

GEOLOGICAL SURVEY OF CANADA
ROBERT BELL, M.D., Sc.D. (CANTAB), LL.D., F.R.S.

MINERAL RESOURCES OF CANADA

COAL

*Reprint of Article in Annual Report of the Section of Mines for 1902,
Part 3, Vol. XV.*



OTTAWA

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GEOLOGICAL SURVEY OF CANADA,

OTTAWA, January 9, 1904. •

To Dr. ROBERT BELL, L.L.D., F.R.S., &c.,
Acting Director.

SIR:—The following pamphlet dealing with the coal industry and coal-fields of Canada is reprinted from the Annual Report of the Mines Section for 1902, constituting Part S. Vol. XV, N.S., of the Annual Report of the Geological Survey Department.

Pursuant to a policy suggested some years ago and now carried out with your permission, this report is one of a series of similar bulletins intended to give in condensed and popular form, information regarding the mineral resources and possibilities of the country, together with any data regarding similar occurrences in other countries where such would seem to be of use to prospectors and operators in Canada.

I am, sir,
Your obedient servant,

ELFRIC DREW INGALL,
Mining Engineer in Charge.

MINES SECTION.

EXPLANATORY NOTE.

A number of special articles relating to the mineral industries and resources of Canada have appeared from time to time in the various reports of the Mines Section issued annually since 1897.

In these the aim has not been to write up the subject dealt with in great detail, but more particularly to meet the demand for precise descriptions serving to give the general public clear ideas of the important and salient features of given industries and mineral districts, together with references to the literature of the subject, so that anyone so desiring could pursue the subject in greater detail.

THE COAL MINING INDUSTRY OF CANADA.

The principal coal-bearing areas at present worked in Canada are the Nova Scotia coal-fields in rocks of Carboniferous age, the Cretaceous coals of Vancouver island and the more recently opened fields of the Crows Nest Pass B.C., also found in the Cretaceous rocks.* In Alberta, mining is being done in several different areas, Canmore, Lethbridge and Frank being the chief centres of activity. Small quantities of coal, likewise of Cretaceous age, are mined in the vicinity of Edmonton. Lignite of good quality is mined in the Souris river district, Assiniboia, and during the past two years small amounts have been mined in the Yukon district.

The total production of coal in 1902 was 7,193,142 tons (of 2,000 lbs.) valued at \$14,478,181, constituted as follows:—

	Tons.
Bituminous and lignite	7,176,592
Anthracite	16,550

The anthracite coal was mined in the Cascade Coal Basin, Alberta, the mine being situated at Anthracite on the main line of the Canadian Pacific Railway.

Compared with the previous year, the production of coal in Canada in 1902 shows an increase of 965,790 tons or over 15 per cent in quantity and \$2,472,616 or over 20 per cent in value.

The output is the largest that has yet been attained in Canada and is over twice the production of seven years ago.

Statistics of production are given in Tables 1, 2 and 3, following:—

TABLE 1.

COAL.

PRODUCTION BY PROVINCES, 1900, 1901 and 1902.

Production.

Province.	1900.		1901.		1902.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia	3,623,536	\$ 8,088,250	4,158,068	\$ 6,496,982	5,161,316	\$ 9,216,636
British Columbia	1,623,180	4,347,804	1,660,515	4,447,809	1,534,902	4,111,344
North-west Territories including Yukon	351,950	839,375	391,139	1,008,917	478,129	1,110,521
New Brunswick.	10,000	15,000	17,630	51,857	18,795	39,680
Total	5,608,666	13,290,429	6,227,352	12,005,565	7,193,142	14,478,181

* A commencement has been made in coal mining in the Nicola district, B.C.

COAL.
Production.

TABLE 2.
COAL.
PRODUCTION. COMPARISON OF 1901 AND 1902.

Province.	INCREASE OR DECREASE.			
	Tons.	Per cent.	Value. \$	Per cent.
Nova Scotia	<i>i</i> 1,003,248	<i>i</i> 24·13	<i>i</i> 2,719,654	<i>i</i> 41·86
British Columbia.....	<i>d</i> 125,613	<i>d</i> 7·56	<i>d</i> 336,465	<i>d</i> 7·56
North-west Territories including Yukon.....	<i>i</i> 86,990	<i>i</i> 22·24	<i>i</i> 101,604	<i>i</i> 10·07
New Brunswick.....	<i>i</i> 1,165	<i>i</i> 6·61	<i>d</i> 12,177	<i>d</i> 23·49
Dominion.....	<i>i</i> 965,790	<i>i</i> 15·51	<i>i</i> 2,472,616	<i>i</i> 20·59

i Increase. *d* Decrease.

TABLE 3.
COAL.
ANNUAL PRODUCTION SHOWING THE INCREASE OR DECREASE EACH YEAR

Calendar Year.	Tons.	Value.	Average Value per Ton.	Increase (<i>i</i>) or Decrease (<i>d</i>) in Tonnage.	Incr. (<i>i</i>) or Decr. (<i>d</i>) per cent.
1886.....	2,116,653	\$3,739,840	\$1 77		
1887.....	2,429,330	4,388,206	1 81	<i>i</i> 312,677	<i>i</i> 14·8
1888.....	2,602,552	4,674,140	1 80	<i>i</i> 173,222	<i>i</i> 7·1
1889.....	2,658,303	4,894,287	1 84	<i>i</i> 55,751	<i>i</i> 2·1
1890.....	3,084,682	5,676,247	1 84	<i>i</i> 426,379	<i>i</i> 16·0
1891.....	3,577,749	7,019,425	1 96	<i>i</i> 493,067	<i>i</i> 16·0
1892.....	3,287,745	6,363,757	1 94	<i>d</i> 290,004	<i>d</i> 8·1
1893.....	3,783,499	7,359,080	1 95	<i>i</i> 495,754	<i>i</i> 15·1
1894.....	3,847,070	7,429,468	1 93	<i>i</i> 63,571	<i>i</i> 1·7
1895.....	3,478,344	6,739,153	1 94	<i>d</i> 368,726	<i>d</i> 9·6
1896.....	3,745,716	7,226,462	1 93	<i>i</i> 267,372	<i>i</i> 7·7
1897.....	3,786,107	7,303,597	1 93	<i>i</i> 40,391	<i>i</i> 1·1
1898.....	4,172,582	8,222,878	1 97	<i>i</i> 386,475	<i>i</i> 10·2
1899.....	4,925,051	10,283,497	2 09	<i>i</i> 752,469	<i>i</i> 18·0
1900.....	5,608,666	13,290,429	2 37	<i>i</i> 683,615	<i>i</i> 13·9
1901.....	6,227,352	12,005,565	1 93	<i>i</i> 618,686	<i>i</i> 11·04
1902.....	7,193,142	14,478,181	2 01	<i>i</i> 965,790	<i>i</i> 15·51

Million
Tons

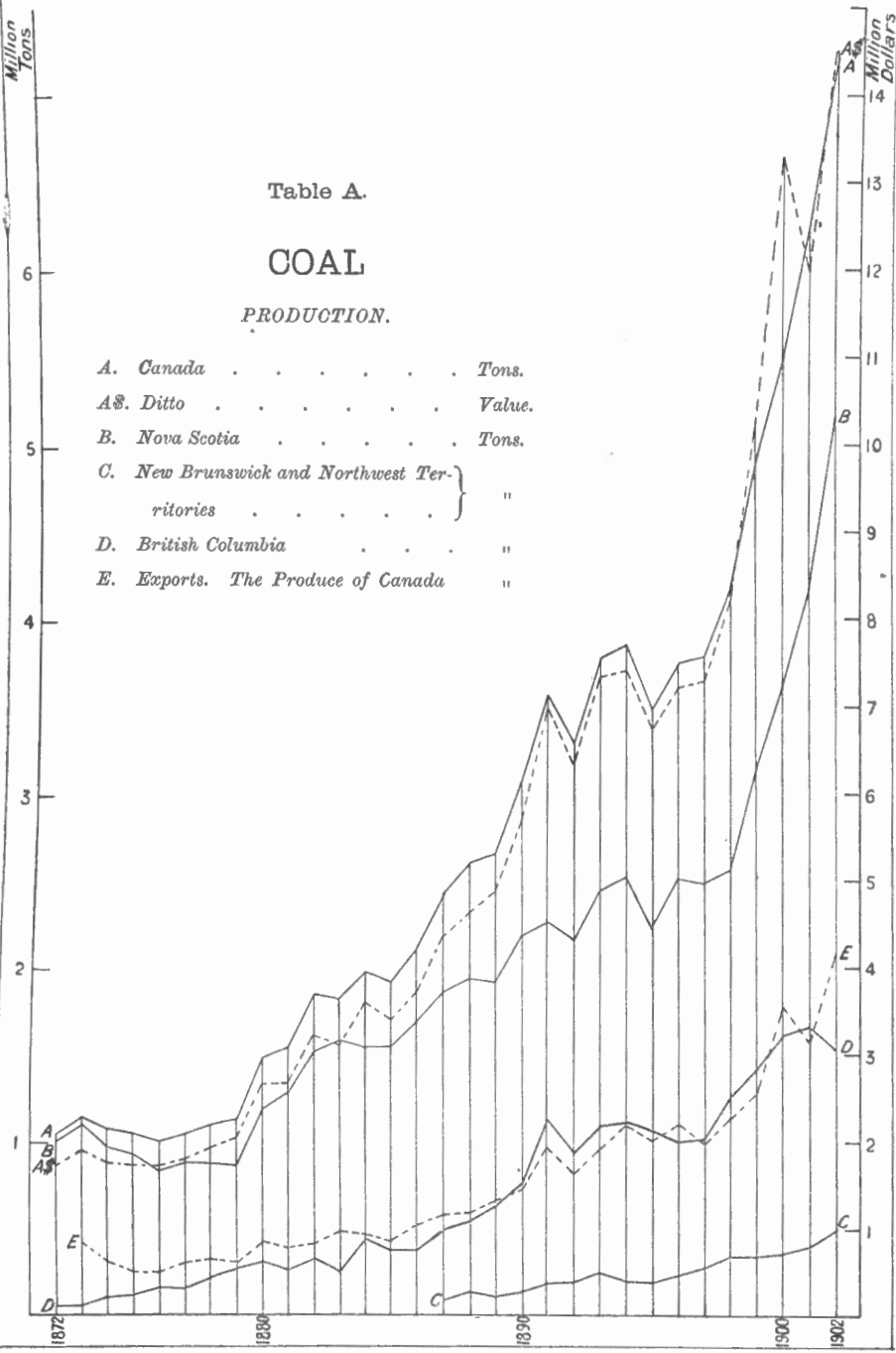
Million
Dollars

Table A.

COAL

PRODUCTION.

- A. Canada Tons.
- A\$. Ditto Value.
- B. Nova Scotia Tons.
- C. New Brunswick and Northwest Ter-
ritories } "
- D. British Columbia "
- E. Exports. The Produce of Canada "



COAL.

The percentage of production to be credited to the several provinces at various periods since 1874 is shown in the following table:—

Province.	1874.	1880.	1890.	1898.	1899.	1900.	1901.	1902.
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.
Nova Scotia.....	91	79	71	61.4	63.9	64.6	66.8	71.8
British Columbia.....	8	20	25	30.3	29.0	28.9	25.7	21.3
Northwest Territories } ..	.....	.....	4	8.3	7.1	6.5	6.5	6.9
New Brunswick.								

Statistics of exports and imports are given in the following five tables:

TABLE 4.

COAL.

EXPORTS.

Exports.

CALENDAR YEAR.	PRODUCE OF CANADA.	NOT PRODUCE.	CALENDAR YEAR.	PRODUCE OF CANADA.	NOT PRODUCE.
	Tons.	Tons.		Tons.	Tons.
1873.....	420,683	5,403	1888.....	588,627	84,316
1874.....	310,988	12,859	1889.....	665,315	89,294
1875.....	250,348	14,026	1890.....	724,486	82,534
1876.....	248,638	4,995	1891.....	971,259	77,827
1877.....	301,317	4,829	1892.....	823,733	93,988
1878.....	327,959	5,468	1893.....	960,312	102,827
1879.....	306,648	8,468	1894.....	1,103,694	89,786
1880.....	432,188	14,217	1895.....	1,011,235	96,836
1881.....	395,382	14,245	1896.....	1,106,661	116,774
1882.....	412,682	37,576	1897.....	986,130	101,848
1883.....	486,811	44,388	1898.....	1,150,029	99,189
1884.....	474,405	62,665	1899.....	1,293,169	101,004
1885.....	427,937	71,003	1900.....	1,787,777	62,776
1886.....	520,703	78,443	1901.....	1,573,661	53,894
1887.....	580,965	89,098	1902.....	2,090,268	23,453

TABLE 5.
COAL.
EXPORTS.—NOVA SCOTIA AND BRITISH COLUMBIA.

COAL.

Exports.

Calendar Year.	Nova Scotia.		*British Columbia.	
	Tons.	Value.	Tons.	Value.
1874.....	252,124	\$647,539	51,001	\$ 278,180
1875.....	179,626	404,351	65,842	356,018
1876.....	126,520	263,543	116,910	627,754
1877.....	173,389	352,453	118,252	590,263
1878.....	154,114	293,795	165,734	693,870
1879.....	113,742	203,407	186,094	608,845
1880.....	199,552	344,148	219,878	775,008
1881.....	193,081	311,721	187,791	622,965
1882.....	216,954	390,121	179,552	628,437
1883.....	192,795	336,088	271,214	946,271
1884.....	222,709	430,330	245,478	901,440
1885.....	176,287	349,650	250,191	1,000,764
1886.....	240,459	441,693	274,466	960,649
1887.....	207,941	390,738	356,657	1,262,552
1888.....	165,863	330,115	405,071	1,605,650
1889.....	186,608	396,830	470,683	1,918,263
1890.....	202,387	426,070	508,882	1,977,191
1891.....	194,867	417,816	767,734	2,958,695
1892.....	181,547	407,980	599,716	2,317,734
1893.....	203,198	470,695	708,228	2,693,747
1894.....	310,277	633,398	770,439	2,855,216
1895.....	241,091	534,479	728,283	2,692,562
1896.....	380,149	787,270	679,799	2,507,752
1897.....	307,128	642,754	630,341	2,221,737
1898.....	309,153	629,363	813,843	2,948,428
1899†.....	459,260	827,941	781,809	2,947,369

*See foot-note, table 16.

†Since 1899, exports by provinces have not been published in Trade and Navigation Report.

COAL.

Imports of
bituminous.

TABLE 6.

COAL.
IMPORTS OF BITUMINOUS COAL.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
1880.....	457,049	\$1,220,761	1892.....	1,615,220	\$4,099,221
1881.....	587,024	1,741,568	1893.....	1,603,154	3,967,764
1882.....	636,374	1,992,081	1894.....	1,359,509	3,315,094
1883.....	911,629	2,996,198	1895.....	1,444,928	3,321,387
1884.....	1,118,615	3,613,470	1896.....	1,538,489	3,299,025
1885.....	1,011,875	3,197,539	1897.....	1,543,476	3,254,217
1886.....	930,949	2,591,554	1898.....	1,684,024	3,179,595
1887.....	1,149,792	3,126,225	1899.....	2,171,358	3,691,946
1888.....	1,231,294	3,451,661	1900.....	2,439,764	4,310,964
1889.....	1,248,540	3,255,171	1901.....	2,516,392	4,956,025
1890.....	1,409,282	3,528,959	1902*.....	3,047,392	5,712,058
1891.....	1,598,855	4,060,896			

*Duty, 53c. per ton.

Imports of
anthracite.TABLE 7.
COAL.
IMPORTS OF ANTHRACITE COAL.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
1880.....	516,729	\$1,509,960	1892.....	1,479,106	\$5,640,346
1881.....	572,092	2,325,937	1893.....	1,500,550	6,355,285
1882.....	638,273	2,666,356	1894.....	1,580,522	6,354,040
1883.....	754,891	3,344,936	1895.....	1,404,342	5,350,627
1884.....	868,000	3,831,283	1896.....	1,574,355	5,667,096
1885.....	910,324	3,909,844	1897.....	1,457,295	5,695,168
1886.....	995,425	4,028,050	1898.....	1,460,701	5,874,685
1887.....	1,100,165	4,423,062	1899.....	1,745,460	6,490,509
1888.....	†2,138,627	5,291,875	1900.....	1,654,401	6,602,912
1889.....	1,291,705	5,199,481	1901.....	1,933,283	7,923,950
1890.....	1,201,335	4,595,727	1902*.....	1,652,451	7,021,939
1891.....	1,399,067	5,224,452			

*Coal anthracite, and anthracite coal dust. Duty free.

†In Table 7, Imports of Anthracite Coal, a very considerable increase will be noticed in 1888 over 1887, an increase of over ninety-four per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888 and 1889, were \$4.02, \$2.47 and \$4.03 respectively. Although a duty of fifty cents per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation Report, no explanation is available.

TABLE 8.
COAL.
IMPORTS OF COAL DUST.

COAL.

Imports of
dust.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
1880.....	3,565	\$ 8,877	1892.....	82,091	\$39,840
1881.....	337	666	1893.....	109,585	44,474
1882.....	471	900	1894.....	117,573	49,510
1883.....	8,154	10,082	1895.....	181,318	52,221
1884.....	12,782	14,600	1896.....	210,386	53,742
1885.....	20,185	20,412	1897.....	225,562	59,609
1886.....	36,230	36,996	1898.....	229,445	45,556
1887.....	31,401	33,178	1899.....	276,547	44,717
1888.....	28,808	34,730	1900.....	330,174	98,349
1889.....	39,980	47,139	1901.....	414,432	275,559
1890.....	53,104	29,818	1902*.....	489,548	264,550
1891.....	60,127	36,130			

*Duty, 20 p. c., not over 13c. per ton.

An approximation of the consumption of coal in Canada sufficiently accurate for purposes of comparison may be made as follows, if we assume the figures of imports for the fiscal year to represent closely enough the importation during the calendar year.

	Tons.	Tons.
Production, Table 3.....	7,193,142	
Exports of coal the produce of Canada, Table 4	2,090,268	
	<hr/>	
Home consumption of Canadian coal.....		5,102,874
Imports of bituminous, anthracite and coal dust Tables 6, 7 and 8.....	5,189,391	
Exports of coal not the product of Canada....	23,453	
	<hr/>	
Home consumption of imported coal.....		5,165,938
		<hr/>
Total consumption of coal in Canada, home and imported.....		10,268,812

Table 9 embodies similar calculations for each year since 1886. Therein is shown the consumption of Canadian and imported coal and the percentage of each as well as the total production per capita. It will be seen that not only the total consumption, but the consumption per capita also has been steadily increasing.

It will be observed too that the proportion of the consumption mined in Canada was greater in 1902 than in any previous year.

An examination of the relation of the total production in Canada, to the amount of coal consumed in the country shows, that in 1902

COAL.

the production amounted to over 70 per cent of the consumption as compared with 65.8 per cent in 1901 and 68.5 per cent in 1900. In 1890 the proportion was 62.4 per cent, and in 1886, 60.8 per cent.

TABLE 9.

COAL.

Consumption.

CONSUMPTION OF COAL IN CANADA.

Calendar Year.	Canadian.	Imported.	Total.	Percentage Canadian.	Percentage Imported.	Consumption per capita.
	Tons.	Tons.	Tons.			Tons.
1886.....	1,595,950	1,884,161	3,480,111	45.9	54.1	.758
1887... ..	1,848,365	2,192,260	4,040,625	45.7	54.3	.871
1888.....	2,013,925	3,314,353	5,328,278	37.8	62.2	1.137
1889.....	1,992,988	2,490,931	4,483,919	44.4	55.6	.946
1890.....	2,360,196	2,581,187	4,941,383	47.8	52.2	1.031
1891.....	2,606,490	2,980,222	5,586,712	46.7	53.3	1.153
1892.....	2,464,012	3,082,429	5,546,441	44.4	55.6	1.133
1893.....	2,823,187	3,110,462	5,933,649	47.6	52.4	1.198
1894.....	2,743,376	2,917,818	5,661,194	48.5	51.5	1.130
1895.....	2,467,109	2,933,752	5,400,861	45.7	54.3	1.066
1896.....	2,639,055	3,206,456	5,845,511	45.1	54.9	1.140
1897.....	2,799,977	3,124,485	5,924,462	47.3	52.7	1.143
1898.....	3,022,553	3,274,981	6,297,534	48.0	52.0	1.200
1899.....	3,631,882	4,092,361	7,724,243	47.0	53.0	1.454
1900.....	3,820,889	4,361,563	8,182,452	46.7	53.3	1.521
1901.....	4,653,691	4,810,213	9,463,904	49.1	50.9	1.761
1902.....	5,102,874	5,165,938	10,268,812	49.7	50.3	1.877

Nova Scotia. NOVA SCOTIA.

Detailed statistics of the production of coal in the province are given in Tables 10, 11, 12 and 13.

The production amounted in 1902 to 5,161,316 tons, being an increase over that of the previous year of over 24 per cent. The average value of the production for the year was about \$2 per long ton.

TABLE 10.
COAL.
NOVA SCOTIA :—OUTPUT, SALES, COLLIERY CONSUMPTION, AND PRODUCTION.

Calendar Year.	Output, Tons, 2,240 lbs.	Sales, Tons, 2,240 lbs.	Colliery Consump- tion, Tons, 2,240 lbs.	Production* Tons 2,240 lbs.	Output, Tons, 2,000 lbs.	Sales, Tons, 2,000 lbs.	Colliery Consump- tion, Tons, 2,000 lbs.	Production* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of production.
1872.....	880,950	785,914	110,341	896,255	986,664	880,224	123,562	1,003,806	\$1 75	\$1,568,446
1873.....	1,051,467	989,504	108,988	1,177,643	1,177,643	986,839	121,406	1,108,245	1 75	1,781,620
1874.....	872,720	749,127	119,882	868,709	977,446	839,022	133,932	973,954	1 75	1,520,240
1875.....	781,165	706,795	124,110	830,905	874,905	791,610	139,003	980,613	1 75	1,454,084
1876.....	709,646	634,207	113,788	747,995	794,894	710,312	127,443	837,755	1 75	1,308,991
1877.....	757,496	687,065	98,841	785,906	848,396	769,513	110,702	880,215	1 75	1,375,339
1878.....	770,603	693,511	88,627	782,138	863,075	776,732	99,262	875,994	1 75	1,368,741
1879.....	788,271	688,624	84,787	773,411	882,863	771,259	94,961	866,220	1 75	1,353,469
1880.....	1,032,710	954,659	96,831	1,051,490	1,156,635	1,069,218	108,451	1,177,669	1 75	1,840,108
1881.....	1,124,270	1,035,014	107,888	1,142,902	1,239,183	1,159,216	120,884	1,280,050	1 75	2,000,079
1882.....	1,365,811	1,250,179	111,381	1,361,560	1,529,708	1,400,200	124,747	1,524,947	1 75	2,382,730
1883.....	1,422,563	1,297,523	111,949	1,409,472	1,593,259	1,453,226	126,383	1,578,609	1 75	2,466,576
1884.....	1,389,295	1,261,650	116,769	1,378,419	1,556,011	1,413,048	130,781	1,543,829	1 75	2,412,233
1885.....	1,352,205	1,254,510	127,624	1,382,134	1,514,470	1,405,051	142,939	1,547,990	1 75	2,418,735
1886.....	1,502,611	1,373,666	142,421	1,516,087	1,682,924	1,538,506	159,512	1,698,018	1 75	2,653,152
1887.....	1,670,830	1,519,684	139,777	1,659,461	1,871,330	1,702,046	136,560	1,898,596	1 75	2,904,067
1888.....	1,776,128	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,831	1 75	3,034,735
1889.....	1,756,279	1,555,107	158,131	1,713,288	1,967,032	1,741,720	177,107	1,918,827	1 75	2,998,167
1890.....	1,984,001	1,796,111	161,240	1,947,351	2,222,081	2,000,444	180,589	2,181,033	1 75	3,407,864
1891.....	2,044,784	1,849,945	174,983	2,024,928	2,290,158	2,071,938	195,981	2,267,919	1 75	3,543,624
1892.....	1,942,780	1,752,954	175,092	1,928,026	2,175,913	1,963,286	196,108	2,159,389	1 75	3,374,046
1893.....	2,223,042	1,977,543	205,425	2,182,968	2,489,807	2,214,948	210,751	2,444,924	1 75	3,820,194
1894.....	2,250,631	2,060,920	196,206	2,257,126	2,520,707	2,308,231	239,076	2,527,982	1 75	3,949,970
1895.....	1,959,756	1,793,098	193,639	1,986,737	2,239,727	2,008,270	216,875	2,225,145	1 75	3,476,790
1896.....	2,292,675	2,046,828	192,675	2,239,803	2,567,796	2,292,447	216,132	2,508,579	1 75	3,919,655
1897.....	2,340,031	2,044,672	181,716	2,226,388	2,620,835	2,290,032	203,522	2,493,554	1 75	3,896,179
1898.....	2,262,656	2,121,126	167,428	2,268,554	2,534,175	2,375,061	187,519	2,563,180	1 75	4,004,970
1899.....	2,865,443	2,633,989	177,460	2,811,449	3,200,296	2,950,067	198,755	3,143,822	2 00	5,622,898
1900.....	3,298,791	2,998,737	236,563	3,235,300	3,694,646	3,328,585	264,941	3,623,536	2 50	8,088,250
1901.....	3,821,033	3,411,127	301,434	3,712,561	4,279,557	3,850,462	337,606	4,158,068	2 50	6,496,982
1902.....	4,725,480	4,229,120	379,198	4,608,318	5,292,538	4,736,614	424,702	5,161,316	2 00	9,216,636

COAL.
Nova Scotia.
* This Production is obtained by adding Sales and Colliery Consumption. For sales previous to 1872, see report of the Department of Mines Nova Scotia, 1883, page 68.

COAL.
Nova Scotia.

TABLE 11.
COAL,
NOVA SCOTIA :—COAL TRADE BY COUNTIES.

CALENDAR YEAR.	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
	Tons, 2,000 lbs.	Tons, 2,000 lbs.	Tons, 2,000 lbs.	Tons, 2,000 lbs.	Tons, 2,000 lbs.	Tons, 2,000 lbs.	Tons, 2,000 lbs.	Tons, 2,000 lbs.
1st quarter.	150,993	111,097	126,349	103,482	783,718	567,542	20,043	16,214
2nd "	143,515	126,137	142,015	129,274	950,189	886,849	33,648	22,976
3rd "	163,862	151,087	174,944	164,203	1,088,652	1,106,589	37,050	30,770
4th "	163,421	150,864	191,997	173,181	1,064,344	950,266	57,798	46,283
Total, 1902	621,791	538,985	635,305	570,140	3,886,903	3,511,246	148,539	116,243
" 1901	538,773	447,616	538,840	460,349	3,116,641	2,888 610	40,303	23,887

TABLE 12.

COAL.

COAL.

Nova Scotia.

NOVA SCOTIA:—OUTPUT BY COLLIERIES DURING THE CALENDAR YEAR, 1902.

Colliery.	Tons, 2,000 lbs.	Colliery.	Tons, 2,000 lbs.
<i>Cumberland County.</i>		<i>Inverness County.</i>	
Chignecto.....	4,607	Mabou.....	1,120
Joggins.....	58,580	Pt. Hood.....	57,188
Jubilee.....	883	Broad Cove.....	76,749
Scotia.....	1,047	<i>Victoria County.</i>	
Springhill.....	554,322	New Campbellton.....	13,481
Strathcona.....	2,352	<i>Cape Breton County.</i>	
<i>Pictou County.</i>		Dominion Coal Co.....	3,555,184
Acadia.....	357,418	Nova Scotia Steel and Coal Co.....	296,338
Nova Scotia Steel and Coal Co.....	35,766	Gowrie and Blockhouse...	26,208
Intercolonial.....	242,122	Sydney.....	9,223
		Total.....	5,292,538

TABLE 13.

COAL.

NOVA SCOTIA:—DISTRIBUTION OF COAL SOLD.

Markets.	Calendar Years.			
	1901.		1902.	
	Tons, 2,000 lbs.	Per cent.	Tons, 2,000 lbs.	Per cent.
Nova Scotia, transported by land.....	757,975	19·8	468,658	9·9
" " sea.....	533,569	14·0	1,175,644	24·8
Total, Nova Scotia.....	1,291,544	33·8	1,644,302	34·7
New Brunswick.....	366,976	9·6	358,664	7·6
Prince Edward Island.....	78,324	2·1	70,316	1·5
Quebec.....	1,315,935	34·4	1,492,902	31·5
Newfoundland.....	124,265	3·3	118,041	2·5
United States.....	623,390	16·3	1,004,650	21·2
West Indies.....			6,700	·1
Other countries.....	20,028	·5	41,039	·9
Total.....	3,820,462	100·0	4,736,614	100·0

NEW BRUNSWICK.

New
Brunswick.

The production of coal in this province in 1902 was 18,795 tons valued at \$39,680, a slight increase in quantity over the previous year, but realizing a somewhat lower price per ton at the mines.

COAL.
New
Brunswick.

TABLE 14.

COAL.
NEW BRUNSWICK :—PRODUCTION.

Calendar Year.	Tons.	Value.	Value per ton.
1887.....	10,040	\$ 23,607	\$2 35
1888.....	5,730	11,050	1 93
1889.....	5,673	11,733	2 07
1890.....	7,110	13,850	1 95
1891.....	5,422	11,030	2 03
1892.....	6,768	9,375	1 39
1893.....	6,200	9,837	1 59
1894.....	6,469	10,264	1 59
1895.....	9,500	14,250	1 50
1896.....	7,500	11,250	1 50
1897.....	6,000	9,000	1 50
1898.....	6,160	9,240	1 50
1899.....	10,528	15,792	1 50
1900.....	10,000	15,000	1 50
1901.....	17,630	51,857	2 94
1902.....	18,795	39,680	2 11

Northwest
Territories.

NORTHWEST TERRITORIES.

One of the main features to record, in connection with coal mining operations in the North-west Territories in 1902 is the large output of coal from the new collieries at Frank, Alberta, on the Crows Nest Pass branch of the Canadian Pacific Railway.

The total product of the Territories for the year has been returned as 478,129 tons valued at \$1,110,521 and made up as follows :*—

	Tons.
Estevan and Coalfields.....	70,400
Lethbridge.....	153,703
Miscellaneous small mines.....	15,841
Anthracite and Canmore.....	107,950
Frank and Blairmore.....	125,325
Yukon district.....	4,910
	478,129

Of this amount 16,550 tons is anthracite coal and the balance bituminous and lignite.

* Since writing the above the annual report of the Department of Public Works of the Northwest Territories for 1902 has been received in which the output of the coal mines of the Territories (not including the Yukon) is given as:—

Bituminous and lignite.....	494,087 tons
Anthracite coal.....	16,587 "
total.....	510,674 "

Although the figures of production in the present report represent sales and shipments only, it is still possible that they are incomplete owing to there being so many producers of coal on a small scale in the Territories.

TABLE 15.
COAL.
NORTH-WEST TERRITORIES :—PRODUCTION.

COAL.
North-west
Territories.

Calendar Year.	Tons.	Value.	Value per ton.
1887.....	74,152	\$ 157,577	\$ 2 13
1888.....	115,124	183,354	1 59
1889.....	97,364	179,640	1 85
1890.....	128,953	198,498	1 54
1891.....	174,131	437,243	2 51
1892.....	184,370	469,930	2 55
1893.....	238,395	598,745	2 51
1894.....	199,991	488,980	2 45
1895.....	185,654	414,064	2 23
1896.....	225,868	606,891	2 69
1897.....	267,163	667,908	2 50
1898.....	340,088	825,220	2 43
1899.....	334,600	811,500	2 43
1900.....	351,950	839,375	2 38
1901.....	391,139	1,008,917	2 58
1902.....	478,129	1,110,521	2 32

BRITISH COLUMBIA.

British
Columbia.

The total sales and shipments including colliery consumption and not including coal used for making coke were in 1902 1,370,448 long tons or 1,534,902 short tons, being a decrease from the previous year of about 7·5 per cent. 244,232 long tons were used for making coke during the year, and 26,946 long tons were added to stock, so that the total output of the collieries for the year was 1,641,626 long tons.

Statistics of output, home consumption, quantity sold for export, etc., are shown in Table 16.

COAL.
British
Columbia.

TABLE 16.
COAL.
BRITISH COLUMBIA :—PRODUCTION.

Calendar Year.	Output Tons, 2,240 lbs.	Home Consumption, Tons, 2,240 lbs.	Sold for Export, Tons, 2,240 lbs. †	PRODUCTION.*		Price per ton, 2,240 lbs.	Value.
				Tons, 2,240 lbs.	Tons, 2,000 lbs.		
1836-52..	10,000				11,200	4 00	40,000
1852-59..	25,398				28,446	4 00	101,592
1859 †... †	1,989				2,228	4 00	7,956
1860.....	14,247				15,957	4 00	56,988
1861.....	13,774				15,427	4 00	55,096
1862.....	18,118				20,292	4 00	72,472
1863.....	21,345				23,906	4 00	85,380
1864.....	28,632				32,068	4 00	114,528
1865.....	32,819				36,757	4 00	131,276
1866.....	25,115				28,129	4 00	100,460
1867.....	31,239				34,988	4 00	124,956
1868.....	44,005				49,286	4 00	176,020
1869.....	35,802				40,098	4 00	143,208
1870.....	29,843				33,424	4 00	119,372
1871-2-3.	148,459				166,274	4 00	593,836
1874.....	81,647	25,023	56,038	81,061	90,788	3 00	243,183
1875.....	110,145	31,252	66,392	97,644	109,361	3 00	292,932
1876.....	139,192	17,856	†122,329	140,185	157,007	3 00	420,555
1877.....	154,052	24,311	115,381	139,692	156,455	3 00	419,076
1878.....	170,846	26,166	164,682	190,848	213,750	3 00	572,544
1879.....	241,301	40,294	192,096	232,390	260,277	3 00	697,170
1880.....	267,595	46,513	225,849	272,362	305,045	3 00	817,086
1881.....	228,357	40,191	189,323	229,514	257,056	3 00	688,542
1882.....	282,139	56,161	232,411	288,572	323,201	3 00	865,716
1883.....	213,299	64,786	149,567	214,353	240,075	3 00	643,059
1884.....	394,070	87,388	306,478	393,866	441,130	3 00	1,181,598
1885.....	465,596	93,227	237,797	333,024	372,987	3 00	999,072
1886.....	326,636	85,987	249,205	335,192	375,415	3 00	1,005,576
1887.....	413,860	99,216	334,839	434,055	486,142	3 00	1,302,165
1888.....	489,301	115,953	365,714	481,667	539,467	3 00	1,445,001
1889.....	579,830	124,574	443,675	568,249	636,439	3 00	1,704,747
1890.....	678,140	177,075	508,270	685,345	767,586	3 00	2,056,035
1891.....	1,029,097	202,697	806,479	1,009,176	1,130,277	3 00	3,027,528
1892.....	826,335	196,223	640,579	836,802	937,218	3 00	2,510,406
1893.....	978,294	207,851	768,917	976,768	1,093,980	3 00	2,930,304
1894.....	1,012,953	165,776	827,642	993,418	1,112,628	3 00	2,980,254
1895.....	939,654	188,349	756,334	944,683	1,058,045	3 00	2,834,049
1896.....	894,882	261,984	634,238	896,222	1,003,769	3 00	2,688,666
1897.....	892,296	290,310	619,860	910,170	1,019,390	3 00	2,730,510
1898.....	1,136,015	374,953	752,863	1,127,816	1,263,154	3 00	3,383,448
1899.....	1,306,324	526,058	751,711	1,277,769	1,431,101	3 00	3,833,307
1900.....	1,590,178	535,084	914,184	1,449,268	1,623,180	3 00	4,347,804
1901.....	1,691,557	568,440	914,163	1,482,603	1,660,515	3 00	4,447,809
1902.....	1,641,626	593,639	776,809	1,370,448	1,534,902	3 00	4,111,344

*This production is obtained by adding 'Home Consumption' and 'Sold for Export, †52,935 of this amount was exported as sales without the division into the 'Home Consumption' and 'Sold for Export.'

†The figures in the 'Sold for Export' column do not agree as they should with those given in Table 5, the only explanation being that the data in the two cases are from different sources, and it has not been possible to find out the cause of the difference.

‡Two months only.

Statistics of coal production in 1902 are given in the Annual Report of the Minister of Mines for the province as follows :

COAL.
British
Columbia.

Statistics
production.

SALES AND OUTPUT FOR YEAR. Tons of 2240 lbs.	Tons.		Cwt.	
	Tons.	Cwt.	Tons.	Cwt.
Sold for consumption in Canada.....	422,466	13		
" export to U.S.A.....	775,300	11		
" " to other countries.....	1,508			
Total sales.....	1,199,275	04		
Used under colliery boilers &c.....	171,172	15		
Total sales and colliery consumption.....			1,370,447	19
Used in making coke.....			244,232	
Stock on hand first of year.....	5,704	17	1,614,679	19
" " last of year.....	32,651			
Difference added to stock during the year.....			26,946	03
Output of collieries for year.....			1,641,626	02

Statistics of labour and wages are given in the same report as follows :

Statistics of
labour and
wages.

Number of hands employed, daily wages paid etc.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTAL.	
	No. of employees	Average daily wage	No. of employees	Average daily wage	No. of employees	Average daily wage
Supervision and clerical assistance.....	63	\$ 4 30	48	\$ 4 85	111	\$ 4 57
Whites—						
Miners.....	1,625	4 30			1,625	4 30
Miners' helpers.....	494	2 40			494	2 40
Labourers.....	569	2 73	206	2 34	775	2 53
Mechanics and skilled labour.....	47	2 81	199	3 10	246	2 95
Boys.....	133	1 42	23	1 15	156	1 23
Japanese.....	38	1 37	46	1 12	84	1 24
Chinese.....	132	1 37	388	1 21	520	1 29
Totals.....	3,101		910		4,011	

In view of the fact that 75 per cent of the production of Vancouver island collieries is exported to California, the following statistics of
COAL—2½

COAL.

receipts of coal in the Californian market are given as illustrating the position which British Columbia coal occupies in this market :

Whence derived.	1901.	1902.
	Tons, 2,240 lbs.	Tons, 2,240 lbs.
British Columbia.....	710,330	591,732
Australia.....	175,959	197,328
England and Wales.....	52,270	55,621
Scotland.....		1,600
Eastern (Cumberland and Anthracite).....	27,370	21,133
Seattle (Washington).....	240,574	165,237
Tacoma.....	433,817	209,358
Mount Diablo, Coos Bay and Tesla.....	143,318	111,209
Japan and Rocky Mountains.....	51,147	47,380
Totals.....	1,834,785	1,445,598

Coal
producers.

Following is a list of the principal coal producers in Canada.

NOVA SCOTIA :—

Inverness Railway and Coal Company.. Broad Cove, C.B.
 Gowrie and Blockhouse Collieries, Ltd ..Port Morien, C.B.
 Mabou Coal Mining Company, Ltd.... Mabou, C.B.
 Port Hood Coal Company, Ltd.....Port Hood, C.B.
 Cape Breton Coal Mining Co., Ltd.....New Campbellton, C.B.
 Dominion Coal Co., Ltd.....Sydney, C.B..
 Sydney Coal Company, Ltd.....Sydney Mines C.B.
 Acadia Coal Co., Ltd.....Stellarton, N.S.
 Nova Scotia Steel & Coal Co., Ltd.....New Glasgow, N.S.
 Intercolonial Coal Mining Co., Ltd....Westville, N.S.
 Cumberland Railway and Coal Co., Ltd..Springhill, N.S.
 Canada Coals and Railway Co., Ltd....Joggins Mines, N.S.
 Minudie Coal Co., Ltd.....River Hebert, N.S.
 Strathcona Coal Co.....River Hebert, N.S.
 Messrs Ripley and Blenkhorn (Scotia Mine)

NEW BRUNSWICK :—

New Brunswick Coal & Railway Company..Fredericton, N.B.

NORTH WEST TERRITORIES :—

Souris Coal Mining Company, Ltd....R. R. Taylor, Manag-
 ing Director, Winni-
 peg, Man.

P. C. Duncan.....	Estevan, Assa.	COAL,
Frank Gillespie.....	Medicine Hat, Assa.	Coal
Joseph Cully.....	" "	producers.
Crockford Bros.....	" "	
Alberta Railway and Coal Co....	Lethbridge, Alta.	
Alberta Coke and Coal Co., (Martin B. Holway).....	Cowley,	"
R. J. Galbraith.....	" "	"
E. V. Wilson.....	Livingston,	"
Blackfoot Indian Agency, J. A. Markle, agent.....	Gleichen,	"
J. T. Cooper.....	Calgary,	"
J. A. Bangs.....	" "	"
F. Barnes.....	Clover Bar,	"
Daly and Lindsay.....	" "	"
Keith Fulton and Fowler.....	" "	"
E. Chevigny.....	Morinville,	"
Wm. Humberstone.....	Edmonton,	"
Milner and Blatchford.....	" "	"
W. J. Baldwin.....	" "	"
Bishopric, Grierson and Mays.....	" "	"
Leon Moret.....	Ft. Saskatchewan, Alta	
Fishburn and Procter.....	Blairmore, Alta.	
The Canadian Am. Coal and Coke Co....	" "	
United Gold Fields of British Columbia.	" "	
International Coal and Coke Co.	" "	
The H. W. McNeil Co., Ltd.....	Anthracite	"

YUKON DISTRICT :—

North American Transportation and Trad- ing Co., Cliff Creek Mines.....	Dawson.
Alaska Exploration Co., Rock Creek Mine.	"
R. S. Ames and Geo. Miller, Five Fingers Mine.....	"

BRITISH COLUMBIA :—

Crows Nest Pass Coal Co., Ltd.....	Fernie, B.C.
Western Fuel Co.....	Nanaimo, B.C.
Wellington Colliery Co., Ltd.....	Victoria, B.C.

COAL.

Coke.

Production.

COKE.

The sales of coke in 1902 amounted to 502,043 tons, valued at \$1,519,185, being an increase over the production of the previous year of 136,512 tons, or 37 per cent in quantity, and \$290,960, or over 23 per cent in value. The increase is to be all credited to the province of Nova Scotia, there being a slight falling off in British Columbia.

TABLE 1.

COKE.

ANNUAL PRODUCTION.

Calendar Year.	Tons.	Value.	Value. per Ton.
1886.....	35,396	\$101,940	\$2 88
1887.....	40,428	135,951	3 36
1888.....	45,373	134,181	2 96
1889.....	54,539	155,043	2 84
1890.....	56,450	166,298	2 95
1891.....	57,084	175,592	3 08
1892.....	56,135	160,249	2 85
1893.....	61,078	161,790	2 65
1894.....	58,044	148,551	2 56
1895.....	53,356	143,047	2 68
1896.....	49,619	110,257	2 22
1897.....	60,686	176,457	2 91
1898.....	87,600	286,000	3 26
1899.....	100,820	350,022	3 47
1900.....	157,134	649,140	4 13
1901.....	365,531	1,228,225	3 36
1902.....	502,043	1,519,185	3 03

TABLE 2.

COKE.

PRODUCTION OF COKE BY PROVINCES.

Calendar Year.	Nova Scotia.		British Columbia.	
	Tons.	Value.	Tons.	Value.
		\$		\$
1897.....	41,532	90,950	19,154	85,507
1898.....	48,400	111,000	39,200	175,000
1899.....	62,459	178,767	38,361	171,255
1900.....	61,767	223,395	95,367	425,745
1901.....	222,694	590,560	142,837	637,665
1902.....	363,330	899,930	138,713	619,255

TABLE 3.
COKE.
EXPORTS OF COKE.

COAL.
Coke.
Exports.

Calendar Year.	Tons.	Value.
		\$
1897	2,987	6,078
1898	3,774	8,394
1899	5,557	18,726
1900	41,529	131,278
1901	57,505	176,990
1902	62,568	180,920

TABLE 4.
COKE.
IMPORTS OF OVEN COKE.

Imports of
oven coke.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1880	3,837	19,353	1892	43,499	194,429
1881	5,492	26,123	1893	41,821	156,277
1882	8,157	36,670	1894	42,864	176,996
1883	8,943	38,588	1895	43,235	149,434
1884	11,207	44,518	1896	61,612	203,826
1885	11,564	41,391	1897	83,330	267,540
1886	11,858	39,756	1898	135,060	347,040
1887	15,110	56,222	1899	141,284	362,826
1888	25,487	102,334	1900	187,378	506,839
1889	29,557	91,902	1901	308,786	680,138
1890	36,564	133,344	1902	Duty free.	267,142
1891	38,533	177,605			

Following is a list of companies making coke in Canada from Canadian coal:—

Nova Scotia.—Acadia Coal Co., Stellarton, N.S.

Intercolonial Coal Mining Co., Westville, N.S.

Nova Scotia Steel and Coal Co., New Glasgow, N.S.

Halifax Electric Tramway Co. (Ltd.), Halifax, N.S.

Dominion Iron and Steel Co. (Ltd.), Sydney, C.B.

British Columbia.—Crows Nest Pass Coal Co. (Ltd.), Fernie, B.C.

Wellington Colliery Co. (Ltd.), Victoria, B.C.

COAL.
Coke.

The production of coke in British Columbia is given in the provincial report as follows :

Sales and Output for the Year.	Tons, 2,240 lbs.	Tons, 2,240 lbs.
Sold for consumption in Canada.....	85,071	
" export to United States.....	38,780	
Total sales		123,851
Stock on hand, first of year.....	186	
" " last "	4,350	
Diff. added to stock during the year.....		4,164
Output for year.....		128,015

Peat.

Peat.—During the past few years many companies have been organized to manufacture peat-fuel from peat bogs in the provinces of Ontario and Quebec. Some of these have met with indifferent success, while others are still in the experimental stage or developing their properties.

Sales of peat during the past three years have been reported as follows :—

	Tons.	Value.
Year 1900.....	490	\$1,200
" 1901	220	660
" 1902.....	475	1,663

*THE COAL FIELDS OF CANADA.

The following short description of the coal fields of Canada will, in connection with the statistics already given, be found illustrative of the coal industry of the country. It has been compiled by Mr Theo. Denis, B. Sc., chiefly from information to be found throughout the Reports of the Geological Survey, supplemented by data taken from other reliable sources. As a guide for reference a full list of the maps published by the Geological Survey of Canada, covering the areas referred to in the course of this summary description has been added at the end of the article ; also a list of references forming a short bibliography of the subject. The maps may be obtained from the librarian of the Survey for the nominal sale prices mentioned in the

*This article, compiled originally by Mr. Theo. Denis, appeared in the Annual Report of the Mines Section for 1898, constituting Part S, Vol. XI of the reports of the Geological Survey Department. In compiling the present article he has not only brought the information up to date but has very much extended its scope.

“List of Publications of the Geological Survey of Canada” and COAL Supplement.

The chief fields are located as follows: In Nova Scotia there are several extensive areas of bituminous coal which have been mined for many years. In New Brunswick is a small area with thin seams, also bituminous. The above are all in rocks of Carboniferous age. In Manitoba and the North-west Territories, very large tracts of the prairie country are underlaid by coal beds, varying in quality from lignite in the east to bituminous in the west, as the foot-hills of the Rocky mountains are approached. In the mountain region itself is a small basin where anthracite is mined. Across the watershed in British Columbia is the Crow's Nest Pass field, now being opened up, and on the Pacific coast are the areas on the east side of Vancouver island, that have long been worked. These coal fields are of Cretaceous age. Coals referable to the same period are also found in the Queen Charlotte islands and in many parts of the interior of British Columbia. These Cretaceous coals are generally bituminous, but anthracite occurs in the Queen Charlotte islands. Tertiary fuels also underlie considerable areas in the interior as well as several tracts along the coast. These are usually lignites or brown coals.

NOVA SCOTIA.

Nova Scotia.

The coal-bearing measures of Nova Scotia belong to the Carboniferous, and are practically confined to the one of its subdivisions generally known as the Coal Measures.

The coal mined in this province is all bituminous in quality.

The following sub-divisions into fields is usually adopted:—

1. The Sydney coal field.
2. The Inverness coal field.
3. The Richmond coal field.
4. The Pictou coal field.
5. The Cumberland coal field.

Sydney Coal Field.

This field is situated in the north-east corner of Cape Breton county, and also takes in a small portion of Victoria county. It occupies a land area of nearly 200 square miles, being about 32 miles long by six wide, and it is limited on three sides by the Atlantic Ocean. The conditions for extraction and shipment are very favourable. There is a remarkable

COAL. absence of faults and the coast affords a number of natural harbours. The greater part of the coal-field is hidden beneath the sea, but the Nova Scotia. seams can be followed under its bed.

*The measures inclosing the Cape Breton coals are largely composed of argillaceous shales and sandstones, the solidity and coherence of which favour submarine exploitation. As to the general structure, it can be said that the seams appear on the shore, sweep inland, and again enter the ocean, forming segments of ellipses whose centres are out at sea. This structure is observable at Cow Bay, Glace Bay, Lingan and Sydney, these places presenting a series of basins, the seams of which have been correlated, and their equivalence in many cases proved. These basins probably owe their origin to a corrugation of the area by numerous folds which bring the same coal seams repeatedly to the surface along the north-east coast of the island.

The whole coast is deeply indented by bays and channels, approximately coinciding with the axes of these folds, and affording in the sea-cliffs numerous natural sections of the strata and exposures of the coal-seams. Some of these bays also constitute excellent harbours, one of which—Sydney Harbour—situated towards the centre of the district, ranks among the finest and most commodious on the Atlantic coast of North America. The cliffs are generally from thirty to eighty feet high, standing perpendicularly, or frequently overhanging the sea. The country inland is of a gently rolling character, the maximum height being about 250 feet.

Such natural advantages, combined with its highly favourable geographical position, point to this district as probably the most important in the Dominion for the supply of fuel to steamships navigating the Atlantic. During the few months of winter, when the more northerly harbours are closed or obstructed by ice, an outlet is afforded by the railway connecting many of the collieries with Louisburg, a fine harbour, open and safe for shipping at almost any season.

The aggregate thickness of coal in workable seams, outcropping on the shore, and for the most part exposed in the bays and cliffs, is from forty to fifty feet; the seams vary from three to nine feet in thickness. They generally dip at very low angles of five to twelve degrees and appear to be very little affected by faults or disturbances. As the strata all dip seaward, much of the coal will be available in the submarine as well as in the land areas. From experience at the Sydney mines it has been fully established that, with due caution and care, these submarine areas may be worked to a large extent.

*See "Descriptive Note on the Sydney coal-field" by Hugh Fletcher B.A., published by the Geological Survey of Canada 1900.

The coal is of the bituminous or 'soft' variety, with comparatively little diversity in the quality of the different seams; all of which yield a fuel exceedingly well adapted for general purposes, while that of some of them is specially applicable to the manufacture of gas. As compared with the Pictou coal, it is characterized on the whole, by a greater proportion of combustible matter and a smaller proportion of ash; but on the other hand, it usually contains a greater amount of sulphur.

The following tabulation, condensed from the work of the Geological Survey shows the equivalency of the different seams of the field at the different places, together with the thickness of the intervening strata:

Average thickness.	Cow Bay.	Glace Bay.	Lingan.	Sydney Mines.	Boulardarie.
3 feet.....	.....	.....	Seam A.....	.....	Point Aconi.
300 "	.....	.....	Carl Seams.....	Lloyd's Cove..	Bonar.
6.5 "	.....	.....	.....	.....	.....
190 "	.....	.....	.....	.....	.....
12 "	.....	Hub.....	Barrasois.....	Seam B.....	Stubbart.
350 "	.....	.....	.....	.....	.....
7 "	Block House	Harbour..	David Head..	Sydney Main.	Seam C.
275 "	.....	.....	.....	.....	.....
3 "	Seam D....	Bouthillier..	Seam D.....	Bryant.....	Mill Pond.
90 "	.....	.....	.....	.....	.....
4 "	Seam E....	Back Pit....	North Head..	Edward....	Black Rock.
110 "	.....	.....	.....	.....	.....
7 "	McAulay..	Phelan.....	Lingan Main..	Seam F.....	Seam F.
125 "	.....	.....	.....	.....	.....
3 "	{ South Head.	Ross.....	Seam G.....	Collins.....	Seam G.
320 "	{ Spencer....	Emery....			
4 "	Long Beach.	Gardiner...	Seam H.....	.....	.....

The correctness of the above correlation is, however, questioned by some. The aggregate thickness of coal in the workable beds outcropping on the shore, ranges from thirty feet at some places to sixty at others. Most of the Sydney coals are well suited for the manufacture of gas, as the following figures show:—

Mines.	Gas, Cubic Feet per ton.	Candle power.	Coke produced.
Little Glace Bay	9,268	15	40 bush.
" "	9,700	14.75	39 "
International Mine.....	10,000	16	1,470 lbs.
Sydney Mines.....	8,200	8	1,295 "
Gowrie "	9,000	15	1,230 "
Caledonia "	8,900	14.25	36 bush.
Reserve "	9,950	13.17	1,500 lbs.

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Nova Scotia.

The value of these coals for steam and house purposes is given whenever obtainable in the table of analyses at the end of this article.

The Sydney coal-field was the first one opened in Canada. As early as 1785, work was done on it by the government. This, however, was of a desultory nature. In 1827, systematic and regular mining was begun by the General Mining Association.

The collieries at present in operation in this field are described below. Comparing the descriptions with the tabulation of the seams already given, it will be noted that the greater part of these are not at present under exploitation, although very extensive work has been done at different times on some of them. Should need arise, however, many of these would constitute a very important additional source of supply.

Sydney Mines Colliery.—This colliery was worked by the General Mining Association until 1900, when it was purchased from this corporation by the Nova Scotia Steel and Coal Company. This transaction practically terminated the connection of the General Mining Association with coal mining in Nova Scotia, after a career of nearly three-quarters of a century.

The colliery is situated three miles to the north-east of North Sydney.

Seam, 5 feet 4 inches. Dip 1 in 12.

Shaft, 690 feet deep ; 13 feet diameter.

Worked by pillar and stall and longwall. Safety lamps.

Coal produced in 1902, 270,000 tons.*

Average number of persons employed above and underground, 1,000.

North Sydney Colliery.—Operated by the Sydney Coal Company.

Seam, 4 feet.

Worked by slope, 650 yards.

Method, pillar and stall. Naked lights.

Coal produced in 1902, 7,510 tons. Persons employed, 32.

New Campbellton Colliery.—Operated by the Cape Breton Coal Company.

Situated on the Big Bras d'Or lake.

Seam, 4 feet ; dip, 1 in 5

* These figures of production are only approximate and are here given to illustrate the relative importance of the collieries.

Slope, 600 yards.

COAL.

Coal-cutting machines. Method of working, pillar and stall.

Nova Scotia.

Naked lights.

Coal produced in 1902, 13,443 tons. Persons employed, 36.

Gowrie and Block House Collieries.—Situated on Port Morien or Cow Bay. Operated by the Gowrie and Blockhouse Colliery, Limited. This company was organized in 1898, acquiring properties which had been idle for some time. The coal area controlled by this corporation covers five square miles, comprising leases 193, 146, 194, 206 and 235.

McAulay or Gowrie seam, 5 feet 6 inches. Worked by shaft, 205½ feet deep.

Coal-cutting machines. Coal produced in 1902, 20,000 tons.

Persons employed, 81.

Dominion Coal Company.—This company was incorporated in 1893. It holds a number of leases for a period of ninety-nine years in the coal basins of Cow Bay, Glace Bay and Lingan. The collieries which it is operating at present are enumerated below. Besides these, it owns others of importance which are not now being worked, such as the Victoria, Lingan, Cow Bay and Old Bridgeport, etc. The company has concentrated its operations on the Glace Bay basin, which it has developed to a great extent. The production of the Dominion Coal Company for 1902 amounted to nearly 3,306,000 tons, giving employment to 3,454 persons.

Caledonia Colliery, Glace Bay Basin.—Situated one mile from Little Glace Bay. Phelan seam worked; 7 to 8 feet.

Worked by pillar and room.

Underground haulage by endless rope.

Output for 1900, 573,298 tons.

Reserve Colliery, Glace Bay Basin.—On Phelan seam, 8 feet thick.

Worked by slopes, pillar and room method.

Endless rope haulage. Output for 1900, 707,927 tons.

International Mine, Glace Bay Basin.—Seam worked 'Harbour' 6 feet.

Method, pillar and room. Endless and tail rope systems of haulage.

Three-compartment shafts. Output for 1900, 249,427 tons.

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Dominion No. 1, Glace Bay Basin.—On Phelan seam. Dip, 1 in 14. Worked by pillar and room. Electric underground haulage.

Output for 1900, 602,825.

Dominion No. 2, Glace Bay Basin.—This colliery was opened in 1900. The shaft is a four-compartment one, 37' 11" down to 410 feet where it strikes the Harbour seam and is reduced to 21' 11" down to 850 feet where it strikes the Phelan seam.

Harbour seam $6\frac{1}{2}$ feet, Phelan seam 8 feet.

This mine is equipped for a daily output of 6,000 tons.

Dominion No. 3, Glace Bay Basin.—Opened on Phelan seam in 1900. Mined by pillar and room method.

Entered by slopes two miles from Caledonia Colliery. Endless rope haulage. In 1902, the output of this mine had increased to 1900 tons a day.

Dominion No. 4, Glace Bay Basin.—Slope-driven on Emery seam, 5 feet thick, about three quarters of a mile from the Caledonia colliery.

Beside the above mentioned workings, the Dominion Coal Company has erected a coal washing plant on the Sydney and Louisburg railway about three miles from Morien junction. The operation of coal washing by removing the finer stoney debris, diminishes the ash that would otherwise be contained in the material mined, by 41 per cent and the sulphur by 28 per cent. Water for the coal washers is obtained by gravitation from Morrison lake.

Inverness Coal Field.

This comprises a series of narrow areas on a line extending from Judique to Margaree on the western shore of Cape Breton island in the county of Inverness. These areas of productive measures form parts of the rim of a basin, the greater portion of which has been removed by erosion. Seams of coal of workable size have been found at Port Hood, Mabou, Inverness or Broad Cove and Chimney Corner.

At Port Hood the strata run parallel to the shore for about two miles. One seam about 7 feet thick is operated. Considerable work on this seam was done thirty five years ago, but the mine was closed in 1878 and resumed on a large scale in 1899.

At Mabou a small coal field shows several seams of good thickness which outcrop there. At Inverness or Broad Cove, north of Cape Mabou is a coal area in which outcrop several seams ranging in thickness from two to twelve feet. The dip is seaward at an angle of about

twelve degrees. At Chimney Corner Mines other workable seams occur.

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Work on some of the coal areas in this field was carried on as far back as 1866, and in places the operations were on a large scale, but subsequently very little development was done until three years ago. A great drawback to the development of these areas, was the lack of shipping facilities; the coast does not offer suitable harbours. In 1900 however, a line of railway was completed from Inverness or Broad Cove to Port Hastings, and was subsequently continued to Point Tupper on the Intercolonial. This gives the field a connection with the railway system of the continent; operations on a large scale have been resumed. There are at present three companies at work.

Inverness Railway and Coal Company, Limited.—This company, formerly called the Inverness and Richmond Railway Company, owns coal areas at Inverness or Broad Cove, Port Hood, Chimney Corner and Margaree Island. Its most extensive operations are at Inverness on a seven foot seam, with a dip of one in seven. The company has a shipping pier at Port Hastings.

Coal produced in 1902, 42,934 tons.

Port Hood Coal Company.—This company incorporated in 1899, operates a colliery at Port Hood on a seven feet seam. Worked by a slope 1,150 feet.

Persons employed in 1902, 92.

Coal produced 38,659 tons.

Mabou Coal Company.—Operates at Mabou, where work, mostly of a development nature, is proceeding on three seams of 7, 8 and 13 feet respectively.

A railway about 6 miles long is projected, connecting the mine with a shipping place at Mabou Harbour.

Richmond Field.

In the south-western portion of Richmond county, coal occurs in several localities.

Extensive explorations have been carried on in this field, and coal has been discovered at Coal Brook, Caribacou, Little River and Sea Coal Bay. Although comparatively large sums were spent between 1863 and 1878, also in 1900 and 1902 on exploration work, very little systematic mining has been done.

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Coal Brook.—At this place some exploration and drilling were done in 1902. A bore-hole was put down to a depth of 520 feet on the north bank of Coal brook, near the proved outcrop of a seam. The drill was then moved 800 feet to the west, down stream, and a second boring struck coal 1 foot 8 inches thick at a depth of 170 feet. The hole was continued to 1,020 feet but did not strike any other seam of importance. The details of the boring are given in the report of the Department of Mines of Nova Scotia for 1902, and in the Summary Report of the Geological Survey for the year 1902.

Sea Coal Bay.—Here a seam of a thickness of about 11 feet gave, on analysis, such a large proportion of ash as to show it to be of very little use for ordinary purposes.

In his report on this coal field, Mr. Hugh Fletcher, of the Geological Survey, gives a summary of his own observations and of information gathered from various sources. Rep. of Progress, Geol. Survey, 1879-1880.

Pictou Coal Field.

This field, situated almost in the centre of Pictou county, has an area of about 25 square miles. It is 11 miles long, with a maximum width of 3 miles between New Glasgow on the north and Stellarton on the south. The field is therefore small, but the seams are of great size, two being nearly forty feet in thickness.

The district is of a remarkably intricate structure, being cut up by numerous faults of various magnitude, and the productive measures are almost completely surrounded by a girdle of faults. The field is very well situated for railway communication, which advantage, however, is somewhat offset by the physical difficulties encountered due to faulting. It has also been noticed that the seams change their character to a remarkable degree within short distances. The field was opened in 1798, but the first systematic work was contemporary with the development of the Cape Breton field in 1827, when both became the property of the General Mining Association.

The Pictou field is conveniently divided into three districts, viz.:—the Central or Albion, the Western or Westville, and the Eastern or Vale.

In the Albion, four seams have been worked. They are the Main, 38 feet thick, the Deep, 22 to 38 feet, the Third, 10 to 13 feet, and the McGregor, 13 to 20 feet. The measures containing these seams rest conformably on the Millstone Grit. The dip of the coal-bearing

measures varies from the horizontal to over 30 degrees. Several other seams have been reported in this section, but none of them of workable size. COAL.
Nova Scotia.

The Westville section is separated from the Albion section by a downthrow fault, estimated at 2,600 feet. The seams of this section are believed to be equivalent to those of the Albion section. The variation in dip and change of character in short distances are similar in both sections.

The Vale section is in the form of a syncline with east-and-west axes. The thicker and more valuable seams appear in the southern outcrop, where they are worked. Two seams of this section, viz., the McBean and the Six Feet have been extensively worked.

The collieries in operation in the Pictou field are as follows:—

Acadia Colliery.—Operated by the Acadia Coal Company. It is situated at Westville, three miles from Stellarton.

Seam worked 10 feet, dip 27°.

Opened by main slope, over 4,000 feet.

Safety lamps used exclusively.

Albion Colliery.—Operated by the Acadia Coal Company. Situated at Stellarton on the Intercolonial Railway. This important colliery taps four seams, by shafts and long slopes. Work is now carried on on the Third seam 10 to 13 feet, Deep seam over 20 feet, and McGregor 13 to 20 feet.

Safety lamps are used in this colliery.

Vale Colliery.—Operated by the Acadia Coal Company. This colliery is on a six feet seam which is worked on both slopes of a basin; the dip has an average of 15°. Slope 2,800 feet. This mine was worked with open lights until a couple of years ago, when the management, as a measure of precaution, introduced the use of safety lamps.

The Acadia Coal Company in 1902, produced from the three collieries which it controls about 324,800 tons of coal, giving employment to 835 persons.

Drummond Colliery.—Worked by the Intercolonial Coal Mining Company. Three seams are tapped in this colliery. The Main, 17 feet; second seam 12 feet and the third seam 8½ feet. The coal produced in 1902 was nearly 231,840 tons. Persons employed 665.

Marsh Colliery.—Operated by the Nova Scotia Steel and Coal Co. This company has held this property for a number of years past, but

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Nova Scotia.

only began actual work on it in 1901. It is situated between New Glasgow and Thorburn on the George McKay or Four Feet seam. Worked by slopes now 1,575 feet long. The coal is shipped to New Glasgow by the Vale Colliery railway and thence to Trenton by the Intercolonial railway. This colliery in 1902 produced 25,488 tons of coal, and employed 95 men.

Cumberland Field.

This is the most westerly of the coal districts of Nova Scotia, a part of it being adjacent to Chignecto Bay.

In this field there are two coal-producing areas, both in Cumberland county. One situated near the coast, may be called the Joggins area, and the other situated about 15 miles to the east of the first at Springhill. The equivalence of the seams in these two basins has not yet been determined. These two coal-bearing areas are separated by a development of Permian strata, and this intervening space is affected by several faults. The coal measures of the Joggins area form a narrow strip some eighteen miles long.

In the Joggins area the following seams of workable size are known: At Joggins two seams, respectively 4 and 6 feet; at River Hebert one 5 feet seam with two shale partings; at Maccan two seams, the upper $2\frac{1}{2}$ and lower $4\frac{1}{2}$ feet; at Chignecto, a seam $9\frac{1}{2}$ feet, of which $2\frac{1}{2}$ feet are shale partings; at the Styles mine a seam 7 feet 8 inches with a S.W. dip of 40° .

At Springhill three seams are at present worked; in Mr. Scott Barlow's reports these three seams are called in descending order: the North or Thirteen feet seam, the East seam, and the West eleven feet, or Black seam. By the courtesy of Mr. J. R. Cowans, the General Manager of the Springhill Collieries, which are operated by the Cumberland Railway and Coal Co., the following section was furnished to the Mines Section of the Geological Survey, through Mr. Hugh Fletcher. The section gives the stratigraphical succession at the Springhill mines as revealed by the mine workings up to 1903. Mr. Fletcher gives the following information in regard to it:—

“This section is original. . . . The upper portion is compiled from a horizontal tunnel 502 feet long, between No. 3 and No. 1 seams and a other 250 feet long, between No. 1 and No. 2. The remainder is from a tunnel cut across the strata underlying No. 2 seam for 1,122 feet, from the 2,600 ft. level of No. 2. The dip varies from 30° to 38° .”

Section of Coal Measures at Springhill mines, N.S.,
in descending order.

COAL.
Nova Scotia.

	Feet.	Inches.
1 Coal, North or No. 3 seam.....	9	0
2 Strata.....	238	0
3 Coal, East or No. 1 seam.....	10	0
4 Strata.....	118	0
5 Coal, West or No. 2 seam.....	10	0
6 Strata.....	45	5
' "		
7 { Coal 0 1 } { Stone 0 8 } { Coal 2 0 } { Stone 0 2 } { Coal 0 3 }	3	2
8 Strata.....	44	6
' "		
9 { Coal 0 9 } { Stone 0 3 } { Coal 1 10 }	2	10
10 Strata.....	5	4
11 Coal.....	0	11
12 Strata.....	85	10
13 Coal.....	2	2
14 Strata.....	29	2
15 Coaly shale.....	0	2
16 Strata.....	37	7
17 Coaly shale.....	0	2
18 Strata.....	7	8
19 Coal.....	2	1
20 Strata.....	27	11
21 Coal.....	1	7
22 Strata.....	39	4
23 Coaly shale and coal.....	0	6
24 Strata.....	25	5
25 Coal.....	0	6
26 Strata.....	42	4
' "		
27 { Coal 0 11 } { Stone 0 3 } { Coal 1 5 }	2	7
28 Strata.....	10	7
' "		
29 { Coal 0 3 } { Stone 0 7 } { Coal 2 0 }	2	10
30 Strata.....	11	4
31 Coal.....	0	4
32 Strata.....	3	10
33 Coal.....	0	3
34 Strata.....	20	1
35 Coal.....	1	0
36 Strata.....	11	2
37 Coal and coaly shale and stone.....	1	1

COAL—3½

COAL.		Feet.	Inches.
Nova Scotia.	38	Strata.....	8 10
	39	Coal.....	0 4
	40	Strata.....	28 5
		" "	
	41	{ Coal 0 3 Stone 0 2 Coal 0 6 }.....	0 11
	42	Strata.....	25 0
		" "	
	43	{ Coal 0 0½ Stone 1 7 Coal 0 1 Coaly shale 0 5 }.....	2 1½
	44	Strata.....	35 0
		" "	
	45	{ Coaly shale 0 2 Coal 0 2 Coaly shale 0 2 Coal 2 6 }.....	3 0
	46	Strata to face of tunnel.	5 8
	Total thickness.....		963 11½

Joggins Mines.—Operated by the Canada Coal and Railway Company. This colliery is situated one mile from the shore of Chignecto Bay. It is connected with the Joggins wharf by a tramway. The nearest railway station is Maccan on the Intercolonial, distant eleven miles, with which it is connected by a standard gauge railway.

Seam worked 4 to 5½ feet thick, dip 17°, on which are two slopes, 2,500 and 2,700 feet; only one of these is at present in operation. Underground haulage by tailrope system. Coal produced in 1902, 64,960 tons, giving employment to 276 persons. Besides this comparatively large producing colliery, there are scattered throughout this area, smaller mines in operation. In 1902 there are records of four such mines having produced a certain amount of coal. These are the Chignecto Mine which produced 2,512 tons, the Strathcona, 2,352 tons, the Jubilee 1,543, the Scotia about 500 tons; besides these, there are others which have been opened and worked for some time.

Springhill Collieries.—Worked by the Cumberland Railway and Coal Co. On three seams 10 feet wide, dip 30°. Worked by slopes. This colliery is connected with the Intercolonial Railway by a branch 5 miles long, and by an extension 25 miles long with Parrsboro' on the Bay of Fundy, from whence shipments by vessels are made.

This colliery, the most important of the Cumberland field, is well equipped and the surface plant is very complete.—The coal is specially

well adapted for steam purposes, and the produce of the mine is largely COAL. used by the Intercolonial, Canadian Pacific and Grand Trunk rail-Nova Scotia. ways.

Coal produced in 1902, 538,720 tons. Men employed 1,537.

NEW BRUNSWICK.

New
Brunswick.

The discovery of coal in the Province of New Brunswick dates back to 1782.—The most important, and so far, the only field of economic value in this province being that situated at the head of Grand lake, Queens county. This deposit has been worked to a limited extent since 1825. Rocks of Carboniferous age have been recognized over a great part of New Brunswick, but according to the conclusions arrived at by investigation and studies the coal seams occurring in them do not belong to the productive measures corresponding to those of Nova Scotia; and the conditions under which the known coal occurs in New Brunswick are not very favourable for mining on a large scale. Hopes were entertained that south of the Coastal Range the features more closely resembled those of the Nova Scotia coal basins. Deep borings were undertaken at different places, but the results obtained do not seem to be encouraging, for no workable coal-seams were encountered. Therefore, the coal-bearing measures of the province are limited to the Grand Lake field. The area of this field seems to be about 100 square miles. The quality of the coal is excellent but the seams are thin, from 15 to 20 inches. The total quantity of coal underlying this district has been estimated at from 100 to 150 million tons.

Although mining operations were begun more than fifty years ago, they are yet conducted in a small way, and the proximity of the Nova Scotia fields, as well as the limited thickness of the seams would hardly justify the expenditure necessary for exploitation on a large scale. The beds are flat, lying with a cover varying from 2 to 30 feet, rendering it possible in many places to work them opencast. This enables small seams to be worked profitably for the local market, when the stripping does not exceed 8 feet. Beyond this depth it would be more advantageous to work under ground.

MANITOBA AND NORTH WEST TERRITORIES.

Manitoba and
North-west
Territories.

In Manitoba and the North West Territories the coal measures occur in the Cretaceous system or in the Laramie, which may be regarded as its upward continuation. The coal is therefore of more recent age than that of the Atlantic Coast. The quality of the fuel grades from lignite or brown coal as that found in Southwestern Manitoba, to anthracite in the Rocky Mountains. These various grades of coal are

COAL.

Manitoba and
North-west
Territories.

found in measures of nearly the same geological age, the differences depending on the amount of alteration and disturbance undergone by the rocks. Therefore, as might be expected, the quality of the fuel improves as the Rocky mountains are approached. The Souris river country and eastern Assiniboia yield only lignites, whereas in western Alberta the character changes to lignite coal, becoming more and more bituminous as the Foot Hills are reached and in the outer range of the Rocky mountains, steam coal and anthracite are produced.

It is roughly estimated that the coal-bearing region of the North West Territory, between the international boundary and the 56th degree of latitude, has an area of some 65,000 square miles, and although the fossil fuel of the greater part of this is lignite, which is not so valuable as the true coals, yet such deposits possess great importance as sources of supply of fuel for the adjacent farming communities.

Several separate coal-bearing districts or basins have been recognized throughout the region, and in the majority of these, some work has been done, either of a prospecting nature or for local wants, while in some places, coal seams are systematically worked and extensive well-equipped collieries are in operation.

Souris River and Turtle Mountain Fields.—The Souris district is situated in the south-eastern part of Assiniboia and is underlain by several seams of lignite which constitute an almost inexhaustible supply. The use of this fuel in the districts remote from the sources of supply of better grades of coal, is extending rapidly, and the Souris lignite is now used for the generation of steam.

In the vicinity of Estevan, three seams are recognizable over a great part of the region. The upper is four feet thick and is the most constant. The middle is very variable in thickness, reaching in places a maximum of 6 feet. The lower is more strictly speaking a series of seams separated by partings of clay. The quality of the lignite of this last seam is superior to that of the upper one.

Roche Percée and Coalfields mines.—Operated by the Souris Coal Mining Co. This company owns sections 3, 4 and 5, tp. II, range VI, and sections 32, 33 and 34 tp. I, range VI. The seam is about 8 feet worked by adit on the banks of the Souris river. This mode of working presents the objection of considerable upgrade haul to reach the prairie level, and it is probable that work by shaft from the prairie level would decrease the cost of haulage. The mines are well equipped, having air compressors, coal-cutting machines, etc. They are equipped for an output 600 tons a day.

The Turtle Mountain Field is in the south-western part of the province of Manitoba and is separated from the Souris field by a synclinal in which no coal has been recognized as yet. Several coal seams were found on the northern flank of Turtle Mountain, a number of years ago, but so far have not given rise to very active mining operations. There are only small workings to supply local wants.

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North-west
Territories.

Belly River Coal Fields.

This coal-bearing region is situated in the southern part of Alberta. According to the results of Dr. Dawson's explorations in that region the outcrop of the seams which occur on the Belly river have been traced northwestward as far as the Red Deer river and southwestward to the 49th parallel, a distance of about 150 miles. The thickness and quality of the seams vary greatly, but on the Belly river and on the lower part of the St. Mary, a length of outcrop of 18 miles may be considered as workable. A list of the principal localities of the region, where natural outcrops of coal and lignite were observed, was published in the report of the Geological Survey for 1882-83-84, Part C.

Outcrops of coal are worked in numerous places, but in the majority of cases to supply only local demand. In Lethbridge, however, on the branch of the Canadian Pacific railway, an important colliery is in operation.

Lethbridge Colliery.—Operated by the Alberta Railway and Coal Company. Seam worked $5\frac{1}{2}$ feet, with a fire-clay parting of 2 to 6 inches. System of working, room and pillar, with coal-cutting machines and endless rope haulage. The mine is equipped for a production of 1,000 tons a day, but it is not worked to its full capacity. The company owns 66 miles of railway, from Lethbridge to Coutts, Alberta.

Cascade Basin.

This is part of the Bow River valley, which is underlain by Cretaceous coal-bearing rocks. It forms a basin or trough running approximately from the northern part of the Kananaskis range, south of latitude 51° , longitude 115° , in a northwesterly direction. Its total area is some 60 square miles. This area, although small, contains much coal. The rocks here have been greatly disturbed; in places the seams assume an almost vertical attitude. Most of the coal is bituminous, although some of the seams have been locally converted to anthracite.

COAL.

Manitoba and
North-west
Territories.

At Marsh's mine, near the south end of the field, are two seams, one of about 15 feet and the other eight feet. Three miles to the north-west of this are several openings into beds of workable size. At Canmore there are three seams of 4 feet, 12 feet and 16 feet, respectively. At Anthracite three seams are now being worked, two of a thickness of 4 feet each and one of 3 feet. All of these seams are situated very near the main line of the Canadian Pacific railway.

The measures in this field are often faulted, and the seams dip to the south-west at an inclination varying from 15 to 60 degrees. At Canmore two of the seams are almost vertical. The field was first opened by the Canadian Anthracite Coal Company in 1886 at Canmore and Anthracite.

Canmore Colliery.—This colliery is worked by the H. W. McNeil Company. The four seams worked vary considerably in thickness from 3 to 6 feet; worked by shaft and room and stall method. The product of the mine is a good bituminous coal.

Anthracite Colliery.—Operated by the H. W. McNeil Company. There are three seams worked which produce anthracite coal. The mine has an output of 100 tons a day. Both the Anthracite and the Canmore collieries are situated on the main line of the Canadian Pacific railway.

In the district around Edmonton there are several small mines operating, supplying the needs of Edmonton itself and the villages and market centres of that region. This industry, however, will certainly grow as the district becomes more thickly settled, and may in time assume great importance.

- *Blairmore-Frank Coal Fields.*

This coal-bearing area is situated on the eastern slope of the main range of the Rocky Mountains and extends in width from Crow's Nest lake for a distance eastward of fourteen miles. Its southern limit would be almost latitude 49° 20' and its northern boundary has not been determined.

In this field a section of the coal measures observed at Cat Mountain gave some 740 feet in which there are present 21 seams of an aggregate thickness of 125 feet 3 inches. Until 1900 very little work had been done in this field, but within the last three years its development has been very active.

Frank Colliery.—This is operated by the Canadian American Coal and Coke Company. It is located on the east flank of Turtle mountain.

Seam worked nine to twelve feet, dip 83° west. Worked by a main entry run in some 4,500 feet. Output about 500 tons a day, to be increased shortly. The coal produced is an excellent steam coal, though high in ash. COAL.
Manitoba and
North-west
Territories.

Lille Collieries.—Operated by the United Gold Fields of British Columbia. The mine is situated on Gold Creek, three and a half miles above the town of Frank. A railway line connects it with the Crow's Nest branch of the Canadian Pacific railway.

Recently another important colliery has been added to these two. It is operated by the International Coal and Coke Company, Blairmore, and is said to be shipping coal, but no particulars are at hand.

Besides these collieries, a great deal of prospecting work has been done in the region, and from all appearances this coal-field will probably grow in importance and become a great factor in the question of the fuel supply of the mining districts and the smelting centres of British Columbia and adjacent parts of the United States.

BRITISH COLUMBIA.

British
Columbia.

In western Canada coal occurs in connection with newer rocks than in the east. Although Carboniferous rocks of great thickness are frequently met in the west, they are all marine deposits, mainly limestones. Ancient swamps and marshes which afforded the conditions giving rise to accumulation of vegetable matter, producing coal beds, existed in the Cretaceous and Tertiary times. In character, the coals of British Columbia range from anthracite to lignite, showing that the grade depends on conditions of metamorphism rather than on age.

Four recognized coal-fields in British Columbia may be named, but mineral fuels are known in many other places, which have only to be worked in order to receive recognition.

The Crow's Nest Pass Field.

The Nanaimo Field.

The Comox Field.

The Queen Charlotte Islands Field.

Crow's Nest Pass Field.

This field is situated immediately west of the summit of the Rocky Mountains, which form the boundary between Alberta and the province of British Columbia. It has a length north and south of

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British
Columbia.

about thirty five miles and a maximum width of thirteen miles. An east and west line passing through the town of Fernie, divides it into two almost equal parts. On the west it is bounded by the Elk river, and on the east by the main ridge of the Rockies. About 230 square miles are underlain by the coal measures. Coal was discovered in this district many years ago and the first allusion to its existence in the Reports of the Geological Survey dates back to 1883, when Dr. G. M. Dawson approximately examined and defined the field in a preliminary way; however, it was only on the construction of the Crow's Nest Branch of the Canadian Pacific railway, a few years ago, that it became important from an economic standpoint.

The coal occurs in the Cretaceous rocks; it is bituminous in character, and cokes well. Some of the upper seams are said to partake of the character of cannel coal. In a section of the coal measures of this area, in a thickness of 4,700 feet, over 215 feet of coal were observed in beds of from one foot to forty six feet. Of these, at least one hundred feet would be workable, and on this assumption, some 22,600,000,000 tons would be available over the total area of 230 square miles.

There are at present three collieries in this field, working and producing actively. They are all operated by the Crow's Nest Pass Coal Company.

Coal Creek Collieries.—The Crow's Nest Pass Coal Co. was incorporated in 1897 and has operated these collieries since that time. The workings are situated on Coal Creek, about five miles from its mouth. Seams worked, 10 feet, 6 feet and part of a 36 feet seam. They are entered by tunnels. The mine is connected with the Canadian Pacific railway by a spur from the town of Fernie. At this place there are at present over 400 coke ovens of the bee-hive pattern, in operation. Production of this mine in 1902, 267,429 tons, of which about one-half was used in the production of coke.

Michel Colliery.—These workings are situated on the Crow's Nest branch of the Canadian Pacific railway. Work has been done on eight seams which outcrop here, but at present there are three mines in operation and producing, while the others are being developed. There are 200 coke ovens in operation, and 200 more under construction. Production of these collieries in 1902, 117,515 tons, of which 50,000 were converted into coke.

Morrissey Colliery.—Situated on Morrissey creek, about four miles from the Canadian Pacific railway. The colliery is connected with

the Great Northern railway by a branch from Jennings, Montana. COAL.
 Four mines are in operation at Morrissey, and a bank of 200 coke British
 ovens is under construction. Production for 1902, 46,291 tons, to be Columbia
 increased greatly in a near future.

To the north of the Crow's Nest Pass field, in the Elk river trough of Cretaceous rocks, is another development of coal-bearing rocks which has lately attracted some attention. This coal area lies between the Elk river and its tributary Fording river; its southern limit is some twenty-four miles north of the mouth of Michel creek, and the coal-bearing rocks extend northward. In a section of these measures, twelve seams were encountered, aggregating a total thickness of nearly ninety feet of coal. There are at present no means of communication beyond the rough trail along the Elk river, but the construction of a railway to reach this area would not offer any great difficulties. Several extensive concessions have been taken up.

West Kootenay, Kamloops.

In the Kamloops district of the West Kootenay, there are several occurrences of coal and lignite in rocks of Tertiary age. The most important of these known outcrops is on the Nicola river, near the Coldwater river. A list of coal outcrops in this district was given in Dr. G. M. Dawson's report on the Kamloops map sheet, Geological Survey Report, part B, vol. VII, 1894. In his report for 1901 the Provincial Mineralogist for British Columbia mentions that work is going on in this basin, but detailed information is not available.

North Fork, Kettle River.

The following extract from the Summary Report of the Geological Survey for 1901 is interesting as mentioning a new discovery of coal in the West Kootenay District.

"The new coal fields, as they are locally called, are situated about twenty-four miles above the forks of the East Branch on the Main North Fork of the Kettle river, or about fifty-two miles from Grand Forks. Here, as above mentioned, a tertiary outlier rests on the granite The extent of coal-bearing rocks is not large, as they are overlaid by the unproductive volcanic flows and immediately underlaid by granite which is exposed on the east bank for the greater part of the distance between the two exposures of coal. Nor have they a wide areal extension, as the granite boulders in the river and tributary creeks testify.

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“Colonel N. E. Linsley, of Spokane, who examined the district after my visit, reports having discovered four seams of coal on the lower (Gilpin’s) claim. Of these the upper (seven inches wide) was the largest and was separated from the lowest by 150 feet of tuffs. He also found the area of coal-bearing rocks to be extremely circumscribed. The coal is of very fair quality, coking easily and well.”

Nanaimo Coal Field.

This field is situated on the Island of Vancouver, towards its south-eastern part. Its area has been estimated at about 200 square miles. Two seams, at least, of workable thickness are known, but the measures being much folded and cut up by faults, it is very difficult to correlate the beds in the various parts of the field.

The product of both this and the Comox areas is largely exported to California, where it competes successfully with the coals produced in the United States, notwithstanding that it is handicapped by an import duty.

Nanaimo Collieries.—Operated by the Western Fuel Company, which took over the properties of the New Vancouver Coal Mining Co. This latter had been formed in 1862 and reorganized in 1889. Its output is the largest of the coal companies operating in Vancouver island. Figures of production for 1902 are not available, but in 1901, the output amounted to 584,826 tons. The collieries consist of the following workings.

Northfield Colliery.—Situated four miles from Departure bay. Seam worked 2 to 3½ feet thick; dip, 6 degrees; worked by shaft 440 feet deep, and slope at bottom 2,100 feet. System of working, long-wall. This colliery is at present idle.

No. 1, Shaft, Esplanade.—Situated half a mile from the wharfs of Nanaimo harbour.

Seam worked, the ‘Harbour’; thickness, 5 to 12 feet; dip, 6 degrees. System of working, pillar and stall.

Haulage. For haulage from the levels, which are in about 2 miles from the foot of the shaft, the company uses electric motors.

Ventilation by Guibal fan, 36 feet in diameter and 12 feet wide. Connected with the Protection island shaft which is used as intake.

Lamps, naked lights.

The workings of this extensive colliery are under the waters of Nanaimo harbour and beneath the surface of Protection island. The

mine is quite safe from invasion by water, being protected by a thickness of rock and earth varying from 400 to 1,200 feet between the workings and the bed of the harbour. The pillars left in place amount to two-thirds of the original seam, this large proportion being thought necessary to insure safety. They will be robbed at a later period.

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British
Columbia.

Protection Island Shaft.—Situated 300 yards from the shipping wharf and half a mile from Nanaimo.

Seams worked, the 'Douglass,' upper and lower. Thickness of upper seam 6 to 8 feet; dip 6 degrees, vertical depth of shaft to seam 670 feet. The lower seam is reached at a depth of 740 feet and is 4 feet thick.

In the upper seam two slopes have been driven, 900 and 600 yards respectively.

System of working, pillar and stall.

The Protection Island shaft is the intake of the system of ventilation which includes Esplanade shaft.

Southfield Colliery.—No. 5. Situated five miles from Nanaimo in the southern part of the area controlled by the Western Fuel Co.

Seam worked varies from 6 to 12 feet in thickness. Dip 6 degrees. Vertical depth of shaft 508 feet.

System of working, pillar and stall.

This part of the field is very much cut up by faults and breaks.

Harewood Mine.—This mine is situated about three miles and a half south-west of Nanaimo. This was worked actively some 25 years ago, and subsequently acquired by the New Vancouver Coal and Land Co. which left it idle for some time. In 1901 work was resumed at this place and the mine produced for a couple of years. The main workings are the Harewood slope on a six foot seam and a shaft which are now connected. Work however, was discontinued in September 1902.

Wellington Colliery, Cranberry District.—Operated by the Wellington Colliery Co.—The colliery is an important producer. The workings consist of No. 1 slope, No. 3 slope, and the Tunnel. The main equipment of the colliery consists of five miles of railway, four locomotives, 350 coal cars, stationary engines, electric power house, &c. The company has wharves and bunkers at Ladysmith, Oyster Harbour. The mining is carried on by pillar and stall. No figures of production are available for 1902, but in 1901 the output of the mine was 405,986 tons.

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Alexandria Colliery.—This is situated in South Nansimo district and is operated by the Wellington Colliery Co. Worked by a slope. The colliery is connected by a short railway line with the E. and N. railway. In 1901 the output of the mine was 68,420 tons. In 1902 no work was carried on, the colliery being allowed to remain idle all year. The Wellington Colliery Co. whose offices are at Victoria employ a staff for prospecting in this and other districts.

Comox Field.

This field is situated on the north-west of the Nanaimo field, from which it is separated by the intervention of crystalline rocks. The Comox area has probably a greater extent of productive measures than the Nanaimo field. Mr. Richardson, late of the Geological Survey, estimated it at 300 square miles, without taking into consideration the seaward extension.

In a section on Brown River, almost the entire thickness of the productive measures is exposed, amounting to 740 feet. In this section nine seams occur, with an aggregate thickness of $16\frac{1}{2}$ feet. At the Union mines a section of 122 feet reveals ten seams aggregating $29\frac{1}{2}$ feet, the thickest being 10 feet.

Wellington Colliery, Cumberland Town, Comox District.—This mine was formerly designated by the name of Union Mines. It is worked by the Wellington Colliery Co., which also operates two other mines in the Nanaimo field. The main workings consist of one slope and two shafts, worked partly by pillar and stall and partly by longwall. Seams worked, three feet and five feet respectively. The surface plant consists mainly of nearly 12 miles of standard gauge railway to shipping wharf; 4 locomotives; steam saw mill; coal washers; 200 beehive coke ovens at the mine, beside 70 at Union.

This company also carries on the manufacture of fire-bricks, from the fire-clay mined in connection with the extraction of the coal.

Queen Charlotte Island Field.

This field is in that part of the Cretaceous area of the province which extends over parts of Graham and Moresby Islands, on both sides of Skidegate Sound.

The coals are anthracite and bituminous, the former comparing favourably with that of Pennsylvania. In the 'Mineral Wealth of British Columbia' Dr. Dawson speaks of the Cowgitz seams on the Skidegate as follows:

'At Cowgitz, the Queen Charlotte Coal Mining Co. about 1871, ^{COAL.} constructed a wharf, houses, tramway, &c., and attempted to work the coal seams which have there the character of anthracite, but met with ^{British} difficulties in following the seams, of which some portions were found ^{Columbia.} to be in a crushed and pulverulent state.

'Though these efforts were not attended with success, the work was not carried far enough to prove that the coal in this vicinity is not of a workable character. Further exploration appears to be fully justified by what is known of the place * * * The beds containing the anthracite are almost vertical, and it is evidently on account of the disturbance and local alteration which it has suffered that the coal has passed into the condition of anthracite. The best seam found had a maximum thickness of a little over 6 feet, while a second outcrop showed 2 feet 5 inches.'

A bed 18 feet thick, of bituminous coal, has been reported on the Ya-Kum river, midway between Skidegate and the head of Masset inlet.

Means of communication with the coast, however, must be provided before this deposit can be utilized.

In 1892 Mr. H. E. Parrish, C.E. and M.E., late of the staff of the Geological Survey of Pennsylvania, examined some coal areas on this island for private parties. After mentioning and describing some prospecting work done at Camp Robertson, section 20, township 5; Camp Anthracite, section 17, township 5; Camp Wilson, section 36, township 9; he concludes with the following remarks:

* "With the knowledge I have of the coal regions of Pennsylvania, acquired there as a mining engineer and on the geological staff of that state, it must gratify you to know that in my judgment you have the best coal field I have seen. Until I visited it, I had no conception such a valuable field existed on the Pacific Coast. You possess a number of beds of unusual thickness, containing coals of superior quality, suitable for all requirements. You have anthracite, first class steam, gas and coking coals, and a bed, over 15 feet thick, excellent for domestic purposes."

Peace River region.

Of the other localities in British Columbia where coal has been observed, the country in the Peace river region is likely to come into

* Report of H. E. Parrish, extracts of which were published in the Report of the Minister of Mines for British Columbia for 1898, p. 1163.

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prominence if the project now being discussed of the building of the Grand Trunk Pacific Railway becomes a fact. The line, as it is now projected, would follow part of the Peace river valley and would pass at a moderate distance from the cañon where Dr. Selwyn and Dr. Dawson observed outcrops of coal.

Dr. Selwyn in his report on the Peace river country in 1875, mentions four seams of good lignite coal, from six inches to two feet in thickness, as occurring on Peace river below the cañon.

As to the coal-bearing character of the country, Dr. Dawson expresses himself as follows: "It would thus appear that while in the region lying between the Athabasca and the Peace rivers, no coal-seams sufficiently thick to be of great economic value have yet been discovered, that coal and lignite of good quality occur in two distinct series of beds. Wherever natural sections of these occur in the valleys of rivers and streams, coal in greater or less quantity is found, and the persistently carboniferous character of the beds, thus abundantly proven. There can be little doubt that beds of a workable character exist in different parts of this district and will be found by further search.

"The promising coal-bearing belt of rocks supposed to belong to the lower sandstones and shales which run south-eastward from the cañon of the Mountain of Rocks to Table Mountain and the lower forks of Pine river, probably extends still further in the same direction, crossing the head-waters of the Wapiti and Smoky rivers above the points reached in my explorations, and forming the southwestern side of a synclinal in which the Upper sandstones and shales lie. In this the coals reported by the Indians to exist on the upper parts of these rivers may occur."

In support of these views, it is interesting to quote the following section measured recently by Mr. Hugh Campbell up a small creek on the Peace river cañon.*

	Ft. In.		Ft. In.
Blue shale	10	Shale	20
Shale with hard bands	6	Limestone	3
Sandstones	10	Unseen strata	50
Gray shale	8	Fossiliferous sandstone	30
Impure cannel coal	2	Coal	2 7
Coal, good	9	Shale	9 0
Soft blue shale	7	Coal	0 8
Measures not seen	50	Calcareous shale	12
Limestone	10	Coal	1 4
Sandstone	9	Hard gray shale	20

* From a private letter communicated by Dr. H. M. Ami.

	Ft. In.		Ft. In.	
Soft shales.....	20	Dark shale.....	10	COAL.
Coal.....	2	Coal.....	2 8	British
Shales with bands.....	30	Hard rock.....	2	Columbia.
Sandstone.....	10	Soft dark shale.....	2 6	
Shale.....	1 3	Coal.....	4 2	
Cannel coal.....	1	Soft clay.....	3	
Shale.....	20	Shale.....	6	
Coal.....	3 10	Limestone.....	6	
Sandstone.....	3	Coal.....	3	
Shale.....	4	Shale.....	5	
Sandstone.....	20	Coal.....	2 6	
Coal.....	1 4	Sandstone.....	8	
Sandstone.....	10	Shale with bands.....	8	
Shale.....	5	Sandstone.....	6	
Sandstone.....	20	Shale.....	1 3	
Limestone.....	4	Coal.....	3	
Shale.....	10	Sand.....	1	
Hard bands.....	50	Coal.....	3	
Limestone.....	4	Dark soft shale.....	2	
Sandstone.....	15			

The measures, according to Mr. Campbell, dip S. 30° E. at an angle of about 13°.

YUKON TERRITORY.

Yukon
Territory.

Lignites and lignitic coals occur in the Tertiary rocks of the valleys of the Yukon river and of the Klondike river. On Coal creek, a branch of Rock creek, a tributary of the Klondike, a seam occurs in which a tunnel some 400 feet in length has been driven. These workings are situated about 20 miles from Dawson. The seam worked here consists of an upper part of 3 feet of hard lignite, and a lower part of 2 to 3 feet, separated by a layer of clay of about one foot. Outcrops of lignite also occur on Cliff creek, which enters the Yukon about 55 miles below Dawson. Between these two occurrences, other outcrops have been observed at intermediate points, and it has been estimated that this area underlaid by lignite exceeds 200 square miles.

On Cliff creek the lignite is worked very actively by the North American Trading and Transportation Company. The workings are situated on both banks of the creek, $1\frac{3}{4}$ miles from its mouth. The coal is shipped to Dawson for heating purposes and is also used by river steamers. The mine is connected with the shipping wharf by a narrow gauge railway.

COAL
Analyses.ANALYSES OF CANADIAN COALS.
SYDNEY FIELD, N.S.

Seam of Mine.	Fast or slow cooking.	Moisture.	Vol. Matter.	Fixed Carbon.	Ash.	Sulphur.	Spec. Gravity.	Theor. Evap. Power.	*Analyst.	†Reference.
		p. c.	p. c.	p. c.	p. c.	p. c.				
Hub seam.....			29.10	65.50	4.50	3.29	.....	.....	.....	C
".....			28.62	68.14	3.24	2.29	.....	8.59	k	D
Block House seam...	S	600	29.48	65.57	4.35	2.63	1.292	8.97	a	A
".....			31.94	62.79	5.27	3.76	.....	7.67	k	D
Harbour seam.....	S	.80	27.85	67.05	4.30	2.32	1.29	9.19	a	A
" Internat. Coll.....			34.09	62.92	2.99	2.26	.....	7.76	a	B
" Glace Bay.....			30.21	67.78	2.01	.90	.....	9.31	k	D
Victoria seam.....	S	.28	37.96	54.84	5.60	4.03	.....	.....	.....	C
".....			28.61	67.61	3.50	2.84	1.29	9.27	a	A
".....			38.70	58.40	2.90	.....	.....	8.02	b	D
Sydney main.....	S	3.04	31.14	61.50	4.32	1.24	1.30	8.45	c	B
".....			3.13	67.57	5.49	.....	.....	9.25	.....	E
Sydney Colliery.....	S	1.26	23.81	60.79	4.12	1.71	1.312	8.33	a	A
".....			33.84	61.54	5.72	3.37	.....	8.49	k	B
McAulay seam, Gowrie mine.....			32.74	61.54	5.72	3.37	.....	8.49	k	B
Gowrie Colliery.....			36.25	58.05	5.70	2.34	.....	7.97	p	D
Phelan seam, Caledonia Coll.....	S	.50	28.13	66.01	5.36	2.71	1.31	9.05	a	A
".....			28.63	64.02	6.43	1.11	1.33	8.78	a	A
".....		.92	33.00	57.37	9.63	.....	.....	7.88	d	C
" Reserve Coll.....			28.02	68.05	2.19	1.72	.....	.....	.....	B
".....			32.00	63.93	2.95	1.33	.....	.....	.....	C
".....			37.26	58.39	4.35	2.06	.....	8.02	r	B
".....		1.00	36.26	58.39	4.35	2.47	.....	.....	.....	B
".....			34.50	59.50	6.00	.....	.....	.....	s	B
".....			34.21	59.73	5.54	1.25	1.28	8.19	a	A
" Dominion No. 1 Coll.....		.52	25.13	71.22	2.73	1.10	.....	.....	.....	C

"	Old Bridgeport.....	31.81	63.86	3.09	1.33	7.88	C
"	Clyde Coll.....	32.82	64.33	2.85	2.17	8.42	D
"	Lingan seam.....	34.61	61.39	3.25	1.35	9.07	A
"	South Head seam.....	30.03	66.90	3.07	.77	1.38	D
"	Emery seam.....	28.00	62.26	7.97	2.64	1.98	A
"	Emery seam.....	32.21	63.49	3.65	2.41	8.70	A
"	Ross seam, Schooner Pond.....	38.10	58.46	3.44	1.21	8.03	B
"	Collins seam.....	26.16	66.48	5.40	2.25	9.10	A
"	Gardiner seam.....	31.96	65.22	2.82	1.31	8.51	B
"	Lorway seam.....	34.33	61.97	3.70	1.18	8.51	A
"	Tracey seam.....	34.84	55.98	13.28	5.27	8.02	D
"	Kraser seam.....	30.09	66.61	.98	.....	.....	B
"	Carroll seam.....	31.40	62.40	6.20	.....	.....	B
"	Block House seam.....	32.80	61.40	5.80	.....	.....	B
"	Block House seam.....	38.80	56.80	5.40	.....	7.67	B

COAL — 4

INVERNESS FIELD, N.S.

Chimney Corner.....	F	8.19	57.70	7.72	.....	.....	A
Broad Cove, 7-foot seam.....	S	4.02	70.41	5.40	.....	.....	A
"	S	7.24	56.86	10.15	1.41	7.61	A
"	S	7.78	52.87	11.68	.....	.....	E
"	S	8.45	56.94	6.25	.....	.....	E
Port Hood.....	S	2.54	61.93	5.73	5.54	8.49	A
"	S	4.02	53.60	7.52	.....	.....	E
"	S	2.11	49.25	9.78	.....	.....	E
Port Hood mines, face of slope depth of 1,150 feet.....	2.47	38.48	8.66	B
"	2.47	50.39	8.66	B
"	2.42	50.96	9.44	B
"	2.42	37.18	B

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COAL.
 Analyses.

COAL
Analyses.

ANALYSES OF CANADIAN COALS—Continued.
RICHMOND FIELD, N.S.

Seam or Mine.	Fast or slow coking.	Moisture.	Vol. Matter.	Fixed Carbon.	Ash.	Sulphur.	Spec. Grav.	Theor. Evap. Power.	*Analyst.	†Reference.
		p.c.	p.c.	p.c.	p.c.	p.c.				A A
Sea Coal Bay, 11-foot seam.....		25.20	44.70	30.10					b	
Little River, 4-foot seam.....		30.25	56.40	13.25						

PICTOU FIELD, N.S.

Main seam, average of 31 analyses (a).....	S	1.48	23.65	62.61	13.61	.....	.....	.....	b	B
" Ford pit.....	S	1.05	24.28	66.50	7.74	.55	1.294	9.13	c	B
Albion Mines.....	S	1.50	26.19	63.41	9.35	1.48	1.31	8.68	a	A
Acadia Coal Co.—McGregor pit, slack.....	S	1.50	26.80	58.00	13.70	1.73	.....	.....	m	F
" Ford pit.....	S	2.10	25.90	54.30	18.30	.73	.....	.....	n	F
Acadia Colliery.....	S	.72	32.27	57.57	7.55	.51	1.920	.....	d	B
Drummond Colliery—Top coal.....		1.56	29.93	60.35	9.46	.26	1.309	8.23	d	B
" Fall coal.....		1.80	31.69	60.32	7.56	.43	1.328	8.29	d	B
" 1st bench.....		1.31	33.53	55.39	10.50	.58	1.327	7.61	d	B
" 2nd ".....		1.43	29.97	60.31	8.67	1.05	1.343	8.29	d	B
" 3rd ".....		1.58	30.76	59.89	8.79	.564	1.335	8.27	d	B
" Coarse bench.....		1.75	32.81	37.16	31.03	.....	1.765	.....	d	B
Deep seam.....	S	1.30	20.34	68.50	10.41	.945	1.330	9.39	a	A
"	S	2.54	25.44	61.65	10.25	.861	1.330	.....	d	B
" .....		.....	20.46	68.50	8.50	1.69	1.345	9.41	c	B
McGregor seam.....		.....	22.50	65.70	11.80	.....	1.334	9.03	.....	B
" .....		.....	23.30	70.00	6.70	.....	1.301	9.62	.....	B

COAL.
Analyses.

Intercolonial Mine	S	1.52	29.46	60.19	9.10	1.625	1.330	8.24	A
Montreal and Pictou Mines		4.40	24.95	61.07	9.58			8.39	B
"		5.47	19.93	68.55	6.05		1.360	9.41	B
McBean seam, east side of East River		1.57	20.29	52.36	16.76				B
"		2.67	28.65	49.66	19.42				B
"		2.67	27.20	54.86	15.27				B
"		1.94	23.95	57.17	16.94				B
"		.86	20.95	64.95	13.24	.85			A
McKay seam, north part	S	1.62	22.86	68.18	7.34	.53		8.90	A
" south "	S	.90	22.50	65.28	11.32	1.72		8.97	A
"		None.	29.72	62.28	8.00				B
"		None.	29.98	62.15	7.87				B
Richardson seam		.76	38.84	55.81	5.09				B
Greener	S	1.22	22.96	65.61	10.21	Trace.		8.99	A
Pottery		.57	19.24	72.76	7.43	.65		9.97	A
CUMBERLAND FIELD, N.S.									
Joggins	S	2.50	36.30	56.00	5.00				A
Maccan	S		37.00	59.17	3.83				A
Styles	S	4.05	33.72	55.83	6.40				A
"	S	3.72	33.24	52.15	10.89				A
Springhill—Main seam, 11 feet—									
Band No. 1	S	.98	30.84	60.73	7.45	.85	1.31	8.33	A
" No. 2	S	.76	32.22	60.91	6.11	.56	1.30	8.40	A
" No. 3	S	1.21	33.81	63.13	1.85	.79	1.28	8.65	A
" No. 4	S	.30	29.19	67.95	2.56	1.21	1.27	9.28	A
" No. 5	S	.63	28.90	65.16	5.31	1.85	1.23	8.92	A
" No. 6	S	.90	34.56	60.59	3.95	.89	1.28	8.32	A
" No. 7	S	1.34	33.64	59.86	5.16	1.40	1.29	8.20	A
" No. 8	S	.56	30.27	60.89	8.28	2.65	1.33	8.35	A
" No. 9	S	.41	28.54	63.63	7.42	2.25	1.32	8.99	A

(a) Average of samples taken every foot across the section of the seam.

MINES SECTION

COAL.
Analyses.

Belly river, 5 miles below Little Bow river.....	S	9-18	30-66	53-31	6-85	1-398	10-84	B	
coal banks, seam 5 $\frac{1}{2}$	S	6-50	31-59	54-36	7-55	1-359	11-51	B	
St. Mary river, 7 miles above junction with Belly river.....	S	7-02	29-41	57-28	6-29	1-369	11-72	B	
Yukon District, 7 miles up Coal creek, seam 12 $\frac{1}{2}$ feet.....	F	7-24	41-45	48-91	2-40			B	
COALS.									
Cascade river, 2 $\frac{3}{4}$ miles from confluence with Bow river, seam 20 inches.....	S	2-07	15-84	74-35	7-74			B	
Cascade river, semi-anthracite, seam 3 feet 10 inches, $\frac{1}{2}$ mile from C.P.R.....	F	1-04	9-15	87-18	2-63			B	
Bow river, Coal creek seam 4 $\frac{1}{2}$ feet.....	S	4-93	27-22	52-54	15-31	1-400	10-93	B	
Bow river, Pass seam 4 feet.....	S	.71	10-58	81-14	7-57	1-427	14-62	B	
Coal creek, Bow river, Sec. 22, Tp. 27, R. 5, west of 5th M.....	F	2-79	36-90	53-40	6-91			B	
Marsh's Mine, $\frac{1}{2}$ mile south of Bow river at Gap siding, 2 seams, 10 and 12 feet.....		.70	11-03	79-78	8-49			B	
Little Red Deer river, 11-foot seam; foot-hills at base of main limestone range of Rocky mountains.....	F	1-87	13-74	79-55	4-84			B	
Little Red Deer river, seam 4 feet.....	F	1-52	11-66	81-16	5-67			B	
Sheep creek, Sec. 2, Tp. 20, R. 3, west of 5th M., 4-foot seam.....	F	3-08	39-37	54-50	3-05			B	
Near Moose mountain, Sec. 8, Tp. 23, R. 6, west of 5th M., seam 5 feet.....	F	2-74	18-62	75-52	3-12			B	
Head waters of Mill and Pincher creeks, Sec. 10, Tp. 5, R. 1, west of 5th M., seam 8 feet.....		1-99	20-88	61-87	15-26			B	
Old Man river, north fork, 5 feet.....	S	1-75	16-85	61-54	19-86	1-530	11-32	B	
" " middle fork, 3 feet.....	S	3-27	26-41	50-50	19-82	1-482	11-13	B	
" " south fork 9 $\frac{3}{4}$ ".....	S	2-36	32-07	56-37	9-20	1-311	13-06	B	
" " south fork 9 $\frac{3}{4}$ ".....	F	1-93	23-23	57-50	17-34			B	
Anthracite, Alberta Territory, H. W. McNeil & Co.— 1st vein, raw.....		.10	13-09	78-94	7-87			F	
" " washed.....		.39	14-82	79-98	4-84			F	
2nd vein, raw.....		.42	15-46	75-07	9-05			F	
" " washed.....		.40	6-02	89-40	4-18			F	
3rd vein, raw.....		.08	15-12	76-67	8-13			F	
" " washed.....		.07	15-30	79-46	5-17			F	

* } See page 51.
+ }

COAL.
Analyses.

ANALYSES OF CANADIAN COALS—Continued.
CROW'S NEST PASS, B.C.

Seam or Mine.	F ast or s low c o k i n g.	Moisture.		Vol. Matter.		Fixed Carbon.		Ash.		Subsur.	Spec. Gravity.	Theor. Evap. Power.	*Analyst.	†Reference.
		p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.					
Marten creek—Peter seam, 14 ft.	S	1.79	25.45	69.14	3.62	.51	1.305	14.99	l	B				
" Jubilee seam, 30 ft.	S	1.89	24.88	68.86	4.37	.48	1.309	14.64	l	B				
" Four seams, 3, 4, 5 and 6 ft.	S	2.10	44.41	43.63	9.86	.....	.....	.....	l	B	
" Two-foot seam.	F	2.12	26.92	43.48	27.48	.....	.....	.....	l	B	
" Middle seam, 2½ ft.	F	1.82	24.55	51.22	22.41	.....	.....	.....	l	B	
On Elk river seam, 15 feet. ....	.....	.....	21.76	68.20	10.04	.....	.....	.....	.....	B
Morrissey mine, No. 1—Highest seam worked; 18 ft. thick; dip, N. 21°; strike, E and W; suitable for steam. ....	.....	.9	22.19	70.99	5.6	.....	.82	14.346	u	G
Morrissey mine, No. 2—Seam, 18 ft.; dip and strike same as above; suitable for steam and household. ....	.....	.82	11.73	71.5	15.75	.2	.....	12.858	u	G	
Coal creek mine, No. 1—Seam, 8 ft.; dip, E. 15°; suitable for steam and household. ....	.....	.84	22.38	73.17	3.15	46	.....	14.935	u	G	
" No. 1—Seam, 9 ft.; dip, E. 15°; steam and household. ....	.....	.92	18.85	64.42	15.65	.16	.....	13.757	u	G	
" No. 2—Seam, 6 ft.; dip, E. 15°; suitable for steam and household. ....	.....	.84	22.38	73.17	3.15	.46	.....	14.935	u	G	
" No. 3—Same seam as above; samples taken one mile apart. ....	.....	.92	20.63	72.05	6.0	.4	.....	14.284	u	G	
" No. 4—750 ft. below No. 1; seam, 22 ft.; dip, E. 10°. ....	.....	.96	13.46	61.92	23.5	.16	.....	12.114	u	G	
Michel Mine, No. 3—Highest seam worked, 15 to 30 ft.; used for steam and coke. ....	.....	1.0	20.57	72.00	6.15	.28	.....	14.656	u	G		
" No. 4—80 feet below No. 3; 10 to 30 ft.; used for steam and coke. ....	.....	1.0	18.93	70.13	9.5	.44	.....	13.850	u	G		

NICOLA VALLEY.

Nicola river, mouth of Coldwater river.....	2.13	27.99	59.66	10.22	.....	.....	u
Coal gully, Iron mountain.....	3.36	26.95	59.30	10.30	.....	.....	u

NANAIMO FIELD, B.C.

Wellington mines, Nanaimo.....	2.75	30.95	59.72	6.58	.....	.....	t
Upper seam, Nanaimo.....	38.40		51.45	10.15	.....	.....	t
Newcastle island, Nanaimo.....	1.57	30.95	58.03	8.63	.....	.....	t
"	35.49		52.57	11.94	.....	.....	t
Esplanade, No. 1 shaft, upper seam.....	1.88	33.27	54.67	9.4	.....	.....	u
" " lower seam.....	2.86	35.84	54.79	5.5	.....	.....	u
Harewood mine.....	1.58	33.84	52.17	11.85	.....	.....	u
Southfield mine, No. 5.....	2.08	35.78	56.26	5.6	.....	.....	u
Extension seam, bottom vein.....	1.28	35.26	55.83	7.30	.....	.....	u
" top vein.....	1.24	36.49	58.72	8.20	.....	.....	u
Tunnel vein, bottom seam.....	1.52	35.27	57.04	5.85	.....	.....	u
" ".....	1.44	31.40	46.18	20.65	.....	.....	u

COMOX FIELD, B.C.

Union Colliery.....	1.34	28.11	67.72	2.83	.....	.....	t
" "	1.70	27.17	68.27	2.86	.....	.....	t
Baynes sound mine.....	1.18	34.13	48.51	16.18	.....	.....	t
Trent river.....	.97	25.09	66.42	5.95	.....	.....	t
Beaufort mine, Comox.....	29.30		55.75	14.95	.....	.....	t
Union No. 5 Pit upper seam.....	1.08	29.24	57.03	9.60	.....	.....	u
Hamilton lake.....	1.70	22.82	47.72	27.00	.....	.....	u
No. 4 Slope Comox or lower seam.....	.88	27.34	61.82	8.70	u
No. 5 Pit.....	1.32	27.62	63.64	6.70	u
No. 6 Pit " ".....	1.26	27.33	63.49	6.80	u

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