coal shipped from mine.			Run-of-mine			Pea coal.		
Taken by	F. Aspinall, provincial mine inspector.			F. Aspinall			Provincial mine inspector.		
Date of sampling	July 7, 1916			July 12, 1916			May 1916. Lab., sample November 29, 1916.		
Remarks									

ALBERTA COAL FIELDS.

Brazeau Area.

Description.	Brazeau Collieries, Ltd., Nordegg. Sec. 22, Tp. 40, R. 15.															
Sample No	469			537			574			858		859	
Moisture condition (see note p.2)	R	AD	D	R	AD	D	R	AD	D	R	D	R	D
Loss on air-drying %	1·0	....	....	1·8	....	....	0·3	....	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	1·8	0·9	....	2·1	0·4	....	0·8	0·5	....	0·8	....	0·6	....
Ash %	11·9	12·0	12·1	10·5	10·6	10·7	2·7	2·7	2·7	14·5	14·6	11·6	11·7
Volatile matter %	16·3	16·5	16·6	16·8	17·1	17·1	17·9	17·9	18·0	15·1	15·2	14·6	14·7
Fixed carbon %	70·0	70·6	71·3	70·6	71·9	72·2	78·6	78·9	79·3	69·6	70·2	73·2	73·6
Ultimate analysis:— Carbon %	77·9	78·7	79·4	78·7	80·1	80·4	....	....	....	76·1	76·7	79·7	80·1
Hydrogen %	4·3	4·2	4·1	4·2	4·1	4·0	....	....	....	3·9	3·8	4·1	4·0
Ash %	11·9	12·0	12·1	....	....	....	....	....	....	14·5	14·6	11·6	11·7
Sulphur %	0·4	0·4	0·4	....	....	....	....	....	....	0·5	0·5	0·4	0·4
Nitrogen %	1·1	1·1	1·1	....	....	....	....	....	....	1·1	1·1	1·1	1·2
Oxygen %	4·4	3·6	2·9	....	....	....	....	....	....	3·9	3·3	3·1	2·6
Calorific value:— Calories per gram, gross	7420	7490	7560	....	....	....	....	....	....	7280	7340	7600	7640
B. Th. U. per lb., gross	13350	13480	13620	....	....	....	....	....	....	13110	13210	13690	13760
Fuel ratio	4·30			4·20			4·40			4·60		5·00	
Carbon-Hydrogen ratio	18·2	18·7	19·2	18·8	19·7	20·0	....	....	....	19·6	20·0	19·7	20·0
Coking properties	poor coke			small lump of fair coke			swells considerably forming good coke			poor coke		poor coke	
Hoffmann potash test	....			11			10			....		....	
Location in mine	No. 2 mine, No. 2 seam, main entry.			No. 2 seam			No. 2 seam			No. 2 seam, 4200 feet from entry.		No. 2 seam, centre of workings.	
Kind of sample	Mine			Mine			Mine			Mine		Mine.	
Quality of coal	....			....			....			....		....	
Taken by	J. A. Richards, provincial mine inspector.			Fire ranger, Board of Railway Commissioners.			Fire ranger			J. S. Stewart, Geological Survey.		J. S. Stewart.	
Date of sampling	December, 1914			February, 1915			May, 1915			Summer of 1916.		1916.	
Remarks	....			....			....			....		....	

ALBERTA COAL FIELDS.

Brazeau Area.

Description.	Brazeau Collieries, Ltd., Nordegg. Sec. 22, Tp. 40, R, 15.											
Sample No.	538			575			719			860		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	D	
Loss on air-drying %	1·6	....	....	0·1	....	....	0·0	....	....	....	....	
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	
Proximate analysis:—												
Moisture %	2·1	0·5	....	0·7	0·6	....	0·7	0·7	....	0·6	....	
Ash %	12·3	12·5	12·6	34·9	34·9	35·2	13·1	13·1	13·2	16·9	17·0	
Volatile matter %	16·5	16·8	16·8	14·7	14·7	14·8	12·6	12·6	12·7	14·6	14·7	
Fixed carbon %	69·1	70·2	70·6	49·7	49·8	50·0	73·6	73·6	74·1	67·9	68·3	
Ultimate analysis:—												
Carbon %	77·0	78·2	78·6	....	....	....	77·7	77·7	78·3	74·4	74·8	
Hydrogen %	4·3	4·2	4·2	....	....	....	4·1	4·1	4·0	3·9	3·9	
Ash %	12·3	12·5	12·6	....	....	....	13·1	13·1	13·2	16·9	17·0	
Sulphur %	....	....	....	....	....	....	0·5	0·5	0·5	0·5	0·5	
Nitrogen %	....	....	....	....	....	....	1·1	1·1	1·1	1·2	1·2	
Oxygen %	....	....	....	....	....	....	3·5	3·5	2·9	3·1	2·6	
Calorific value:—												
Calories per gram, gross	....	....	....	....	....	....	7430	7430	7480	7100	7140	
B. Th. U. per lb., gross	....	....	....	....	....	....	13370	13370	13460	12790	12860	
Fuel ratio	4·20			3·40			5·85			4·65		
Carbon-Hydrogen ratio	17·9	18·7	18·9	....	....	....	19·0	19·0	19·4	19·1	19·4	
Coking properties	small lump of fair coke			poor coke			poor coke			poor coke		
Hoffmann potash test	10–11			9			8–9			....		
Location in mine	No. 3 seam			No. 3 seam			No. 3 mine, No. 3 seam, main gangway.			No. 3 seam, 2000 ft. from entry.		
Kind of sample	Mine			Mine			Mine			Mine.		
Quality of coal	....			....			Average of 14-ft. seam.			....		
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger			J. A. Richards, provincial mine inspector.			J. S. Stewart, Geological Survey.		
Date of sampling	February 1915			May 1915			December 9, 1915			Summer of 1916.		
Remarks	....			....			....			....		

ALBERTA COAL FIELDS.

Brazeau Area.

Description.	Brazeau Collieries, Ltd., Nordegg. Sec. 22, Tp. 40, R. 15.						British Collieries (Brazeau), Ltd., Ed. Brown & Co., Agents, Winnipeg, Man. Tp. 44, R. 20.			
Sample No.	534			560		561		293		294	
Moisture condition (see note p. 2)	R	AD	D	R	D	R	D	R	D	R	D
Loss on air-drying %	0·1	....	....	0·0	....	0·0	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture %	0·6	0·4	....	0·8	....	0·7	....	0·8	....	0·9	....
Ash %	3·5	3·5	3·6	18·3	18·4	17·3	17·5	13·5	13·6	12·6	12·7
Volatile matter %	18·2	18·2	18·3	16·7	16·9	17·1	17·2	22·4	22·6	23·2	23·3
Fixed carbon %	77·7	77·9	78·1	64·2	64·7	64·9	65·3	63·3	63·8	63·3	64·0
Ultimate analysis:—											
Carbon %	87·0	87·1	87·5	....	....	....	....	....	....	....	....
Hydrogen %	4·4	4·4	4·4	....	....	....	....	....	....	....	....
Ash %	3·5	3·5	3·6	....	....	....	....	....	....	....	....
Sulphur %	....	....	....	....	....	....	....	0·2	0·2	0·1	0·1
Nitrogen %	....	....	....	....	....	....	....	....	....	....	....
Oxygen %	....	....	....	....	....	....	....	....	....	....	....
Calorific value:—											
Calories per gram, gross	....	....	....	....	....	....	....	7310	7360	7370	7440
B. Th. U. per lb., gross	....	....	....	....	....	....	....	13150	13260	13270	13390
Fuel ratio	4·25			3·85		3·80		2·85		2·75	
Carbon-Hydrogen ratio	19·7	19·7	19·9	....	....	....	....	....	....	....	....
Coking properties	swells considerably forming good coke			poor coke		poor coke		poor coke		fair coke	
Hoffmann potash test	10			9		10		....		....	
Location in mine	....			....		....		Lower portion of 20-foot seam.		Top 12 feet in 20-foot seam	
Kind of sample	Mine			Commercial		Commercial		....			
Quality of coal	....			From tipple		From tipple		....			
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger		Fire ranger		L. V. Rice		L. V. Rice.	
Date of sampling	February 1915.			Feb. 18, 1915.		Feb. 18, 1915.		1913		1913.	
Remarks	....			....		....		....			

ALBERTA COAL FIELDS.

Mountain Park Area.

Description.	Mountain Park Coal Co., Ltd., Mountain Park. Sec. 33, Tp. 45, R. 23.											
Sample No.	434			546			866		885			
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	D	R	AD	D	
Loss on air-drying %	0·2	....	....	1·4	....	....	....	....	1·5	....	....	
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	
Proximate analysis:—												
Moisture %	0·8	0·7	....	3·2	1·9	....	0·9	....	2·2	0·7	....	
Ash %	12·0	12·0	12·1	4·3	4·3	4·4	5·4	5·4	13·7	13·9	14·0	
Volatile matter %	28·7	28·7	28·9	30·5	30·9	31·5	29·9	30·2	24·1	24·4	24·6	
Fixed carbon %	58·5	58·6	59·0	62·0	62·9	64·1	63·8	64·4	60·0	61·0	61·4	
Ultimate analysis:—												
Carbon %	76·3	76·4	76·9	81·2	82·3	83·8	81·4	82·1	72·8	73·9	74·4	
Hydrogen %	4·9	4·8	4·8	5·4	5·3	5·2	5·1	5·0	4·6	4·5	4·5	
Ash %	12·0	12·0	12·1	4·3	4·3	4·4	5·4	5·4	13·7	13·9	14·0	
Sulphur %	0·3	0·3	0·3	0·4	0·4	0·4	0·4	0·5	0·4	0·4	0·4	
Nitrogen %	....	....	....	1·3	1·3	1·4	1·4	1·4	1·1	1·1	1·1	
Oxygen %	....	....	....	7·4	6·4	4·8	6·3	5·6	7·4	6·2	5·6	
Calorific value:—												
Calories per gram, gross	....	....	....	7900	8000	8150	7950	8020	7100	7210	7260	
B. Th. U. per lb., gross	....	....	....	14210	14400	14680	14310	14440	12780	12970	13070	
Fuel ratio	2·05			2·05			2·15		2·50			
Carbon-Hydrogen ratio	15·7	15·8	16·0	15·0	15·5	16·1	16·0	16·4	15·7	16·3	16·6	
Coking properties	fair coke			good coke, considerably swollen			fair coke, swollen and friable		fair, somewhat friable, coke			
Hoffmann potash test	....	....	....	....	....	....	....	....	....	....	....	
Location in mine	No. 1 seam			No. 1 seam			No. 1 seam, 1000 ft. from entry.		Nos. 1 and 3 seams.			
Kind of sample	Mine			Mine			Mine		Commercial — 25 tons.			
Quality of coal	....			....			....		Run-of-mine.			
Taken by	Fire ranger, Board of Railway Commissioners.			E. D. Black, provincial mine inspector.			J. S. Stewart, Geological Survey.		Provincial mine inspector.			
Date of sampling	November 1914			February 16, 1915			Summer of 1916.		April 1916. Lab. sample Nov. 24, 1916.			
Remarks	....			....			....		....			

ALBERTA COAL FIELDS.

Mountain Park Area.

Description.	Mountain Park Coal Co., Ltd., Mountain Park. Sec. 33, Tp. 45, R. 23.									
Sample No.	435			868		869		867		870	
Moisture condition (see note p. 2)	R	AD	D	R	D	R	D	R	D	R	D
Loss on air-drying ... %	0·4	....	....	....	....	....	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture ... %	1·2	0·8	....	0·5	....	0·7	....	0·7	....	1·3	....
Ash ... %	8·0	8·0	8·1	23·6	23·8	22·8	23·0	15·2	15·3	17·5	17·7
Volatile matter ... %	28·2	28·3	28·6	25·1	25·2	23·0	23·2	25·2	25·4	24·3	24·6
Fixed carbon ... %	62·6	62·9	63·3	50·8	51·0	53·5	53·8	58·9	59·3	56·9	57·7
Ultimate analysis:— Carbon ... %	78·9	79·2	79·9	64·9	65·2	66·1	66·5	73·0	73·6	69·0	69·9
Hydrogen ... %	4·8	4·8	4·8	4·2	4·1	4·1	4·0	4·4	4·3	4·3	4·2
Ash ... %	....	....	....	23·6	23·8	22·8	23·0	15·2	15·3	17·5	17·7
Sulphur ... %	....	....	....	0·3	0·3	0·4	0·4	0·4	0·4	0·4	0·4
Nitrogen ... %	....	....	....	0·9	0·9	1·0	1·0	0·9	0·9	1·5	1·5
Oxygen ... %	....	....	....	6·1	5·7	5·6	5·1	6·1	5·5	7·3	6·3
Calorific value:— Calories per gram, gross	7680	7720	7780	6270	6300	6400	6440	7090	7140	6670	6760
B. Th. U. per lb., gross	13830	13890	14010	11290	11350	11520	11600	12760	12860	12010	12170
Fuel ratio	2·20			2·00		2·30		2·35		2·35	
Carbon-Hydrogen ratio	16·3	16·5	16·8	15·6	15·8	16·3	16·6	16·7	17·0	15·9	16·5
Coking properties	fair coke			fair coke, somewhat swollen.		poor coke		fair coke		poor coke	
Hoffmann potash test	....			....		....		....		....	
Location in mine	No. 3 seam			No. 3 seam, middle portion.		No. 3 seam, lower portion.		No. 2 (prospect) seam, 150 ft. from entry.		No. 5 seam, 50 ft. from entry.	
Kind of sample	Mine			Mine		Mine		Mine		Mine	
Quality of coal	....			....		....		....		....	
Taken by	Fire ranger, Board of Railway Commissioners.			J. S. Stewart, Geological Survey.		J. S. Stewart		J. Stewart		J. S. Stewart.	
Date of sampling	November 1914			Summer of 1916.		1916.		1916.		1916.	
Remarks	....			Samples taken 400 ft. from bottom of slope.							

ALBERTA COAL FIELDS.

Jasper Park Area.

Description.	Jasper Park Collieries, Ltd., Pocohontas.		Jasper Park Collieries, Ltd., Miette mine, Pocohontas. Sec. 18, Tp. 49, R. 28.			The Blue Diamond Coal Co., Ltd., Brulé Mines. Sec. 13, Tp. 50, R. 27.	
Sample No.	602		487			603	
Moisture condition (see note, p. 2)	R	D	R	AD	D	R	D
Loss on air-drying %	....	....	1·8	....	....	....	....
Results obtained by	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—							
Moisture %	0·8	....	2·3	0·5	....	0·7	....
Ash %	5·8	5·8	21·4	21·8	21·9	15·8	15·9
Volatile matter %	17·8	17·9	18·5	18·8	18·9	20·5	20·6
Fixed carbon %	75·6	76·3	57·8	58·9	5w·2	63·0	63·5
Ultimate analysis:—							
Carbon %	....	....	66·8	68·1	68·4	....	....
Hydrogen %	....	....	4·0	3·9	3·8	....	....
Ash %	....	....	21·4	21·8	21·9	....	....
Sulphur %	....	....	0·8	0·8	0·8	....	....
Nitrogen %	....	....	1·1	1·1	1·1	....	....
Oxygen %	....	....	5·9	4·3	4·0	....	....
Calorific value:—							
Calories per gram, gross	....	....	6430	6550	6580	....	....
B. Th. U. per lb., gross	....	....	11580	11790	11840	....	....
Fuel ratio	4·25			3·10		3·10	
Carbon-Hydrogen ratio	....	....	16·7	17·6	17·8	....	....
Coking properties	small lump of fair coke		small lump of good coke			small lump of poor coke	
Hoffmann potash test	11					11	
Location in mine	No. 1 seam		....			....	
Kind of sample	Mine		Commercial—30 tons			Mine.	
Quality of coal	....		....			....	
Taken by	Fire ranger, Board of Railway Commissioners.		Provincial mine inspector			Fire ranger.	
Date of sampling	July 1915		December 1914 Lab. sample February 1, 1915			July 1915.	
Remarks	....		....			Operated by Mackenzie & Mann at time of sampling.	

ALBERTA COAL FIELDS.

Jasper Park Area.

Description.	The Blue Diamond Coal Co., Ltd., Brulé Mines. Sec. 15, Tp. 50, R. 27.									Bartholemew claim. Near Brulé Lake. Sec. 17, Tp. 50, R. 28.	
Sample No.	1219			1220			1221			889	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	D
Loss on air-drying ..... %	0·0	....	....	0·0	....	....	0·0	....	....	....	....
Results obtained by	Anal.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture ..... %	0·5	0·5	....	0·9	0·9	....	0·5	0·5	....	2·2	....
Ash ..... %	11·2	11·2	11·3	16·5	16·5	16·6	13·5	13·5	13·6	18·7	19·1
Volatile matter ..... %	21·3	21·3	21·4	16·9	16·9	17·1	18·6	18·6	18·7	15·3	15·6
Fixed carbon ..... %	67·0	67·0	67·3	65·7	65·7	66·3	67·4	67·4	67·7	63·8	65·3
Ultimate analysis:—											
Carbon ..... %	79·3	79·3	79·7	74·2	74·2	74·9	77·3	77·3	77·7	....	....
Hydrogen ..... %	4·3	4·3	4·3	4·0	4·0	3·9	4·2	4·2	4·1	....	....
Ash ..... %	....	....	....	....	....	....	....	....	....	....	....
Sulphur ..... %	....	....	....	....	....	....	....	....	....	....	....
Nitrogen ..... %	....	....	....	....	....	....	....	....	....	....	....
Oxygen ..... %	....	....	....	....	....	....	....	....	....	....	....
Calorific value:—											
Calories per gram, gross	....	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....	....	....	....
Fuel ratio	3·15			3·90			3·60			4·15	
Carbon-Hydrogen ratio	18·3	18·3	18·5	18·7	18·7	19·2	18·6	18·6	18·9	....	....
Coking properties	very swollen, rather friable coke			small lump of fair coke			good coke			non-coking	
Hoffmann potash test	....			....			....			....	
Location in mine	No. 2 north seam.			No. 4 south seam.			.....				
Kind of sample	Mine.			Mine.			Commercial.			Prospect.	
Quality of coal	.....			.....			Coal from tipple.				
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger.			Fire ranger.			John MacVicar, Geological Survey, Ottawa.	
Date of sampling	November 1917.			November 1917.			November 1917.			Summer of 1916.	
Remarks	.....			.....			.....				

ALBERTA COAL FIELDS.

Description.	Pincher Creek Area.			Saunders Creek Area.							
	The Breckenridge & Lund Coal Co., Ltd Lundbreck. Sec. 26, Tp. 7, R. 2.			Sample said to be from 10-ft. seam near Saunders Cache, close to survey line of C.N.R. west of Rocky Mountain House.		Saunders Creek Coal Co., Ltd., Saunders Creek. Tp. 40, R. 12.					
Sample No	M 47			106		720			861		
Moisture condition (see note p. 2)	R	AD	D	R	D	R	AD	D	R	D	
Loss on air-drying ..... %	1·2	....	....	....	....	2·5	....	....	....	....	
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	
Proximate analysis:—											
Moisture ..... %	4·9	3·8	....	7·1	....	10·8	8·4	....	4·8	....	
Ash ..... %	28·2	28·6	29·7	6·7	7·2	6·4	6·6	7·2	6·3	6·7	
Volatile matter ..... %	28·6	28·9	30·1	....	....	27·0	27·7	30·3	33·1	34·7	
Fixed carbon ..... %	38·3	38·7	40·2	....	....	55·8	57·3	62·5	55·8	58·6	
Ultimate analysis:—											
Carbon ..... %	52·1	52·7	54·8	68·2	73·4	65·7	67·4	73·7	70·4	74·0	
Hydrogen ..... %	4·4	4·3	4·1	5·3	4·8	5·2	5·1	4·5	4·9	4·5	
Ash ..... %	28·2	28·6	29·7	6·7	7·2	6·4	6·6	7·2	6·3	6·7	
Sulphur ..... %	1·2	1·2	1·2	0·7	0·8	0·3	0·3	0·3	0·3	0·3	
Nitrogen ..... %	1·4	1·4	1·5	....	....	1·0	1·0	1·1	1·2	1·2	
Oxygen ..... %	12·7	11·8	8·7	....	....	21·4	19·6	16·2	16·9	13·3	
Calorific value:—											
Calories per gram, gross	5180	5240	5450	....	....	6190	6350	6940	6630	6960	
B. Th. U. per lb., gross	9330	9440	9810	....	....	11150	11430	12490	11930	12530	
Fuel ratio	1·35			....	....	2·05			1·70		
Carbon-Hydrogen ratio	11·8	12·1	13·4	12·9	15·3	12·6	13·4	16·4	14·6	16·4	
Coking properties	....	....	....	....	....	non-coking			non-coking		
Hoffmann potash test	....			....		4			....		
Location in mine	....			....		Lower seam			Lower seam, 650 ft. from entry.		
Kind of sample	Commercial—2 tons			....		Mine			Mine.		
Quality of coal	Run-of-mine			....		....					
Taken by	T. Denis, Mines Branch.			Private individual		J. A. Richards, provincial mine inspector.			J. S. Stewart, Geological Survey.		
Date of sampling	July 21, 1908			1911		December 11, 1915.			Summer of 1916.		
Remarks	....			....		....					

ALBERTA COAL FIELDS.

Yellowhead Pass Area.

Description.	North American Collieries, Ltd., Edmonton. Pacific Pass colliery, Lovettville. Sec. 3, Tp. 47, R. 19.														
Sample No.	671		864		433			558			862				
Moisture condition (see note p.2)	R	D	R	D	R	AD	D	R	AD	D	R	D			
Loss on air-drying %	....	....	....	....	0·5	....	....	1·8	....	....	....	....			
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.			
Proximate analysis:—															
Moisture %	6·5	....	8·1	....	4·9	4·4	....	9·2	7·5	....	4·4	....			
Ash %	4·8	5·1	7·8	8·5	12·5	12·6	13·2	7·5	7·6	8·3	10·3	10·7			
Volatile matter %	34·4	36·8	38·0	41·4	34·0	34·2	35·7	29·7	30·3	32·7	31·4	32·9			
Fixed carbon %	54·3	58·1	46·1	50·1	48·6	48·8	51·1	53·6	54·6	59·0	53·9	56·4			
Ultimate analysis:—															
Carbon %	....	....	59·4	64·6	65·5	65·8	68·9	66·4	67·6	73·1	67·3	70·4			
Hydrogen %	....	....	4·2	3·6	4·7	4·6	4·3	5·4	5·3	4·8	4·5	4·2			
Ash %	....	....	7·8	8·5	....	....	....	7·5	7·6	8·3	10·3	10·7			
Sulphur %	....	....	0·2	0·2	....	....	....	0·2	0·2	0·2	0·1	0·1			
Nitrogen %	....	....	0·9	1·0	....	....	....	1·0	1·0	1·1	1·0	1·1			
Oxygen %	....	....	27·5	22·1	....	....	....	19·5	18·3	12·5	16·8	13·5			
Calorific val e:—															
Calories per gram, gross	....	....	5330	5790	....	....	....	6260	6380	6900	6340	6620			
B. Th. U. per lb., gross	....	....	9590	10430	....	....	....	11280	11480	12420	11410	11930			
Fuel ratio	1·60		1·20		1·45			1·80			1·70				
Carbon-Hydrogen ratio	....	....	14·2	18·2	14·0	14·2	15·9	12·4	12·9	15·3	14·9	16·6			
Coking properties	non-coking		non-coking		non-coking			non-coking			non-coking				
Hoffmann potash test	....		....		6–7			4–3			....				
Location in mine	Val d'ore seam.		Prospect seam practically at surface.		Silkstone or upper seam.			Silkstone or upper seam, No. 2 west level.			Silkstone or upper seam, 600 ft. from entry.				
Kind of sample	Mine		Mine		Mine			Mine			Mine.				
Quality of coal								Clay and sulphur bands omitted.							
Taken by	Fire ranger, Board of Railway Commissioners.		J. S. Stewart, Geological Survey.		Fire ranger			Provincial mine inspector at Edson.			J. S. Stewart.				
Date of sampling	November 1915.		Summer of 1916.		November 1914.			March 29, 1915.			1916.				
Remarks	Operated by Canadian Coal & Coke Co., Ltd., at time of sampling.														

ALBERTA COAL FIELDS.

Yellowhead Pass Area.

Description.	North American Collieries, Ltd., Edmonton. Pacific Pass colliery, Lovettville. Sec. 3, Tp. 47, R. 19.					Yellowhead Pass Coal & Coke Co., Ltd., Coalspur. Sec. 6, Tp. 48, R. 21.					
Sample No.	432			863		314			315		
Moisture condition (see note p. 2)	R	AD	D	R	D	R	AD	D	R	AD	D
Loss on air-drying ..... %	0·8	....	....	....	....	2·4	....	....	1·1	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc
Proximate analysis:— Moisture ..... %	5·5	4·8	....	4·4	....	6·6	4·2	....	4·9	3·9	....
Ash ..... %	9·3	9·4	9·9	16·1	16·9	9·9	10·2	10·6	12·7	12·8	13·3
Volatile matter ..... %	34·9	35·2	36·9	32·6	34·1	36·1	37·0	38·6	36·7	37·1	38·6
Fixed carbon ..... %	50·3	50·6	53·2	46·9	49·0	47·4	48·6	50·8	45·7	46·2	48·1
Ultimate analysis:— Carbon ..... %	68·1	68·6	72·1	62·9	65·7	65·0	66·7	69·6	64·7	65·4	68·1
Hydrogen ..... %	4·8	4·7	4·4	4·5	4·2	4·8	4·6	4·3	5·1	5·0	4·8
Ash ..... %	9·3	9·4	9·9	16·1	16·9	9·9	10·2	10·6	12·7	12·8	13·3
Sulphur ..... %	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·1	0·1	0·1
Nitrogen ..... %	....	....	....	0·9	1·0	....	....	....	....	....	....
Oxygen ..... %	....	....	....	15·4	12·0	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	6470	6520	6850	5920	6180	6260	6420	6700	6230	6300	6560
B. Th. U. per lb., gross	11650	11740	12330	10650	11130	11270	11550	12060	11220	11340	11800
Fuel ratio	1·45			1·45		1·30			1·25		
Carbon-Hydrogen ratio	14·3	14·5	16·4	14·1	15·8	13·6	14·5	16·0	12·7	13·1	14·2
Coking properties	barely agglomerates			non-coking		barely agglomerates			barely agglomerates		
Hoffmann potash test	6–7			....		4–5			4–5		
Location in mine	Mynheer or lower seam.			Mynheer or lower seam, 900 ft. from entry.		.....					
Kind of sample	Mine			Mine		Mine			Mine.		
Quality of coal	.....			.....		.....					
Taken by	Fire ranger, Board of Railway Commissioners.			J. S. Stewart, Geological Survey.		Fire ranger			Fire ranger.		
Date of sampling	November 1914			Summer of 1916		December 1913			December 1913.		
Remarks	Operated by Canadian Coal & Coke Co., Ltd., at time of sampling.					.....			Sample received in a broken bottle and therefore partially dried.		

ALBERTA COAL FIELDS.

Yellowhead Pass Area.

Description.	Yellowhead Pass Coal & Coke Co., Ltd., Coalspur. Sec. 6, Tp. 48, R. 21.											
Sample No.	316			431			489			865		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	D	
Loss on air-drying.....%	2·2	....	....	1·1	....	....	2·2	....	....	....	....	
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	
Proximate analysis:—												
Moisture.....%	6·0	3·8	....	5·1	4·0	....	5·9	3·8	....	3·7	....	
Ash.....%	12·2	12·5	13·0	8·2	8·3	8·7	10·9	11·1	11·6	11·4	11·9	
Volatile matter.....%	35·4	36·3	37·7	37·3	37·8	39·3	35·2	36·0	37·4	33·2	34·5	
Fixed carbon.....%	46·4	47·4	49·3	49·4	49·9	52·0	48·0	49·1	51·0	51·7	53·6	
Ultimate analysis:—												
Carbon.....%	64·3	65·7	68·3	68·4	69·2	72·1	64·5	65·9	68·5	67·8	70·4	
Hydrogen.....%	4·9	4·8	4·6	4·9	4·8	4·5	4·7	4·5	4·3	4·4	4·2	
Ash.....%	12·2	12·5	13·0	8·2	8·3	8·7	10·9	11·1	11·6	11·4	11·9	
Sulphur.....%	0·1	0·1	0·1	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	
Nitrogen.....%	....	....	....	....	....	....	0·7	0·7	0·7	0·9	0·9	
Oxygen.....%	....	....	....	....	....	....	19·0	17·6	14·7	15·3	12·4	
Calorific value:—												
Calories per gram, gross	6170	6310	6560	6470	6550	6820	6070	6210	6460	6330	6570	
B. Th. U. per lb., gross	11110	11360	11800	11650	11790	12280	10930	11180	11620	11400	11830	
Fuel ratio	1·30			1·30			1·35			1·55		
Carbon-Hydrogen ratio	13·1	13·7	14·9	14·0	14·4	15·9	13·7	14·5	16·1	15·4	16·9	
Coking properties	barely agglomerates			barely agglomerates			slight tendency to agglomerate			non-coking		
Hoffmann potash test	4–5			4–5			....			....		
Location in mine										Prospect seam near surface.		
Kind of sample	Mine			Mine			Commercial—30 tons.			Mine.		
Quality of coal							Screened coal					
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger			Provincial mine inspector.			J. S. Stewart, Geological Survey.		
Date of sampling	December 1913.			November 1914			February 1914. Lab. sample Feb. 2, 1915.			Summer of 1916.		
Remarks												

ALBERTA COAL FIELDS.

Yellowhead Pass Area.

Description.	Yellowhead Pass Coal & Coke Co., Ltd., No. 5 mine, Coalspur. Sec. 6, Tp. 48, R. 21.						The Oliphant-Munson Collieries Ltd., Coalspur. Sec. 23, Tp. 48, R. 21.			
Sample No.	985			986			877		987	
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	D	R	D
Loss on air-drying %	0·3	....	....	0·6	....	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—										
Moisture %	4·8	4·5	....	5·5	5·0	....	6·1	....	3·5	....
Ash %	9·6	9·6	10·1	8·0	8·1	8·5	6·6	7·0	12·0	12·5
Volatile matter %	36·8	37·0	38·7	34·7	34·9	36·7	35·1	37·4	36·4	37·7
Fixed carbon %	48·8	48·9	51·2	51·8	52·0	54·8	52·2	55·6	48·1	49·8
Ultimate analysis:—										
Carbon %	66·9	67·2	70·3	67·9	68·3	71·9	....	....	....	....
Hydrogen %	4·8	4·8	4·5	4·8	4·8	4·4	....	....	....	....
Ash %	....	....	....	....	....	....	....	....	....	....
Sulphur %	....	....	....	....	....	....	....	....	....	....
Nitrogen %	....	....	....	....	....	....	....	....	....	....
Oxygen %	....	....	....	....	....	....	....	....	....	....
Calorific value:—										
Calories per gram, gross	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....	....	....
Fuel ratio	1·30			1·50			1·50		1·30	
Carbon-Hydrogen ratio	14·0	14·1	15·8	14·1	14·3	16·2	....	....	....	....
Coking properties	non-coking			non-coking			non-coking		non-coking	
Hoffmann potash test	4–5			5–4			4		4–5	
Location in mine	No. 1 seam, 500 ft. from entry.			No. 2 seam, 500 ft. from entry.			No. 1 seam		No. 1 seam, 350 ft. from entry.	
Kind of sample	Mine			Mine			Mine		Mine.	
Quality of coal										
Taken by	Fire ranger, Board of Railway Commissioners.									
Date of sampling	1917			1917			October 1916.		1917.	
Remarks										

ALBERTA COAL FIELDS.

Yellowhead Pass Area.

Description.	The Oliphant-Munson Collieries, Ltd., Coalspur. Sec. 23, Tp. 48, R. 21.									
Sample No	878		988		927			928		
Moisture condition (see note p. 2)	R	D	R	D	R	AD	D	R	AD	D
Loss on air-drying %	....	....	....	....	0·1	....	....	0·7	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—										
Moisture %	5·4	....	3·2	....	3·4	3·3	....	4·1	3·4	....
Ash %	6·2	6·5	8·7	9·0	7·9	8·0	8·2	8·0	8·1	8·4
Volatile matter %	36·2	38·3	37·1	38·3	....	....	....	....	....	....
Fixed carbon %	52·2	55·2	51·0	52·7	....	....	....	....	....	....
Ultimate analysis:—										
Carbon %	....	....	....	....	70·3	70·4	72·8	68·8	69·3	71·8
Hydrogen %	....	....	....	....	4·9	4·9	4·6	5·0	4·9	4·7
Ash %	....	....	....	....	7·9	8·0	8·2	8·0	8·1	8·4
Sulphur %	....	....	....	....	....	....	....	....	....	....
Nitrogen %	....	....	....	....	....	....	....	....	....	....
Oxygen %	....	....	....	....	....	....	....	....	....	....
Calorific value:—										
Calories per gram, gross	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....	....	....
Fuel ratio	1·45		1·40			....			....	
Carbon-Hydrogen ratio	....	....	....	....	14·4	14·5	15·7	13·8	14·0	15·2
Coking properties	non-coking		non-coking			....			....	
Hoffmann potash test	4		5-4			....			....	
Location in mine	No. 2 seam		No. 2 seam, 650 ft. from entry.							
Kind of sample	Mine		Mine		Commercial			Commercial.		
Quality of coal										
Taken by	Fire ranger, Board of Railway Commissioners.									
Date of sampling	October 1916		1917		January 1917			January 1917.		
Remarks										

ALBERTA COAL FIELDS.

Lethbridge-McGrath Area.

Description.	North American Collieries, Ltd., Edmonton. Lethbridge Mine, Coalhurst. Sec. 21, Tp. 9, R. 22.						C. P. Ry., Nat. Resources Dept., Calgary					
							Galt No. 3 mine, Lethbridge. Sec. 6, Tp. 9, R. 21.			Galt No. 6 mine, Lethbridge. Sec. 18, Tp. 9, R. 21		
Sample No.	321			722			M 44			306		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	0·1	....	....	1·5	....	....	0·5	....	....	1·0	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture %	8·9	8·8	....	10·7	9·3	....	8·4	7·9	....	9·8	8·9	....
Ash %	9·7	9·7	10·7	13·1	13·3	14·7	10·1	10·1	11·0	9·6	9·7	10·7
Volatile matter %	33·6	33·6	36·8	27·4	27·8	30·7	34·3	34·5	37·5	33·4	33·7	37·0
Fixed carbon %	47·8	47·9	52·5	48·8	49·6	54·6	47·2	47·5	51·5	47·2	47·7	52·3
Ultimate analysis:—												
Carbon %	63·3	63·4	69·5	58·1	59·0	65·0	60·9	61·3	66·5	62·9	63·5	69·7
Hydrogen %	5·4	5·4	4·8	5·2	5·1	4·5	5·4	5·4	4·9	5·5	5·5	4·9
Ash %	9·7	9·7	10·7	13·1	13·3	14·7	10·1	10·1	11·0	9·6	9·7	10·7
Sulphur %	0·6	0·6	0·6	0·5	0·5	0·6	0·7	0·7	0·8	0·5	0·5	0·6
Nitrogen %	1·6	1·6	1·8	1·4	1·4	1·6	1·6	1·6	1·7	1·5	1·5	1·7
Oxygen %	19·4	19·3	12·6	21·7	20·7	13·6	21·3	20·9	15·1	20·0	19·3	12·4
Calorific value:—												
Calories per gram, gross	6050	6060	6640	5520	5610	6180	5960	6000	6510	6040	6100	6700
B. Th. U. per lb., gross	10890	10900	11950	9940	10090	11130	10730	10790	11710	10880	10980	12030
Fuel ratio	1·40			1·80			1·35			1·40		
Carbon-Hydrogen ratio	11·7	11·8	14·4	11·1	11·5	14·4	11·2	11·3	13·5	11·4	11·6	14·2
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	3			3–2			....			3–2		
Location in mine	No. 1 seam			No. 1 seam, south-west section.			....					
Kind of sample	Mine			Mine			Commercial—3 tons			Mine.		
Quality of coal	....			....			Over ¾-inch screen and picking table.					
Taken by	S. A. Jones, provincial mine inspector.			W. Shaw, provincial mine inspector.			T. Denis, Mines Branch.			A. N. Scott and S.A. Jones, provincial mine inspectors.		
Date of sampling	January 1914			December 22, 1915			July 22, 1908			December 1913.		
Remarks	Operated by the Canadian Coal & Coke Co., Ltd., at time of sampling.						Operated by Alberta Railway & Irrigation Co., at time of sampling.					

ALBERTA COAL FIELDS.

Description.	Lethbridge-McGrath Area.									Carmangay (Aldersyde) Area.		
	Chinook Coal Co., Ltd., Commerce. Sec. 12, Tp. 10, R. 22.									Ellis Bros. No. 1 mine, Champion. Sec. 8, Tp. 16, R. 23.		
Sample No	304			697			721			717		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	0·0	....	....	3·3	....	....	0·8	....	....	2·9	....	....
Results obtained by	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture %	9·6	9·6	....	9·4	6·3	....	8·7	8·0	....	12·8	10·2	....
Ash %	9·8	9·8	10·8	14·9	15·4	16·4	11·2	11·3	12·2	6·8	7·0	7·8
Volatile matter %	32·8	32·8	36·3	30·9	32·0	34·1	28·0	28·2	30·7	31·7	32·7	36·4
Fixed carbon %	47·8	47·8	52·9	44·8	46·3	49·5	52·1	52·5	57·1	48·7	50·1	55·8
Ultimate analysis:—												
Carbon %	62·7	62·7	69·3	57·8	59·8	63·8	62·1	62·5	68·0	60·7	62·5	69·6
Hydrogen %	5·3	5·3	4·6	5·2	5·0	4·5	5·3	5·3	4·7	5·5	5·4	4·7
Ash %	9·8	9·8	10·8	14·9	15·4	16·4	11·2	11·3	12·2	6·8	7·0	7·8
Sulphur %	0·5	0·5	0·5	0·7	0·7	0·8	0·6	0·6	0·7	0·5	0·5	0·6
Nitrogen %	1·5	1·5	1·7	1·4	1·4	1·6	1·6	1·6	1·8	1·2	1·2	1·4
Oxygen %	20·2	20·2	13·1	20·0	17·7	12·9	19·2	18·7	12·6	25·3	23·4	15·9
Calorific value:—												
Calories per gram, gross	5910	5910	6540	5590	5780	6170	5950	5990	6520	5750	5920	6600
B. Th. U. per lb., gross	10640	10640	11760	10060	10400	11100	10710	10790	11730	10350	10660	11870
Fuel ratio	1·45			1·45			1·85			1·55		
Carbon-Hydrogen ratio	11·9	11·9	15·0	11·2	12·1	14·1	11·7	11·9	14·4	11·0	11·7	14·9
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	2–3			....			3			2		
Location in mine	No. 1 seam			No. 1 seam			No. 1 seam, south-west main entry			No. 1 seam, main entry.		
Kind of sample	Mine			Commercial — 20 tons.			Mine			Mine.		
Quality of coal				Lump						Inferior coal not taken.		
Taken by	S. A. Jones, provincial mine inspector.			F. Aspinall, provincial mine inspector.			W. Shaw, provincial mine inspector.			J. A. Richards, provincial mine inspector.		
Date of sampling	November 1913			October 1915. Lab. sample Mar. 6, 1916.			Dec. 21, 1915			November 4, 1915.		
Remarks												

ALBERTA COAL FIELDS.

Drumheller Area.

Description.	Rosedale Coal & Clay Products Co., Ltd., Rosedale. Sec. 28, Tp. 28, R. 19.											
Sample No.	259			348			665			691		
Moisture condition (see note p. 2)	R	D		R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	....	....		7·2	....	....	5·1	....	....	4·7	....	....
Results obtained by	Anal.	Calc.		Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture %	16·5	....		15·3	8·8	....	18·3	13·9	....	18·8	14·8	....
Ash %	6·5	7·8		7·6	8·2	9·0	4·9	5·1	6·0	7·9	8·3	9·8
Volatile matter %	33·6	40·2		32·1	34·6	37·9	32·1	33·8	39·3	28·4	29·8	34·9
Fixed carbon %	43·4	52·0		45·0	48·4	53·1	44·7	47·2	54·7	44·9	47·1	55·3
Ultimate analysis:—												
Carbon %	57·3	68·6		56·9	61·2	67·2	57·9	61·0	70·9	54·7	57·4	67·4
Hydrogen %	5·8	4·7		5·6	5·2	4·6	5·7	5·4	4·5	5·6	5·3	4·3
Ash %	6·5	7·8		7·6	8·2	9·0	4·9	5·1	6·0	7·9	8·3	9·8
Sulphur %	0·4	0·5		0·6	0·6	0·6	0·4	0·5	0·5	0·5	0·5	0·5
Nitrogen %	1·3	1·6		....	....	....	1·3	1·4	1·6	1·4	1·5	1·7
Oxygen %	28·7	16·8		....	....	....	29·8	26·6	16·5	29·9	27·0	16·3
Calorific value:—												
Calories per gram, gross	5360	6420		5340	5750	6300	5570	5870	6820	5200	5460	6410
B. Th. U. per lb., gross	9650	11560		9600	10350	11340	10030	10570	12270	9370	9830	11540
Fuel ratio	1·30			1·40			1·40			1·60		
Carbon-Hydrogen ratio	9·9	14·6		10·2	11·9	14·7	10·1	11·3	15·7	9·8	10·8	15·6
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	....			....			....			....		
Location in mine							No. 2 seam			No. 2 seam.		
Kind of sample	Commercial—15 tons.			Commercial—15 tons.			Mine			Commercial—30 tons.		
Quality of coal							Run-of-mine			Run-of-mine.		
Taken by	Provincial mine inspector.			Provincial mine inspector.			F. Aspinall, provincial mine inspector.			Provincial mine inspector.		
Date of sampling	1913			1913			October 22, 1915.			October 1915.		
Remarks	Lab. sample July 10, 1913. Both lab. samples taken from same commercial sample.			Lab. sample March 18, 1914.						Lab. sample Feb. 7, 1916.		

ALBERTA COAL FIELDS.

Drumheller Area.

Description.	The Drumheller Land Co., Ltd., Drumheller. Sec. 2, Tp. 29, R. 20.						Alberta Block Coal Co., Ltd., Drumheller. Sec. 3, Tp. 29, R. 20.		
Sample No.	319			473			531		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	3·2	....	....	8·7	....	....	5·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture %	19·2	16·5	....	18·9	11·2	....	16·5	11·6	....
Ash %	6·4	6·6	7·9	14·8	16·2	18·3	2·9	3·1	3·5
Volatile matter %	30·3	31·3	37·5	28·3	31·0	34·9	33·2	35·1	39·7
Fixed carbon %	44·1	45·6	54·6	38·0	41·6	46·8	47·4	50·2	56·8
Ultimate analysis:—									
Carbon %	56·4	58·3	69·8	49·2	53·8	60·6	....	....	....
Hydrogen %	5·8	5·6	4·5	5·5	4·9	4·1	....	....	....
Ash %	6·4	6·6	7·9	14·8	16·2	18·3	....	....	....
Sulphur %	0·4	0·4	0·5	0·4	0·4	0·5	....	....	....
Nitrogen %	1·2	1·3	1·5	1·0	1·1	1·3	....	....	....
Oxygen %	29·8	27·8	15·8	29·1	23·6	15·2	....	....	....
Calorific value:—									
Calories per gram, gross	5240	5410	6490	4630	5070	5710	....	....	....
B. Th. U. per lb., gross	9440	9750	11680	8330	9120	10270	....	....	....
Fuel ratio		1·45			1·35			1·45	
Carbon-Hydrogen ratio	9·8	10·5	15·6	9·0	11·0	14·7	....	....	....
Coking properties	non-coking			non-coking			non-coking		
Hoffmann potash test		....			....			....	
Location in mine	Lower seam								
Kind of sample	Mine			Commercial—carload					
Quality of coal				Slack					
Taken by	J. T. Stirling, provincial chief mine inspector.			F. Aspinall, provincial mine inspector.			Mine authorities.		
Date of sampling	November 1913			May 1914			January 1915.		
Remarks				Lab. sample Jan. 7, 1915.					

ALBERTA COAL FIELDS.

Drumheller Area.

Description.	Newcastle Coal Co., Ltd., Drumheller. Sec. 9, Tp. 29, R. 20.			Midland Collieries, Ltd., Drumheller. Sec. 9, Tp. 29, R. 20.					
Sample No.	491			650			881		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	5·9	....	....	5·8	....	....	4·3	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	16·5	11·4	....	18·6	13·7	....	16·2	12·5	....
Ash %	7·6	8·1	9·1	5·8	6·1	7·1	7·9	8·2	9·4
Volatile matter %	32·1	34·1	38·5	30·1	32·0	37·0	30·3	31·6	36·1
Fixed carbon %	43·8	46·4	52·4	45·5	48·2	55·9	45·6	47·7	54·5
Ultimate analysis:— Carbon %	56·3	59·8	67·5	57·3	60·8	70·4	57·3	59·9	68·4
Hydrogen %	5·6	5·2	4·5	5·7	5·4	4·4	5·5	5·2	4·4
Ash %	7·6	8·1	9·1	5·8	6·1	7·1	7·9	8·2	9·4
Sulphur %	0·4	0·4	0·5	0·4	0·4	0·4	0·4	0·5	0·5
Nitrogen %	1·2	1·2	1·4	1·2	1·3	1·5	1·3	1·3	1·5
Oxygen %	28·9	25·3	17·0	29·6	26·0	16·2	27·6	24·9	15·8
Calorific value:— Calories per gram, gross	5330	5660	6390	5490	5830	6750	5380	5620	6420
B. Th. U. per lb., gross	9590	10190	11500	9890	10490	12150	9680	10120	11560
Fuel ratio		1·35			1·50			1·50	
Carbon-Hydrogen ratio	10·1	11·4	15·1	10·1	11·4	15·9	10·4	11·4	15·5
Coking properties	non-coking			non-coking			non-coking		
Hoffmann potash test		....			....			....	
Location in mine	Newcastle seam			No. 3 seam			No. 4 seam.		
Kind of sample	Commercial—20 tons.			Mine			Commercial—30 tons.		
Quality of coal	Run-of-mine			Bone and clay left out, to correspond with regular practice at mine.			Run-of-mine.		
Taken by	F. Aspinall, provincial mine inspector.			F. Aspinall			Provincial mine inspector.		
Date of sampling	October 15, 1914. Lab. sample Feb. 4, 1915.			October 21, 1915			September 1915. Lab. sample Nov. 17, 1916.		
Remarks									

ALBERTA COAL FIELDS.

Big Valley-Trochu-Three Hills-Carbon Area.

Description.	Chas. S. Wilson's mine, Twining. Sec. 14, Tp. 31, R. 24			Geo. Watson's mine, Three Hills. Sec. 22, Tp. 31, R. 24			Ellis Coal Co., Ltd., Three Hills. Sec. 36, Tp. 31, R. 24			William Halbert's mine, Trochu. Sec. 12, Tp. 33, R. 23		
Sample No.	961			957			936			984		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying ... %	0·9	....	....	2·3	....	....	3·3	....	....	2·4	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture ... %	15·1	14·3	....	15·7	13·8	....	17·3	14·5	....	17·3	15·3	....
Ash ... %	8·3	8·4	9·8	5·9	6·1	7·0	7·9	8·2	9·5	8·4	8·6	10·1
Volatile matter ... %	28·3	28·5	33·3	30·9	31·5	36·6	28·3	29·3	34·3	27·2	27·9	33·0
Fixed carbon ... %	48·3	48·8	56·9	47·5	48·6	56·4	46·5	48·0	56·2	47·1	48·2	56·9
Ultimate analysis:—												
Carbon ... %	58·0	58·5	68·3	59·6	60·9	70·7	57·1	59·0	69·0	57·0	58·4	68·9
Hydrogen ... %	5·4	5·3	4·3	5·7	5·6	4·7	5·4	5·2	4·2	5·4	5·2	4·1
Ash ... %	8·3	8·4	9·8	5·9	6·1	7·0	7·9	8·2	9·5	8·4	8·6	10·1
Sulphur ... %	0·6	0·6	0·7	1·8	1·8	2·1	0·4	0·4	0·5	0·3	0·3	0·4
Nitrogen ... %	0·9	0·9	1·1	1·0	1·0	1·2	0·9	0·9	1·1	0·9	0·9	1·1
Oxygen ... %	26·8	26·3	15·8	26·0	24·6	14·3	28·3	26·3	15·7	28·0	26·6	15·4
Calorific value:—												
Calories per gram, gross	5440	5490	6410	5650	5780	6700	5340	5520	6460	5320	5450	6430
B. Th. U. per lb., gross	9800	9890	11540	10170	10410	12070	9610	9940	11630	9570	9810	11580
Fuel ratio	1·70			1·55			1·65			1·75		
Carbon-Hydrogen ratio	10·8	11·0	15·7	10·5	11·0	15·2	10·5	11·3	16·4	10·6	11·2	16·6
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	2			2			2			2-1		
Location in mine	No. 1 seam, 350 ft. in No. 1 entry.			No. 1 seam, 300 ft. in east entry.			No. 1 seam, west entry, 600 ft. from shaft bottom.			No. 1 seam, 120 ft. in No. 2 entry		
Kind of sample	Mine			Mine			Mine			Mine		
Quality of coal	Run-of-mine			Run-of-mine			Run-of-mine					
Taken by	Duncan McDonald, provincial mine inspector.											
Date of sampling	January 19, 1917.			January 19, 1917.			January 18, 1917.			March 8, 1917.		
Remarks	Sample received in broken bottle, and therefore partially dried.											

ALBERTA COAL FIELDS.

Big Valley-Trochu-Three Hills-Carbon Area.

Description.	Halbert Bros'. (R. & D.) mine, Trochu. Sec. 14, Tp. 33, R. 23			Ole Thompson's mine, Lousana. Sec. 12, Tp. 36, R. 22.						Calgary Collieries, Ltd., Ardley. Sec. 29, Tp. 38, R. 23		
Sample No.	983			807			971			814		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying ..... %	2·6	....	....	2·9	....	....	3·0	....	....	2·0	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture ..... %	17·6	15·4	....	18·2	15·7	....	17·9	15·3	....	17·1	15·4	....
Ash ..... %	8·3	8·5	10·1	7·8	8·0	9·5	15·6	16·1	19·0	8·4	8·6	10·1
Volatile matter ..... %	27·4	28·1	33·2	28·3	29·2	34·6	27·3	28·2	33·3	32·3	32·9	38·9
Fixed carbon ..... %	46·7	48·0	56·7	45·7	47·1	55·9	39·2	40·4	47·7	42·2	43·1	51·0
Ultimate analysis:—												
Carbon ..... %	56·7	58·2	68·8	55·4	57·0	67·7	49·9	51·5	60·8	55·9	57·0	67·4
Hydrogen ..... %	5·4	5·2	4·1	5·3	5·2	4·0	5·3	5·2	4·0	5·6	5·5	4·5
Ash ..... %	8·3	8·5	10·1	7·8	8·0	9·5	15·6	16·1	19·0	8·4	8·6	10·1
Sulphur ..... %	0·4	0·4	0·5	0·2	0·2	0·3	0·4	0·4	0·5	0·4	0·4	0·4
Nitrogen ..... %	0·9	1·0	1·1	0·9	0·9	1·1	0·9	0·9	1·1	1·0	1·1	1·3
Oxygen ..... %	28·3	26·7	15·4	30·4	28·7	17·4	27·9	25·9	14·6	28·7	27·4	16·3
Calorific value:—												
Calories per gram, gross	5280	5420	6410	5120	5270	6260	4710	4850	5730	5290	5400	6380
B. Th. U. per lb., gross	9500	9750	11530	9210	9490	11270	8470	8740	10320	9530	9720	11490
Fuel ratio	1·70			1·60			1·45			1·30		
Carbon-Hydrogen ratio	10·6	11·2	16·8	10·4	11·0	16·8	9·4	10·0	15·0	9·9	10·3	15·0
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	2–1			1			2–1			2		
Location in mine	No. 1 seam, 130 ft. in No. 1 entry.						250 ft. in main entry			Red Deer seam.		
Kind of sample	Mine			Mine			Mine			Mine.		
Quality of coal				Run-of-mine			Run-of-mine					
Taken by	Duncan McDonald, provincial mine inspector.											
Date of sampling	March 8, 1917			August 2, 1916			March 7, 1917			August 1, 1916.		
Remarks												

ALBERTA COAL FIELDS.

Pembina-Wabamun Area.

Description.	Security Coal Mines, Wabamun. Sec. 14, Tp. 53, R. 4.						Lakeside Coals, Ltd., Wabamun. Sec. 9, Tp. 53, R. 4.					
Sample No	193			194			872		875			
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	D	R	AD	D	
Loss on air-drying %	2·5	....	....	1·0	....	....	....	....	5·4	....	....	
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	
Proximate analysis:— Moisture %	18·9	16·8	....	14·6	13·8	....	6·7	....	24·1	19·7	....	
Ash %	5·6	5·7	6·9	5·6	5·7	6·6	11·7	12·5	6·1	6·5	8·1	
Volatile matter %	31·6	32·4	38·9	33·3	33·6	39·0	34·8	37·3	27·7	29·3	36·5	
Fixed carbon %	43·9	45·1	54·2	46·5	46·9	54·4	46·8	50·2	42·1	44·5	55·4	
Ultimate analysis:— Carbon %	54·7	56·0	67·4	58·3	58·9	68·3	58·9	63·1	52·0	55·0	68·5	
Hydrogen %	5·3	5·2	4·0	5·1	5·1	4·1	4·4	3·9	5·8	5·5	4·0	
Ash %	5·6	5·7	6·9	5·6	5·7	6·6	11·7	12·5	6·1	6·5	8·1	
Sulphur %	0·2	0·2	0·3	0·2	0·2	0·2	0·1	0·1	0·1	0·1	0·2	
Nitrogen %	0·7	0·7	0·8	0·7	0·7	0·9	0·7	0·8	0·7	0·7	0·9	
Oxygen %	33·5	32·2	20·6	30·1	29·4	19·9	24·2	19·6	35·3	32·2	18·3	
Calorific value:— Calories per gram, gross	4960	5080	6110	5250	5300	6150	5360	5750	4690	4950	6170	
B. Th. U. per lb., gross	8930	9150	11000	9450	9550	11080	9650	10340	8440	8920	11110	
Fuel ratio	1·40			1·40			1·35		1·50			
Carbon-Hydrogen ratio	10·3	10·8	17·0	11·4	11·6	16·7	13·4	16·2	9·1	10·1	17·0	
Coking properties	non-coking			non-coking			non-coking		non-coking			
Hoffmann potash test	....			....			....		1–2			
Location in mine	....			....			No. 1 or upper seam.		No. 1 or upper seam.			
Kind of sample	Mine			Mine			Mine		Mine.			
Quality of coal	Average of mine			Average of mine			....					
Taken by	J. G. S. Hudson, Mines Branch, Ottawa.			J. G. S. Hudson			J. S. Stewart, Geological Survey.		J. T. Stirling, provincial chief mine inspector.			
Date of sampling	August 22, 1912			August 22, 1912			Summer of 1916.		October 28, 1916.			
Remarks	....			....			Operated by Island Lake Coal Co. at time of sampling.					

ALBERTA COAL FIELDS.

Pembina-Wabamun Area.

Description.	Gainford Collieries, Ltd., Gainford. Sec. 14, Tp. 53, R. 6.							
Sample No.	186			187			260	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	D
Loss on air-drying %	1·3	....	....	4·8	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—								
Moisture %	9·9	8·7	....	19·9	15·8	....	17·0	....
Ash %	6·0	6·1	6·7	5·8	6·1	7·3	8·4	10·1
Volatile matter %	34·8	35·3	38·7	30·0	31·5	37·4	30·8	37·1
Fixed carbon %	49·3	49·9	54·6	44·3	46·6	55·3	43·8	52·8
Ultimate analysis:—								
Carbon %	60·9	61·7	67·6	54·9	57·6	68·4	53·8	64·8
Hydrogen %	5·0	4·9	4·3	5·8	5·5	4·4	5·0	3·8
Ash %	6·0	6·1	6·7	5·8	6·1	7·3	8·4	10·1
Sulphur %	0·2	0·2	0·2	0·2	0·2	0·2	0·6	0·7
Nitrogen %	0·9	0·9	1·0	0·7	0·7	0·9	1·6	1·9
Oxygen %	27·0	26·2	20·2	32·6	29·9	18·8	30·6	18·7
Calorific value:—								
Calories per gram, gross	5680	5750	6300	5130	5390	6400	5020	6050
B. Th. U. per lb., gross	10220	10350	11340	9230	9700	11510	9040	10890
Fuel ratio		1·40			1·50		1·40	
Carbon-Hydrogen ratio	12·2	12·5	15·6	9·5	10·5	15·5	10·8	17·1
Coking properties		non-coking			non-coking		non-coking	
Hoffmann potash test		....			....		....	
Location in mine								
Kind of sample	Mine			Mine			Commercial—carload.	
Quality of coal	Average of seam			Average of seam				
Taken by	J. G. S. Hudson, Mines Branch.			J. G. S. Hudson			Provincial mine inspector.	
Date of sampling	August 10, 1912			August 10, 1912			Lab. sample July 9, 1913.	
Remarks								

ALBERTA COAL FIELDS.

Pembina-Wabamun Area.

Description.	North American Collieries, Ltd., Edmonton. Pembina mine, Evansburgh. Sec. 30, Tp. 53, R. 7.										
Sample No.	357			369			302			871	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	D
Loss on air-drying ..... %	6·2	....	....	4·1	....	....	3·3	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture ..... %	17·0	11·5	....	18·2	14·7	....	18·9	16·1	....	5·7	....
Ash ..... %	9·7	10·4	11·7	10·3	10·7	12·6	10·1	10·5	12·5	11·1	11·8
Volatile matter ..... %	29·5	31·5	35·7	27·6	28·8	33·7	27·1	28·0	33·4	32·4	34·3
Fixed carbon ..... %	43·8	46·6	52·6	43·9	45·8	53·7	43·9	45·4	54·1	50·8	53·9
Ultimate analysis:—											
Carbon ..... %	54·4	58·0	65·6	53·9	56·2	65·9	55·1	57·0	67·9	61·9	65·7
Hydrogen ..... %	5·7	5·4	4·6	5·5	5·3	4·3	5·5	5·3	4·1	4·3	3·9
Ash ..... %	9·7	10·4	11·7	10·3	10·7	12·6	10·1	10·5	12·5	11·1	11·8
Sulphur ..... %	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·2	0·2
Nitrogen ..... %	....	....	....	....	....	....	0·7	0·8	0·9	1·0	1·0
Oxygen ..... %	....	....	....	....	....	....	28·4	26·2	14·3	21·5	17·4
Calorific value:—											
Calories per gram, gross	4990	5320	6010	4960	5170	6060	4930	5100	6080	5720	6060
B. Th. U. per lb., gross	8980	9580	10830	8930	9310	10910	8870	9180	10940	10300	10920
Fuel ratio		1·50			1·60			1·60			1·55
Carbon-Hydrogen ratio	9·5	10·8	14·3	9·7	10·6	15·4	10·1	10·8	16·4	14·4	16·9
Coking properties	non-coking			non-coking			non-coking			non-coking	
Hoffmann potash test		....			....			1			....
Location in mine							Lower or No. 2 seam			Lower or No. 2 seam.	
Kind of sample	Commercial—30tons			Commercial—30tons			Mine			Mine.	
Quality of coal											
Taken by	Provincial mine inspector.			Provincial mine inspector.			J. T. Stirling, provincial chief mine inspector.			J. S. Stewart, Geological Survey.	
Date of sampling	March 1914. Lab. sample March 27, 1914.			March 1914. Lab. sample April 27, 1914.			November 1913			Summer of 1916.	
Remarks	Both lab. samples taken from same commercial sample. Operated by Pembina Coal Co., Ltd., at time of sampling.									Operated by Pembina Coal Operators, Ltd., at time of sampling.	

ALBERTA COAL FIELDS.

Taber-Bow Island Area.

Description.	Canada West Coal Co., Ltd., Taber. Sec. 31, Tp. 9, R. 16.						
Sample No	M 43			M EX 12	366		
Moisture condition (see note p. 2)	R	AD	D	D	R	AD	D
Loss on air-drying %	1·5	....	....	....	0·8	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—							
Moisture %	13·0	11·7	....	....	13·0	12·2	....
Ash %	12·3	12·4	14·1	23·6	10·8	10·9	12·4
Volatile matter %	31·3	31·8	36·0	33·8	30·9	31·2	35·5
Fixed carbon %	43·4	44·1	49·9	42·6	45·3	45·7	52·1
Ultimate analysis:—							
Carbon %	56·1	56·9	64·5	....	58·9	59·4	67·7
Hydrogen %	5·6	5·5	4·7	....	5·4	5·4	4·6
Ash %	12·3	12·4	14·1	....	10·8	10·9	12·4
Sulphur %	1·2	1·3	1·4	1·4	0·9	0·9	1·0
Nitrogen %	1·3	1·4	1·6	....	1·4	1·4	1·6
Oxygen %	23·5	22·5	13·7	....	22·6	22·0	12·7
Calorific value:—							
Calories per gram, gross	5330	5420	6130	5220	5460	5510	6280
B. Th. U. per lb., gross %	9600	9750	11040	9400	9830	9920	11300
Fuel ratio		1·40		1·25		1·45	
Carbon-Hydrogen ratio	10·1	10·4	13·6	....	10·8	11·0	14·8
Coking properties	non-coking			....	non-coking		
Hoffmann potash test		....		....		....	
Location in mine							
Kind of sample	Commercial—5 tons			Mine	Mine.		
Quality of coal	Over ¾-inch shaking screen.			Slack			
Taken by	T. Denis, Mines Branch.			T. Denis	S. A. Jones, provincial mine inspector.		
Date of sampling	July 23, 1908			July 23, 1908	April 1914.		
Remarks							

ALBERTA COAL FIELDS.

Taber-Bow Island Area.

Description.	Regal Coal Co., Ltd., Eureka mine, Taber. Sec. 8, Tp. 10, R. 16.			Superior Coal Co., Ltd., Taber. Sec. 18, Tp. 10, R. 16.			Rock Springs Coal & Brick Co., Ltd., Elcan. Sec. 3, Tp. 10, R. 17.		
Sample No.	406			408			407		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	1·2	....	....	2·6	....	....	0·5	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	15·0	14·0	....	14·9	12·7	....	12·8	12·4	....
Ash %	7·3	7·4	8·7	6·9	7·0	8·1	11·2	11·2	12·8
Volatile matter %	31·4	31·8	36·9	31·8	32·6	37·3	30·0	30·2	34·4
Fixed carbon %	46·3	46·8	54·4	46·4	47·7	54·6	46·0	46·2	52·8
Ultimate analysis:— Carbon %	59·7	60·5	70·3	59·3	60·8	69·7	56·4	56·7	64·7
Hydrogen %	5·8	5·8	4·9	6·0	5·8	5·1	5·4	5·4	4·6
Ash %	7·3	7·4	8·7	6·9	7·0	8·1	11·2	11·2	12·8
Sulphur %	1·2	1·2	1·4	1·3	1·3	1·5	1·1	1·1	1·2
Nitrogen %	1·4	1·5	1·7	1·5	1·6	1·8	1·3	1·3	1·4
Oxygen %	24·6	23·6	13·0	25·0	23·5	13·8	24·6	24·3	15·3
Calorific value:— Calories per gram, gross	5610	5680	6600	5580	5730	6560	5330	5350	6110
B. Th. U. per lb., gross	10100	10220	11880	10050	10320	11810	9580	9630	10990
Fuel ratio		1·45			1·45			1·55	
Carbon-Hydrogen ratio	10·3	10·5	14·4	9·9	10·4	13·8	10·5	10·6	14·2
Coking properties		non-coking			non-coking			non-coking	
Hoffmann potash test		1–2			....			1–2	
Location in mine									
Kind of sample	Mine samples.								
Quality of coal									
Taken by	S. A. Jones, provincial mine inspector.								
Date of sampling	October 1914.								
Remarks									

ALBERTA COAL FIELDS.

Hanna Area.

Description.	Luck & Sinclair mine, Parr. Sec. 18, Tp. 29, R. 14.			W. J. Anderson's mine, Sheerness. Sec. 12, Tp. 29, R. 13.			Sam. Wadsworth's mine Hanna. Sec. 19, Tp. 29, R. 14.		
Sample No.	916			944			820		
Moisture condition, (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	3·3	....	....	6·1	....	....	4·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture %	23·8	21·2	....	24·9	20·0	....	24·1	20·8	....
Ash %	9·1	9·4	12·0	4·4	4·7	5·9	5·6	5·8	7·3
Volatile matter %	28·3	29·2	37·1	27·5	29·3	36·6	29·7	31·0	39·2
Fixed carbon %	38·8	40·2	50·9	43·2	46·0	57·5	40·6	42·4	53·5
Ultimate analysis:—									
Carbon %	48·7	50·3	63·9	52·5	55·9	69·8	51·7	53·9	68·2
Hydrogen %	5·9	5·7	4·2	6·0	5·7	4·3	6·0	5·8	4·3
Ash %	9·1	9·4	12·0	4·4	4·7	5·9	5·6	5·8	7·3
Sulphur %	0·4	0·5	0·6	0·3	0·3	0·4	0·4	0·4	0·5
Nitrogen %	1·0	1·1	1·4	1·0	1·1	1·4	1·0	1·1	1·4
Oxygen %	34·9	33·0	17·9	35·8	32·3	18·2	35·3	33·0	18·3
Calorific value:—									
Calories per gram, gross	4530	4690	5950	4870	5190	6490	4850	5060	6400
B. Th. U. per lb., gross	8160	8440	10710	8770	9340	11680	8730	9120	11510
Fuel ratio		1·35			1·55			1·35	
Carbon-Hydrogen ratio	8·3	8·9	15·3	8·7	9·9	16·3	8·6	9·4	15·7
Coking properties		non-coking			non-coking			non-coking	
Hoffmann potash test		1			1			1	
Location in mine	No. 1 seam, No. 1 south entry.			No. 1 seam, south entry, 200 ft. from slope bottom.			No. 1 seam, main entry.		
Kind of sample	Mine			Mine			Mine.		
Quality of coal	Run-of-mine								
Taken by	Duncan McDonald, provincial mine inspector.								
Date of sampling	December 1, 1916			December 13, 1916			August 24, 1916.		
Remarks									

ALBERTA COAL FIELDS.

Lacombe Area.

Description.	McCormack Mine Co., Castor. Sec. 34, Tp. 37, R. 14.					Coal said to be from Coalbeck Collieries, Castor.					
Sample No.	876			992		323		324		325	
Moisture condition (see note p. 2)	R	AD	D	R	D	R	D	R	D	R	D
Loss on air-drying ... %	7·0	....	....	....	....	....	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture ... %	28·1	22·7	....	14·5	....	15·5	....	18·8	....	17·5	....
Ash ... %	7·6	8·2	10·6	8·3	9·7	5·5	6·4	4·3	5·3	4·4	5·3
Volatile matter ... %	28·6	30·7	39·7	33·6	39·3	37·0	43·8	35·2	43·3	34·4	41·7
Fixed carbon ... %	35·7	38·4	49·7	43·6	51·0	42·0	49·8	41·7	51·4	43·7	53·0
Ultimate analysis:— Carbon ... %	46·0	49·4	63·9	....	....	....	....	....	....	....	....
Hydrogen ... %	6·1	5·7	4·1	....	....	....	....	....	....	....	....
Ash ... %	7·6	8·2	10·6	....	....	....	....	....	....	....	....
Sulphur ... %	0·4	0·5	0·6	....	....	....	....	....	....	....	....
Nitrogen ... %	0·9	1·0	1·3	....	....	....	....	....	....	....	....
Oxygen ... %	39·0	35·2	19·5	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	4250	4570	5900	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	7640	8220	10630	....	....	....	....	....	....	....	....
Fuel ratio	1·25			1·30		1·15		1·20		1·25	
Carbon-Hydrogen ratio	7·5	8·6	15·4	....	....	....	....	....	....	....	....
Coking properties	non-coking			non-coking		....		....		....	
Hoffmann potash test	1			....		....		....		....	
Location in mine	No. 1 seam, No. 2 south entry.					No. 1 entry.		No. 4 entry.		No. 5 entry.	
Kind of sample	Mine										
Quality of coal	Run-of-mine										
Taken by	Duncan McDonald, provincial mine inspector.			Mine authorities.		Private individual.		Private individual.		Private individual.	
Date of sampling	September 9, 1916.			April 1917.		January 1914.		1914		1914.	
Remarks						Samples apparently from the Colbeck Colliery, now operated by the National Coal Co., Sec. 3, Tp. 38, R. 14.					

ALBERTA COAL FIELDS.

Lacombe Area.

Description.	Coal said to be from Coalbeck Collieries, Castor.				Frank Mehiltz' mine, Halkirk. Sec. 18, Tp. 39, R. 15			Armour Gray's mine Gadsby. Sec. 28, Tp. 39, R. 16		
Sample No.	326		327		760			958		
Moisture condition (see note p. 2)	R	D	R	D	R	AD	D	R	AD	D
Loss on air-drying %	....	....	....	....	3·9	....	....	8·0	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—										
Moisture %	17·8	....	17·6	....	27·9	25·0	....	25·8	19·3	....
Ash %	6·2	7·6	5·3	6·4	5·0	5·2	7·0	7·9	8·6	10·6
Volatile matter %	35·3	42·9	34·8	42·2	26·7	27·8	37·0	26·8	29·1	36·1
Fixed carbon %	40·7	49·5	42·3	51·4	40·4	42·0	56·0	39·5	43·0	53·3
Ultimate analysis:—										
Carbon %	....	....	....	....	48·8	50·8	67·6	48·7	53·0	65·6
Hydrogen %	....	....	....	....	6·2	6·0	4·2	6·0	5·5	4·2
Ash %	....	....	....	....	5·0	5·2	7·0	7·9	8·6	10·6
Sulphur %	....	....	....	....	0·7	0·7	0·9	0·4	0·4	0·5
Nitrogen %	....	....	....	....	1·0	1·0	1·4	0·9	1·0	1·3
Oxygen %	....	....	....	....	38·3	36·3	18·9	36·1	31·5	17·8
Calorific value:—										
Calories per gram, gross	....	....	....	....	4560	4740	6320	4530	4920	6100
B. Th. U. per lb., gross	....	....	....	....	8200	8540	11370	8150	8860	10970
Fuel ratio	1·15		1·20		1·50			1·50		
Carbon-Hydrogen ratio	....	....	....	....	7·9	8·5	15·9	8·1	9·6	15·7
Coking properties	....		....		non-coking			non-coking		
Hoffmann potash test	....		....		1			1		
Location in mine	No. 6 entry.		No. 7 entry.		Main entry.			No. 1 seam, 200 ft. in No. 1 entry.		
Kind of sample	....		....		Mine			Mine.		
Quality of coal	....		....		Normal output of mine.			Run-of-mine.		
Taken by	Private individual.		Private individual.		F. Aspinall, provincial inspector of mines.			Duncan McDonald, provincial mine inspector.		
Date of sampling	January 1914.		1914.		May 3, 1916.			Feb. 15, 1917.		
Remarks	Samples apparently from the Colbeck Colliery, now operated by the National Coal Co., Sec. 3, Tp. 38, R. 14.									

ALBERTA COAL FIELDS.

Camrose-Battle River Area.

Description.	Colfax Coal Mining Company Bish or Le Gear mine, Hastings Coulee. Sec. 36, Tp. 40, R. 16.			J. B. Turney's mine, Hastings Coulee. Sec. 36, Tp. 40, R. 16.		
Sample No.	758			744		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D
Loss on air-drying %	3·1	....	....	5·1	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—						
Moisture %	25·4	23·0	....	25·3	21·3	....
Ash %	5·8	6·0	7·8	5·1	5·4	6·9
Volatile matter %	27·8	28·7	37·3	28·1	29·6	37·6
Fixed carbon %	41·0	42·3	54·9	41·5	43·7	55·5
Ultimate analysis:—						
Carbon %	50·4	52·0	67·5	51·3	54·1	68·7
Hydrogen %	6·0	5·9	4·3	6·4	6·1	4·8
Ash %	5·8	6·0	7·8	5·1	5·4	6·9
Sulphur %	0·4	0·4	0·6	0·4	0·4	0·5
Nitrogen %	1·1	1·1	1·4	1·1	1·2	1·5
Oxygen %	36·3	34·6	18·4	35·7	32·8	17·6
Calorific value:—						
Calories per gram, gross	4720	4870	6330	4830	5090	6460
B. Th. U. per lb., gross	8500	8770	11390	8690	9160	11630
Fuel ratio		1·45			1·50	
Carbon-Hydrogen ratio	8·4	8·9	15·8	8·0	8·8	14·4
Coking properties	non-coking			non-coking		
Hoffmann potash test	1			2		
Location in mine	Main entry			Main entry.		
Kind of sample	Mine			Mine.		
Quality of coal	Impurities left out of sample, which was a little better then normal output.			Bands and parting left out of sample, which was a little better than normal output.		
Taken by	F. Aspinall, provincial mine inspector.					
Date of sampling	May 5, 1916.					
Remarks						

ALBERTA COAL FIELDS.

Tofield Area.

Description.	Tofield Coal Co., Ltd., Tofield. Sec. 26, Tp. 50, R. 19.								
Sample No.	180			181			182		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying ... %	8·7	....	....	5·4	....	....	11·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture ... %	23·2	15·9	....	16·5	11·7	....	26·3	17·0	....
Ash ... %	5·1	5·6	6·6	6·5	6·9	7·8	5·0	5·6	6·8
Volatile matter ... %	31·3	34·3	40·8	34·7	36·7	41·5	30·4	34·2	41·2
Fixed carbon ... %	40·4	44·2	52·6	42·3	44·7	50·7	38·3	43·2	52·0
Ultimate analysis:—									
Carbon ... %	53·3	58·4	69·4	55·6	58·8	66·6	49·6	55·9	67·3
Hydrogen ... %	6·3	5·8	4·8	5·4	5·1	4·3	6·1	5·4	4·3
Ash ... %	5·1	5·6	6·6	6·5	6·9	7·8	5·0	5·6	6·8
Sulphur ... %	0·5	0·5	0·6	0·5	0·5	0·6	0·5	0·6	0·7
Nitrogen ... %	1·0	1·1	1·3	1·1	1·1	1·3	1·0	1·1	1·4
Oxygen ... %	33·8	28·6	17·3	30·9	27·6	19·4	37·8	31·4	19·5
Calorific value:—									
Calories per gram, gross ...	4970	5440	6480	5120	5410	6130	4770	5370	6470
B. Th. U. per lb., gross ...	8950	9800	11660	9220	9740	11040	8580	9660	11640
Fuel ratio ...		1·30			1·20			1·25	
Carbon-Hydrogen ratio ...	8·5	10·1	14·5	10·2	11·5	15·5	8·2	10·3	15·8
Coking properties ...	non-coking			non-coking			non-coking		
Hoffmann potash test ...	1			....			....		
Location in mine ...									
Kind of sample ...	Mine ...			Mine ...			Mine.		
Quality of coal ...	Full height of seam ...			Full height of seam ...			Top 4 ft. of seam.		
Taken by ...	J. G. S. Hudson, Mines Branch.								
Date of sampling ...	August 7, 1912.								
Remarks ...									

ALBERTA COAL FIELDS.

Tofield Area.

Description.	Tofield Coal Co., Ltd., Tofield. Sec. 26, Tp. 50, R. 19.								The Dobell Coal Co. Ltd., Tofield. S.W. ¼ Sec. 35, Tp. 50, R. 19.		
Sample No.	183			184			232		185		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	D	R	AD	D
Loss on air-drying ..... %	12·7	....	....	9·6	....	....	....	....	7·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture ..... %	27·4	16·8	....	21·1	12·7	....	25·0	....	22·2	15·8	....
Ash ..... %	6·3	7·2	8·7	10·8	11·9	13·7	8·5	11·3	6·2	6·7	7·9
Volatile matter ..... %	28·2	32·4	38·9	30·0	33·2	38·0	29·8	39·7	29·9	32·4	38·5
Fixed carbon ..... %	38·1	43·6	52·4	38·1	42·2	48·3	36·7	49·0	41·7	45·1	53·6
Ultimate analysis:—											
Carbon ..... %	48·5	55·6	66·8	47·9	52·9	60·7	50·4	67·2	52·3	56·6	67·2
Hydrogen ..... %	6·2	5·5	4·3	5·5	4·9	4·0	6·6	5·1	5·7	5·3	4·1
Ash ..... %	6·3	7·2	8·7	10·8	11·9	13·7	8·5	11·3	6·2	6·7	7·9
Sulphur ..... %	0·4	0·4	0·5	0·6	0·6	0·7	0·3	0·4	0·4	0·5	0·6
Nitrogen ..... %	1·0	1·1	1·3	0·9	1·0	1·1	0·9	1·2	1·0	1·1	1·3
Oxygen ..... %	37·6	30·2	18·4	34·3	28·7	19·8	33·3	14·8	34·4	29·8	18·9
Calorific value:—											
Calories per gram, gross	4520	5180	6230	4540	5020	5750	4440	5920	4860	5260	6240
B. Th. U. per lb., gross	8140	9330	11210	8170	9030	10350	7990	10660	8740	9460	11230
Fuel ratio	1·35			1·25			1·25		1·40		
Carbon-Hydrogen ratio	7·8	10·1	15·4	8·7	10·8	15·1	7·6	13·2	9·2	10·7	16·2
Coking properties	non-coking			non-coking			non-coking		non-coking		
Hoffmann potash test	....			....			....		....		
Location in mine	.....			.....			.....		Water well.		
Kind of sample	Mine			Mine			Commercial—20 tons.		Mine.		
Quality of coal	Lower 4 ft. of seam.			Slack, exposed to atmosphere for two years.			.....				
Taken by	J. G. S. Hudson, Mines Branch.			J. G. S. Hudson.			Provincial mine inspector.		J. G. S. Hudson.		
Date of sampling	August 7, 1912.			August 7, 1912.			January 1913. Lab. sample June 12, 1913.		August 7, 1912.		
Remarks	.....			.....			.....				

ALBERTA COAL FIELDS.

Edmonton-Clover Bar Area.

Description.	The Bush Mine Coal Co., Beverly. River lot 42, Secs. 6 and 7, Tp. 53, R. 23.			Humberstone Coal Co., Beverly. Sec. 7, Tp. 53, R. 23.			The Great West Coal Co., Ltd., Edmonton. Mine at Clover Bar. Secs. 5–8, Tp. 53, R. 23.			The Clover Bar Coal Co., Ltd., Clover Bar. Sec. 18, Tp. 53, R. 23.		
Sample No	680			681			470			679		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying ..... %	7·2	....	....	5·8	....	....	2·7	....	....	9·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture ..... %	23·2	17·2	....	23·6	18·9	....	25·4	23·3	....	25·5	17·6	....
Ash ..... %	5·7	6·2	7·5	8·8	9·3	11·5	5·7	5·9	7·7	7·3	8·0	9·7
Volatile matter ..... %	26·5	28·6	34·5	25·1	26·6	32·8	27·1	27·9	36·3	25·1	27·8	33·8
Fixed carbon ..... %	44·6	48·0	58·0	42·5	45·2	55·7	41·8	42·9	56·0	42·1	46·6	56·5
Ultimate analysis:— Carbon ..... %	52·5	56·6	68·4	49·9	53·0	65·3	51·9	53·4	69·6	49·9	55·2	67·0
Hydrogen ..... %	5·9	5·5	4·3	5·9	5·6	4·3	6·2	6·1	4·5	6·0	5·4	4·2
Ash ..... %	5·7	6·2	7·5	8·8	9·3	11·5	5·7	5·9	7·7	7·3	8·0	9·7
Sulphur ..... %	0·3	0·3	0·4	0·4	0·4	0·5	0·3	0·3	0·4	0·3	0·4	0·5
Nitrogen ..... %	1·1	1·1	1·4	1·0	1·0	1·3	1·1	1·1	1·5	1·0	1·1	1·3
Oxygen ..... %	34·5	30·3	18·0	34·0	30·7	17·1	34·8	33·2	16·3	35·5	29·9	17·3
Calorific value:— Calories per gram, gross ..	4840	5210	6300	4600	4880	6020	4740	4880	6360	4580	5070	6150
B. Th. U. per lb., gross .	8710	9380	11330	8270	8780	10830	8540	8780	11450	8250	9130	11080
Fuel ratio	1·70			1·70			1·55			1·65		
Carbon-Hydrogen ratio	8·9	10·3	15·8	8·4	9·4	15·1	8·4	8·8	15·4	8·4	10·2	16·0
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	1			1			....			2		
Location in mine	800 ft. in main entry.			Main entry, No. 2 opening.			North west entry ...			No. 1 seam, No. 3 north entry.		
Kind of sample	Mine			Mine			Mine			Mine.		
Quality of coal	.....			.....			1 foot of bone coal and clay at top of seam not included.					
Taken by	S. A. Jones, provincial mine inspector.			S. A. Jones			E. D. Black, provincial mine inspector.			S. A. Jones.		
Date of sampling	December 3, 1915 ...			December 2, 1915 ...			November 26, 1914 .			December 1, 1915.		
Remarks	.....			.....			.....					

ALBERTA COAL FIELDS.

Edmonton-Clover Bar Area.

Description.	Strathcona Coal Co., Strathcona. River lot No. 9, Edmonton Settlement.			Parkdale Coal Co., Edmonton. River lot No. 22, Edmonton Settlement.			The McPeak Coal Co., City Mine, Edmonton. River lot 26, Edmonton Settlement. Sec. 10, Tp. 53, R. 24.					
Sample No.	M 46			M 42			M 45			678		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying ..... %	5·8	....	....	4·6	....	....	4·9	....	....	8·4	....	....
Results obtained by	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture ..... %	22·9	18·2	....	22·7	18·9	....	23·7	19·8	....	26·2	19·4	....
Ash ..... %	8·8	9·3	11·4	8·4	8·8	10·9	6·2	6·5	8·1	8·1	8·9	11·0
Volatile matter ..... %	31·6	33·6	41·0	29·2	30·6	37·8	32·0	33·7	42·0	24·2	26·4	32·8
Fixed carbon ..... %	36·7	38·9	47·6	39·7	41·7	51·3	38·1	40·0	49·9	41·5	45·3	56·2
Ultimate analysis:—												
Carbon ..... %	48·5	51·5	62·9	50·5	52·9	65·3	50·1	52·7	65·6	48·9	53·3	66·2
Hydrogen ..... %	6·0	5·7	4·5	6·1	5·9	4·6	6·0	5·8	4·5	5·9	5·5	4·1
Ash ..... %	8·8	9·3	11·4	8·4	8·8	10·9	6·2	6·5	8·1	8·1	8·9	11·0
Sulphur ..... %	0·3	0·3	0·4	0·3	0·3	0·4	0·3	0·3	0·4	0·3	0·3	0·4
Nitrogen ..... %	1·0	1·1	1·3	1·0	1·0	1·2	1·0	1·0	1·3	1·0	1·1	1·3
Oxygen ..... %	35·4	32·1	19·5	33·7	31·1	17·6	36·4	33·7	20·1	35·8	30·9	17·0
Calorific value:—												
Calories per gram, gross.	4590	4880	5960	4680	4910	6060	4820	5060	6310	4470	4880	6050
B. Th. U. per lb., gross.	8270	8780	10730	8430	8840	10900	8670	9120	11360	8040	8780	10890
Fuel ratio	1·15			1·35			1·20			1·70		
Carbon-Hydrogen ratio.	8·0	9·0	13·9	8·3	9·0	14·1	8·3	9·1	14·7	8·2	9·7	16·2
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	....			....			....			2		
Location in mine										Main entry, 75 ft. from slope bottom		
Kind of sample	Commercial—2 tons			Commercial—2 tons			Commercial—2 tons			Mine.		
Quality of coal	Over 1¼-inch bar screen.			Over 1¼-inch bar screen.			Over 1¼-inch bar screen.					
Tak en by	T. Denis, Mines Branch.			T. Denis			T. Denis			S. A. Jones, provincial mine inspector.		
Date of sampling	July 16, 1908			July 1908			July 1908			December 3, 1915.		
Remarks							Operated by Edmonton Standard Coal Co., Ltd., at time of sampling.					

ALBERTA COAL FIELDS.

Edmonton-Clover Bar Area.

Description.	Twin City Coal Co., Ltd., Edmonton. River lot 17, Tp. 53, R. 24.											
Sample No.	175			176			177			178		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	7·5	....	....	9·1	....	....	10·6	....	....	9·9	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture? %	20·8	14·4	....	23·1	15·4	....	24·5	15·6	....	23·8	15·4	....
Ash %	24·5	26·5	30·9	6·2	6·9	8·1	12·2	13·6	16·2	6·0	6·7	7·9
Volatile matter %	24·1	26·1	30·5	30·3	33·3	39·4	26·8	30·0	35·5	29·2	32·4	38·3
Fixed carbon %	30·6	33·0	38·6	40·4	44·4	52·5	36·5	40·8	48·3	41·0	45·5	53·8
Ultimate analysis:— Carbon %	39·5	42·8	50·0	54·3	57·6	68·1	46·1	51·5	61·0	52·1	57·8	68·3
Hydrogen %	5·0	4·5	3·4	6·1	5·6	4·6	5·7	5·1	4·0	5·9	5·3	4·2
Ash %	24·5	26·5	30·9	6·2	6·9	8·1	12·2	13·6	16·2	6·0	6·7	7·9
Sulphur %	0·2	0·3	0·3	0·3	0·4	0·4	0·3	0·4	0·4	0·3	0·3	0·4
Nitrogen %	0·8	0·8	1·0	1·1	1·2	1·4	1·0	1·1	1·3	1·0	1·1	1·3
Oxygen %	30·0	25·1	14·4	34·0	28·3	17·4	34·7	28·3	17·1	34·7	28·8	17·9
Calorific value:— Calories per gram, gross	3630	3920	4580	4870	5360	6340	4260	4760	5640	4820	5350	6320
B. Th. U. per lb., gross	6530	7060	8250	8770	9650	11410	7660	8570	10160	8670	9630	11380
Fuel ratio	1·25			1·35			1·35			1·40		
Carbon-Hydrogen ratio	7·9	9·5	14·8	8·5	10·2	14·8	8·0	10·1	15·4	8·9	11·0	16·2
Coking properties	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	....			....			....			....		
Location in mine	Mining Mackina cutting.			No. 1 north level.			3rd east level.			Main east level.		
Kind of sample	Mine			Mine			Mine			Mine.		
Quality of coal	....			Full section of seam.			Full section of seam.			Full section of seam.		
Taken by	J. G. S. Hudson, Mines Branch.											
Date of sampling	July 31, 1912.											
Remarks												

ALBERTA COAL FIELDS.

Edmonton-Clover Bar Area.

Description.	Twin City Coal Co., Ltd., Edmonton. River lot 17, Tp. 53, R. 24.								
Sample No.	179			274			352		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	10·1	....	....	1·8	....	....	6·4	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	23·5	15·0	....	18·1	16·6	....	15·9	10·1	....
Ash %	3·8	4·2	4·9	7·3	7·4	8·9	13·5	14·5	16·1
Volatile matter %	30·0	33·3	39·2	33·3	33·9	40·6	29·8	31·8	35·4
Fixed carbon %	42·7	47·5	55·9	41·3	42·1	50·5	40·8	43·6	48·5
Ultimate analysis:— Carbon %	55·0	61·2	71·9	54·1	55·1	66·1	51·3	54·8	61·0
Hydrogen %	6·3	5·7	4·8	5·9	5·8	4·7	5·4	5·0	4·3
Ash %	3·8	4·2	4·9	7·3	7·4	8·9	13·5	14·5	16·1
Sulphur %	0·3	0·3	0·4	0·4	0·4	0·5	0·3	0·3	0·3
Nitrogen %	1·0	1·2	1·4	1·1	1·1	1·3	....	....	....
Oxygen %	33·6	27·4	16·6	31·2	30·2	18·5	....	....	....
Calorific value:— Calories per gram, gross	5140	5710	6720	5090	5180	6210	4740	5060	5630
B. Th. U. per lb., gross	9250	10290	12100	9160	9320	11180	8530	9120	10140
Fuel ratio		1·40			1·25			1·35	
Carbon-Hydrogen ratio	8·8	10·7	15·1	9·2	9·5	14·0	9·5	11·0	14·1
Coking properties	non-coking			non-coking			non-coking		
Hoffmann potash test		....			....			....	
Location in mine	6th south entry								
Kind of sample	Mine			Commercial—20 tons.			Commercial—20 tons.		
Quality of coal	Full section of seam								
Taken by	J. G. S. Hudson, Mines Branch.			Provincial mine inspector.			Provincial mine inspector.		
Date of sampling	July 31, 1912			August 1913. Lab. sample Sept. 6, 1913			August 1913. Lab. sample Mar. 23, 1914.		
Remarks				Both lab. samples taken from same commercial sample.					

ALBERTA COAL FIELDS.

Cardiff-Namao Area.

Description.	Comfort Coal Co., Namao. Sec. 8, Tp. 55, R. 24.			The Alberta Coal Mining Co., Ltd., Cardiff. Sec. 23, Tp. 55, R. 25.			Gervais or Banner mine, operated by Blain & Gilliland, Cardiff. Sec. 24, Tp. 55, R. 25.		
Sample No	360			682			683		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	4·6	....	....	6·3	....	....	5·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	25·7	22·1	....	24·1	19·0	....	24·0	19·9	....
Ash %	4·8	5·1	6·5	7·7	8·2	10·1	6·5	6·9	8·6
Volatile matter %	28·4	29·7	38·2	27·1	28·9	35·7	26·8	28·3	35·3
Fixed carbon %	41·1	43·1	55·3	41·1	43·9	54·2	42·7	44·9	56·1
Ultimate analysis:— Carbon %	52·1	54·6	70·2	49·9	53·2	65·7	50·5	53·3	66·5
Hydrogen %	6·2	6·0	4·5	6·1	5·8	4·5	6·1	5·8	4·5
Ash %	4·8	5·1	6·5	7·7	8·2	10·1	6·5	6·9	8·6
Sulphur %	0·3	0·3	0·4	0·2	0·2	0·3	0·3	0·3	0·3
Nitrogen %	1·1	1·1	1·4	0·9	1·0	1·2	1·0	1·0	1·3
Oxygen %	35·5	32·9	17·0	35·2	31·6	18·2	35·6	32·7	18·8
Calorific value:— Calories per gram, gross	4800	5030	6450	4580	4880	6030	4660	4910	6130
B. Th. U. per lb., gross	8630	9050	11620	8240	8790	10850	8390	8840	11040
Fuel ratio		1·45			1·50			1·60	
Carbon-Hydrogen ratio	8·4	9·2	15·7	8·2	9·3	14·7	8·3	9·2	14·9
Coking properties	non-coking			non-coking			non-coking		
Hoffmann potash test		....			1-2			1	
Location in mine	New drift			No. 1 or top seam, No. 1 main entry.			No. 1 or top seam, north-east section.		
Kind of sample	Mine			Mine			Mine.		
Quality of coal									
Taken by	Mr. Heathcote, provincial mine inspector.			S. A. Jones, provincial mine inspector.			S. A. Jones.		
Date of sampling	March 1914			December 6, 1915			December 7, 1915.		
Remarks	Operated by Duthie, Wilcox & Gwilliam at time of sampling.						Operated by Capital Coal Co., Ltd., at time of sampling.		

ALBERTA COAL FIELDS.

Cardiff-Namao Area.

Description.	Cardiff Collieries, Ltd., Cardiff. Secs. 13, 24, 25, Tp. 55, R. 25.											
Sample No.	188			189			190			191		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying ..... %	9·6	....	....	10·6	....	....	11·3	....	....	4·7	....	....
Results obtained by.....	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture..... %	26·1	18·2	....	24·8	15·8	....	27·4	18·1	....	26·2	22·5	....
Ash..... %	4·8	5·3	6·5	6·3	7·0	8·4	3·4	3·8	4·6	6·0	6·3	8·1
Volatile matter..... %	28·9	31·9	39·0	29·6	33·2	39·4	29·0	32·7	40·0	30·0	31·6	40·7
Fixed carbon..... %	40·2	44·6	54·5	39·3	44·0	52·2	40·2	45·4	55·4	37·8	39·6	51·2
Ultimate analysis:—												
Carbon..... %	50·2	55·6	67·9	50·2	56·2	66·8	50·6	57·0	69·6	49·9	52·3	67·6
Hydrogen..... %	6·1	5·6	4·3	6·0	5·4	4·3	6·4	5·7	4·5	6·5	6·2	4·8
Ash..... %	4·8	5·3	6·5	6·3	7·0	8·4	3·4	3·8	4·6	6·0	6·3	8·1
Sulphur..... %	0·2	0·2	0·3	0·2	0·3	0·3	0·2	0·2	0·3	0·2	0·2	0·3
Nitrogen..... %	0·8	0·9	1·1	1·0	1·1	1·3	0·9	1·0	1·2	0·9	1·0	1·2
Oxygen..... %	37·9	32·4	19·9	36·3	30·0	18·9	38·5	32·3	19·8	36·5	34·0	18·0
Calorific value:—												
Calories per gram, gross	4700	5200	6360	4650	5200	6180	4600	5190	6330	4650	4880	6310
B. Th. U. per lb., gross	8460	9360	11440	8370	9360	11130	8280	9340	11400	8370	8790	11350
Fuel ratio.....		1·40			1·30			1·40			1·25	
Carbon-Hydrogen ratio	8·2	10·0	15·8	8·3	10·4	15·4	8·0	9·9	15·4	7·7	8·4	14·1
Coking properties.....	non-coking			non-coking			non-coking			non-coking		
Hoffmann potash test	....			....			....			....		
Location in mine.....	Main southwest entry.			Butt of southwest entry.			Northeast entry.....			Northwest entry.		
Kind of sample.....	Mine.....			Mine.....			Mine.....			Mine.		
Quality of coal.....										Full height of seam.		
Taken by.....	J. G. S. Hudson, Mines Branch.											
Date of sampling	August 14, 1912.											
Remarks.....												

ALBERTA COAL FIELDS.

Cardiff-Namao Area.

Description.	Cardiff Collieries, Ltd., Cardiff. Secs. 13, 24, 25, Tp. 55, R. 25.								
Sample No.	192			273			350		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	0·9	....	....	0·9	....	....	14·7	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	13·6	12·8	....	20·0	19·3	....	21·2	7·6	....
Ash %	5·8	5·9	6·7	8·0	8·1	10·0	7·6	8·9	9·6
Volatile matter %	35·4	35·7	41·0	31·6	31·9	39·5	32·1	37·6	40·7
Fixed carbon %	45·2	45·6	52·3	40·4	40·7	50·5	39·1	45·9	49·7
Ultimate analysis:— Carbon %	57·7	58·2	66·8	52·1	52·6	65·2	51·5	60·4	65·4
Hydrogen %	5·6	5·6	4·7	6·4	6·3	5·1	6·1	5·2	4·7
Ash %	5·8	5·9	6·7	8·0	8·1	10·0	7·6	8·9	9·6
Sulphur %	0·2	0·2	0·3	0·2	0·2	0·3	0·2	0·2	0·2
Nitrogen %	1·1	1·1	1·2	1·1	1·1	1·4	....	....	....
Oxygen %	29·6	29·0	20·3	32·2	31·7	18·0	....	....	....
Calorific value:— Calories per gram, gross	5300	5340	6130	4870	4920	6100	4760	5580	6040
B. Th. U. per lb., gross	9540	9620	11030	8770	8850	10970	8570	10050	10870
Fuel ratio		1·30			1·30			1·20	
Carbon-Hydrogen ratio	10·3	10·5	14·1	8·1	8·4	12·8	8·5	11·6	13·8
Coking properties	non-coking			non-coking			non-coking		
Hoffmann potash test	....			....			....		
Location in mine	....			....			....		
Kind of sample	Mine			Commercial—25 tons			Commercial—25 tons.		
Quality of coal	Exposed to atmosphere for 7 months.			....			....		
Taken by	J. G. S. Hudson, Mines Branch.			Provincial mine inspector.			Provincial mine inspector.		
Date of sampling	August 14, 1912			August 1913. Lab. sample Aug. 29, 1913.			August 1913. Lab. sample March 20, 1914.		
Remarks	....			Both lab. samples taken from same commercial sample.					

ALBERTA COAL FIELDS.

Peace River Area.

Description.	From a 5-ft. seam 5 miles down Peace river from Peace River Crossing.		Prospect tunnel, South Heart river. Near Peace River Crossing.				Outcrop on bank of Heart river near its junction with the Peace river. Sec. 28, Tp. 83, R. 21, W. 5 Mer.	
Sample No.	1002		1157		1158		845	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D
Loss on air-drying %	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	16·0	....	14·2	....	7·9	....	7·6	....
Ash %	18·6	22·1	13·9	15·2	58·2	63·2	51·9	56·2
Volatile matter %	27·4	32·6	28·9	33·7	15·1	16·4	15·3	16·6
Fixed carbon %	38·0	45·3	43·0	50·1	18·8	20·4	25·2	27·2
Ultimate analysis:— Carbon %	....	....	....	....	....	....	....	....
Hydrogen %	....	....	....	....	....	....	....	....
Ash %	....	....	....	....	....	....	....	....
Sulphur %	....	....	....	....	....	....	....	....
Nitrogen %	....	....	....	....	....	....	....	....
Oxygen %	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....
Fuel ratio	1·40		1·50		1·25		1·65	
Carbon-Hydrogen ratio	....	....	....	....	....	....	....	....
Coking properties	non-coking		non-coking		non-coking		non-coking	
Hoffmann potash test	....		....		....		....	
Location in mine			Top coal		Bottom coal			
Kind of sample			Prospect		Prospect			
Quality of coal	Does not include 3-inch seam of carbonised shale							
Taken by	Private individual at Grande Prairie.		F. H. McLearn, Geological Survey.		F. H. McLearn.			
Date of sampling	1917.		Summer of 1917.		1917.		1916.	
Remarks								

ALBERTA COAL FIELDS.

Peace River Area.

Description.	Errington claim, Hay River.				MacConnachie claim, Hay river. 100-ft. seam. Sec. 2, Tp. 53, R. 5, W. 6 Mer.		Claim of A. Joachim on Smoky river. Sec. 24, Tp. 56, R. 9, W. 6 Mer.	
	From 18-ft. seam Sec. 24, Tp. 52, R. 4, W. 6 Mer.		From Sec. 27, Tp. 52, R. 4, W. 6 Mer.					
Sample No.	890		891		892		896	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D
Loss on air-drying %	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—								
Moisture %	1·1	....	2·9	....	1·9	....	1·3	....
Ash %	16·3	16·5	16·6	17·1	13·1	13·4	2·5	2·6
Volatile matter %	24·0	24·3	23·6	24·3	26·2	26·7	16·9	17·1
Fixed carbon %	58·6	59·2	56·9	58·6	58·8	59·9	79·3	80·3
Ultimate analysis:—								
Carbon %	....	....	....	....	....	....	....	....
Hydrogen %	....	....	....	....	....	....	....	....
Ash %	....	....	....	....	....	....	....	....
Sulphur %	....	....	....	....	....	....	....	....
Nitrogen %	....	....	....	....	....	....	....	....
Oxygen %	....	....	....	....	....	....	....	....
Calorific value:—								
Calories per gram, gross	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....
Fuel ratio	2·45		2·40		2·25		4·70	
Carbon-Hydrogen ratio	....	....	....	....	....	....	....	....
Coking properties	small lump of dense hard coke.		non-coking		non-coking		non-coking	
Hoffmann potash test	....		....		....		....	
Location in mine								
Kind of sample	Prospect.							
Quality of coal								
Taken by	J. MacVicar, Geological Survey, Ottawa.							
Date of sampling	Summer of 1916.							
Remarks								

ALBERTA COAL FIELDS.

Peace River Area

Description.	Abbot claim. Between 15th base line and Grand Cache lake. Sec. 4, Tp. 57, R. 7, W. 6 Mer.		Isenberg claim on Smoky river. 17-ft. seam. Sec. 15, Tp. 58, R. 8, W. 6 Mer.		Moberly claim on Sheep creek. Sec. 4, Tp. 58, R. 9, W. 6 Mer.		Campbell claim on Sheep creek. Sec. 9. Tp. 58, R. 9, W. 6 Mer.	
Sample No	893		897		895		894	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D
Loss on air-drying %	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—								
Moisture %	1·1	....	1·4	....	1·3	....	1·3	....
Ash %	5·3	5·3	3·0	3·0	3·0	3·0	3·1	3·2
Volatile matter %	23·0	23·3	19·5	19·8	17·0	17·2	17·4	17·6
Fixed carbon %	70·6	71·4	76·1	77·2	78·7	79·8	78·2	79·2
Ultimate analysis:—								
Carbon %	....	....	....	....	....	....	....	....
Hydrogen %	....	....	....	....	....	....	....	....
Ash %	....	....	....	....	....	....	....	....
Sulphur %	....	....	....	....	....	....	....	....
Nitrogen %	....	....	....	....	....	....	....	....
Oxygen %	....	....	....	....	....	....	....	....
Calorific value:—								
Calories per gram, gross	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....
Fuel ratio	3·05		3·90		4·65		4·50	
Carbon-Hydrogen ratio	....	....	....	....	....	....	....	....
Coking properties	forms good coke		agglomerates slightly		non-coking		non-coking	
Hoffmann potash test	....		....		....		....	
Location in mine								
Kind of sample	Prospect.							
Quality of coal								
Taken by	J. MacVicar, Geological Survey.							
Date of sampling	Summer of 1916.							
Remarks								

ALBERTA COAL FIELDS.

Peace River Area.

Description.	Brown's stripping pit, Red Willow creek, Halcourt. Sec. 21, Tp. 70, R. 10, W. 6 Mer.			Ray's mine, Red Willow creek, Halcourt. Sec. 25, Tp. 70, R. 11, W. 6 Mer.			Dunlop's mine, Spring creek, Grand Prairie. Sec. 35, Tp. 70, R. 7, W. 6 Mer.		
Sample No	874			833			832		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	1·6	....	....	1·8	....	....	3·3	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	11·8	10·4	....	12·3	10·7	....	17·5	14·6	....
Ash %	3·7	3·8	4·2	4·0	4·1	4·5	5·7	5·9	6·9
Volatile matter %	31·5	32·0	35·7	31·2	31·7	35·6	30·0	31·0	36·3
Fixed carbon %	53·0	53·8	60·1	52·5	53·5	59·9	46·8	48·5	56·8
Ultimate analysis:— Carbon %	67·0	68·0	75·9	66·7	67·9	76·1	59·5	61·5	72·1
Hydrogen %	5·7	5·6	4·9	5·7	5·6	4·9	5·8	5·6	4·7
Ash %	3·7	3·8	4·2	4·0	4·1	4·5	5·7	5·9	6·9
Sulphur %	0·3	0·3	0·4	0·4	0·4	0·5	0·4	0·4	0·4
Nitrogen %	1·7	1·8	2·0	1·8	1·8	2·0	1·5	1·5	1·8
Oxygen %	21·6	20·5	12·6	21·4	20·2	12·0	27·1	25·1	14·1
Calorific value:— Calories per gram, gross	6470	6570	7340	6500	6610	7410	5710	5910	6930
B. Th. U. per lb., gross	11650	11830	13210	11700	11910	13330	10290	10640	12470
Fuel ratio		1·70			1·70			1·55	
Carbon-Hydrogen ratio	11·8	12·2	15·5	11·8	12·2	15·6	10·3	11·0	15·5
Coking properties	non-coking			non-coking			non-coking		
Hoffmann potash test	4			5–4			3–2		
Location in mine	No. 1 seam			No. 1 seam			Entrance to drift.		
Kind of sample	Mine			Mine			Mine.		
Quality of coal	Bone coal left out of sample.			....			Bone coal left out of sample.		
Taken by	J. A. Richards, provincial mine inspector.								
Date of sampling	September 20 to 23, 1916.								
Remarks									

MISCELLANEOUS SAMPLES.

ALBERTA NATURAL GAS.

Sample No. 345.

Natural Gas from the Canadian Western Natural Gas, Light, Heat & Power Co., Calgary.

Analysis:

Oxygen	0·2%
Methane	91·6%
Nitrogen	8·2%

Density:

0·595%

Calorific Value:—Gross—per cu. ft. of dry gas, at 60° F. and 30 inches of mercury = 946 B. Th. U.

There is no evidence that the gas contains appreciable quantities of unsaturated hydrocarbons, and it is therefore a "dry" gas.

Sample received from above named company on March 9th, 1914.

Sample No. 815.

Natural Gas.—From the Pelican well, situated on Athabaska river 90 miles below Athabaska Landing.

Analysis:

Carbon Dioxide	1·0%
Oxygen	2·9%
Methane	83·5%
Nitrogen	12·6%

Calorific Value:—Gross—(Calculated from results of analysis) Per cu. ft. dry gas at 60° F. and 30 inches mercury. 850 B. Th. U.

Sample taken by F. H. McLearn of the Geological Survey during July 1916.

Sample No. 825,

Natural Gas.—From a spring on Tar Island in Peace river, 25 miles below Peace River Crossing.

Analysis:

Carbon Dioxide	1·8%
Oxygen	3·7%
Methane	77·2%
Nitrogen	17·3%

Density:

0·670

Calorific Value:—Gross—(Calculated from results of analysis) per cu. ft. dry gas at 60° F. and 30 inches mercury. 785 B. Th. U.

Sample taken by Chas. Camsell of the Geological Survey, Sept. 18th, 1916.

ALBERTA OIL.

Sample No. 401.

Crude oil from Dingman No. 1 well.

The oil was of a yellow colour, showed fluorescence and was practically free from any sediment. It possessed a strong unpleasant odour.

Specific Gravity:
At 15·5° C. 0·756.

Distillation Test:
Distillation carried out in Engler apparatus—intermittent method.
First drop distilled at 76° C.

Temperature.	% by volume.	Specific gravity.	Colour of distillate.
76°–100°	14·4	·702	Yellow.
100°–120°	28·3	·729	Orange.
120°–140°	19·3	·746	"
140°–160°	11·3	·760	Yellow.
160°–180°	7·0	·774	Pale yellow.
180°–200°	4·3		
200°–220°	3·4	·791	Almost colourless.
220°–250°	2·8		
Residue	6·6	·874	Dark brown.
Loss	2·6		

Specific gravity calculated from above test 0·752.

Sulphur: 0·10%

Sample received from Calgary Petroleum Products Company, Oct. 30th, 1914.

Sample No. 402.

Gasoline from Dingman No. 1 well.

The gasoline was of a pale yellow colour, deposited a white sediment on standing, and had a strong, unpleasant odour.

Specific Gravity:

At 15·5° C. 0·700.

Distillation Test: Engler apparatus—intermittent method.
First drop distilled at 53° C.

Temperature.	% by volume	Specific gravity.
53°- 70°	32·5	·670
70°- 80°	21·2	·690
80°- 90°	15·5	·707
90°-100°	11·1	·719
100°-120°	9·8	·737
120°-140°	3·4	·735
140°-160°	1·7	·754
160°-180°	0·7	
180°-200°	0·7	
Residue	1·8	·80 (approximately).
Loss	1·6	

The various fractions were colourless, and the residue a dark brown liquid.

Specific gravity calculated from above test 0·699.

Sulphur: 0·11%

Sample received from Calgary Petroleum Products Company, Oct. 30th, 1914.

Sample No. 530.

Crude oil from a well on Sec. 18, Tp. 49, R. 24, W. of 4 Mer., at a depth of 800 ft.

The oil was very dark in colour.

Specific Gravity:

At 15·5° C. 0·829.

Distillation Test: Engler apparatus—intermittent method.

First drop distilled at 128° C.

Temperature.	% by volume.	Specific gravity.	Colour.
128°-150°	1·0	0·718	Colourless.
150°-200°	24·8		
200°-250°	25·4	0·804	Yellow.
250°-300°	17·8	0·832	Orange-yellow.
Residue	30·0		Black.
Loss	1·0		

The tests show that the oil is a crude petroleum of normal composition, but give no indication of its original source.

Sample received from Hon. Frank Oliver, February 10, 1915.

Sample No. 924.

Crude Oil or Tar from McMurray district.
The oil is almost black, and very viscous at ordinary temperatures.

Filtration and Distillation: continuous method.

Vegetable and earthy matter	13·7%	
Water	16·5%	
Up to 170° C. (770 m.m. pressure)	1·3%	Burning oils.
170°-250° (420 m.m. pressure)	3·7%	
Asphalt	64·8%	

The asphalt is soluble in carbon bisulphide, and flows slowly at ordinary temperatures.

Sample received from a private individual, January 18, 1917.

Sample No. 1156.

Crude Oil.—Said to be from No. 1 well, Peace River Oil Co., on Peace river.

N.E. ¼ Sec. 24, Tp. 85, R. 21 W. 5 Mer.

The oil is dark coloured and viscous, with an odour resembling that of kerosene.

Specific Gravity:
At 15·5° C. 0·981

Distillation Tests:

Temperature.	Method "A"* Continuous.	Method "B"* Intermittent.
	% by volume.	% by volume.
Below 150° C	0·1	2·0
150°–200° C	1·7	4·8
200°–250° C	3·6	5·3
250°–300° C	10·7	56·2
300°–325° C	....	5·2
Residue and loss	83·9	26·5

The above results, especially those by method "B," were distinctly affected by "cracking."*

Sample received from private individual, Nov. 8, 1917.

Sample No. 1293.

Crude oil from No. 2 well, Peace River Oil Co., at a depth of 980 feet.

Specific Gravity:

At 15·5° C. 0·978.

Distillation Tests:

Temperature.	Method "A"*		Method "B"*		Method "C"*	
	% by volume.	Sp. Gr. at 15·5° C.	% by volume.	Sp. Gr. at 15·5° C.	% by volume.	Sp. Gr. at 15·5° C.
0°–150° C	0·4	....	0·9	....	1·8	0·75
150°–200° C	1·5	0·74	1·8	0·75	1·2	0·80
200°–250° C	2·9	0·82	8·6	0·86	5·5	0·84
250°–300° C	11·7	0·882	52·8	0·880	30·7	0·884
Residue	84·2	0·996	40·7	1·07	62·5	1·03
Gain	0·7	....	4·8	....	1·7	....
Specific gravity of crude oil calculated from above results	....	0·972	....	0·944	....	0·967

The above results, especially those by method "B," were distinctly affected by "cracking."*

Sample taken by F. H. McLearn, Geological Survey, Ottawa, October 13, 1917.

* See Appendix.

Sample No. 1218.

Crude Petroleum.—From right bank of Peace river, 14 miles below town of Peace River, at a depth of 900 ft.

The oil was black and very viscous, with an odour resembling that of kerosene.

Specific Gravity:

At 15·5° C. 0·987.

Distillation Tests: continuous method (in 500 c.c. flask).

Temperature.	% by volume.	Nature of product.
0°-100° C.	3·5	Water.
100°-150°	....	
150°-300°	10·4	Illuminating oils.
Residue	86·1	Lubricating oils, coke, etc.

A further distillation at temperatures above 300°, to obtain lubricating oils, gave a yield equivalent to 53% of the original weight of crude oil.

General Analysis:

Paraffin wax	0·9%
Asphalt (insoluble in alcohol and ether)	8·4%
Sulphur	4·0%
Impurities (mineral matter)	1·5%

Sample collected by F. H. Kitto, Natural Resources Intelligence Branch, Department of the Interior, during the summer of 1917.

Sample No. 823.

Crude Petroleum from McArthur well on Peace river, 17 miles below Peace River Crossing.

The oil was dark and viscous, with an odour resembling that of kerosene.

Solubility: In Benzene—Practically complete.
In Gasoline—5% insoluble.
In Alcohol—Ether—Considerable insoluble matter.

Specific Gravity:

At 15·5° 0·984

Flash Point: (Closed Test) 59°C

Fire Point: 127°C

Calorific Value: Gross 9730 calories per gram.
17520 B. Th. U. per lb.

Preliminary Distillation: under reduced pressure.

—	% by volume.	% by weight.	Specific gravity.
Oil distillate	73·9	67·7	0·902
Pitch residue	....	23·0	.....
Water and loss	....	9·3	.....

Fractional Distillation of above Oil Distillate—intermittent method.
First drop at 140°C.

		Sp. Gr.
140°–150°	Gasoline and kerosene, 2% by volume (1·5% crude oil)	0·642
150°–300°	Illuminating Oils, etc., 32·5% by volume (24·0% crude oil)	0·834
Residue	Lubricating Oils, etc., 65·5% by volume (48·4% crude oil)	

Sample taken by Chas. Camsell of the Geological Survey, September 18, 1916.

OIL FROM NORTHWEST TERRITORIES.

Sample No. 824.

Crude Petroleum from Pointe aux Esclaves, Great Slave lake.
The oil was dark and viscous, with an odour resembling that of kerosene.

Specific Gravity:

At 15·5°C..... 0·957

Calorific Value: Gross— 10040 calories per gram.
18070 B. Th. U. per lb.

Sulphur:

1·0%

Preliminary Distillation: under reduced pressure.
Oil Distillate (sp. gr. 0·888) 60% by weight and 64·5 by volume of crude oil.

Fractional Distillation of Oil Distillate: intermittent method.
First drop at 178°C.

178°–300°C. Illuminating Oils, etc., 23% by volume (14·9% crude oil) sp. gr. 0·835.
Residue—Lubricating Oils, etc., 77% by volume (49·6% crude oil).

Sample collected by Chas. Camsell, of the Geological Survey in August 1916.

Sample No. 1292.

Crude Oil from Windy point, Great Slave lake.

Specific Gravity:

At 15·5°C..... 0·949

Distillation Tests:

Temperature.	Method "A"*		Method "B"*	
	% by volume.	Sp. Gr. at 15·5° C.	% by volume.	Sp. Gr. at 15·5° C.
0°–150° C.....	0·9	....	0·9	....
150°–200° C.....	0·2	....	0·1	....
200°–250° C.....	0·1	....	1·1	0·85
250°–300° C.....	14·2	0·871	46·9	0·863
Residue.....	84·6	0·956	47·2	0·983
Loss.....	0·0	....	3·8	....
Specific gravity of crude oil calculated from above results.....	....	0·940	....	0·921

The above results, especially those by method "B," were distinctly affected by "cracking."*

Sample taken by A. E. Cameron, Geological Survey, Ottawa, during the summer of 1917.

* See Appendix.

APPENDIX.

Distillation Tests of Crude Petroleum and its Products.

Crude Petroleum. Many methods of distillation are in common use, the most important of these being as follows:—

A. The Ubbelohde continuous method. 100 c.c. of the oil is distilled at a uniform rate, from a distillation flask of approximately the same dimensions as the standard Engler flask, by the continuous application of heat; the various fractions being collected between specified temperatures.

B. The Engler intermittent method. 100 c.c. of the oil is distilled from a glass distillation flask of specified dimensions (about 150 c.c. capacity). When the thermometer indicates the maximum temperature for the first fraction, the source of heat is removed and the temperature allowed to fall at least 20°C., the flask is then reheated to the maximum of the fraction. This process is repeated until practically no more distillate is obtained. The succeeding fractions are collected in like manner.

C. The Hempel continuous fractionation method. 100 c.c. of the oil is distilled from a flask with a fractionating column attached. The column is filled with beads, preferably aluminium, and the distillation is carried out at a uniform rate by continuous heating.

A crude oil, especially when it contains a notable amount of water, may give so much trouble with bumping and frothing that it is impossible to make a regular test on the original sample. It is then customary to make a preliminary distillation, preferably under reduced pressure at the higher temperatures, and redistil the distillate in the regular way. The results are not strictly comparable with those on original samples.

The following table[1] illustrates the discrepancies between the results obtained with two of the above methods:—

TABLE I.

Method.	A. Continuous.	B. Intermittent.
To 150° C.	5·2	9·5% by volume
150°–300° C.	32·3	32·7
Above 300° C.	56·0	52·9

From theoretical reasons it is clear that wide discrepancies must occur between the results of the different methods and the actual composition of the mixture distilled. Method C normally gives the closest results, but is little used and has less claim than the others to be regarded as standard. Method B generally gives closer results than A, especially for the lower fractions, but is very slow. Method A gives more concordant results between duplicate tests. In some cases neither B nor C can be used on account of the low temperature at which "cracking" begins. "Cracking" is the name given to the decomposition by heat of hydrocarbon or other compounds into new bodies of lower molecular weight and

[1] Rittmann & Dean: The Analytical Distillation of Petroleum, U.S. Bureau of Mines, Bul. 125, p. 8.

lower boiling point. Rittmann & Dean [1] found that California, Oklahoma, and Pennsylvania crude petroleums do not begin to crack below 325°C., but some careful tests with samples 1156, 1292 and 1293 (see pages 62, 63, and 66) showed that considerable cracking occurred with these oils below 300°C. In these cases the divergence between the results of the different methods was very considerable.

Petroleum Products. The International Petroleum Congress in 1912 officially adopted the Ubbelohde continuous method, but many modifications are in common use. These vary in the rate of heating, position of thermometer bulb, employment of a still head, etc. Thus in Dean's modification [2] the distillation rate is 4–5 c.c. per minute, and the condenser is ice-jacketed. Some results taken from Lomax [3] illustrate the variations to be expected in the results on gasoline with the method employed.

TABLE II.

Method.	1	2	3
Volatile below 100° C	8·5	17·0	21·5% by volume
" 125° C	58·0	64·5	64·0
" 150° C	88·5	92·0	90·5
Total distillate	98·5	98·5	97·5
Residue	1·4	1·2	2·1
Loss	0·1	0·3	0·4

Method 1: Redwood, continuous. Method 2: Engler, intermittent (slightly modified). Method 3: Lomax, fractionating, continuous.

Most samples of oil, whether crude or refined, examinedi n the Fuel Testing Laboratories at Ottawa, were distilled in an Engler apparatus, having a metal flask and condenser, either by the continuous or intermittent method as stated.

[1] Rittmann & Dean: The Analytical Distillation of Petroleum, U.S. Bureau of Mines, Bul. 125, p. 14.

[2] Motor Gasoline, by E. W. Dean, U.S. Bureau of Mines, Tech. Paper 166.

[3] Testing and Standardization of Motor Fuels. The Petroleum World, Vol. XIV, No. 206, Nov. 1917.