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

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

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

During the Calendar Year

1916

JOHN McLEISH, B.A.
Chief of the Division of Mineral Resources and Statistics.

OTTAWA
GOVERNMENT PRINTING BUREAU
1918

30894c

No. 474

LETTER OF TRANSMITTAL.

DR. EUGENE HAANEL,
Director Mines Branch,
Department of Mines,
Ottawa.

SIR,—

I beg to hand you, herewith, the Annual Report on the Mineral Production of Canada, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year 1916.

A preliminary report on the mineral production during 1916 was sent to press February 28, 1917, and issued within the following week.

Parts of the present report—including "Report on the Production of Iron and Steel in Canada during 1916;" "Report on the Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and other Metals, in Canada, during 1916;" "Report on the Production of Coal and Coke in Canada, during 1916;" and "Report on the Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada, during 1916," have already been separately published.

In the preparation of this Report, Mr. A. Buisson has again contributed largely to the compilation of the special chapters on gold, silver, copper, lead, nickel, zinc, and miscellaneous metallic minerals. Mr. J. Casey has not only given particular care to the compilation of the statistical tables, but has also contributed the section on "Cement, Lime, Clay Products, and Other Structural Materials."

Grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have almost without exception cheerfully complied with our requests, and furnished the department with statistics and information regarding their operations.

I have the honour to be, Sir,
Your obedient servant,
(*Signed*) **John McLeish.**

DIVISION OF MINERAL RESOURCES AND STATISTICS,
October 27, 1917.

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The term "ton" used throughout this report signifies a ton of 2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The Government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation, published by the Customs Department.

The term "production" used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped, at the end of the year, are not included as "production." An exception to this usage will be found in reference to pig-iron, in which case the statistics of production represent the quantities made.

The value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard, except in the case of lead, for which the Montreal price is now used. The value of non-metallic products is given as at the mine or point of shipment.

THE

MINERAL PRODUCTION OF CANADA

During the Calendar Year

1916

General Summary

The term "mineral production" is so comprehensive that in general statistical compilations on the subject there is wide divergence in method in respect to the character of mineral products which shall be included; the adoption of a basis of valuation; and the period of time to be covered. These differences in methods, which have been the subject of discussion in previous reports, are the principal cause of most of the apparent discrepancies that are found in mining statistics emanating from different authorities.

A Preliminary Report on the Mineral Production of Canada in 1916 was published on February 28, subject to revision, in which the following general comments were made:—

"The war has had a most pronounced effect not only in stimulating the production of those metals such as nickel, copper and zinc, iron and steel, molybdenum, etc., which are used so extensively for war purposes, but also in increasing the production of other products such as chromite and magnesite which can only now be obtained with difficulty if at all from sources previously available. The general industrial activity in metallurgical operations and in the manufacture generally of munitions of all kinds, including freight movements required, have in turn increased the demand for fuel which has been met in western Canada at least by large increases in coal production."

"Increased production in quantity has in most instances been accompanied by large increases in prices, thus further enhancing the total value of the production."

"Considerable progress has been made during the year in establishing and increasing smelting and refining capacities, of which the installation of electrolytic zinc and copper refineries at Trail and the beginning of construction of a nickel refinery at Port Colborne, Ont., are conspicuous examples. In addition, mention should be made of the production of metallic magnesium at Shawinigan Falls; of ferro-molybdenum at Orillia and Belleville; of metallic arsenic at Thorold; and of stellite, the cobalt

alloy for high speed tool metal, at Deloro; and of the increased capacity for the production of steel particularly the installation of electric furnaces.

"The mining output has been restricted and the efficiency of its operation considerably reduced by the withdrawal for war service of such a large proportion of the more highly experienced labour and engineering supervision. Higher costs have tended to offset the advantages to be derived from higher prices of output and in the case of gold mining have been a distinct burden."

"The mining and metallurgical industries include a great variety of products so that in dealing with the industry as a whole the total value presents the only means of comparison."

The total value[1] of the metal and mineral production in 1916 was $177,201,534, compared with $137,109,171 in 1915; $128,863,075 in 1914, and $145,634,812 in 1913, the latter being the highest production previously recorded. The increase in 1916 over 1915 was $40,092,363, or 29·2 per cent, while compared with 1913 the increase was $31,566,722, or 21·7 per cent.

The record of annual mineral production in Canada since 1886, shown in the following table, indicates the rapid growth which the mineral industry has made.

Annual Mineral Production in Canada since 1886.

Year.	Value of production.	Value per capita.	Year.	Value of production.	Value per capita.
1886	$10,221,255	$ 2.23	1901	$65,797,911	$12.16
1887	10,321,331	2.23	1902	63,231,836	11.36
1888	12,518,894	2.67	1903	61,740,513	10.83
1889	14,013,113	2.96	1904	60,082,771	10.27
1890	16,763,353	3.50	1905	69,078,999	11.49
1891	18,976,616	3.92	1906	79,286,697	12.81
1892	16,623,415	3.39	1907	86,865,202	13.75
1893	20,035,082	4.04	1908	85,557,101	13.16
1894	19,931,158	3.98	1909	91,831,441	13.70
1895	20,505,917	4.05	1910	106,823,623	14.93
1896	22,474,256	4.38	1911	103,220,994	14.42
1897	28,485,023	5.49	1912	135,048,296	18.27
1898	38,412,431	7.32	1913	145,634,812	18.77
1899	49,234,005	9.27	1914	128,863,075	15.96
1900	64,420,877	12.04	1915	137,109,171	.....
			1916	177,201,534	.....

The total value of the production in 1886 was $10,221,255, or about $2.23 per capita. In ten years the value had increased to $22,474,256, or $4.38 per capita, more than twice the total in 1886, and nearly twice the production per capita. The next ten years witnessed an increase to $79,286,697 in 1906, or $12.81 per capita, about 3½ times the production in 1896. From 1906 to 1916 the total production has shown an increase of over 120 per cent.

[1]In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals, copper, gold, lead, nickel, and silver is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

Comparative Statement of Mineral Production for Years 1915 and 1916.

Product.	1915.			1916.			Increase (+) or Decrease (−).		Increase (+) or Decrease (−).	
	Quantity.	Value (*a*).	Per cent of total.	Quantity.	Value (*a*).	Per cent of total.	Quantity.	%	Value.	%
Metallic.										
Antimony ore *Tons.	1,341	$ 81,283	.....	885	$ 94,537	.....	− 456	34·0	+$ 13,254	16·3
Antimony refined Lbs.	59,440	11,888	.....	107,185	41,823	.....	+ 47,745	80·3	+ 29,935	251·8
Cobalt metallic and contained in oxide, etc. „	504,212	536,268	0·39	840,536	924,590	0·52	+ 336,324	66·7	+ 388,322	72·4
Copper (*b*) „	100,785,150	17,410,635	12·69	117,150,028	31,867,150	17·98	+16,364,878	16·2	+14,456,515	83·0
Gold Ozs.	918,056	18,977,901	13·84	930,492	19,234,976	10·85	+ 12,436	1·4	+ 257,075	1·4
Iron, pig, from Canadian ore (*c*) Tons	158,595	1,715,874	1·25	115,691	1,328,605	0·75	− 42,904	27·1	− 387,269	22·6
Iron ore sold for export (*k*) „	89,730	181,381	.....	140,608	393,689	0·22	+ 50,878	56·7	+ 212,308	117·1
Lead (*d*) Lbs.	46,316,450	2,593,721	1·89	41,497,615	3,532,692	1·99	− 4,818,835	10·4	+ 938,971	36·2
Molybdenite „	29,210	28,450	.....	156,461	156,461	0·09	+ 127,251	435·6	+ 128,011	449·9
Nickel (*e*) „	68,308,657	20,492,597	14·95	82,958,564	29,035,498	16·39	+14,649,907	21·4	+ 8,542,901	41·7
Platinum Ozs.	23	1,063	.....	15	600	.....	− 8	34·8	− 463	43·7
Silver (*f*) „	26,625,960	13,228,842	9·65	25,459,741	16,717,121	9·43	− 1,166,219	4·4	+ 3,488,279	26·4
Zinc ore (*m*) Tons.	14,895	554,938	0·40	.....	.....	.....	.....	.....	.....	.....
Zinc (*m*) Lbs.	.....	.....	.....	23,364,760	2,991,623	1·69	.....	.....	.....	.....
Total	.....	75,814,841	55·30	.....	106,319,365	60·00	.....	.....	+30,504,524	40·2

Comparative Statement of Mineral Production for Years 1915 and 1916—Continued.

Product.	1915.			1916.			Increase (+) or Decrease (−).		Increase (+) or Decrease (−).	
	Quantity.	Value (a).	Per cent of total.	Quantity.	Value (a).	Per cent of total.	Quantity.	%	Value.	%
Non-metallic.										
Actinolite Tons	220	$ 2,420	.....	250	$ 2,750	.....	+ 30	13·6	+$ 330	13·6
Arsenious oxide "	2,396	147,830	.....	2,186	262,349	0·15	− 210	8·8	+ 114,519	77·5
Asbestos "	111,142	3,553,166	2·59	133,439	5,199,797	2·93	+ 22,297	20·1	+ 1,646,631	46·3
Asbestic "	25,700	21,819	.....	20,710	29,072	.....	− 4,990	19·4	+ 7,253	33·2
Chromite "	12,341	179,543	.....	27,517	311,460	0·18	+ 15,176	122·9	+ 131,917	73·5
Coal "	13,267,023	32,111,182	23·42	14,483,395	38,817,481	21,91	+ 1,216,372	9·2	+ 6,706,299	20·9
Corundum "	262	33,138	.....	67	10,307	.....	− 195	74·4	− 22,831	68·9
Feldspar "	14,559	57,801	.....	19,488	71,407	.....	+ 4,929	33·9	+ 13,606	23·5
Fluorspar "	.....	.....	.....	1,284	10,238	.....	+ 1,284	.....	+ 10,238	.....
Graphite "	2,635	124,223	.....	3,955	325,362	0·18	+ 1,320	50·1	201,139	161·9
Graphite, artificial "	249	.....	.....	263	.....	.....	+ 14	5·6	.....	.....
Grindstones "	2,580	35,768	.....	3,478	52,782	.....	+ 898	34·8	+ 17,014	47·6
Gypsum "	474,815	854,929	0·62	342,915	738,593	0·42	− 131,900	27·8	− 116,336	13·6
Magnesite "	14,779	126,584	.....	55,413	563,829	0·32	+ 40,634	274·9	+ 437,245	34·5
Manganese "	201	9,360	.....	957	89,544	.....	+ 756	376·1	+ 80,184	856·7
Mica "	.....	91,905	.....	(1,208)	255,239	0·14	.....	.....	+ 163,334	177·7
Mineral pigments—										
Barytes Tons	550	6,875	.....	1,368	19,393	.....	+ 818	148·7	+ 12,518	182·1
Oxides "	6,248	48,353	.....	8,811	58,711	.....	+ 2,563	41·0	+ 10,358	21·4
Mineral water	.....	115,274	.....	.....	127,806	.....	.....	.....	+ 12,532	10·9
Natural gas (g) M. cu. ft.	20,124,162	3,706,035	2·70	25,467,458	3,958,029	2·23	+ 5,343,296	26·6	+ 251,994	6·8
Peat Tons.	300	1,050	.....	300	1,500	.....	.....	.....	+ 450	42·9
Petroleum Bls.	215,464	300,572	0·22	198,123	392,284	0·22	− 17,341	8·0	+ 91,712	30·5
Phosphate Tons	217	2,502	.....	203	2,514	.....	− 14	6·5	+ 12	0·5
Pyrites "	286,038	985,190	0·72	309,251	1,084,095	0·61	+ 23,213	8·1	+ 98,905	10·0
Quartz "	127,108	205,153	0·15	136,745	251,226	0·14	+ 9,637	7·6	+ 46,073	22·5
Salt "	119,900	600,226	0·44	132,903	717,653	0·40	+ 13,003	10·8	+ 117,427	19·6
Talc "	11,885	40,554	.....	13,104	49,423	.....	+ 1,219	10·3	+ 8,869	21·9
Tripolite "	317	12,119	.....	620	12,139	.....	+ 303	95·6	+ 20	0·2
Total	.....	43,373,571	31·63	.....	53,414,983	30·14	.....	.....	+10,041,412	23·2

Structural Materials and Clay Products.

Cement, portland	Bls.	5,681,032	$ 6,977,024	5·09	5,369,560	$ 6,547,728	3·70	— 311,472	5·5	—$ 429,296	6·2
Clay products—											
Brick, common	No.	234,732,882	1,755,187	1·28	237,034,675	1,826,844	1·03	+ 2,301,793	0·98	+ 71,657	4·1
Brick, pressed	„	49,817,160	492,774	0·36	44,947,089	492,355	0·28	— 4,870,071	9·8	— 419	.....
Brick, paving	„	1,227,647	20,694	.....	1,589,893	30,144	.....	+ 362,246	29·5	+ 9,450	45·7
Brick, moulded and ornamental	„	1,008,567	49,097	.....	.....	21,102	.....	.....	.....	— 27,995	57·0
Fireclay, and fireclay products	.....	.....	110,693	.....	.....	234,562	0·13	.....	.....	+ 123,869	111·9
Fireproofing architectural terra-cotta	.....	.....	253,401	0·18	.....	361,555	0·20	.....	.....	+ 108,154	42·7
Kaolin	Tons	1,300	13,000	.....	1,750	17,500	.....	+ 450	34·6	+ 4,500	34·6
Pottery	.....	.....	64,900	.....	.....	61,069	.....	.....	.....	— 3,831	5·9
Sewerpipe	.....	.....	799,446	0·58	.....	716,287	0·40	.....	.....	— 83,159	10·4
Tile, drain	No.	.....	355,296	0·26	.....	359,387	0·20	.....	.....	+ 4,091	1·2
Lime	Bus.	5,047,244	1,015,702	0·74	5,493,250	1,091,463	0·62	+ 446,006	8·8	+ 75,761	7·5
Sand-lime brick	No.	17,960,802	141,742	.....	16,540,747	126,235	.....	— 1,420,055	7·9	— 15,507	10·9
Sand and gravel	.....	6,445,717	1,624,767	1·19	8,156,207	1,838,320	1·04	+ 1,710,490	26·5	+ 213,553	13·1
Slate	Squares	397	2,039	.....	1,262	6,223	.....	+ 865	217·9	+ 4,184	205·2
Stone—											
Granite	.....	.....	1,525,553	1·11	.....	1,247,267	0·70	.....	.....	— 278,286	18·2
Limestone	.....	.....	2,312,081	1·69	.....	2,224,091	1·26	.....	.....	— 87,990	3·8
Marble	.....	.....	158,027	0·12	.....	118,810	0·07	.....	.....	— 39,217	24·8
Sandstone	.....	.....	249,336	0·18	.....	146,244	0·08	.....	.....	— 103,092	41·3
Total	.....	.....	17,920,759	13·07	.....	17,467,186	9·86	.....	.....	— 453,573	2·5
Grand total	.....	.....	137,109,171	100·00	.....	177,201,534	100·00	.....	.....	+40,092,363	29·2

*Short tons throughout. (*a*) The metals, copper, lead, nickel, silver and zinc are for statistical and comparative purposes valued at the final average value of the refined metal. Pig-iron, zinc ore, and cobalt oxides are valued at the furnace or spot, and non-metallic products at the mine or point of shipment. (*b*) Copper content of smelter products and estimated recoveries from ores exported, at 17·275 cents per pound, in 1915, and 27·202 cents per pound in 1916. (*c*) The total production of pig-iron in Canada in 1915 was 913,775 tons valued at $11,374,199, of which it is estimated 755,180 tons valued at $9,658,325 should be credited to imported ores; in 1916 the total production was 1,169,257 tons valued at $16,750,898, of which 1,053,566 tons valued at $15,422,293 are credited to imported ores. (*d*) Refined lead and lead contained in base bullion exported at 5·600 cents per pound in 1915, and 8·513 cents in 1916, the average prices in Montreal. (*e*) Nickel content of matte produced and nickel recovered from silver-cobalt-nickel ores valued at 30 cents in 1915 and 35 cents in 1916. The value of the nickel contained in matte, as returned by the operators, was from 10 to 15 cents per pound for both years. (*f*) Silver recovered in bullion and recoverable from ores and smelter products exported at 49·684 cents per ounce in 1915, and at 65,661 cents in 1916. (*g*) Gross returns for sale of gas. (*h*) In 1915 and 1916 figures as reported by the producers, which differ slightly from those of the Trade and Navigation reports. (*m*) Zinc production in 1916 is here given altogether in terms of metal, and in 1915 and previous years in terms of ore. See chapter on zinc for details.

The detailed comparative statement here presented shows the production of each important product during the past two years, the proportion which each contributes to the total production, and the increase or decrease as the case may be of the production in 1916 as compared with that of 1915.

The total value of the metallic production in 1916 was $106,319,365, as against a value of $75,814,841 in 1915, and $59,386,619 in 1914, the increase in 1916 being 40 per cent over the previous year.

The total production of non-metallic products was valued at $70,882,169, as against $61,294,330 in 1915, and $69,476,456 in 1914. While an increase of 15 per cent is thus shown over the production in 1915, the 1916 production was but little greater than that of 1914 and less than the production in 1912 and 1913.

The total annual production of metallic and non-metallic products since 1907 is shown in the following table:—

Annual Values of Metallic and Non-Metallic Production.

Year.	Metallic.	Non-Metallic.		Total.
		Fuels and other Non-Metallics.	Structural or clay and stone quarry products.	
				$
1907	$42,426,607	$31,275,546	$12,863,049	(a) 86,865,202
1908	41,774,362	32,142,784	11,339,955	(a) 85,557,101
1909	44,156,841	31,141,251	16,533,349	91,831,441
1910	49,438,873	37,757,158	19,627,592	106,823,623
1911	46,105,423	34,405,960	22,709,611	103,220,994
1912	61,172,753	45,080,674	28,794,869	135,048,296
1913	66,361,351	48,463,709	30,809,752	145,634,812
1914	59,386,619	43,467,229	26,009,227	128,863,075
1915	75,814,841	43,373,571	17,920,759	137,109,171
1916	106,319,365	53,414,983	17,467,186	177,201,534

(a) Total includes $300,000 allowed for products not reported.

The production of pig-iron given in the general table includes only that proportion of the output of Canadian blast furnaces credited to Canadian ores. There is an important production of pig-iron from imported ores (shown in the footnotes to the general table and in the chapter on iron and steel) and the total value thereof in 1916 was exceeded only by the production of coal, gold, copper and nickel. There is also a large production of aluminium from imported ores for which no value is included, in the general table of production.

Metal prices again varied within wide limits. In 1915, the average price for most metals, with the notable exception of silver, was higher than the average for many years. The averages for 1916 were higher for all metals with the exception of antimony and spelter.

Metal Prices.

(In cents per pound or ounce).

	1911.	1912.	1913.	1914.	1915.	1916.
Antimony (ordinaries).....Per pound.	7·540	7·760	7·520	8·763	30·280	25·370
Copper, New York..... "	12·376	16·341	15·269	13·602	17·275	27·202
Lead " ..... "	4·420	4·471	4·370	3·862	4·673	6·858
" London..... "	3·035	3·895	4·072	4·146	4·979	6·715
" Montreal*..... "	3·480	4·467	4·659	4·479	5·600	8·513
Nickel, New York..... "	40·000	40·000	40·000	40·000	45·000	45·000
Silver, " .....Per ounce.	53·304	60·835	59·791	54·811	49·684	65·661
Spelter, " .....Per pound.	5·758	6·943	5·648	5·213	13·230	12·804
Tin, " ..... "	42·281	46·096	44·252	34·301	38·500	43·480

*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que.

EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand considerable quantities of mine products, chiefly those which have been refined or subjected to partial treatment, or in the form of manufactured goods ready for consumption, are imported.

The total value of the exports of products of the mine, including direct mine products and manufactures thereof, in 1916 was $171,178,583, compared with $124,157,761 in 1915. This value includes for 1916 mine products to the value of $80,755,461, and manufactures valued at $90,423,122, as against mine products valued at $57,951,340, and manufactures valued at $66,206,421 in 1915.

Practically the whole of the Canadian production of copper, nickel, and silver is exported, also a very large proportion of the production of gold, asbestos, and mica. There are, as well, considerable exports of coal. These products alone contribute about 93 per cent of the value of the mine products exported. Manufactured products exported consist chiefly of iron and steel goods, agricultural implements, aluminium, calcium carbide, acetate of lime, fertilizers, and coke.

The United States is the chief destination of Canada's mine exports, about 77 per cent having been exported to that country during the fiscal year 1915-1916, and about 20 per cent to the United Kingdom.

The large increase in exports in 1916 has not been confined to any particular group, but has been participated in by almost every item in the table.

A great variety of mineral products, chiefly in the manufactured or semi-manufactured condition, are annually imported into Canada. These imports increased with great rapidity during the ten years preceding 1913. During the next two years, however, there was a falling off, but in 1916 the imports have again increased to a value almost equal to that of 1913. The total value of these imports during the calendar year 1916 was

$256,144,573, as compared with imports valued at $146,464,510 in 1915; $181,675,667 in 1914; $259,299,745 in 1913; and $238,212,835 in 1912.

Exports of Products of the Mine and Manufactures of Mine Products, Calendar Year, 1915 and 1916.

Products.	1915.		1916.	
	Quantity.	Value.	Quantity.	Value.
Arsenic.....Cwt.	46,364	$ 174,190	39,505	$ 197,458
Asbestos.....Tons.	84,584	2,734,695	96,775	3,872,463
Asbestos sand and waste..... "	25,103	157,410	33,564	241,272
Coal..... "	1,766,543	5,406,058	2,135,359	7,099,387
Cobalt (nine months only).....	.....	.....	.....	712,880
Chromite (Chromic Ore)..... "	7,290	81,838	12,633	152,534
Corundum..... "	339	37,798	56	8,583
Feldspar, Magnesite, Talc, etc.....	.....	148,915	.....	329,215
Gold-bearing quartz, dust, nuggets, etc.....	.....	16,528,143	.....	18,382,903
Gypsum or plaster, crude.....Tons.	292,234	336,380	221,156	252,476
Metals, viz:—				
Copper, fine, contained in ore, matte, regulus, etc.....Cwt.	814,370	8,671,641	1,249,424	20,776,536
Lead, metallic, contained in ore, etc..... "	18,451	40,273	90,484	558,180
Nickel, fine, contained in ore, matte, or speiss. "	664,104	7,394,446	804,417	8,662,179
Platinum, contained in concentrates or other forms.....Ozs.	236	11,052	532	41,945
Silver, metallic, contained in ore concentrates, etc..... "	27,672,481	13,812,038	25,279,359	15,637,885
Mica.....Lbs.	879,631	236,124	1,308,793	379,720
Mineral pigments, iron oxides, ochres.....Cwt.	23,916	17,263	33,917	25,312
Mineral Water, natural, not in bottles.....Gals.	198	53	229	22
Mineral wax.....Cwt.	.....	.....	80,987	201,653
Oil:—				
Mineral, coal and kerosene, crude.....Gals.	35,977	1,789	137,647	11,439
Mineral, coal and kerosene, refined..... "	103,488	14,107	446,595	48,137
Gasoline and naphtha..... "	16,644	4,540	54,806	14,194
Ores:—				
Antimony.....Tons.	1,149	82,990	794	48,158
Iron..... "	79,770	206,823	161,260	541,779
Manganese..... "	255	6,855	957	89,544
Other..... "	23,816	798,214	69,331	1,348,540
Phosphates..... "	179	1,860	103	1,543
Plumbago, crude ore and concentrates.....Cwt.	5,254	12,009	6,223	13,114
Pyrites.....Tons.	137,598	527,318	156,722	557,024
Salt.....Cwt.	8,893	5,836	3,059	2,223
Sand and Gravel.....Tons.	808,022	380,549	1,114,913	388,309
Stone, ornamental, granite, marble, etc., unwrought. "	29,976	12,764	15,967	7,989
Stone, building, freestone, limestone, etc., unwrought "	35,804	28,910	128,453	103,796
Stone, crushed..... "	42,716	24,453	26,754	27,611
Stone, for manufacture of grindstones, rough..... "	180	900	356	1,764
Other articles of the mine.....	.....	53,106	.....	17,694
Total mine products.....	.....	57,951,340	.....	80,755,461

Exports of Products of the Mine and Manufactures of Mine Products, Calendar Year 1915 and 1916—Continued.

Product.		1915		1916	
		Quantity.	Value.	Quantity.	Value.
MANUFACTURES.					
Agricultural implements and machines, viz:—					
Mowing machines	No.	5,031	$ 175,912	6,672	$ 233,024
Cultivators	"	5,957	166,602	4,219	142,028
Reapers	"	471	21,105	1,115	65,011
Drills	"	6,400	422,772	4,713	317,831
Harvesters and binders	"	7,668	809,141	7,495	814,517
Ploughs	"	14,923	309,286	17,700	483,650
Harrows	"	4,459	81,731	6,691	97,214
Hay rakes	"	1,758	40,289	2,011	43,746
Seeders	"	2	87	2	128
Threshing machines	"	1,001	568,401	1,522	465,209
All others		.....	302,355	.....	292,603
Parts		.....	519,379	.....	750,966
Asbestos, manufactures of		.....	125,003	.....	4,741
Bricks	M	1,155	9,089	1,746	13,942
Cement		.....	5,161	.....	2,424
Clay, manufactures of		.....	25,202	.....	58,550
Coke	Tons.	35,869	160,053	48,539	221,334
Cream separators		.....	.....	.....	34,567
Drugs, chemicals and medicines, viz:—					
Acetate of lime	Cwt.	100,018	205,748	73,589	216,397
Acid sulphuric	"	192,705	243,457	31,517	74,527
Calcium carbide	"	1,020,174	3,160,950	1,469,663	4,369,085
Phosphorus	Lbs.	545,050	77,476	834,950	122,323
Earthenware, and manufactures of		.....	11,281	.....	7,620
Fertilizers		.....	2,335,297	.....	3,338,413
Gasoline engines	No.	.....	.....	529	86,310
Grindstones, manufactured		.....	35,334	.....	43,178
Gypsum or plaster, ground		.....	80,933	.....	154,630
Iron and steel and manufactures of, viz:—					
Stoves of all kinds		1,271	18,563	.....	29,956
Gas buoys and parts of		.....	2,017	.....	2,484
Castings, n.o.p.		.....	143,714	.....	167,881
Ferro-silicon and ferro compounds	Tons.	9,238	537,081	22,802	1,352,013
Pig-iron	"	17,307	231,551	23,304	374,383
Linotype machines, and parts of		.....	6,946	.....	35,465
Machinery, n.o.p.		.....	536,162	.....	1,206,863
Sewing machines, and parts of	No	2,557	30,479	.....	82,032
Washing machines, domestic, and wringers		.....	20,334	.....	5,763
Typewriters	No.	3,175	206,811	3,597	246,761
Scrap iron or steel	Cwt.	1,787,155	883,134	2,285,991	1,357,018
Hardware, viz.—					
Wire, and wire nails	Cwt.	1,439,950	3,224,740	2,450,517	8,597,320
Tools, hand or machine		.....	321,021	.....	376,549
Hardware, n.o.p.		.....	401,053	.....	515,613
All other, n.o.p.		.....	31,147,770	.....	38,974,154
Lead in pigs, etc	Cwt	20,669	79,067	1,121	7,710
Lime		.....	15,617	.....	66,406
Metals —					
Aluminium in bars, blocks, etc	Cwt	186,808	3,333,726	184,253	5,201,066
Aluminium, manufactures of		.....	620,562	.....	26,780
Brass, old and scrap	Cwt.	120,685	1,468,165	375,037	6,064,779
Copper, in pigs, bars, sheets, etc	"	212,925	3,788,715	24,304	581,268
Copper, old and scrap	"	41,616	616,553	58,466	1,284,895
Metallic shingles and laths and corrugated roofing		.....	66,655	.....	30,563
Plated ware, n.o.p.		.....	.....	.....	15,050
N.o.p.		.....	878,258	.....	3,143,135
Mineral and aerated waters in bottles		.....	3,525	.....	1,576
Oil, n.o.p.	Gals.	1,247,376	290,943	3,391,857	1,038,025
Plumbago, manufactures of		.....	84,316	.....	304,919
Stone of all kinds, dressed		.....	6,650	.....	4,592
Tar		.....	37,331	.....	50,352
Tin, manufactures of		.....	173,206	.....	16,284
Vehicles—					
Automobiles	No.	13,475	6,756,395	12,579	6,078,668
" parts of		.....	363,178	.....	672,060
Bicycles	No.	116	4,692	580	50,894
" parts of		.....	15,447	.....	5,877
Total Manufactures		.....	66,206,421	.....	90,423,122
Grand Total		.....	124,157,761	.....	171,178,583

EXPORTS.

Showing Destination of Mine Products during the Fiscal Years, 1913-1914, 1914-1915, and 1915-1916.

Destination.	1913–14. Value.	1914–15. Value.	1915–16. Value.
British Empire.			
United Kingdom	$ 16,027,128	$ 12,219,937	$ 12,425,248
Australia	92,457	125,903	122,409
Bermuda	1,192	.....	5
British South Africa	13,863	8,092	45,397
„ Guiana	23,351	.....	28,812
„ India	.....	612	.....
„ E. Indies, other	.....	4,404	.....
„ W. Indies	3,343	1,552	9,170
Gibraltar	.....	1,974	3,301
Hong Kong	1,058,229	213,254	498,991
Newfoundland	649,682	516,756	806,726
New Zealand	.....	130	695
Total British Empire	17,869,245	13,092,614	13,943,754
Other Countries			
Alaska	102,383	243,231	295,169
Argentina	19,206	3,447	102
Austria-Hungary	74,200	37,124	.....
Belgium	258,180	45,668	.....
Brazil	.....	3,159	.....
China	162,034	94,203	368,199
Cuba	19,253	1,461	7,304
Denmark	365	611	.....
France	167,974	91,857	186,868
Germany	618,201	290,276	.....
Greece	200	.....	914
Greenland, Iceland, etc.	.....	.....	4,957
Hawaii	.....	26,262	1,804
Holland	185,158	87,207	5,130
Italy	16,704	41,353	154,783
Japan	32,626	69,483	61,016
Mexico	.....	1,928	9,393
Miquelon and St. Pierre	20,476	36,519	40,919
Norway	100	2,662	.....
Panama	.....	3,891	.....
Peru	.....	.....	237
Philippines	.....	5,257	.....
Porto Rico	.....	.....	2,016
Portugal	1,322	633	.....
Russia	140	2,678	62,687
Spain	10	911	9,900
Sweden	150	345	9,001
United States	39,491,127	37,558,209	51,425,708
Total other countries	41,169,809	38,648,375	52,646,107
Grand total	59,039,054	51,740,989	66,589,861

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products —Calendar Years 1914, 1915, and 1916.

Products.	1914. Value.	1915. Value.	1916. Value.
Alumina	$ 571,419	$ 892,634	$ 1,114,061
Alum, alum cake, and chloralum	188,918	196,685	471,836
Aluminium and manufactures	860,351	722,235	671,098
Ammonia, sulphate of	21,335	14,637	9,672
Antimony regulus	47,498	344,918	208,450
Antimony salts	10,217	10,320	13,891
Arsenic, oxide and sulphide of	1,005	6,072	18,925
Asbestos	282,053	168,894	334,670
Asphaltum	712,980	570,295	563,446
Bells and gongs	99,898	43,205	72,420
Bismuth	3,927	9,004	8,608
Blanc fixe and satin white	39,849	59,471	86,306
Blast furnace slag	20,736	14,067	4,602
Borax	103,975	164,180	265,933
Brick and tile	1,296,657	488,288	390,467
Brick, fire, of a kind not made in Canada, and n.o.p.	690,133	813,071	1,657,792
Bromine and bromides	997	530	413
Burrstones	16	314	648
Cement, portland, and manufactures	159,691	47,836	43,747
Chalk, Cornwall stone, feldspar, fluorspar, magnesite, mica, schist	113,211	100,012	170,498
Clays: china, fire, pipe and all other	288,128	237,096	325,494
Coal: anthracite, bituminous, slack, and run-of-mine	39,801,498	28,345,605	38,289,666
Coke	1,585,259	1,608,464	2,229,078
Coke, ground for electric batteries	13,115	12,266	8,119
Copper and manufactures of	4,256,901	3,957,770	7,566,080
Cryolite	60,517	61,312	78,916
Crucibles, clay or plumbago	49,913	106,761	520,341
Chloride of lime	138,619	112,142	158,546
Cyanides of potassium, sodium, cyanogen, or cpd. of bromine	309,913	367,329	507,021
Diamonds, unset, and bort	2,190,786	709,154	1,332,957
Earthenware	2,192,222	1,460,010	2,180,414
Earths, crude	3,992	1,811	4,074
Electric carbons	55,880	40,685	58,676
Emery	118,008	206,732	367,719
Fertilizers, compound or manufactured	677,174	734,952	639,884
Flint, quartz, silex, etc	63,433	54,493	90,280
Foundry facings	11,372	9,855	27,638
Fullers earth	12,338	12,321	13,072
Fossils	4,477	4,000	2,699
Gannister	595	2,462	2,833
Gold and silver and manufactures of	15,777,804	1,829,953	20,016,288
Graphite and manufactures of	50,279	45,117	103,150
Grindstones	98,872	79,391	122,291
Gypsum and plaster of Paris	75,031	25,819	43,291
Hydrofluosilicic acid	41,576	36,085	28,611
Iron and steel—Total, 1914, 80,063,679; 1915, 74,308,983; 1916, 129,040,248			
Pig-iron	982,189	624,200	1,145,150
Ferro products and chrome steel	560,686	820,976	1,893,879
Ingots, blooms, billets, puddled bars, etc	259,703	1,270,687	895,446
Scrap iron and scrap steel	337,406	127,614	179,751
Plates and sheets	7,576,312	7,647,560	12,806,896
Tin plates and sheets	3,151,385	2,883,951	5,221,163
Bars, rods, hoops, bands, etc	5,138,193	5,829,088	13,362,807
Structural iron and steel	4,214,520	3,615,333	8,042,127
Rails and connexions	1,116,773	379,218	470,023
Pipes and fittings	395,466	110,978	165,576
Nails and spikes	210,098	86,876	283,007
Wire	3,205,635	2,175,834	4,305,674
Forging castings and manufactures	1,375,590	1,932,370	3,343,559
Other iron and steel products	51,238,306	46,804,298	76,975,990
Iron ore	2,387,358	2,331,755	4,419,013
Iron sand	13,743	3,263	15,641
Kainite	13,337	146	5,016
Lead and manufactures; litharge	1,042,538	2,482,916	2,077,896
Lime	211,123	98,040	96,332
Lithographic stone	4,107	1,316	2,768
Manganese, oxide of	42,287	46,678	63,786

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products —Calendar Years 1914, 1915, and 1916.—Continued.

Products.	1914. Value.	1915. Value.	1916. Value.
Magnesia	$ 16,429	$ 9,695	$ 20,651
Meerschaum	372	73	.....
Mercury or quicksilver, cinnabar	97,449	159,284	74,461
Metallic alloys:—			
Babbitt metal	26,489	16,709	20,524
Brass and manufactures of	2,868,464	3,177,942	4,676,374
Britannia metal	33,080	11,198	25,192
German silver, nickel, and nickel silver	238,612	274,706	414,410
Type metal	1,500	1,838	2,126
Mineral and bituminous substances	146,763	123,726	344,743
Mineral water, including aerated water	199,327	126,569	130,933
Nickel anodes	12,640	9,571	6,019
Ochres, etc	278,064	284,749	409,258
Ores of metals, n.o.p., cobalt ore	574,690	962,999	2,844,277
Paraffin wax	57,527	40,965	70,308
Paraffin candles	44,874	27,552	30,539
Petroleum and products of	11,072,362	7,979,264	14,604,476
Phosphate (fertilizer)	20,220	14,148	16,182
Platinum and manufactures of	79,614	84,087	88,543
Potash and manufactures of	343,004	206,575	150,735
Precious stones	177,168	132,173	207,621
Pumice	16,976	18,814	34,554
Salt	540,881	517,526	694,835
Saltpetre	108,784	279,692	101,103
Sand and gravel	224,759	120,756	183,894
Slate and manufactures of	213,256	108,676	96,776
Sand paper	138,415	133,677	247,317
Soda products: barilla, bichromate, caustic, salt, and salt cake	960,670	858,364	2,079,859
Stone and manufactures of (including marble)	1,252,869	539,173	587,304
Soda, nitrate of	604,952	1,050,648	2,973,473
Sulphate of iron (copperas)	5,517	5,302	11,549
Sulphur and phosphorus	877,628	509,889	1,229,356
Sulphuric acid	7,149	4,872	115,173
Talc	8,983	1,866	(a)
Tar, coal and pitch	198,283	151,377	184,286
Tin and manufactures of (including tinware)	2,023,329	1,634,796	2,999,675
Whiting and prepared chalk	134,511	109,551	181,349
Zinc and manufactures of	1,210,652	2,775,358	3,690,577
	181,675,667	146,464,510	256,144,573

(a) Not separately recorded.

PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1915 and 1916 is shown in the accompanying tables, in the first of which the total production in the several provinces and the percentages of each, are given for the past three years. Ontario continues as the largest contributor to the total, having a production of $80,461,323 or 45·4 per cent, as against $61,071,287 or 44·5 per cent of the total in 1915. British Columbia was second, with a production of $39,969,962 or 22·6 per cent, against $28,689,425, or 20·9 per cent of the total in the previous year. Nova Scotia, third in importance, had a production of $20,042,262, or 11·3 per cent of the total in 1916, as against $18,088,342, or 13·2 per cent of the total in 1915. Quebec, in fourth place, had a production of $14,406,598, or 8·6 per cent; Alberta occupied fifth place, with a production of $13,297,543 or 7·5 per cent. The Yukon District, Manitoba, New Brunswick, and Saskatchewan, follow in the order named.

In making these comparisons it should be remembered that Nova Scotia is not credited with the large production of pig-iron and steel at Sydney and Sydney Mines, which is made almost entirely from imported iron ores and is not naturally credited as Canadian mine product. Similarly a large proportion of the pig-iron production in Ontario is excluded from the total value, because it is derived from imported ores. The Province of Quebec also, is not credited with the production of aluminium at Shawinigan Falls, which is made from imported bauxite.

Mineral Production by Provinces, 1914, 1915, and 1916.

Province.	1914.		1915.		1916.	
	Value of production.	Per cent of total.	Value of production.	Per cent of total.	Value of production.	Per cent of total.
*Nova Scotia	$ 17,584,639	13·65	$ 18,088,342	13·19	$ 20,042,262	11·31
New Brunswick	1,014,570	0·79	903,467	0·66	1,118,187	0·63
Quebec	11,836,929	9·19	11,619,275	8·48	14,406,598	8·13
Ontario	53,034,677	41·16	61,071,287	44·54	80,461,323	45·41
Manitoba	2,413,489	1·87	1,318,387	0·96	1,823,576	1·03
Saskatchewan	712,313	0·55	451,933	0·33	590,473	0·33
Alberta	12,684,234	9·84	9,909,347	7·23	13,297,543	7·50
British Columbia	24,164,039	18·75	28,689,425	20·92	39,969,962	22·56
Yukon	5,418,185	4·20	5,057,708	3·69	5,491,610	3·10
Dominion	128,863,075	100·00	137,109,171	100·00	177,201,534	100·00

*Includes a small production of lime from Prince Edward Island in 1914 and 1916.

Mineral Production of Nova Scotia, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Gold	Ozs.	6,636	$ 137,180	4,562	$ 94,305
Barytes	Tons	550	6,875	1,368	19,393
Coal	"	7,463,370	16,659,308	6,912,140	18,514,662
Grindstones	"	285	5,300	273	5,800
Gypsum	"	298,864	339,857	238,212	278,160
Manganese	"	51	5,760	646	70,371
Tripolite	"	317	12,119	620	12,139
Clay products		.....	221,881	.....	238,470
Lime	Bus.	915,086	183,017	911,534	182,506
Stone		.....	367,924	.....	459,298
Other products		.....	149,121	.....	167,158
Total		.....	18,088,342	.....	20,042,262

The total production of pig-iron in Nova Scotia in 1915 was 420,275 tons valued at $5,463,575, and in 1916, 470,055 tons valued at $7,050,825.

Mineral Production of New Brunswick, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Iron ore sold for export	Tons	3,683	$ 8,261	.....	.....
Coal	"	127,391	309,612	143,540	$ 386,016
Grindstones	"	2,295	30,468	3,205	46,982
Gypsum	"	74,501	184,929	39,546	153,064
Manganese ore	"	150	3,600	(a)	.....
Natural gas	M. cu. ft.	430,692	60,383	610,118	79,628
Petroleum	Bls.	1,020	1,423	1,345	2,663
Clay products		.....	35,780	.....	42,881
Lime	Bus.	369,117	93,797	424,113	104,635
Stone		.....	153,512	.....	112,257
Other products		.....	21,702	.....	190,061
Total		.....	903,467	.....	1,118,187

(a) Included in "Other products."

Mineral Production of Quebec, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Copper	Lbs.	4,197,482	$ 725,115	5,703,347	$1,551,424
Gold	Ozs.	1,099	22,720	1,034	21,375
Iron ore, sold for export	Tons	.....	.....	3,209	8,308
Lead	Lbs.	40,401	2,262	698,760	59,485
Silver	Ozs.	63,450	31,524	98,610	64,748
Zinc ore	Tons	300	16,500	lbs.1,663,200	212,956
Asbestos and asbestic	"	136,842	3,574,985	154,149	5,228,869
Chromite	"	12,341	179,543	27,517	311,460
Feldspar	"	572	2,005	4,610	18,075
Graphite	"	75½	5,431	479	75,776
Magnesite	"	14,779	126,584	54,778	554,304
Mica		.....	50,390	.....	192,343
Mineral water	Gals.	.....	18,086	93,782	16,223
Iron oxides	Tons	6,248	48,353	8,811	58,711
Phosphate	"	200	2,400	190	2,340
Pyrites	"	142,735	570,940	130,639	523,272
Quartz	"	778	778	1,149	1,436
Cement	Bls.	2,390,724	2,812,797	2,150,475	2,525,863
Clay products		.....	905,425	.....	976,164
Kaolin	Tons	1,300	13,000	1,750	17,500
Lime	Bus.	1,351,306	274,831	1,498,845	267,119
Slate	Squares	397	2,039	1,262	6,223
Stone		.....	1,966,194	.....	1,370,465
Other products		.....	267,373	.....	342,159
Total		.....	11,619,275	.....	14,406,598

There was also in this Province an important production of aluminium from imported ores.

Mineral Production of Ontario, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Cobalt, metallic and in oxide, etc	Lbs.	504,212	$ 536,268	840,536	$ 924,590
Copper	"	39,361,464	6,799,693	44,997,035	12,240,094
Gold	Ozs.	406,577	8,404,693	492,481	10,180,485
Iron ore, sold for export	Tons	86,047	173,120	137,399	385,381
Iron, pig, from Canadian ore (a)	"	158,595	1,715,874	115,691	1,328,605
Lead	Lbs.	88,985	4,983	685,932	58,393
Molybdenite	"	23,300	25,800	(c)	.....
Nickel	"	68,308,657	20,492,597	82,958,564	29,035,498
Silver	Ozs.	22,748,609	11,302,419	21,608,158	14,188,133
Actinolite	Tons	220	2,420	250	2,750
Arsenious oxide	"	2,396	147,830	2,186	262,349
Corundum	"	262	33,138	67	10,307
Feldspar	"	13,987	55,796	14,878	53,332
Fluorspar	"	.....	.....	1,284	10,238
Graphite	"	2,559½	118,792	3,476	249,586
Gypsum	"	81,172	190,422	36,668	116,086
Mica		.....	41,515	.....	62,896
Mineral water		.....	95,788	.....	110,333
Natural gas (b)	M. cu. ft	15,211,523	2,622,838	17,953,109	2,765,105
Peat	Tons	300	1,050	300	1,500
Petroleum	Bls.	214,444	299,149	196,778	389,621
Phosphate	Tons	17	102	13	174
Pyrites	"	143,303	414,250	177,552	555,523
Quartz	"	95,771	143,257	94,519	167,636
Salt	"	119,900	600,226	132,903	717,653
Talc	"	11,885	40,554	13,051	48,575
Cement	Bls.	2,407,670	2,597,807	2,230,386	2,312,677
Clay products		.....	2,254,863	.....	2,145,036
Lime	Bus.	1,903,914	328,515	2,031,396	367,115
Sand-lime brick	No.	13,237,682	93,965	11,638,150	77,726
Stone		.....	806,137	.....	857,023
Other products		.....	727,426	.....	836,903
Total		.....	61,071,287	.....	80,461,323

(a) The total production of pig-iron in Ontario in 1915 was 493,500 tons, valued at $5,910,624; in 1916 699,202 tons, valued at $9,700,073.
(b) Figures for 1915 from Ontario Bureau of Mines. (c) Included under "Other products."

Mineral Production of Manitoba, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Calcined gypsum	Tons	20,278	$ 139,721	28,489	$ 191,283
Clay products		.....	93,674	.....	104,248
Lime	Bus.	281,432	71,372	355,301	83,754
Cement	Bls.	339,554	625,369	427,293	794,897
Sand-lime brick	No.	2,775,420	31,121	3,215,097	33,048
Stone		.....	153,464	.....	372,894
Other products		.....	203,666	.....	243,452
Total		.....	1,318,387	.....	1,823,576

Mineral Production of Saskatchewan, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Coal	Tons	240,107	$ 365,246	281,300	$ 441,836
Clay products		.....	44,406	.....	78,668
Sand-lime brick	No.	473,000	4,075	990,000	9,890
Other products		.....	38,206	.....	60,079
Total		.....	451,933	.....	590,473

Mineral Production of Alberta, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Gold	Ozs.	195	$ 4,026	82	$ 1,695
Coal	Tons	3,360,818	8,283,079	4,559,054	11,386,577
Natural gas	M. cu. ft.	4,481,947	1,022,814	6,904,231	1,113,296
Cement	Bls.	233,648	415,009	275,727	477,832
Clay products		.....	115,696	.....	225,140
Lime	Bus.	74,152	14,445	78,019	20,033
Sand-lime brick	No.	764,700	6,191	697,500	5,571
Stone		.....	890	.....	257
Other products		.....	47,197	.....	67,142
Total		.....	9,909,347	.....	13,297,543

Mineral Production of British Columbia, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Antimony and Molybdenite		.....	.....	.....	$ 13,003
Copper (a)	Lbs.	56,692,988	$ 9,793,714	63,642,550	17,312,046
Gold	Ozs.	273,376	5,651,184	219,633	4,540,216
Lead	Lbs.	45,377,064	2,541,116	39,157,701	3,333,496
Platinum	Ozs.	23	1,063	15	600
Silver	"	3,565,852	1,771,658	3,392,872	2,227,794
Zinc ore	Lbs.	14,595	538,438	21,701,560	2,778,667
Coal	Tons	2,065,613	6,455,041	2,584,061	8,075,190
Magnesite	"	.....	.....	635	9,525
Mineral water		.....	1,400	.....	1,250
Pyrites	Tons	.....	.....	1,060	5,300
Quartz	"	30,559	61,118	41,077	82,154
Talc	"	.....	.....	53	848
Cement	Bls.	309,436	526,042	285,679	436,459
Clay products		.....	229,763	.....	292,698
Lime	Bus.	152,237	49,725	194,042	66,301
Stone		.....	796,876	.....	564,218
Other products		.....	272,287	.....	230,197
Total		.....	28,689,425	.....	39,969,962

(a) Smelter recoveries of copper.

Mineral Production of Yukon, 1915 and 1916.

Product.		1915.		1916.	
		Quantity.	Value.	Quantity.	Value.
Antimony ore	Tons	.....	.....	20	$ 160
Copper	Lbs.	533,216	$ 92,113	2,807,096	763,586
Gold	Ozs.	230,173	4,758,098	212,700	4,396,900
Lead	Lbs.	810,000	45,360	955,222	81,318
Silver	Ozs.	248,049	123,241	360,101	236,446
Coal	Tons	9,724	38,896	3,300	13,200
Total		.....	5,057,708	.....	5,491,610

Mineral Production by Provinces, 1899-1916.

Calendar Year.	Nova Scotia*.	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
1899	$ 6,817,274	$ 420,227	$ 2,585,635	$ 9,819,557	$17,108,707				$12,482,605	$ 49,234,005
1900	9,298,479	439,060	3,292,383	11,258,099	23,452,330				16,680,526	64,420,877
1901	7,770,159	467,985	3,759,984	13,970,010	19,297,940				20,531,833	65,797,911
1902	10,686,549	607,129	3,743,636	14,619,091	16,127,400				17,448,031	63,231,836
1903	11,431,914	580,495	3,585,938	14,160,033	14,082,986				17,899,147	61,740,513
1904	11,212,746	559,913	3,688,482	12,582,843	12,713,613				19,325,174	60,082,771
1905	11,507,047	559,035	4,405,975	18,833,292	11,387,642				22,386,008	69,078,999
1906	12,894,303	646,328	5,242,058	25,111,682	10,092,726				25,299,600	79,286,697
1907	14,532,040	664,467	6,205,553	30,381,638	$ 898,775	$ 4,657,524	$ 533,251	$ 3,335,898	25,656,056	86,865,202
1908	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,669,290	23,704,035	85,557,101
1909	12,504,810	657,035	7,086,265	37,374,577	1,193,377	6,047,447	456,246	4,032,678	22,479,006	91,831,441
1910	14,495,730	581,942	8,270,136	43,538,078	1,500,359	8,996,210	498,122	4,764,474	24,478,572	106,823,623
1911	15,409,397	612,830	9,304,717	42,796,162	1,791,772	6,662,673	636,706	4,707,432	21,299,305	103,220,994
1912	18,922,236	771,004	11,656,998	51,985,876	2,463,074	12,073,589	1,165,642	5,933,242	30,076,635	135,048,290
1913	19,376,183	1,102,613	13,475,534	59,167,749	2,214,496	15,054,046	881,142	6,276,737	28,086,312	145,634,812
1914	17,584,639	1,014,570	11,836,929	53,034,677	2,413,489	12,684,234	712,313	5,418,185	24,164,039	128,863,075
1915	18,088,342	903,467	11,619,275	61,071,287	1,318,387	9,909,347	451,933	5,057,708	28,689,425	137,109,171
1916	20,042,262	1,118,187	14,406,598	80,461,323	1,823,576	13,297,543	590,473	5,491,610	39,969,962	177,201,534

*Includes a small production of lime from Prince Edward Island.

MINE PRODUCTION.

For a number of years past this Division has endeavoured to obtain from every mine operator in Canada, an annual return with respect to labour employed, wages paid, tonnage and value of ores or minerals mined, treated and shipped, and in the case of metallic ores, the quantities of metals contained in the ores shipped or treated. In the case, however, of gold placer mining and the production of crude petroleum, it has not as yet been found feasible to obtain complete returns from the operators themselves, so that in these cases, while a record of production is available, there is no record of the labour employed, nor of the wages paid.

Statistics covering the past three years are shown in the accompanying tables. According to the records shown, the total value of the mineral production compiled on this basis was $138,418,335 in 1916, as against $115,158,848 in 1915, $114,239,635 in 1914, $126,444,201 in 1913, $120,332,966 in 1912, $91,876,084 in 1911, and $92,501,244 in 1910. Excluding placer and hydraulic workings and petroleum wells, the total number of shipping mines, clay works, quarries, etc., in 1916 was 1,608, as against 1,618 in 1915, 1,661 in 1914, and 1,529 in 1913. The total number of men employed was 57,604, as against 56,876 in 1915, 66,855 in 1914, and 71,011 in 1913. The total wages paid were $47,092,478 in 1916, as against $37,720,762 in 1915, $43,609,696 in 1914, and $50,368,602 in 1913.

The total number of metalliferous mines shipping in 1916, exclusive of placer and hydraulic workings, was 260, as against 205 in 1915, 187 in 1914, and 183 in 1913; number of men employed in 1916, 14,598, as against 12,698 in 1915, 11,994 in 1914, and 12,437 in 1913; wages paid $15,867,748 in 1916 as against $11,805,919 in 1915, $11,669,854 in 1914, and $11,746,400 in 1913; tons of ore mined 7,450,654 in 1916, as against 6,138,150 in 1915; 4,997,406 in 1914, and 4,736,288 in 1913; tons of ore concentrates, or metal shipped from mines 4,684,041 in 1916, as against 4,259,734 in 1915, 3,115,855 in 1914, and 3,423,414 in 1913; total net value of shipments including placer gold $67,536,166 in 1916, as against $53,864,518 in 1915, $44,763,179 in 1914, and $47,170,740 in 1913.

In non-metalliferous mining, exclusive of stone quarries, clay works, etc., and not including petroleum wells, there were employed in 1916 an average of 30,541 men earning in wages $24,987,562, as against 30,392 men earning in wages $20,257,126 in 1915, 33,732 men, earning in wages $22,058,526 in 1914, and 34,207 men employed and $25,752,148 wages paid in 1913.

The manufacture of cement, clay products, and lime, and the quarrying of stone, etc., employed in 1916 an average of 12,465 men earning in wages $6,237,168, as against an average of 13,786 men earning in wages $5,657,717 in 1915, and 21,129 men earning in wages $9,881,316 in 1914. These operations in 1913 engaged an average of 24,367 men earning $12,870,054.

It should be noted that these records cover only active shipping mines and do not include the labour employed in prospecting or in developing new properties, nor is there included any record of the labour employed in the smelting and refining of ores, nor in blast furnace operations. The values of the ores given herewith are in general those furnished by the operators. In certain cases, however, where such values have not been furnished, estimates have been made.

The tables showing the quantities of metals contained in the ores shipped give the total quantities of metals contained without any deductions or allowances being made for smelter or treatment losses.

Mine Production, 1914.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Underground.	Surface.				
METALLIFEROUS ORES.	No.	No.		$	Tons.	Tons.	$
Iron ores	5	598		364,489	345,410	244,854	542,041
Milling gold ore—							
Bullion shipped						13	6,101,463
Concentrates	44	1,070	1,206	2,603,414	754,732	6,974	860,379
Silver-cobalt ores—							
Mine bullion shipped						354	5,665,006
Ore and concentrate	29	1,412	1,883	3,207,116	733,174	16,917	7,827,140
Nickel-copper ores	9	736	1,286	1,693,997	1,000,364	999,908	5,020,003
Copper ores	4	113	180	177,721	119,292	117,762	502,637
Silver-lead and zinc ores	76	394	817	1,110,876	186,646	70,207	2,652,802
Zinc products						10,893	262,563
Gold-copper-silver ores	20	823	1,746	2,512,241	1,857,788	1,647,973	9,580,537
Placer mining—							
Yukon						10	5,182,616
British Columbia						1	565,000
Alberta							992
Total metalliferous	187	11,994		11,669,854	4,997,406	3,115,855	44,763,179
Total non-metalliferous	451	33,732		22,058,526	17,078,300	14,708,307	43,467,229
Total structural materials	1,023	21,129		9,881,316			26,009,227
	1,661	66,855		43,609,696			114,239,635

Mine Production 1914, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.
Milling gold ore—						
Bullion	289,860	85,110				
Concentrates	38,717	64,218		90	15,141	
Silver-cobalt ores—						
Mine bullion shipped		10,335,527				
Ore and concentrate		15,523,608				
Nickel-copper ores			60,800,799	36,300,532		
Copper ores	1,059	51,440		6,450,899		
Silver-lead zinc ores	334	2,501,820			50,527,130	
Zinc products		376,420				9,101,460
Gold-copper-silver ores	182,784	761,890		53,771,126		
Placer mining—						
Yukon	247,753	55,744				
British Columbia	27,332					
Alberta	48					
Total	787,887	29,755,777	60,800,799	96,522,647	50,542,271	9,101,460

Mine Production, 1915.

———	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Underground.	Surface.				
METALLIFEROUS ORES	No.	No.		$	Tons.	Tons.	$
Antimony ore	7	157		55,038	15,318	1,491	83,971
Molybdenite	4	52		16,990	.....	37	28,450
Iron ores	5	399		230,346	251,742	398,112	774,427
Milling gold ore—							
Bullion shipped	.....	.....	.....	.....	.....	18	8,953,130
Concentrates	50	1,324	1,555	2,893,187	1,180,477	8,335	711,947
Silver-cobalt ores—							
Mine bullion shipped	.....	.....	.....	.....	.....	232	3,410,936
Ore and concentrate	25	1,008	1,531	2,363,414	588,404	61,362	8,326,776
Nickel-copper ores	9	857	1,745	2,202,536	1,364,048	1,372,724	10,552,673
Copper ores	6	173	205	215,065	141,758	142,121	1,026,562
Silver-lead and zinc ores	66	328	784	960,894	215,694	73,752	2,958,394
Zinc products	.....	.....	.....	.....	.....	14,895	540,022
Gold-copper-silver ores	33	886	1,694	2,868,449	2,380,709	2,186,646	10,947,059
Placer mining—							
Yukon	.....	.....	.....	.....	.....	9	4,776,145
British Columbia	.....	.....	.....	.....	.....	.....	770,000
Alberta	.....	.....	.....	.....	.....	.....	4,026
Total metalliferous	205	12,698		11,805,919	6,138,150	4,259,734	53,864,518
Total non-metalliferous	472	30,392		20,257,126	16,594,889	14,481,882	43,373,571
Total structural materials	943	13,786		5,657,717	.....	.....	17,920,759
	1,618	56,876		37,720,762	.....	.....	115,158,848

Mine Production 1915, Content of Shipments.

———	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.	Antimony.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Antimony ore	.....	.....	.....	.....	.....	.....	1,080,196
Milling gold ore—							
Bullion	430,981	87,116	.....	.....	.....	.....	.....
Concentrates	35,779	37,507	.....	.....	.....	.....	.....
Silver-cobalt ores—							
Mine bullion shipped	.....	6,752,183	.....	.....	.....	.....	.....
Ore and concentrate	.....	17,603,943	.....	.....	.....	.....	.....
Nickel-copper ores	.....	.....	87,782,224	46,636,547	.....	.....	.....
Copper ores	1,151	64,965	.....	7,075,858	.....	.....	.....
Silver-lead zinc ores	459	2,637,444	.....	.....	48,708,005	.....	.....
Zinc products	.....	316,731	.....	.....	.....	12,231,439	.....
Gold-copper-silver ores	202,127	849,784	.....	69,516,485	.....	.....	.....
Placer mining—							
Yukon	229,803	25,689	.....	.....	.....	.....	.....
British Columbia	37,249	.....	.....	.....	.....	.....	.....
Alberta	195	.....	.....	.....	.....	.....	.....
Total	937,744	28,375,362	87,782,224	123,228,890	48,708,005	12,231,439	1,080,196

Mine Production, 1916.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Underground.	Surface.				
METALLIFEROUS ORES.	No.	No.		$	Tons.	Tons.	$
Antimony ore	5	116		59,957	14,947	(a) 938	136,360
Molybdenite	9	262		122,072	13,522	(b) 78	156,461
Iron ores	4	530		376,716	331,822	275,176	715,107
Milling gold ore—							
Bullion shipped	.....	.....	.....	.....	.....	21	10,418,052
Concentrates	49	1,304	1,709	3,540,899	1,502,336	9,340	522,409
Silver-cobalt ores—							
Mine bullion shipped	.....	.....	.....	.....	.....	171	3,444,736
Ore and concentrate	32	1,034	1,561	2,450,614	547,882	77,453	9,736,490
Nickel-copper ores	6	875	1,837	2,824,818	1,566,333	1,566,333	11,766,201
Copper ores	12	232	261	293,115	170,666	155,999	1,444,676
Silver-lead and zinc ores	.....	573	1,070	1,803,633	395,802	84,516	4,568,500
Zinc products	84	.....	.....	.....	.....	82,077	1,086,249
Gold-copper-silver ores	59	1,259	1,975	4,395,924	2,907,344	2,431,930	18,544,772
Placer mining—							
Yukon	.....	.....	.....	.....	.....	9	4,413,958
British Columbia	.....	.....	.....	.....	.....	.....	580,500
Alberta	.....	.....	.....	.....	.....	.....	1,695
Total metalliferous	260	14,598		15,867,748	7,450,654	4,684,041	67,536,166
Total non-metalliferous	532	30,541		24,987,562	18,170,207	15,699,830	53,414,983
Total structural materials	816	12,465		6,237,168	.....	.....	17,467,186
Total	1,608	57,604		47,092,478	.....	.....	138,418,335

(a) Includes refined antimony.
(b) MoS_2 contents of concentrates produced.

Mine Production 1916, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.	Antimony.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Antimony ore	.....	.....	.....	.....	.....	.....	857,585
Milling gold ore—							
Bullion	519,202	102,349	.....	.....	.....	.....	.....
Concentrates	30,138	54,136	.....	.....	.....	.....	.....
Silver-cobalt ores—							
Mine bullion shipped	.....	4,982,702	.....	.....	.....	.....	.....
Ore and concentrate	.....	15,690,716	.....	.....	.....	.....	.....
Nickel-copper ores	.....	.....	102,254,207	50,532,528	.....	.....	.....
Copper ores	713	65,438	.....	9,275,467	.....	.....	.....
Silver-lead zinc ores	784	2,582,952	.....	.....	54,124,628	.....	.....
Zinc products	.....	363,262	.....	.....	.....	48,498,078	.....
Gold-copper-silver ores	163,466	905,685	.....	84,251,136	.....	.....	.....
Placer mining—							
Yukon	212,010	47,703	.....	.....	.....	.....	.....
British Columbia	28,082	.....	.....	.....	.....	.....	.....
Alberta	82	.....	.....	.....	.....	.....	.....
Total	954,477	24,794,943	102,254,207	144,059,131	54,124,628	48,498,078	.....

Labour and Wages Statistics Covering Non-Metalliferous Mines During 1914, 1915, and 1916.

	1914.			1915.			1916.		
	No. active mines or works.	No. employed.	Wages paid.	No. active mines or works.	No. employed.	Wages paid.	No. active mines or works.	No. employed.	Wages paid.
NON-METALLIC.									
Asbestos and asbestic	10	2,992	$1,283,977	9	2,394	$ 1,091,076	13	2,821	$ 1,659,913
Chromite	.....	(b)	.....	6	204	116,339	12	229	109,146
Coal	231	27,571	19,060,011	255	24,574	17,385,200	277	23,611	20,884,236
Feldspar	5	104	29,197	6	87	21,173	7	119	42,980
Fluorspar	.....	.....	.....	.....	.....	.....	3	36	8,449
Graphite	4	135	47,776	5	110	40,643	6	344	191,876
Grindstones, pulpstones, scythestones	5	155	34,950	4	110	18,996	5	128	24,330
Gypsum	16	1,149	552,192	16	1,152	468,612	15	919	467,262
Magnesite	.....	(b)	.....	4	110	23,607	3	183	144,987
Mica and phosphate	30	232	78,646	23	138	47,372	33	241	86,101
Mineral pigments: barytes, and ochres	4	73	21,146	4	61	24,197	4	125	42,169
Mineral water	18	64	32,058	17	50	23,066	20	60	30,307
Natural gas	92	561	474,293	(a) 88	619	511,967	94	750	532,913
Peat	.....	(b)	.....	1	18	3,200	.....	(b)	.....
Pyrites	8	214	165,001	7	207	172,986	(d) 11	375	310,656
Quartz	8	81	33,872	6	122	78,747	8	167	164,763
Salt	11	253	178,277	11	254	186,059	9	262	219,595
All others†	9	148	67,130	10	182	43,886	12	171	67,879
Total non-metallic	451	33,732	22,058,526	472	30,392	20,257,126	532	30,541	24,987,562
STRUCTURAL									
Cement	24	2,977	2,271,006	20	1,686	1,184,459	15	1,695	1,307,224
Clay products	419	8,339	3,201,380	349	4,405	1,452,828	290	4,164	1,740,900
Lime	85	1,015	518,331	78	633	293,735	76	758	381,365
Sand-lime brick	21	467	190,031	18	177	41,043	15	139	50,079
Sand and gravel	254	2,382	821,601	241	1,721	491,830	221	1,667	631,195
Slate	1	20	7,150	1	20	5,520	1	22	11,085
Stone	219	5,929	2,871,817	236	5,144	2,188,302	198	4,020	2,115,320
Total structural	1,023	21,129	9,881,316	943	13,786	5,657,717	816	12,465	6,237,168
Total non-metalliterous	1,474	54,861	31,939,842	1,415	44,178	25,874,670	1,348	43,006	31,224,730

†Includes in 1914—actinolite, chromite, corundum, magnesite, manganese, peat, talc, and tripolite.
" " 1915—actinolite, corundum, manganese, talc, and tripolite.
" " 1916—actinolite, corundum, manganese, peat, tripolite and talc.

(a) Estimated for 1915. (b) Included in 'All other.' (d) Partial.

METALLIC ORES.

ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Shawinigan Falls, Quebec, from bauxite ores imported from France, the United States, and also formerly from Germany, by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium we are precluded from publishing statistics of production.

Imports of alumina, probably including bauxite, and exports of aluminium are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1916, the imports of alumina were 53,819,000 pounds, or 26,910 tons valued at $1,114,061, as against 35,016,200 pounds or 17,508 tons valued at $892,634 in 1915.

The imports of aluminium in ingots, bars, tubes, etc., were in 1916, 1,355,503 pounds or 678 tons, valued at $526,646; besides manufactures of aluminium valued at $144,452, compared with 2,667,355 pounds, or 1,334 tons of aluminium in ingots, bars, tubes, etc., valued at $633,502, and manufactures of aluminium valued at $88,733, in 1915.

The exports of aluminium in ingots, bars, tubes, etc., in 1916, amounted to 18,425,300 pounds, or 9,213 tons, valued at $5,201,066, together with manufactures of aluminium valued at $26,780, as against 18,680,800 pounds, or 9,340 tons, valued at $3,333,726, and manufactures valued at $620,562, in 1915.

Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of alumina.		Exports of aluminium.		
			Ingots, bars, etc.		Manufactures.
	Pounds.	Value.	Pounds.	Value.	Value.
1905	5,360,800	$ 138,765	2,535,386	$ 508,219	$ 1,588
1906	8,975,400	239,136	4,521,486	899,113	2,244
1907	12,705,300	268,502	5,478,203	1,109,353	1,499
1908	1,485,500	29,752	1,713,800	399,785	1,727
1909	11,794,100	234,544	6,134,500	918,195	3,453
1910	19,464,400	403,283	7,722,400	1,160,242	3,741
1911	18,607,200	372,009	4,990,100	747,587	1,555
1912	22,400,500	448,061	18,285,700	2,002,363	10,898
1913	30,704,200	614,713	13,015,000	1,762,214	8,203
1914	28,557,000	571,419	14,510,800	2,364,907	5,571
1915	35,016,200	892,634	18,680,800	3,333,726	620,562
1916	53,819,000	1,114,061	18,425,300	5,201,066	26,780

Annual Imports of Aluminium.

Year.	Ingots, blooms, bars.		Tubing.		Manufactures.	Leaf or foil (a).	Total value.
	Pounds.	Value.	Pounds.	Value.			
1910	3,180,250	$674,683	10,019	$4,203	$ 77,664	....	$756,550
1911	2,527,120	531,273	3,594	1,495	115,278	....	648,046
1912	2,396,375	410,022	11,624	3,654	120,029	....	533,705
1913	3,455,686	604,582	19,856	9,174	131,938	....	745,694
1914	3,796,353	745,855	15,775	6,898	103,143	$ 4,455	860,351
1915	2,661,117	630,504	6,238	2,998	83,281	5,452	722,235
1916	1,350,485	523,564	5,018	3,082	95,408	49,044	671,098

(a) Not given separately, previous to 1914.

Prices.—The price quotations on aluminium in New York remained steady around 60 cents for the greater part of the year.

The variety of uses of aluminium created by the exigencies of the war were the cause of the demand greatly exceeding the supply. There was a continued large demand for aluminium for the manufacture of "Ammonal," an explosive which is a mixture of nitrate of ammonia and powdered aluminium, also for the frame work of airships, aeroplanes, certain parts of machine guns, rifle bullet points, etc.

Average Monthly Prices of Ingot Aluminium[1].

(At New York in cents per pound).

	1912.	1913.	1914.	1915.	1916.
January	19·13	26·31	18·81	19·08	55·00
February	19·44	26·04	18·81	19·22	58·00
March	19·58	27·05	18·50	19·00	60·25
April	20·38	27·03	18·16	18·88	59·50
May	21·69	26·44	17·95	22·03	59·00
June	22·83	24·68	17·75	30·00	61·50
July	23·50	23·38	17·66	32·38	60·20
August	24·38	22·70	19·88	34·50	60·00
September	25·13	21·69	19·94	47·75	61·88
October	26·25	20·13	18·50	50·00	65·05
November	26·56	19·35	18·00	57·75	65·12
December	25·75	18·88	18·96	57·13	63·00
	22·01	23·64	18·63	33·98	60·71

[1] As quoted by the Engineering and Mining Journal, Jan. 6th, 1917.

ANTIMONY.

Shipments of both antimony ore and concentrates, and of refined antimony were made from Canadian properties during 1915 and 1916, this being the first recorded production of antimony since 1910. Refined antimony was produced at the smelter of the Consolidated Mining and Smelting Company at Trail, B.C., recovered from the residues of the lead refinery; and at the works, at Lake George, New Brunswick, of the New Brunswick Metals, Limited, the latter property having been formerly operated by the Canadian Antimony Company.

The production of refined antimony was reported as 107,185 pounds valued at $41,823, as against 59,440 pounds valued at $11,888 in 1915.

The shipments of antimony ore and concentrates were reported as 885 tons, containing approximately 750,400 pounds of antimony, and valued at $94,537, as against 1,341 tons, containing approximately 1,050,196 pounds of antimony and valued at $81,283 in 1915.

This production was derived principally from the mines of West Gore, Hants Co., Nova Scotia, and the property of the New Brunswick Metals, Ltd., at Lake George, New Brunswick. There were also shipments from the Alps-Alturas property, near Sandon, B.C., and from the Wheaton district, Yukon Territory.

Annual Shipments of Antimony Ore.

Year.	Tons.	Value.	Year.	Tons.	Value.
1886	665	$31,490	1907	2,016	$65,000
1887	584	10,860	1907 *Refined antimony	.....	5,108
1888	345	3,696	1908 (b)	148	5,443
1889	55	1,100	1909	35	1,575
1890	26½	625	1909 *Refined antimony	.....	4,285
1891	10	60	1910	364	13,906
1892 to 1897	.....	.....	1911-1914	.....	.....
1898	1,344	20,000	1915	1,341	81,283
1899 to 1904	.....	.....	1915 *Refined antimony	.....	11,888
1905 (a)	527	.....	1916	885	94,537
1906 (a)	782	.....	1916 *Refined antimony	.....	41,823

(a) As recorded by the Nova Scotia Department of Mines; no value given.
(b) Exports.
* Refined antimony; 63,850 pounds in 1907, 61,207 pounds in 1909, 59,440 pounds in 1915, and 107,185 pounds in 1916.

Exports of Antimony Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1880	40	$1,948	1890	38	$ 1,000	1905	525	$27,118
1881	34	3,308	1891	3½	60	1906	420	17,064
1882	323	11,673	1892–1897	.....	.....	1907	1,327	37,807
1883	165	4,200	1898	1,232	15,295	1908	148	5,443
1884	483	17,875	1899	6¾	190	1909	4	120
1885	758	36,250	1900	210	3,441	1910	239	14,095
1886	665	31,490	1901	10	1,643	1911	57	4,946
1887	229	9,720	1902	90	13,658	1912–1914	.....	.....
1888	352½	6,894	1903	33	4,332	1915	1,149	82,990
1889	30	695	1904	160	7,237	1916	794	48,158

Imports of Antimony.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	42,247	$ 5,903	1889.....	119,034	$11,206	1898.....	156,451	$12,350
1881.....	.....	7,060	1890.....	117,066	17,439	1899.....	289,066	16,851
1882.....	183,597	15,044	1891.....	114,084	17,483	1900.....	186,997	20,001
1883.....	105,346	10,355	1892.....	180,308	17,680	1901.....	350,737	24,714
1884.....	445,600	15,564	1893.....	181,823	14,771	1902.....	504,822	39,276
1885.....	82,012	8,182	1894.....	139,571	12,249	1903.....	868,146	65,434
1886.....	89,787	6,951	1895.....	79,707	6,131	1904.....	418,943	27,112
1887.....	87,827	7,122	1896.....	163,209	9,557	1905.....	186,454	12,828
1888.....	120,125	12,242	1897.....	134,661	8,031	1906.....	403,918	56,297

Calendar Year.	Antimony or Regulus of.		Antimony salts.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1907.....	416,512	$ 69,447	117,592	$19,083	534,104	$ 88,530
1908.....	396,904	28,509	29,832	2,452	426,736	30,961
1909.....	551,354	37,362	40,176	4,369	591,530	41,731
1910.....	388,952	25,296	94,330	9,152	483,282	34,448
1911.....	561,046	36,405	18,420	2,418	579,466	38,823
1912.....	998,045	60,456	55,683	7,197	1,053,728	67,653
1913.....	667,050	49,408	23,649	2,421	690,699	51,829
1914.....	648,516	47,498	45,634	10,217	694,150	57,715
1915.....	1,962,194	344,918	67,956	10,320	2,030,150	355,238
1916.....	796,728	208,450	41,985	13,891	838,713	222,341

Prices.—The price of antimony, ordinary grades, in New York, ranged between a maximum of 46 cents in March, and a minimum of 9 cents in August, after which precipitate decline the prices gradually increased to about 15 cents in December.

The decline in prices was due to the new production especially in China which is the principal source of the world's supply of antimony.

Average Prices of Antimony.*

(In cents per pound.)

	1914.			1915.			1916.		
	Cookson's	U.S.[1]	Ordinaries.[2]	Cookson's	U.S.[1]	Ordinaries.[2]	Cookson's	U.S.[1]	Ordinaries.[2]
January.....	7·388	7·110	6·125	17·90	.....	15·85	.....	.....	42·45
February.....	7·250	7·057	6·100	21·25	.....	18·21	.....	.....	44·31
March.....	7·315	7·073	6·053	28·75	.....	22·13	.....	.....	44·75
April.....	7·363	7·048	6·006	31·88	.....	24·88	.....	.....	42·06
May.....	7·365	7·020	6·845	42·70	.....	35·30	.....	.....	31·60
June.....	7·250	7·000	5·825	47·50	.....	37·69	.....	.....	20·05
July.....	7·210	6·940	5·638	50·44	.....	38·13	.....	.....	14·70
August.....	17·250	15·800	13·800	48·00	.....	33·00	.....	.....	11·53
September...	11·830	.....	9·940	44·56	.....	28·63	.....	.....	11·81
October.....	14·680	.....	12·060	45·50	.....	31·45	.....	.....	12·70
November...	17·750	.....	14·450	47·25	.....	38·88	.....	.....	13·84
December...	16·130	.....	13·310	55·00	.....	39·25	.....	.....	14·59
	10·732	.....	8·763	40·06	.....	30·28	.....	.....	25·37

[1]United States brands.
[2] Hungarian, Chinese, or other "Foreign" brands.
*As given by the "Engineering and Mining Journal."

Antimony is reported[1] smelted in the United States by the following firms:—

Magnolia Metal Co., 115 Bank St., New York City. Smelter at Matawan, N.J.

The Pennsylvania Smelting Co., Pittsburgh, Pa.

Great Western Smelting and Refining Co., Chicago, Ill.

Western Metals Co., 625 Security Building, Los Angeles, California.

Chapman Smelting Co., 409 Battery St., San Francisco, California.

International Smelting Co., Wm. Wraith, Mgr., Salt Lake City, Utah.

Antimony Smelting and Refining Co., Central Building, Seattle, Wash.

Besides these the American Star Antimony Co., is extracting antimony electrically at Gilham, Ark.; the Hoyt Metal Co., St. Louis, Mo., smelts more or less antimony ores in conjunction with lead ores to make antimony lead; and the John Finn Metal Works, San Francisco, Cal., has also treated some antimony ores.

[1] The Mining Congress Journal.

COBALT.

The silver-cobalt-nickel arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, in the Province of Ontario, are now the principal sources of the world's supply of cobalt.

The recovery of this metal in Canada has been in the form of cobalt-oxide and mixed oxides of cobalt and nickel, produced by the smelters treating the above ores, together with cobalt residues produced at the high grade mill of the Nipissing Mining Company. Formerly these residues have been chiefly exported, but they are now being shipped mainly to Canadian smelters.

In addition to the oxide of cobalt, there is now being recovered metallic cobalt, cobalt sulphate, cobalt carbonate, cobalt hydroxide, unseparated oxides, and stellite (the cobalt alloy used for high speed tool metal).

The total production of cobalt contained in smelter products recovered and in cobalt residues exported during 1916, amounted to 840,536 pounds which if valued at $1.10 per pound, would be worth $924,590, as against 504,212 pounds valued at $536,268, in 1915.

This production included in 1916, 215,215 pounds of metallic cobalt, valued by the producers at $200,888; 670,760 pounds of cobalt oxide, valued at $542,341; together with smaller quantities of cobalt sulphate, cobalt carbonate, cobalt hydroxide, unseparable oxides, stellite, and cobalt residues.

The 1915 production included 211,610 pounds of metallic cobalt, valued at $197,994, and 423,717 pounds of cobalt oxide, valued at $338,273 (including a small production of cobalt sulphate).

The total cobalt ores and residues treated in 1916 amounted to 8,127 tons with a cobalt content of 1,254,953 pounds.

Some of the cobalt residues from the Nipissing mill were shipped to smelter works in Great Britain.

No record is available as to the recovery of cobalt from silver ores exported but it is stated that cobalt speiss has been accumulated at United States smelters treating these ores.[1]

Production of Cobalt and Cobalt Oxides.

Year.	Metallic cobalt.		Cobalt-oxide.		Mixed oxides of cobalt and nickel and other cobalt material.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1912	.....	.....	257,677	$128,843	1,285,280	$163,988
1913	.....	.....	660,079	525,028	3,216,000	90,266
1914	.....	.....	899,027	571,710	2,079,001	79,995
1915	211,610	$197,994	423,717	338,273	.....	.....
1916	215,215	200,888	670,760	542,341	.....	.....

[1] Mineral Resources of the United States 1913, p. 340.

Prior to the war the principal demand for cobalt was for colouring in the ceramic industry.

A small demand for cobalt metal now exists for use in making high speed tools, such as "stellite," an alloy of cobalt, chrome, and tungsten, or molybdenum.

A small amount is used for plating and for making salts, such as cobalt sulphate and cobalt carbonate, and also for making cobalt hydroxide.

The market for cobalt was very poor in 1915, but improved somewhat in 1916. The price of cobalt as quoted in New York in 1916, ranged from $1.25 to $1.50 per pound.

The results of researches on cobalt and cobalt alloys, undertaken for the Mines Branch, by Dr. H. T. Kalmus, at Queens' University, have been published in five parts.[1]

Under the provision of the "Metal Refining Bounty Act," passed by the Ontario Legislature in 1907, bounties amounting to $26,744.75 were paid to refineries on cobalt oxide, and $10,280.28 on nickel oxide in 1914, while in 1915, $19,029.22 was paid on cobalt metal and cobalt oxide, and $6,521.69 on nickel metal and nickel oxide.

The bounty is at the rate of six cents per pound on the metallic contents of the oxides. The "Act", which expires in April 1917, was quoted in the Annual Report on Mineral Production of Canada during the Calendar Year 1914, and previous reports of this Division.

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[1] Mines Branch No. 259, "Preparation of Metallic Cobalt by Reduction of the Oxide." Report on, by H. T. Kalmus, B.Sc., Ph.D.
Mines Branch No. 334, "Electro-plating with Cobalt." Report on, by H. T. Kalmus, B.Sc., Ph.D., 1915,
Mines Branch No. 309, "The Physical Properties of the Metal Cobalt." Report on, by H. T. Kalmus, B.Sc., Ph.D.
Mines Branch No. 411, "Cobalt Alloys with Non-Corrosive Properties." Report on, by H. T. Kalmus, B.Sc., Ph.D.
Mines Branch No. 413. "Magnetic Properties of Cobalt and of Fe_2Co." Report on, by H. T. Kalmus, B.Sc., Ph.D.

COPPER.

The total production of copper in 1916, estimated on the basis of smelter recovery from ores treated, was 117,150,028 pounds, which at the average price of copper for the year in New York, 27·202 cents per pound, would be worth $31,867,150, as against 100,785,150 pounds, valued at $17,410,635 in 1915; that is an increase of 16·2 per cent in quantity and 83·0 per cent in value; and if compared with the 1914 production, the increase amounts to 50·4 per cent in quantity, and 209·3 per cent in value.

During 1912, 1913, and 1914, there had been a gradual falling off in quantity, and owing to the decrease in the price of the metal, a still greater falling off in value, but due to the great demand for copper for munitions, the production in 1915 and 1916 exceeded, both in quantity and value, that of any preceding year.

Statistics showing the annual copper production in Canada since 1886 are given in the following table, which shows the yearly increase or decrease as the case may be and also the yearly price per pound in New York:—

Annual Production of Copper.

Year.	Pounds.	Increase or Decrease.		Value.	Increase or Decrease.		Cents per pound.
		Pounds.	%		Value.	%	
1886	3,505,000	.....	.....	$ 385,550	.....	.....	11·00
1887	3,260,424	(d) 244,576	6·99	366,798	(d) $ 18,752	4·86	11·25
1888	5,562,864	2,302,440	70·60	927,107	560,309	152·70	16·66
1889	6,809,752	1,246,888	22·40	936,341	9,234	0·99	13·75
1890	6,013,671	(d) 796,081	11·69	947,153	10,812	1·15	15·75
1891	9,529,401	3,515,730	58·46	1,226,703	279,550	29·51	12·87
1892	7,087,275	2,442,126	25·63	818,580	(d) 408,123	33·27	11·55
1893	8,109,856	1,022,381	14·40	871,809	53,229	6·50	10·75
1894	7,708,789	(d) 401,067	4·94	736,960	(d) 134,849	15·46	9·56
1895	7,771,639	62,850	0·81	836,228	99,268	13·47	10·76
1896	9,393,012	1,621,373	20·86	1,021,960	185,732	22·21	10·88
1897	13,300,802	3,907,790	41·60	1,501,660	479,700	46·94	11·29
1898	17,747,136	4,446,334	33·43	2,134,980	633,320	42·17	12·03
1899	15,078,475	(d) 2,668,661	15·04	2,655,319	520,339	24·37	17·61
1900	18,937,138	3,858,663	25·59	3,065,922	410,603	15·46	16·19
1901	37,827,019	18,889,881	99·75	6,096,581	3,030,659	98·84	16·117
1902	38,804,259	977,240	2·58	4,511,383	(d) 1,585,198	26·00	11·626
1903	42,684,454	3,880,195	10·00	5,649,487	1,138,104	25·23	13·235
1904	41,383,722	(d) 1,300,732	3·05	5,306,635	(d) 342,852	6·07	12·823
1905	48,092,753	6,709,031	16·21	7,497,660	2,191,025	41·29	15·590
1906	55,609,888	7,517,135	15·63	10,720,474	3,222,814	42·98	19·278
1907	56,979,205	1,369,317	2·46	11,398,120	677,654	6·32	20·004
1908	63,702,873	6,723,668	11·80	8,413,876	2,984,244	26·18	13·208
1909*	52,493,863	.....	.....	6,814,754	.....	.....	12·982
1910	55,692,369	3,198,506	6·09	7,094,094	279,340	4·10	12·738
1911	55,648,011	(d) 44,358	0·79	6,886,998	(d) 207,096	2·92	12·376
1912	77,832,127	22,184,116	28·50	12,718,548	5,831,550	45·85	16·341
1913	76,976,925	(d) 855,202	1·10	11,753,606	(d) 964,942	7·59	15·269
1914	75,735,960	(d) 1,240,965	1·64	10,301,606	(d) 1,452,000	14·10	13·602
1915	100,785,150	25,049,190	24·85	17,410,635	7,109,029	40·83	17·275
1916	117,150,028	16,364,878	16·24	31,867,150	14,456,515	83·03	27·202

*The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years.

The production of copper in Canada in 1916 included 32,611 pounds recovered in copper sulphate; 43,615,868 pounds contained in blister copper

exported for refining; 49,115,124 pounds contained in matte, chiefly nickel-copper matte, exported for refining (including small amount of copper refined at Trail); and 24,386,425 pounds in ore, after allowing for smelter losses, exported for smelting and refining.

The total production in 1915 included 44,597 pounds recovered in copper sulphate; 42,050,347 pounds contained in blister copper exported for refining ; 44,185,455 pounds contained in matte, chiefly nickel-copper matte, exported for refining, and 14,504,751 pounds in ore, after allowing for smelter losses, exported for smelting and refining.

The Province of British Columbia in 1916 contributed 54·3 per cent of the total, as against 56·2 per cent in 1915; Ontario contributed 38·4 per cent, as against 39·0 per cent in 1915; Quebec contributed 4·9 per cent, as against 4·1 per cent in 1915; and the Yukon Territory contributed 2·4 per cent, as against 0·5 per cent in 1915.

Production of Copper by Provinces, 1914, 1915, and 1916.

Provinces.	1914.		1915.		1916.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Quebec	4,201,497	$ 571,488	4,197,482	$ 725,115	5,703,347	$ 1,551,424
Ontario	28,948,211	3,937,536	39,361,464	6,799,693	44,997,035	12,240,094
British Columbia	41,219,202	5,606,636	56,692,988	9,793,714	63,642,550	17,312,046
Yukon	1,367,050	185,946	533,216	92,113	2,807,096	763,586
Total	75,735,960	10,301,606	100,785,150	17,410,635	117,150,028	31,867,150

Prices.—The price of copper in New York, which was quoted at 22½ cents at the beginning of 1916, rose quite steadily to a maximum of about 34 cents in the early part of May. Then the price gradually receded to 22¾ cents late in July, to again increase, reaching a maximum of 35 cents in November. The price started to drop again, closing the year with 28¾ cents. The Engineering and Mining Journal attributes the high prices in May and November to the large orders from the Allied Governments, and the decrease at the end of the year to the German peace proposal.

Monthly Average Prices of Electrolytic Copper in New York.

(In cents per pound.)

Months.	1912.	1913.	1914.	1915.	1916.
January	14·094	16·488	14·223	13·641	24·008
February	14·084	14·971	14·491	14·394	26·440
March	14·698	14·713	14·131	14·787	26·310
April	15·741	15·291	14·211	16·811	27·895
May	16·031	15·436	13·996	18·506	28·625
June	17·234	14·672	13·603	19·477	26·601
July	17·190	14·190	13·223	18·796	23·865
August	17·498	15·400	*	16·941	26·120
September	17·508	16·328	*	17·502	26·855
October	17·314	16·337	*	17·686	27·193
November	17·326	15·182	11·739	18·627	30·625
December	17·376	14·224	12·801	20·133	31·890
Yearly average	16·341	15·269	13·602	17·275	27·202

* No quotations.

Monthly Average Prices of Standard Copper in London.

(In £ Sterling per ton of 2,240 pounds.)

Months.	1912.	1913.	1914.	1915.	1916.
January	62·760	71·741	64·304	60·756	88·083
February	62·893	65·519	65·259	63·494	102·667
March	65·884	65·329	64·276	66·152	107·714
April	70·294	68·111	64·747	75·096	124·319
May	72·352	68·807	63·182	77·600	135·457
June	78·259	67·140	61·336	82·574	112·432
July	76·636	64·166	60·540	76·011	95·119
August	78·670	69·200	*	68·673	110·283
September	78·762	73·125	*	68·915	113·905
October	76·389	73·383	*	72·601	122·750
November	76·890	68·275	53·227	77·744	134·659
December	75·516	65·223	56·841	80·773	145·316
Yearly average	72·942	68·335	61·524	72·532	116·059

*No quotations.

Exports and Imports.—With the exception of a small output of copper sulphate at Trail, B.C., the copper production of Canada is exported for refining. The exports of copper in ore, matte, regulus, etc., during the calendar year 1916 were 124,942,400 pounds valued at $20,776,536, of which 89·4 per cent, in quantity, and 95·3 per cent in value were exported to the United States, and 10·6 per cent in quantity, and 4·7 per cent in value to Great Britain.

In 1915, 81·2 per cent in quantity, and 86·7 per cent in value were exported to the United States, and 18·8 per cent in quantity, and 13·3 per cent in value to Great Britain.

The exports of copper, black or coarse, and in pigs, etc., were to the United States, with the exception of a very small quantity to Newfoundland, and amounted to 2,430,400 pounds valued at $581,268. The exports of "old and scrap" copper amounted to 5,846,600 pounds valued at $1,284,895, most of which went to the United States.

The total exports of copper in 1916, were 133,219,400 pounds valued at $22,642,699, an increase of 23 per cent in quantity and 73 per cent in value over the exports of 1915.

Exports of Copper, 1915 and 1916.

Destination.	Fine in ore, matte, regulus, etc.		Black or coarse and in pigs, bars, sheets, etc.		'Old and Scrap'.	
1915.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
United States	66,155,803	$7,514,736	21,292,516	$3,788,715	3,956,600	$587,153
Great Britain	15,281,260	1,156,905	.....	.....	205,000	29,400
Other countries	.....	.....	.....	.....	.....	.....
	81,437,063	$8,671,641	21,292,516	$3,788,715	4,161,600	$616,553
1916.						
United States	111,695,500	$19,786,841	2,425,900	$580,525	5,803,300	$1,277,854
Great Britain	13,246,900	989,695	.....	.....	43,300	7,041
Other countries	.....	.....	(a) 4,500	743	.....	.....
	124,942,400	$20,776,536	2,430,400	$581,268	5,846,600	$1,284,895

(a) Newfoundland.

Exports of Copper in Ore, Matte, etc., from 1885 to 1916.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
1885	.....	$ 262,600	1901	32,488,872	$ 3,404,908
1886	.....	249,259	1902	26,094,498	2,476,516
1887	.....	137,966	1903	38,364,676	3,873,827
1888	.....	257,260	1904	38,553,282	4,216,214
1889	.....	168,457	1905	40,740,861	5,443,873
1890	.....	398,497	1906	42,398,538	7,303,366
1891	.....	348,104	1907	54,688,450	8,749,609
1892	.....	277,632	1908	51,136,371	5,934,559
1893	4,792,201	269 160	1909	54,447,750	5,832,246
1894	1,625,389	91,917	1910	56,964,127	5,840,553
1895	3,742,352	236,965	1911	55,287,710	5,467,725
1896	5,462,052	281,070	1912	78,488,564	9,036,479
1897	14,022,610	850,336	1913*	85,147,560	9,927,814
1898	11,572,381	840,243	1914*	77,398,723	8,270,689
1899	11,371,766	1,199,908	1915*	106,891,179	13,076,909
1900	23,631,523	1,741,885	1916*	133,219,400	22,642,699

*Includes "Old and Scrap."

The total recorded imports of copper during the calendar year 1916 were valued at $7,566,080, and included: crude and manufactured copper, 25,594,029 pounds valued at $7,133,117; copper sulphate, 1,803,655 pounds valued at $198,542; and the manufactures of copper valued at $234,421. In 1915, the total imports were valued at $3,957,770, and included: crude and manufactured copper 20,245,407 pounds, valued at $3,593,818; copper sulphate, 1,854,850 pounds valued at $99,282; and the manufactures of copper valued at $264,670.

Unfortunately the above record does not represent the total copper imports during 1916 because of the fact that large quantities of copper, imported for the use of the Imperial Government, have been, for Customs Records' purposes, entered with many other products under one item.

According to United States trade records the exports from the United States to Canada of copper in pigs, ingots, bars, rods, wire, plates, etc., amounted during the calendar year 1916 to 45,947,740 pounds valued at $12,553,494, as against 24,128,098 pounds valued at $4,638,191 in 1915, and 24,221,498 pounds valued at $3,731,774 in 1914. The copper contents of brass or other alloys are not included. It will be noted that these figures are considerably higher than the Canadian record for both 1916 and 1915.

The following tables of imports show that the imports in 1916, were nearly double those of 1915, and exceeded those of 1913, the highest on record

Imports of Copper, 1915 and 1916.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Copper, old and scrap	68,500	$ 8,281	96,700	$ 20,777
Copper in pigs, ingots or in blocks	4,771,200	777,533	3,446,300	904,505
Copper in bars, and rods, in coils, or otherwise, in lengths, not less than 6 feet, unmanufactured	11,989,400	2,082,182	18,460,600	5,062,854
Copper, in strips, sheets or plates, not planished or coated, etc	2,668,400	534,926	2,650,700	792,400
Copper tubing in lengths not less than 6 feet and not polished, bent or otherwise manufactured	670,337	173,896	873,944	335,339
Copper rollers, for use in calico printing	.....	2,777	.....	727
Copper and manufactures of:—				
Nails, tacks, rivets and burrs or washers	.....	8,661	.....	3,593
Wire, plain, tinned or plated	77,383	16,965	55,843	16,523
Wire cloth, etc	.....	1,308	.....	2,926
All other manufactures of, n.o.p	.....	251,924	.....	227,175
Copper, precipitate of, crude	187	35	9,942	719
Copper sulphate (blue vitriol)	1,854,850	99,282	1,803,655	198,542
Total value	.....	3,957,770	.....	7,566,080

Imports of Copper, 1907 to 1916, inclusive.

Year.	Pigs, ingots or in blocks.		Old and scrap.		Manufactures of copper.			Crude precipitate.		Copper sulphate.		Total.
					Bars, rods, sheets, tube and wire.		Other manufactures.					
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Value.	Pounds.	Value.	Pounds.	Value.	Value.
1907	3,456,900	$699,388	196,300	$37,787	13,499,130	$3,138,283	$108,057	7,397	$1,340	2,299,674	$142,948	$4,127,803
1908	2,360,900	353,301	127,700	12,821	12,150,850	1,765,415	88,715	4,209	557	2,768,123	131,057	2,351,866
1909	4,200,100	554,273	132,600	14,447	16,208,978	2,340,464	126,769	1,990	257	1,634,751	66,459	3,102,669
1910	4,640,500	609,111	273,700	31,070	25,322,906	3,579,270	150,322	4,847	595	1,925,557	77,782	4,448,150
1911	5,650,400	705,598	265,300	28,748	29,244,210	3,898,416	215,289	2,608	299	2,191,899	88,419	4,936,769
1912	5,121,800	806,705	400,500	56,748	35,198,208	5,776,003	305,680	5,703	570	2,105,419	101,650	7,047,356
1913	5,314,200	845,095	596,700	87,790	35,101,061	6,002,937	370,313	4,743	515	2,037,714	107,960	7,414,610
1914	3,733,300	507,499	127,800	15,717	22,419,715	3,460,106	219,449	2,017	328	1,143,039	53,802	4,256,901
1915	4,771,200	777,533	68,500	8,281	15,405,520	2,807,969	264,670	187	35	1,854,850	99,282	3,957,770
1916	3,446,300	904,505	96,700	20,777	22,041,087	6,207,116	234,421	9,942	719	1,803,655	198,542	7,566,080

Imports of Copper, 1880 to 1916, inclusive.

Fiscal Year.	Pigs, Old, Scrap, etc.		Manufactures.	Fiscal Year.	Pigs, Old, Scrap, etc.		Manufactures.
	Pounds.	Value.	Value.		Pounds.	Value.	Value.
1880.....	31,900	$ 2,130	$123,061	1899.....	1,655,000	$246,740	$ 551,586
1881.....	9,800	1,157	159,163	1900.....	1,144,000	180,990	1,090,280
1882.....	20,200	1,984	220,235	1901.....	951,500	152,274	951,045
1883.....	124,500	20,273	247,141	1902.....	1,767,200	325,832	1,281,522
1884.....	40,200	3,180	134,534	1903.....	2,038,400	252,594	1,291,635
1885.....	28,600	2,016	181,469	1904.....	2,115,300	270,315	1,191,610
1886.....	82,000	6,969	219,420	1905.....	1,944,400	266,548	1,775,881
1887.....	40,100	2,507	325,365	1906.....	2,627,700	441,854	2,660,303
1888.....	32,300	2,322	303,459	Calendar Year.			
1889.....	32,300	3,288	402,216	1907.....	3,653,200	737,175	3,246,340
1890.....	112,200	11,521	472,668	1908.....	2,488,600	366,122	1,854,130
1891.....	107,800	10,452	563,522	1909.....	4,332,700	568,720	2,467,233
1892.....	343,600	14,894	422,870	1910.....	4,914,200	640,181	3,729,592
1893.....	168,300	16,331	458,715	1911.....	5,915,700	734,346	4,113,705
1894.....	101,200	7,397	175,404	1912.....	5,522,300	863,453	6,081,683
1895.....	72,062	6,770	251,615	1913.....	5,910,900	932,885	6,373,250
1896.....	86,905	9,226	285,220	1914.....	3,861,100	523,216	3,679,555
1897.....	49,000	5,449	264,587	1915.....	4,839,700	785,814	3,072,639
1898.....	1,050,000	80,000	786,529	1916.....	3,543,000	925,282	6,441,537

There are also imports of copper in the form of brass. The recorded imports of brass in 1916 included 2,974,676 pounds of metal in crude and manufactured form (see chapter on Zinc), valued at $923,523, and containing possibly 2,082,273 pounds of copper; and also manufactures of brass, quantity not recorded, valued at $3,752,851; while in 1915 the imports of brass included 3,810,946 pounds of metal in crude and manufactured form, valued at $714,410, and containing probably 2,667,663 pounds of copper; and also manufactures of brass, quantity not recorded, valued at $2,463,532.

Consumption.—In view of the large import of manufactured copper and brass for which no quantity is recorded, it is difficult to estimate closely the consumption of copper. The imports in 1916 amounted to at least 51,000,000 pounds on the basis of the United States record, and allowing 5,000,000 pounds for metal contained in other manufactures of copper and brass. Domestic production was practically all exported together with 6,000,000 pounds of copper "old and scrap," which, if deducted from the imports, gives an estimated consumption of 45,000,000 pounds, or 22,500 tons.

Quebec.

The mines in the Eastern Townships continued very active throughout the year, and the completion of the new concentrator at the Eustis mine in the mid-summer contributed to the increased production which amounted to 5,703,347 pounds, valued at $1,551,424, representing the estimated recovery from 130,492 tons of ore and concentrates with a metal content of 8,215,085 pounds of copper.

Quebec: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1886.....	3,340,000	$367,400	1896...	2,407,200	$261,903	1906...	1,981,169	$ 381,930
1887.....	2,937,900	330,514	1897...	2,474,970	279,424	1907...	1,517,990	303,659
1888.....	5,562,864	927,107	1898...	2,100,235	252,658	1908...	1,282,024	169,330
1889.....	5,315,000	730,813	1899...	1,632,560	287,494	1909...	1,088,212	141,272
1890.....	4,710,606	741,920	1900...	2,220,000	359,418	1910...	877,347	111,757
1891.....	5,401,704	695,469	1901...	1,527,442	246,178	1911...	2,436,190	301,503
1892.....	4,883,480	564,042	1902...	1,640,000	190,666	1912...	3,282,210	536,346
1893.....	4,468,352	480,348	1903...	1,152,000	152,467	1913...	3,455,887	527,679
1894.....	2,176,430	208,067	1904...	760,000	97,455	1914...	4,201,497	571,488
1895.....	2,242,462	241,288	1905...	1,621,243	252,752	1915...	4,197,482	725,115
						1916...	5,703,347	1,551,424
						Total..	88,597,803	$12,988,886

Ontario.

The copper production from Ontario comes mainly from the nickel-copper ores of Sudbury district.

The chief companies are:—

The Canadian Copper Co., Ltd., shipping from the Creighton and adjoining properties.

The Mond Nickel Co., Ltd., operating at Coniston.

The Alexo Mining Co., operating near Porquis Junction, and shipping to the Coniston smelter.

The British American Nickel Corporation, which carried on active development and construction work but did not ship during 1916.

A few small shipments were also made from the following:—

The Bruce Mine, near Bruce Mines, Algoma.

The Cheney Mine, near Thessalon, Algoma.

The property of the Sable River Copper Co., now known as the Kenyon Copper Mines, Ltd., near Massey, Sudbury.

The Tip-Top Mine, near Port Arthur, in the Thunder Bay district.

The Hewitson, operated by the Mine Centre Copper Co., and now known as the Port Arthur Copper Co., Ltd., near Shoal lake, Rainy River district.

The copper production from Ontario in 1916 amounted to 44,997,035 pounds valued at $12,240,094, equivalent to 38·4 per cent of the production for Canada. Details of the production of copper from the nickel-copper ores are given in the article on "Nickel."

The production of copper from the copper mines and Cobalt district amounts to less than one per cent of the total.

The Ontario Government offers a bounty on copper over 95 per cent pure metal, and on copper-sulphate produced from ore mined and refined in the Province. The text of the Act was quoted in the Annual Report on Mineral Production of Canada, 1914, p. 60.

Ontario: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1886.....	165,000	$ 18,150	1897...	5,500,652	$ 621,023	1908.	15,005,171	$1,981,883
1887.....	322,524	36,284	1898...	8,375,223	1,007,539	1909.	15,746,699	2,044,237
1888.....	....	....	1899...	5,723,324	1,007,877	1910.	19,259,016	2,453,213
1889.....	1,466,752	201,678	1900...	6,740,058	1,091,215	1911.	17,932,263	2,219,297
1890.....	1,303,065	205,233	1901...	8,695,831	1,401,507	1912.	22,250,601	3,635,971
1891.....	4,127,697	531,234	1902...	7,408,202	861,278	1913.	25,885,929	3,952,522
1892.....	2,203,795	254,538	1903...	7,172,533	949,285	1914.	28,948,211	3,937,536
1893.....	3,641,504	391,461	1904...	4,913,594	630,070	1915.	39,361,464	6,799,693
1894.....	5,207,679	497,854	1905...	8,779,259	1,368,686	1916.	44,997,035	12,240,094
1895.....	4,576,337	492,414	1906...	10,638,231	2,050,838			
1896.....	3,167,256	344,598	1907...	14,104,337	2,821,432	Total	343,619,242	$56,048,640

British Columbia.

The total quantity of copper contained in matte, blister, and copper-sulphate produced in British Columbia in 1916, and including an estimate of smelter recovery for copper ores exported, was 63,642,550 pounds, after deducting the amount of copper produced from foreign ores.

The following table shows that the production in 1916 exceeded that of 1915 by over seven millions of pounds, an increase of 10·9 per cent. It was nearly double in quantity and over thrice in value that of 1908, when this department first collected returns of smelter production.

British Columbia: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.
1908.....	37,041,115	$4,892,390	1913.....	45,791,579	$ 6,991,916
1909.....	35,658,952	4,629,245	1914.....	41,219,202	5,606,636
1910.....	35,270,006	4,492,693	1915.....	56,692,988	9,793,714
1911.....	35,279,558	4,366,198	1916.....	63,642,550	17,312,046
1912.....	50,526,656	8,256,561	Total.....	401,122,606	$66,339,399

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines of British Columbia, which is based upon ore shipments from mines, provides for a deduction of five pounds of copper per ton of ore shipped on account of smelter losses, a method which gives a result closely approximating that obtained by this Branch. Previous to 1909 no allowance for smelter losses was made.

British Columbia: Copper Content of Ores Shipped.†

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1894.....	324,680	$ 31,039	1902....	29,636,057	$3,445,488	1910‡...	38,243,934	$4,871,512
1895.....	952,840	102,526	1903....	34,359,921	4,547,735	1911‡...	36,927,656	4,571,644
1896.....	3,818,556	415,459	1904....	35,710,128	4,579,110	1912‡...	51,546,537	8,408,513
1897.....	5,325,180	601,213	1905....	37,692,251	5,876,222	1913‡...	46,460,305	7,094,489
1898.....	7,271,678	874,783	1906....	42,990,488	8,287,706	1914‡...	45,009,699	6,121,319
1899.....	7,722,591	1,359,948	1907....	40,832,720	8,168,177	1915‡...	56,918,405	9,835,500
1900.....	9,977,080	1,615,289	1908....	47,274,614	6,244,031	1916‡...	65,379,364	17,784,494
1901.....	27,603,746	4,448,896	1909....	45,597,245	5,918,522			

† As published by the British Columbia Bureau of Mines.
‡Estimated recovery after making due allowance for smelter losses.

British Columbia: Production of Copper by Districts.†

(In pounds.)

——	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Cariboo—Omineca	.....	.....	.....	1,838	6,000	2,831,279	1,646,072
Cassiar—Skeena, etc.	.....	19,151	88,403	1,336	11,123,376	21,915,481	24,065,995
East Kootenay—							
Fort Steele	.....	.....	.....	.....	.....	.....	5,654
Windermere	.....	.....	.....	.....	.....	.....	3,400
West Kootenay—							
Nelson	231,936	.....	26,257	815,126	586,764	30,240	176,383
Trail Creek	3,577,745	3,429,702	2,539,900	2,538,661	3,779,830	4,651,681	4,200,745
Yale—							
Boundary	31,354,985	22,327,359	33,372,199	28,621,973	16,428,959	17,402,662	17,626,623
Ashcroft and Kamloops	1,178	152,723	.....	29,505	14,525	295,164	636,594
Similkameen	.....	.....	.....	8,073	.....	21,701	182,633
Coast districts	3,078,090	10,998,721	15,429,778	14,443,793	13,070,245	9,770,197	16,835,265
Totals	38,243,934	36,927,656	51,456,537	46,460,305	45,009,699	56,918,405	65,379,364

† As published by British Columbia Bureau of Mines.

Copper mining is now by far the most important form of mining in the Province and in 1916 it formed about 57 per cent of the total value of the metalliferous mines.

In the Boundary the production was mainly from the mines of two of the large smelting companies: The Granby Consolidated Mining, Smelting & Power Co., Ltd., and the British Columbia Copper Co., Ltd.

These two companies operate their own smelters and convert their matte to blister copper. The low grade ores of this district are self-fluxing and very uniform in character, averaging a little over one per cent in copper, and from $1 to $2 in gold and silver.

The British Columbia Copper Company have been steadily developing their properties at Princess camp in the Similkameen, employing a large number of men. Some properties were producing during 1916 and we may look forward to the eventual establishment in that part of the country of another important copper producing centre.

Much development and some shipments are reported from the Ashcroft and Nicola divisions.

In the interior the main shippers were, at Rossland, the Centre Star and Le Roi groups, owned by the Consolidated Mining and Smelting Co., and the Le Roi II (Josie) mine. Besides these, shipments were made from the Nelson district by the Queen Victoria mine and a few other operators.

In the Kamloops division the Iron Mask mine is the only important shipper.

Much development work was done in the neighbourhood of New Hazelton in the Omineca mining division, and the Rocher Déboulé mine, after a couple of years of extensive development, has become an important producer.

There was noted in 1915 a large increase in the production of the Coast district which more than offset the falling off in the Boundary district. The increase was still more remarkable in 1916, and was due mostly to the Hidden Creek mines on Observatory inlet, the Britannia mines on Howe sound, and the Marble Bay mines on Texada island.

Yukon.

The production from the Yukon Territory has been from the Whitehorse district. The mines in this district had been more or less idle for the past few years, but the high price of copper during 1916 was the cause of much activity. The production amounted to 2,807,096 pounds, valued at $763,586, as against 533,216 pounds, valued at $92,113 in 1915.

The principal shippers by order of importance were: The Pueblo, operated by the Yukon Mining Co., the War Eagle, Grafter, Copper King, and Anaconda.

Yukon: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.
1906 (and previous)	156,000	$ 23,400	1912	1,772,660	$ 289,670
1907	511,838	102,388	1913	1,843,530	281,489
1908	112,264	14,828	1914	1,367,050	185,946
1909	.....	.....	1915	533,216	92,113
1910	286,000	36,431	1916	2,807,096	763,586
1911	.....	.....			
			Total	9,389,654	$1,789,851

GOLD.

The production of gold in Canada in 1916 amounted to 930,492 fine ounces, valued at $19,234,976, and was made up as follows: (a) gold derived from alluvial workings, $4,964,831 or 25·8 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, i.e., stamp mill bullion, $10,480,661 or 54·5 per cent of the total; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters, $3,789,484 or 19·7 per cent of the total production.

The production during 1915 was 918,056 fine ounces, valued at $18,977,901, and included: (a) gold derived from alluvial workings, $5,524,476 or 29 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, i.e., stamp mill bullion, $8,909,170 or 47 per cent; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters, $4,544,245 or 24 per cent of the total production.

Annual Production of Gold in Canada, 1858–1916.

Year.	Fine ounces‡	Value.	Year.	Fine ounces‡	Value.	Year.	Fine ounces‡	Value.
1858.....	34,104	$ 705,000	1878.....	74,420	$1,538,394	1898....	666,386	$13,775,420
1859.....	78,129	1,615,072	1879....	76,547	1,582,358	1899....	1,028,529	21,261,584
1860.....	107,806	2,228,543	1880....	63,121	1,304,824	1900....	1,350,057	27,908,153
1861.....	128,973	2,666,118	1881....	63,524	1,313,153	1901....	1,167,216	24,128,503
1862.....	135,391	2,798,774	1882....	60,288	1,246,268	1902....	1,032,161	21,336,667
1863.....	202,498	4,186,011	1883....	53,853	1,113,246	1903....	911,559	18,843,590
1864.....	199,605	4,126,199	1884....	51,202	1,058,439	1904....	796,374	16,462,517
1865.....	192,898	3,987,562	1885....	55,575	1,148,829	1905....	684,951	14,159,195
1866.....	152,555	3,153,597	1886....	70,782	1,463,196	1906....	556,415	11,502,120
1867.....	145,775	3,013,431	1887....	57,460	1,187,804	1907....	405,517	8,382,780
1868.....	134,169	2,773,527	1888....	53,145	1,098,610	1908....	476,112	9,842,105
1869.....	102,720	2,123,405	1889....	62,653	1,295,159	1909....	453,865	9,382,230
1870.....	83,415	1,724,348	1890....	55,620	1,149,776	1910....	493,707	10,205,835
1871.....	105,187	2,174,412	1891....	45,018	930,614	1911....	473,159	9,781,077
1872.....	90,283	1,866,321	1892....	43,905	907,601	1912....	611,885	12,648,794
1873.....	74,346	1,536,871	1893....	47,243	976,603	1913....	802,973	16,598,923
1874.....	97,856	2,022,862	1894....	54,600	1,128,688	1914....	773,178	15,983,007
1875.....	130,300	2,693,533	1895....	100,798	2,083,674	1915....	918,056	18,977,901
1876.....	97,729	2,020,233	1896....	133,262	2,754,774	1916....	930,492	19,234,976
1877.....	94,304	1,949,444	1897....	291,557	6,027,016	.....	.....	.....

‡Calculated from the value: one dollar = 0·048375 oz.

Gold was first discovered in various provinces about 1858, and the production gradually increased to over four million dollars in 1863, but fell again to $907,601 in 1892. The discovery of gold in the Yukon and other discoveries in 1896 gave the mining industry a new impetus, resulting in a rapid increase in the gold production, which, in 1900, reached the high mark of nearly twenty-eight million dollars. From this maximum it decreased again to a little over eight million dollars in 1907. With the discovery and development of the Porcupine mines in Ontario, gold production has rapidly increased again.

The Dominion Assay Office in Vancouver, operated in connexion with this Department, receives, assays, and purchases crude bullion, amalgam,

nuggets, and dust, the resultant bullion being resold. The total quantity of bullion thus received during the twelve months ending December 31, 1916, was 180,292·83 ounces, which, after melting was reduced to 175,393·10 ounces and valued at $2,828,239.65, after deducting office charges. The loss by melting was 2·718 per cent. The receipts were mostly from British Columbia and the Yukon, with also a few small deposits from Alaska and Alberta.

Receipts at Dominion Assay Office, Vancouver.

Year.	Weight before melting.	Weight after melting.	Net value.	Year.	Weight before melting.	Weight after melting.	Net value.
	ounces.	ounces.					
1908(*a*).....	90,175·48	89,117·76	$1,478,894.00	1913(*b*)....	111,479·94	109,920·49	$1,448,625.37
1909.....	48,478·58	47,576·27	789,267.94	1914.....	166,148·83	163,523·61	2,029,251.31
1910.....	46,064·31	45,228·92	746,101.92	1915.....	183,924·49	179,751·68	2,736,302.31
1911.....	39,784·70	39,069·31	647·416.38	1916.....	180,292·83	175,393·10	2,828,239.65
1912.....	59,068·82	57,951·98	974,077.14	.....	.....	.....	.....

(*a*) For 9 months only. (*b*) The removal of the assay charge in January 1913, accounts for the large increase.

Refined Metal.—There are two refineries producing fine gold in Canada; the Royal Mint at Ottawa, which receives shipments of gold from various provinces in the Dominion; and that of the Consolidated Mining and Smelting Co. of Canada, Ltd., at Trail, B.C., where gold is mainly recovered from the high grade silver-lead ores and the "dry" ores shipped to the smelter.

The production of gold by provinces is given in the following table in which it will be seen that Ontario, since the discovery of the Porcupine camp, has gradually increased its production, and to such an extent that in 1916 it produced 52·9 per cent of the total, as against 44·3 per cent in 1915, and 14·1 per cent in 1912, when Porcupine came into prominence.

Production of Gold by Provinces, 1914, 1915, and 1916.

	1914.		1915.		1916.	
	Fine ounces.‡	Value.	Fine ounces.‡	Value.	Fine ounces.‡	Value.
Nova Scotia.....	2,904	$ 60,031	6,636	$ 137,180	4,562	$ 94,305
Quebec.....	1,292	26,708	1,099	22,720	1,034	21,375
Ontario.....	268,264	5,545,509	406,577	8,404,693	492,481	10,180,485
Alberta.....	48	992	195	4,026	82	1,695
British Columbia (*a*)....	252,730	5,224,393	273,376	5,651,184	219,633	4,540,216
Yukon.....	247,940	5,125,374	230,173	4,758,098	212,700	4,396,900
Totals.....	773,178	15,983,007	918,056	18,977,901	930,492	19,234,976

(*a*) As follows:	1914.	1915.	1916.
Gold from placer mining	$ 565,000	$ 770,000	$ 580,500
Gold from vein mining.....	4,659,393	4,881,184	3,959,716
	5,224,393	5,651,184	4,540,216

‡The exact value of fine gold is $\frac{8}{387}$ dollars per ounce equivalent to $20·671834. (United States Standard.) In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by $\frac{387}{8000}$ or 0·048375.

Exports and Imports.—The exports of gold in dust, nuggets, etc., during 1916 were valued at $18,382,903 as against $16,528,143 in 1915.

The imports during 1916 were: gold bullion, valued at $18,648,770; gold coins, $17,828,695; and manufactures of gold and silver, valued at $492,361; while in 1915 the imports were: gold bullion, valued at $1,028,405 gold coins, $19,910,229; and manufactures of gold and silver valued at $464,294.

Nova Scotia.

The gold production of this Province, which is derived almost entirely from quartz ores, is reported by the Provincial Department of Mines in 1916 as 4,562 fine ounces, valued at $94,305, as compared with 6,636 fine ounces valued at $137,180, in 1915, a decrease of 31 per cent. In 1915 there had been an increase of 128 per cent over the production of 1914.

The production of Nova Scotia which was 6,863 fine ounces in 1862, reached a maximum of 30,348 fine ounces in 1902; then decreased gradually, reaching in 1913 a minimum of 2,174 fine ounces. It is interesting to note that the production in 1915 is nearly identical to that of 1862, the first year returns were reported by the Provincial Mines Department.

Nova Scotia: Annual Production of Gold.

Year.	Tons treated.	Fine ounces.	Value.	Yield of gold per ton.	Year.	Tons treated.	Fine ounces.	Value.	Yield of gold per ton.
1862...	6,473	6,863	$141,871	$21.91	1890..	42,749	22,978	$474,990	$11.11
1863...	17,000	13,180	272,448	16.02	1891..	36,351	21,841	451,503	12.42
1864...	21,431	18,883	390,349	18.21	1892..	32,552	18,865	389,965	11.98
1865...	24,421	24,011	496,357	20.32	1893..	42,354	18,436	381,095	8.99
1866...	32,157	23,776	491,491	15.28	1894..	55,357	18,834	389,338	7.04
1867...	31,384	25,763	532,563	16.96	1895..	60,600	21,919	453,119	7.47
1868...	32,259	19,377	400,555	12.41	1896..	69,169	23,876	493,568	7.13
1869...	35,144	16,855	348,427	19.91	1897..	73,192	27,195	562,165	7.68
1870...	30,824	18,740	387,392	12.56	1898..	82,747	26,054	538,590	6.50
1871...	30,787	18,139	374,972	12.17	1899..	112,226	29,876	617,604	5.50
1872...	17,089	12,352	255,349	14.94	1900..	87,390	28,955	598,553	6.85
1873...	17,708	11,180	231,122	13.05	1901..	91,948	26,459	546,963	5.32
1874...	13,844	8,623	178,244	12.87	1902..	93,042	30,348	627,357	6.68
1875...	14,810	10,576	218,629	14.76	1903..	103,856	25,533	527,806	5.08
1876...	15,490	11,300	233,585	15.08	1904..	45,436	10,362	214,209	4.71
1877...	17,369	15,925	329,205	18.95	1905..	57,774	13,707	283,353	4.90
1878...	17,989	11,864	245,253	13.63	1906..	66,059	12,223	252,676	3.82
1879...	15,936	12,980	268,328	16.83	1907..	58,550	13,675	282,686	4.82
1880...	13,997	12,472	257,823	18.42	1908..	61,536	11,842	244,799	3.97
1881...	16,556	10,147	209,755	12.66	1909..	56,790	10,193	210,711	3.71
1882...	21,081	13,307	275,090	13.04	1910..	43,006	7,928	163,891	3.81
1883...	25,954	14,571	301,207	11.60	1911..	18,328	7,781	160,854	8.78
1884...	25,186	15,168	313,554	12.44	1912..	14,360	4,385	90,638	6.51
1885...	28,890	20,945	432,971	14.98	1913..	7,324	2,174	44,935	6.13
1886...	29,010	22,038	455,564	15.70	1914..	13,156	2,904	60,031	4.56
1887...	32,280	20,009	413,631	12.81	1915..	25,204	6,636	137,180	5.44
1888...	36,178	21,137	436,939	12.08	1916..	17,497	4,562	94,305	5.38
1889...	39,160	24,673	510,029	13.02					
					Total	2,180,820	904,395	$18,695,587	8.57

Nova Scotia: Production of Gold from 1862 to 1916.

District.	Tons crushed.	Total yield of gold.			Average yield of gold per ton.			Valued at $19 per ounce.
		ounces.	dwt.	grs.	ounces.	dwt.	grs.	
Brookfield (*c*)	93,627	38,748	13	2	.....	8	7	$ 736,224
Caribou & Moose River (*a*)	223,515	62,415	3	11	.....	5	14	1,185,888
Fifteen Mile stream (*f*)	36,878	17,363	0	5	.....	9	10	329,897
Lake Catcha	31,984	28,334	5	11	.....	17	17	538,351
Malaga Barrens (*g*)	23,028	20,422	8	6	.....	17	18	388,026
Montagu	30,191	43,575	12	8	1	8	21	827,937
Oldham	59,951	68,538	7	8	1	2	21	1,302,229
Rawdon (*e*)	12,189	9,606	5	10	.....	15	18	182,519
Renfrew	61,795	48,699	7	19	.....	15	18	925,289
Sherbrooke	340,823	157,333	21	3	.....	9	6	2,989,347
Stormont	529,687	123,422	18	4	.....	4	16	2,345,035
Salmon River (*h*)	118,819	41,852	5	20	.....	7	1	795,194
Tangier	70,098	29,561	5	5	.....	8	10	561,664
Uniacke (*b*)	63,351	43,983	1	17	.....	13	21	835,679
Waverley	155,556	69,986	8	16	.....	9	0	1,329,742
Whiteburn (*d*)	6,907	9,800	0	2	1	8	9	186,200
Wine Harbour	77,396	34,992	15	11	.....	9	1	664,863
Other districts	146,477	75,877	10	2	.....	10	9	1,441,672
West Gore	4,879	6,813	18	14	1	7	2	129,465
	2,087,151	931,327	8	6	.....	8	22	$17,695,221

(*a*) from 1869, (*b*) from 1868, (*c*) from 1883, (*d*) from 1887, (*e*) from 1882, (*f*) from 1887, (*g*) from 1883, (*h*) from 1905.

Quebec.

The gold production in Quebec during 1916 was 1,034 fine ounces, valued at $21,375, as against 1,099 fine ounces, valued at $22,720, in 1915.

This production is derived from the pyritic mines of the Eastern Townships, which are worked chiefly for the sulphur and copper contents of the ore. No alluvial production has been reported for a number of years.

Quebec: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1877	583	$ 12,057	1891	87	$ 1,800	1905	191	$ 3,940
1878	868	17,937	1892	628	12,987	1906	165	3,412
1879	1,160	23,972	1893	759	15,696	1907	.....	.....
1880	1,605	33,174	1894	1,412	29,196	1908	.....	.....
1881	2,741	56,661	1895	62	1,281	1909	193	3,990
1882	827	17,093	1896	145	3,000	1910	124	2,565
1883	860	17,787	1897	44	900	1911	613	12,672
1884	422	8,720	1898	295	6,089	1912	642	13,270
1885	103	2,120	1899	238	4,916	1913	701	14,491
1886	193	3,981	1900	.....	.....	1914	1,292	26,708
1887	78	1,604	1901	145	3,000	1915	1,099	22,720
1888	181	3,740	1902	391	8,073	1916	1,034	21,375
1889	58	1,207	1903	180	3,712			
1890	65	1,350	1904	140	2,900	Total	20,324	$400,096

Ontario.

The gold production in Ontario, which in 1913 had exceeded the total of all the other years since 1886, more than doubled that figure in 1916, amounting to 492,481 fine ounces, valued at $10,180,485, as against 406,577 fine ounces, valued at $8,404,693 in 1915, an increase of 21·1 per cent.

Ontario: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1887.....	327	$ 6,760	1897....	9,157	$189,294	1907....	3,212	$ 66,399
1888.....	.....	.....	1898....	12,863	265,889	1908....	3,212	66,389
1889.....	.....	.....	1899....	20,394	421,591	1909....	1,569	32,425
1890.....	.....	.....	1900....	14,391	297,495	1910....	3,089	63,849
1891.....	97	2,000	1901....	11,844	244,837	1911....	2,062	42,625
1892.....	344	7,118	1902....	11,118	229,828	1912....	86,523	1,788,596
1893.....	708	14,637	1903....	9,096	188,036	1913....	219,801	4,543,690
1894.....	1,917	39,624	1904....	1,935	40,000	1914....	268,264	5,545,509
1895.....	3,015	62,320	1905....	4,402	91,000	1915....	406,577	8,404,693
1896.....	5,563	115,000	1906....	3,202	66,193	1916....	492,481	10,180,485
						Total.....	1,597,163	33,016,282

‡Calculated from the value: one dollar = 0·048375 ounce.

The Porcupine district has since its development in 1912 been the main producer. Other producing districts were: Kirkland Lake and Munro township, in Timiskaming district; and Long Lake, near Naughton, Sudbury district.

Other districts besides Timiskaming and Sudbury, though not as yet arrived at the producing stage, have shown much activity during 1915 and 1916, and may soon become important centres.

The principal of these districts is the Kowkash district, Thunder Bay, which is reported on by Mr. P. E. Hopkins of the Ontario Bureau of Mines.[1]

Other gold discoveries were subsequently made in the surrounding district, the most important being at Tashota, 22 miles west of Kowkash, where gold and tellurides were discovered.

In the Kenora district much interest has been caused by the report of rich gold findings on the Rognon property, near Wabigoon lake.

In the Boston Creek district, Timiskaming, the promising development work on several properties attracted many prospectors to the area and resulted in new discoveries in this district. The Provincial Bureau of Mines had a report made on this district, and published in 1916.[2]

Much prospecting and development have been done in the adjoining district of Goodfish lake.

The most spectacular find probably ever made was that of August, 1915, in Munro township, Timiskaming, on the Dobie-Leyson property, now called the Croesus mine. Specimens from this property have been reported to run from 2,000 to 3,000 ounces in gold.

Since 1914, Ontario has become by far the largest producer of gold in Canada, and this remarkable increase was brought about by the successful development of the Porcupine district and by the extension of milling facilities in that camp.

[1] Bulletin No. 27 of the Ontario Bureau of Mines, on Kowkash gold area.
[2] Bulletin No. 29 of the Ontario Bureau of Mines, on Boston Creek and Goodfish Lake gold areas.

The principal producers in Ontario during 1916 were:—

Operator.	Mine.	District.
Canadian Exploration Co.	Long Lake	Algoma.
		Timiskaming:—
Dome Mines Co., Ltd.	Dome	Porcupine.
Dome Lake Mines, Ltd.	Dome Lake	"
Consol. Gold Mines, Ltd.	Hollinger	"
McIntyre Porcupine Mines, Ltd.	McIntyre	"
Mines Leasing and Developing Co.	Rea	"
Porcupine Crown Mines, Ltd.	Porcupine Crown	"
" Vipond Mines Co., Ltd.	Porcupine Vipond	"
Wm. C. Offer et al.	Porphyry Hill	"
Schumacher Gold Mines, Ltd.	Schumacher	"
Tough Oakes Gold Mines, Ltd.	Tough Oakes	Kirkland Lake.
Croesus Gold Mines, Ltd.	Croesus	Munro.

The following notes are taken from the respective companies' reports:—

The Dome Mines Co., Ltd.

"Record of Production for twelve months ending March 31, 1917:—

Tons of ore milled	459,530
Average value per ton	$5·083
Bullion recovered by amalgamation	$1,337,911
" " " cyanidation	$833,874
Per cent of value recovered by amalgamation	57·308
" " " " cyanidation	35·672
Total value recovered	$2,171,785
Average yield per ton	4·726
Per cent of value recovered	92·980

The completion of the plant extension has resulted in a modern installation with a milling capacity of 45,000 tons and a mining capacity of more than double that amount.

The conditions under which we are operating have been very bad, and gradually get worse month by month.

During our fiscal year, 1915-1916, the cost of producing an ounce of fine gold was $10.30. During our fiscal year, 1916-1917, the cost was $11.82; during the last five months of the above year the cost had risen to $12.64; during the months of March and April the cost had risen to $14.18.

The Dome is a long-lived mine with liberal ore bodies, which will be profitably mined for many years to come, and the labor shortage will eventually rectify itself.

Needless to add that the Dome Mine is essentially a low grade proposition.

Hollinger Consolidated Gold Mines, Ltd.

Year ending December 31, 1916:—

	Total.
Tons of ore milled	601,854
Average value per ton	$8·84
Total values sent to mill	$5,322,716.05
Average tons per day	1,649
Per cent of possible running time	91·1
Average tons per 24 hours of running time	1,810
Stamp duty tons per 24 hours of running time	16·7
Unrecovered values:—	
Concentrates stored for treatment (9,500 tons)	$ 7,367.00
Lost in filter tails	241,958.00
Total	$ 249,325.00
Values recovered	$5,073,401.05
Value per ton in tailings	$0.40
Lime consumed per ton of ore in pounds	2·113
Zinc " " " "	·405
Lead acetate " " "	·0042
Tons of solution precipitated per ton of ore	2·221
Zinc added per ton of solution, pounds	·182
Average value of pregnant solution	$ 3.782

HOLLINGER GOLD MINES, LTD., AND ACME GOLD MINES, LTD.

Year.	Ore milled in tons.	Value recovered.	Dividends paid.
1911	1,000	$ 46,082.52	.....
1912	45,195	933,682.00	$ 270,000
1913	140,131	2,488,022.58	1,170,000
1914	211,846	2,719,354.47	1,170,000
1915	441,236	4,205,901.69	1,720,000
Total	840,128	$10,393,043.26	$4,330,000

HOLLINGER CONSOLIDATED GOLD MINES, LTD.

1916	601,854	5,073,401.05	3,126,000
Grand total	**1,441,982**	**$15,466,444.31**	**$7,456,000**

The dilution of ore with waste has the effect of lowering the value per ton of the mixture, although it increases the number of tons. Our experience, after five years of operations, has been that there is a dilution of approximately 10 per cent, and hence the present estimate of 3,938,540 tons at $8.68 per ton will, when milled, probably yield approximately 4,300,000 tons, averaging about $7.75 per ton.

During the year additions to the mill were completed and the tonnage treated per four weeks gradually increased from 43,000 tons to 50,000 tons.

McIntyre Porcupine Mines.

Year ending June 30, 1917, (15 months):—

Tons of ore milled	179,021
Average value	$9.82
Extraction per ton	$9.36
Tailing loss per ton	0·46
Gross value	$1,757,530.14
Bullion produced and by-products obtained	$1,676,982.39
Total loss in tails	$80,547.75
Per cent of extraction	95·4
Cost per ton of ore milled	$4.78
Profit " " "	$4.58
Per cent of possible running time	90·27

Operating results have been highly satisfactory, considering the handicaps under which, owing to its standard of value, the mining of gold is carried on while all other metals, due to conditions incidental to the great war, have materially advanced in value. Mine and milling costs have been low, notwithstanding the exceedingly high cost of supplies and labour and the natural disadvantages attendant upon gold mining under present conditions. The costs shown in the accompanying report include the total costs of operations, none of our development work being capitalized or deferred to future operations.

During the period 179,021 tons of the Company's ore were treated, yielding $1,676,982.39. In addition 16,286 tons were treated for subsidiary Companies, which yielded $187,931.89, or a total of 195,307 tons and $1,864,914.28 in bullion. Average value of all ore treated was $10.00 with a recovery of $9.55 per ton.

Previous to January 1st., 1917, production for McIntyre-Jupiter and McIntyre-Extension Mines are treated separately and since that date when amalgamation was effected their production is included in McIntyre-Porcupine figures.

While the amount of development work performed has not been up to our expectations, the results obtained are very satisfactory. After mining and treating ore of a value of $1,954,793.28, the ore reserves have been increased over 100%.

Porcupine Crown Mines, Limited.

Year ending December 31, 1916:—

	Total.
Tons of ore milled	51,273
Average value of heads	$11.78
" " "	.33
" extraction	97·14%
Cost per ton of ore milled	$5.47
Gross value of production	$574,604.98
Mint charges	$2,952.48
Mine operation expense	$280,569.60
" net profit	$291,082.90
Dividend paid in 1916	$240,000.00

The war tax amounts to about 3½% on the running profits, and totalled in 1916, $11,169.49, and will amount to $9,627.58 in 1917. The ore reserves are estimated at 97,000 tons of a value of $1,050,000, as against 150,000 tons last year of a value of $1,250,000, but with an increased net profit of over $100,000.

Schumacher Gold Mines, Limited.

Year ending March 31, 1917, (nine months only):—

Tons of ore milled	35,271
Average value per ton	$5.243
Total value sent to mill	$184,919.82
Values recovered	$169,186.78
Average tons per day	128·25
" " " 24 hours running time	147·73
Per cent of time run	87·1

The total ore reserves amount to 99,425 tons with an estimated value of $674,240.
The new mill addition contracted for will increase our output to 180 tons a day and this added capacity should be available by July or August, 1917. If conditions warrant, the mill equipment by the end of the year can be so augmented as to provide a daily output of 300 tons.

Manitoba.

There was no production in Manitoba during 1916, but development work was carried on extensively in the Big Rice Lake district, east of Lake Winnipeg, and in the Pas district, Northern Manitoba.

About 85 miles northeast of Pas is Herb or Wekusko lake, where several companies are operating, the principal one, which made its first shipment early in 1917, being the Northern Manitoba Mining and Development Company.

A few miles southwest from Herb lake is Flin Flon lake, where much development has been carried on by the Great Sulphides Gold Mines, Ltd.; and Schist lake, near which operations are being carried on by the Mandy Mining Co., Ltd., a subsidiary company of the Tonopah Mining Company, and which has the distinction of being the first to ship from this new district early in 1917.

Mr. E. L. Bruce, of the Geological Survey, has been conducting an exploration of the Pas district for the past two years and reported last year as follows:—

Gold-bearing quartz veins have now been discovered in so many parts of the belt of basic rocks extending from Amisk lake (in Saskatchewan) to Wekusko lake (in Manitoba), that there seem to be good possibilities of finding gold in paying quantities. Careful examination requires time and work. This is especially true in the eastern part where the thick deposits of Lake Agassiz clays mantle the rock surfaces. All parts of the belt are easily accessible by canoe travel, but thorough prospecting will demand examination of the country [illegible] from the main routes, and attention concentrated on a few promising claims rather than dissipated over a large number.

A report on Rice Lake, Pas, and Star Lake districts, prepared by Dr. R. C. Wallace and Mr. J. S. Delury, acting for the Manitoba Public Utilities Commission, Winnipeg, was published early in 1917.

Saskatchewan.

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver lake (Amisk lake). A number of prospectors went in with the opening of navigation. A good deal of prospecting was done during 1914, and some further work in 1915, but as yet no production has been reported. Amisk lake is at the western end of the area being examined by Mr. Bruce and referred to under "Manitoba."

Alberta.

In past years there has been a small production of gold from the gravels of the Saskatchewan river. A recovery was reported for 1916 amounting to 82 ounces, valued at $1,695, as against 195 ounces, valued at $4,026, in 1915.

The operations are carried on by individuals, and the returns are necessarily incomplete.

Alberta: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1887.....	102	$ 2,100	1897....	2,419	$ 50,000	1907....	33	$ 675
1888.....	58	1,200	1898....	1,209	25,000	1908....	50	1,037
1889.....	967	20,000	1899....	726	15,000	1909....	25	525
1890.....	193	4,000	1900....	242	5,000	1910....	89	1,850
1891.....	266	5,500	1901....	726	15,000	1911....	10	207
1892.....	508	10,506	1902....	484	10,000	1912....	73	1,509
1893.....	466	9,640	1903....	48	1,000	1913....	.....	.....
1894.....	726	15,000	1904....	24	500	1914....	48	992
1895.....	2,419	50,000	1905....	121	2,500	1915....	195	4,026
1896.....	2,661	55,000	1906....	39	800	1916....	82	1,695
						Total.....	15,009	$310,262

‡Calculated from the value: one dollar = 0·048375 oz.

British Columbia.

The gold production of British Columbia in 1916 amounted to 219,633 fine ounces, valued at $4,540,216, and comprising: (a) placer gold $580,500 or 12·8 per cent of the total; (b) bullion from milling ores $290,088 or 6·4 per cent of the total; and (c) smelter recoveries $3,669,628 or 80·8 per cent.

In 1915 the production was 273,376 fine ounces, valued at $5,651,184 and comprising: (a) placer gold $770,000, or 13·6 per cent of the total; (b) bullion from milling ores $405,334, or 7·2 per cent of the total; and (c) smelter recoveries $4,475,850, or 79·3 per cent.

The total production in 1916 showed a decrease of nearly 20 per cent, and is accounted for by the following reasons: the shortage of water, the scarcity of men, and the very high cost of supplies. Under normal conditions these detrimental causes will be obviated and a much larger production will result therefrom.

British Columbia: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1858.....	34,104	$ 705,000	1878....	61,688	$1,275,204	1898...	142,215	$2,939,852
1859.....	78,129	1,615,072	1879....	62,407	1,290,058	1899...	203,295	4,202,473
1860.....	107,806	2,228,543	1880....	49,044	1,013,827	1900...	228,916	4,732,105
1861.....	128,973	2,666,118	1881....	50,636	1,046,737	1901...	257,292	5,318,703
1862.....	128,528	2,656,903	1882....	46,154	954,085	1902...	288,383	5,961,409
1863.....	189,318	3,913,563	1883....	38,422	794,252	1903...	284,108	5,873,036
1864.....	180,722	3,735,850	1884....	35,612	736,165	1904...	275,975	5,704,908
1865.....	168,887	3,491,205	1885....	34,527	713,738	1905...	285,529	5,902,402
1866.....	128,779	2,662,106	1886....	43,714	903,651	1906...	269,886	5,579,039
1867.....	120,012	2,480,868	1887....	33,558	693,709	1907...	236,216	4,883,020
1868.....	114,792	2,372,972	1888....	29,834	616,731	1908...	286,858	5,929,880
1869.....	85,865	1,774,978	1889....	28,489	588,923	1909...	250,320	5,174,579
1870.....	64,675	1,336,956	1890....	23,918	494,436	1910...	261,386	5,403,318
1871.....	87,048	1,799,440	1891....	20,792	429,811	1911...	238,496	4,930,145
1872.....	77,931	1,610,972	1892....	19,327	399,525	1912...	251,815	5,205,485
1873.....	63,166	1,305,749	1893....	18,360	379,535	1913...	297,459	6,149,027
1874.....	89,233	1,844,618	1894....	25,664	530,530	1914...	252,730	5,224,393
1875.....	119,724	2,474,904	1895....	61,289	1,266,954	1915...	273,376	5,651,184
1876.....	86,429	1,786,648	1896....	86,504	1,788,206	1916...	219,633	4,540,216
1877.....	77,796	1,608,182	1897....	131,805	2,724,657			
						Total..	7,836,549	$162,016,555

‡Calculated from the value: one dollar = 0·048375 oz.

The statistics of lode gold represented, as closely as can be ascertained, the actual gold recovery based on smelter recoveries and bullion shipments.

The record of production of placer gold is given as ascertained by the Provincial Mineralogist, who, in his Annual Report states that:—

Great difficulty is found in obtaining reliable figures, since the work is, in many cases, carried out by individuals or unorganized groups of men who keep no books, frequently paying wages, or for supplies, in gold-dust, which, being readily transported, is scattered, and the tax imposed thereon by law is thus evaded.

The production of gold from lode mining as reported by the Provincial Bureau of Mines being based upon metal contents of ore shipments is naturally somewhat higher than the record of smelter recoveries.

British Columbia: Production of Gold by Districts, 1916.*

Districts.	Gold placer.		Gold lode.	
	Ounces.	Value.	Ounces.	Value.
Cariboo:—				
Cariboo	7,900	$ 158,000	.....	.....
Quesnel	1,000	20,000	.....	.....
Omineca	850	17,000	1,303	$ 26,933
Cassiar:—				
Atlin	16,925	338,500	736	15,213
All others	1,100	22,000	3,806	78,670
East Kootenay:—				
Fort Steele	200	4,000	.....	.....
West Kootenay:—				
Ainsworth	.....	.....	45	930
Nelson	50	1,000	4,107	84,891
Slocan	.....	.....	64	1,323
Trail Creek	.....	.....	129,790	2,682,759
Others	50	1,000	22	455
Lillooet:—				
Lillooet	250	5,000	2,625	54,259
Yale:—				
Grand Forks, Greenwood and Osoyoos	50	1,000	75,628	1,563,231
Similkameen, Nicola, and Vernon	450	9,000	32	661
Yale, Ashcroft, and Kamloops	150	3,000	570	11,782
Coast	50	1,000	3,204	66,227
Total	29,025	$ 580,500	221,932	$ 4,587,334

*From Annual Report of the Minister of Mines for British Columbia.

Yukon.

The gold production of the Yukon in 1916 amounted to 212,700 ounces valued at $4,396,900, and includes 690 ounces valued at $14,264, derived from lode mining. It showed a decrease of nearly 8 per cent on the production for 1915.

The placer production of the Yukon in 1916 is estimated at 212,010 fine ounces of gold, valued at $4,382,636, and 47,703 fine ounces of silver, valued at $31,322, making a total valuation of $4,413,958.

The placer production of the Yukon in 1915 was estimated at 229,803 fine ounces of gold, valued at $4,750,450, and 51,706 fine ounces of silver, valued at $25,689, making the total valuation of the Yukon placer output $4,776,139.

Annual Production of Gold in Yukon.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1885			1896..	14,513	$ 300,000	1907..	152,381	$ 3,150,000
1886 ..	4,837	$ 100,000	1897..	120,937	2,500,000	1908..	174,150	3,600,000
1887 ...	3,386	70,000	1898..	483,750	10,000,000	1909..	191,565	3,960,000
1888 ...	1,935	40,000	1899..	774,000	16,000,000	1910*.	221,091	4,570,362
1889 ...	8,466	175,000	1900..	1,077,553	22,275,000	1911*.	224,197	4,634,574
1890 ...	8,466	175,000	1901..	870,750	18,000,000	1912*.	268,447	5,549,296
1891 ...	1,935	40,000	1902..	701,437	14,500,000	1913*.	282,838	5,846,780
1892 ...	4,233	87,500	1903..	592,594	12,250,000	1914*.	247,940	5,125,374
1893 ...	8,514	176,000	1904..	507,938	10,500,000	1915*.	230,173	4,758,098
1894 ...	6,047	125,000	1905..	381,001	7,876,000	1916*.	212,700	4,396,900
1895 ...	12,094	250,000	1906..	270,900	5,600,000			
						Total.	8,060,768	$166,630,884

‡Calculated from the value: one dollar = 0·048375 oz.
*Including a small production from lode mines.

The statistics of production of gold in the Yukon district during the years between 1898 and 1906, as given in the table showing the annual production, are based primarily on the receipts of gold at the United States mints and receiving offices credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that considerable amounts of gold were produced which escaped royalty payment especially during the years of high production.

Since 1906 the statistics of gold production of the Yukon have been based on the royalty of 2½ per cent which is collected by the Interior Department. For the purpose of collecting the royalty, a fixed value of $15 per ounce is placed on the crude gold. The actual value of the deposits for a number of years, has been about $16.50 per ounce. At the Dominion Government Assay Office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1916, 95,005·82 ounces from the Yukon, valued, after all the charges had been deducted, at $1,525,723.55, showing an average of $16.06 per ounce, as against 87,040·87 ounces, valued at $1,418,496.63, or an average of $16.28 per ounce in 1915.

Receipts from the Yukon, at the Dominion Government Assay Office, Vancouver, B.C.

Year.	Weight before melting.	Net value.	Average value.	Year.	Weight before melting.	Net value.	Average value.
	Ounces.				Ounces.		
1908 (*a*).....	60,132·00	$1,000,296	$16·63	1913 (*b*)...	15,235·29	$ 247,189	$16.22
1909.....	5,003·12	83,871	16.75	1914.....	56,564·83	915,914	16.21
1910.....	3,594·87	62,094	17.27	1915.....	87,040·87	1,418,497	16.28
1911.....	2,073·61	34,994	16.88	1916.....	95,005·82	1,525,724	16.06
1912.....	2,211·88	36,481	16.41				

(*a*) For nine months only.
(*b*) The removal in 1913 of the assay charge accounts for the great increase.

The production of crude placer gold in the Yukon during the past six years, as ascertained by the Interior Department, and upon which a royalty of 2½ per cent has been collected, is shown in the accompanying table:—

Production of Crude Gold in the Yukon District.

(Gross weight of dust, nuggets, and bullion, in ounces.)

Month.	1911.	1912.	1913.	1914.	1915.	1916.
January.....	.....	5·25	19·30	136·50	520·69	3,116·18
February.....	435·66	525·29	56·90	325·50	·40	566·62
March.....	13·30	0·50	.....	6·75	232·13	1,574·82
April.....	.....	.....	1,293·69	1,572·65	277·84	859·56
May.....	16,719·16	26,158·66	5,557·35	11,668·10	17,553·29	13,099·13
June.....	38,499·39	54,243·03	67,594·39	67,604·85	57,884·87	38,292·47
July.....	42,783·38	58,283·29	57,873·50	45,067·31	49,478·87	35,598·34
August.....	47,677·49	56,975·55	63,315·92	49,458·17	41,015·41	47,980·26
September.....	48,383·63	53,225·29	58,641·62	62,744·69	47,055·83	45,883·90
October.....	58,690·82	66,518·01	66,798·37	63,365·22	59,984·89	62,927·73
November.....	11,097·51	11,648·08	26,565·50	4,308·00	7,248·17	13,168·23
December.....	13,130·63	7,432·72	5,183·50	3,433·43	6,001·77	1,944·64
	277,430·97	335,015·67	352,900·04	309,691·17	287,254·16	265,013·88

Since 1898 a royalty to the extent of $4,476,209.67 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between these figures and those shown in the table of annual production of the district which are based on mint receipts of Yukon gold, has already been mentioned, and is probably due to three factors: (1) the fixing of the value of the gold for royalty purposes at $15 per ounce, a figure probably slightly below the actual value of the gold, (2) the probability that in the earlier years of royalty collection, considerable quantities of gold-dust left the camps unrecorded and escaped royalty payments, and (3) the fact that in the last few years there has been a small but growing production from the lode mines.

Gold Production in the Yukon, and Royalty Collected.‡

Fiscal Year.	Total Gold Production.	Total exemption	Royalty collected on.	Royalty paid.
Ending June, 1898	$ 3,072,773	$ 339,845	$ 2,732,928	$273,292.82
" " 1899	7,582,283	1,699,657	5,882,626	588,262.37
" " 1900	9,809,465	2,501,744	7,307,720	730,771.99
" " 1901	9,162,083	1,927,666	7,234,416	592,660.98
" " 1902	9,566,340	1,199,114	8,367,226	331,436.79
" " 1903	12,113,015	.....	12,113,015	302,893.48
" " 1904	10,790,663	.....	10,790,663	272,217.96
" " 1905	8,222,054	.....	8,222,054	206,760.87
" " 1906	6,540,007	.....	6,540,007	163,963.25
" March 1907	3,304,791	.....	3,304,791	82,622.42
" " 1908	2,820,162	.....	2,820,162	70,.04.65
" " 1909	3,260,283	.....	3,260,282	81,507.07
" " 1910	3,594,251	.....	3,594,251	89,844.10
" " 1911	4,126,728	.....	4,126,728	103,168.19
" " 1912	4,024,237	.....	4,024,237	100,606.29
" " 1913	5,018,412	.....	5,018,412	125,460.52
" " 1914	5,301,508	.....	5,301,508	132,537.69
" " 1915	4,649,634	.....	4,649,634	116,241.04
" " 1916	4,458,278	.....	4,458,278	111,457.19
Total	$117,416,966	.....	$109,748,939	$4,476,209.67

‡From the Report of the Yukon and Mining Lands Branch of the Department of the Interior, Fiscal Year ending March 31, 1916, p. 53.

IRON AND STEEL.

INTRODUCTORY.

The war's demands for steel has had the effect of stimulating Canadian production of pig-iron and steel to larger outputs than any previously recorded. This, however, is an industry based largely on iron ores obtained outside of Canada. The actual shipments of iron ores from Canadian mines was less in 1916 than in the previous year, notwithstanding the higher prices in effect, and the total was less than 14 per cent of the entire iron ore consumption in blast furnaces and steel plants. The recorded exports and imports of iron and steel products were considerably higher than in either of the two preceding years.

Prices of practically all iron and steel products increased between January and December by amounts ranging from 40 to over 75 per cent as shown by the accompanying monthly price record quoted from the Iron Trade Review of Cleveland.

Summary of Iron and Steel Statistics, 1913-1916.

	1913.	1914.	1915.	1916.
Iron ore shipped.....Short tons	307,634	244,854	398,112	275,176
Canadian iron ore charged to blast furnaces..... "	139,436	182,964	293,305	221,773
Imported iron ore charged to blast furnaces..... "	2,110,828	1,324,326	1,463,488	1,964,598
Iron ore charged to steel furnaces..... "	55,018	37,686	74,872	55,059
Pig-iron made..... "	1,128,967	783,164	913,775	1,169,257
Pig-iron and ferro-alloys, exported.... "	6,326	19,063	26,545	46,106
Pig-iron imported..... "	236,769	78,680	47,842	58,130
Ferro-alloys made..... "	8,075	7,524	10,794	28,628
Ferro-alloys imported..... "	30,355	22,147	13,758	14,777
Pig-iron and ferro-alloy consumption.. "	1,397,840	872,452	959,254	1,255,218
Pig-iron used in steel furnaces..... "	913,722	619,030	747,834	949,444
Steel ingots and castings made..... "	1,168,993	828,641	1,020,336	1,428,249
Steel rails made..... "	554,481	428,225	232,411	90,123
Canadian coke used in iron blast furnaces..... "	710,260	330,269	578,743	712,715
Imported coke used in iron blast furnaces..... "	706,888	590,902	486,022	645,488
Iron and steel imported..... "	1,890,506	878,179	771,007	864,916
Number of completed blast furnaces...No.	22	22	19	20
Number of men employed in blast furnaces..... "	1,589	1,018	1,004	.....
Wages paid in blast furnaces..... $	1,149,345	693,632	675,453	.....
Value of pig-iron produced..... $	16,540,012	10,002,856	11,374,199	16,750,898
Value of iron and steel goods exported. $	13,999,149	14,391,746	48,268,148	63,837,681
Value of iron and steel goods imported. $	145,226,972	80,063,679	74,308,983	129,090,168

Average Monthly Prices in Pittsburgh in 1916.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pig-Iron:—												
Bessemer, per gr. ton.....	$ 21.32	$ 21.45	$ 21.55	$ 21.95	$ 21.95	$ 21.95	$ 21.95	$ 21.95	$ 22.20	$ 24.325	$ 30.35	$ 35.95
Basic, "	19.20	18.77	19.20	19.20	18.95	18.95	18.95	18.95	19.075	20.825	25.95	30.95
Foundry No. 2 "	19.95	19.51	19.45	19.45	19.325	19.45	19.45	19.45	19.50	21.075	26.76	31.70
Malleable, "	19.95	19.60	19.45	19.45	19.45	19.45	19.45	19.45	19.50	21.075	26.76	31.70
Grey forge "	19.20	18.95	18.75	18.95	18.95	18.95	18.95	18.95	19.00	20.1375	25.95	30.60
Ferro-alloys:—												
Ferro-mang. Balti "	121.00	137.00	170.00	175.00	175.00	175.00	175.00	170.00	172.50	163.00	161.40	160.00
Ferro-sil. (50%) "	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	94.25	95.00	95.00
" (10%) "	28.00	28.00	31.00	31.00	32.00	32.00	32.00	31.80	30.25	30.50	34.60	42.00
Semi-Finished:—												
Bess. billets, "	33.75	34.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
O. H. billets, "	34.75	35.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
Bess. sheet bars, "	33.75	34.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
O. H. sheet bars, "	34.75	35.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
Wire rods, "	46.25	50.00	51.00	55.00	60.00	60.	58.75	55.00	55.00	55.00	64.00	69.00
Finished products:—												
Bess. steel rails, per net ton	28.00	28.00	28.00	30.46	31.76	33.00	33.00	33.00	33.00	33.00	35.00	38.00
Beams, per 100 lbs.....	1.86	2.03	2.40	2.50	2.50	2.50	2.50	2.50	2.60	2.70	2.88	3.00
Plates "	1.87	2.13	2.50	2.67	2.75	2.75	2.86	2.90	2.95	3.00	3.35	3.50
Steel Bars "	1.86	2.01	2.34	2.50	2.50	2.50	2.50	2.50	2.60	2.60	2.78	2.90
Iron " "	2.05	2.20	2.40	2.50	2.65	2.65	2.65	2.65	2.65	2.65	2.75	3.25
Shafting dis. net tons.....	44.00	40.00	27.00	15.00	10.00	10.00	12.05	15.00	15.00	10.00	10.00	10.00
Steel pipe ¾ to 3" net tons..	76.75	68.00	73.6	71.5	70.00	70.00	70.00	70.00	69.25	69.00	68.6	66.00
Standard spikes, per 100 lbs.	2.175	2.27	2.50	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	3.25
Wire nails, " ...	2.125	2.22	2.38	2.40	2.50	2.50	2.50	2.58	2.60	2.625	2.85	3.00
Plain wire, " ...	1.975	2.10	2.23	2.25	2.45	2.45	2.45	2.53	2.55	2.575	2.80	2.95
Hoops, " ...	2.00	2.25	2.55	2.75	2.75	2.75	2.75	2.85	3.00	3.00	3.25	3.25
Bands, " ...	1.865	2.03	2.34	2.50	2.50	2.50	2.50	2.58	2.60	2.60	2.74	2.90
Struct. rivets, " ...	2.575	2.77	3.11	3.37	3.875	4.25	4.06	4.00	4.00	4.00	4.08	4.25
Sheet & Tin Plate:—												
No. 28 black sheets, per 100 lbs.....	2.58	2.60	2.75	2.90	2.925	2.92	2.90	2.75	2.8875	3.225	3.67	4.45
No. 28 Galv. sheets, 100 lbs	4.75	4.75	4.82	4.89	4.8875	4.79	4.375	4.25	4.225	4.45	5.07	6.25
No. 10 blue anld. 100 lbs...	2.45	2.61	2.87	3.00	3.025	3.10	3.00	3.00	2.925	3.125	3.30	3.90
Tin plate, 100 lbs.....	3.75	3.75	4.15	4.69	5.125	5.55	5.81	6.00	5.625	5.75	6.05	6.50
Old Material:—												
Heavy melting, per net ton	17.50	17.37	17.95	18.12	17.125	16.25	16.25	16.00	16.125	17.875	20.55	26.75

From the Iron Trade Review, Cleveland, O. Jan. 4, 1917, p. 116.

IRON ORE.

Mining operations have been confined to the Helen and Magpie mines of the Algoma Steel Corporation in the Michipicoten district of Ontario, together with a small production of ilmenite at Ivry-on-the-Lake, Quebec, by the Manitou Iron Mining Company. There was also a shipment of concentrates from the concentrator at Trenton, Ont., produced in previous years from ores derived from the Bessemer and Childs mines in Hastings county.

The total shipments in 1916 were 275,176 short tons valued at $715,107, as compared with 398,112 tons valued at $774,427 shipped in 1915.

Of the total shipments in 1916, 134,568 tons were sent to blast furnaces in Canada and 140,608 tons to the United States. The year's shipments included 45,541 tons of hematite; 210,522 tons of roasted ore including both straight siderite and a blende of siderite and high sulphur hematite; 15,904 tons of magnetic concentrates, and 3,209 tons of ilmenite. The 1915 shipments included 205,989 tons of hematite, 132,906 tons of roasted siderite, and 59,217 tons of magnetite (including some ores with an admixture of hematite).

In Quebec the Manitou Iron Mining Company operated their ilmenite mine at Ivry-on-the-Lake, Terrebonne county, the ore being taken out under contract and shipped to Niagara Falls, N.Y.

In Ontario the Algoma Steel Corporation continued to operate the "Helen" and "Magpie" mines in the Michipicoten district. From the Helen mine there was shipped during the year 109,685 short tons of which 45,541 tons were shipped to the Sault furnaces and 64,424 tons of high sulphur ore to the Magpie roaster. This Helen high sulphur ore is mixed with Magpie raw ore and then roasted producing a very desirable Bessemer ore. The shipments from Magpie were 210,522 short tons of roasted ore, including 65,351 tons of the blended ore just mentioned. Of the total Magpie shipments 121,495 tons went to Lake Erie ports to fill contracts with United States furnace companies and the balance to the Company's furnaces at Sault Ste. Marie.

No shipments were made from the Moose Mountain mines at Sellwood, Ont., owned by Moose Mountain, Ltd., but experimental work was being carried on at the property with a view to securing a suitable agglomerating method for treating the concentrates. It was anticipated that shipments might be resumed in July of 1917.

The mines of the Canada Iron Mines, Ltd., "Bessemer" and "Childs" in Mayo township, and "Coe Hill" in Wollaston township, as well as the magnetic concentrating plant at Trenton, remained idle throughout 1916. The entire remaining stock of concentrates at Trenton (15,904 short tons) was shipped to Buffalo during the early part of the year.

Shipments of Iron Ore by Provinces, 1914-15-16.

Provinces.	1914.		1915.		1916.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
New Brunswick	4,775	$ 10,841	3,683	$ 8,261	.....	.....
Quebec	.....	.....	.....	.....	3,209	$ 8,308
Ontario	240,079	531,200	394,429	766,166	271,967	706,799
	244,854	542,041	398,112	774,427	275,176	715,107

Shipments of Iron Ore by Classes of Ore, 1907-1916.

IN SHORT TONS.

Year.	Hematite.	Magnetite.	Carbonate including siderite.	Bog ore.	Total.
1907	205,795	50,073	42,740	14,248	312,856
1908	173,164	49,946	4,869	10,103	238,082
1909	190,473	74,240	.....	3,330	268,043
1910	130,380	127,768	.....	1,270	259,418
1911	137,399	72,945	.....	.....	210,344
1912	86,971	128,912	.....	.....	215,883
1913	(a) 92,386	215,248	.....	.....	307,634
1914	89,454	45,562	109,838	.....	244,854
1915	205,989	59,217	132,906	.....	398,112
1916	45,541	19,113	(b)210,522	.....	275,176

(a) Small tonnage of siderite included.
(b) Includes roasted siderite and a blende of siderite and high sulphur hematite, roasted.

Shipments of Iron Ore by Provinces, 1886-1916.

Calendar Year.	New Brunswick.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total. Short tons.
1886	.....	44,388	.....	16,032	3,941	64,361
1887	.....	43,532	13,404	15,698	2,796	76,330
1888	.....	42,611	10,710	16,894	8,372	78,587
1889	.....	54,161	14,533	.....	15,487	84,181
1890	.....	49,206	22,305	5,000	.....	76,511
1891	.....	53,649	14,380	.....	950	68,979
1892	.....	78,258	22,690	.....	2,300	103,248
1893	.....	102,201	22,076	.....	1,325	125,602
1894	.....	89,379	19,492	.....	1,120	109,991
1895	.....	83,792	17,783	.....	1,222	102,797
1896	.....	58,810	17,630	15,270	196	91,906
1897	.....	23,400	22,436	2,770	2,099	50,705
1898	.....	19,079	17,873	21,111	280	58,343
1899	.....	28,000	19,420	25,126	2,071	74,617
1900	.....	18,940	19,000	82,950	1,110	122,000
1901	.....	18,619	15,489	272,538	7,000	313,646
1902	.....	16,172	18,524	359,288	10,019	404,003
1903	.....	40,335	12,035	209,634	2,290	264,294
1904	.....	61,293	16,152	141,601	.....	219,046
1905	.....	84,952	12,681	193,464	.....	291,097
1906	.....	97,820	9,933	141,078	.....	248,831
1907	.....	89,839	12,748	207,769	2,500	312,856
1908	.....	11,802	10,103	216,177	.....	238,082
1909	.....	.....	4,150	263,893	.....	268,043
1910	5,336	18,134	4,503	231,445	.....	259,418
1911	31,120	22	3,616	175,586	.....	210,344
1912	71,520	30,857	1,185	112,321	.....	215,883
1913	86,416	20,436	5,102	195,680	.....	307,634
1914	4,775	.....	.....	240,079	.....	244,854
1915	3,683	.....	.....	394,429	.....	398,112
1916	.....	.....	3,209	271,967	.....	275,176

Production of Iron Ore in Nova Scotia, 1876-1885.

Calendar Year.	Short tons.	Calendar Year.	Short tons.
1876	15,274	1881	39,843
1877	16,879	1882	42,135
1878	36,600	1883	52,410
1879	29,889	1884	54,885
1880	51,193	1885	48,129

EXPORTS AND IMPORTS OF IRON ORE.

According to returns received direct from the mine operators, 140,608 tons of ore were shipped to the United States during 1916, as against 89,730 tons in 1915, and 60,414 tons in 1914, these being the total shipments outside of Canada. The Department of Customs reports the exports during these three years as 161,260 tons in 1916, 79,770 tons in 1915, and 135,451 tons in 1914. The United States Department of Commerce reports the imports of iron ore into the United States from Canada during the same three years as 153,255 short tons in 1916, 94,219 tons in 1915, and 58,816 tons in 1914.

There were charged to Canadian blast furnaces in 1916, 1,964,598 tons of imported ores as compared with 1,463,488 tons in 1915. The annual consumption of imported ores in blast furnaces, which previous to 1912 was the only record of imports, is shown in the Table "Iron Ore, Fuel and Flux charged to Blast Furnaces."

The total quantity of imported ores thus consumed since 1896 has been 19,408,894 tons. The imported ores charged in 1916 included 914,194 tons from Wabana, Newfoundland, and 1,050,404 tons of "Lake Ores."

The imports during 1916 according to the records of the Customs Department were 2,339,677 tons valued at $4,419,013, as compared with 1,504,113 tons valued at $2,331,755 imported in 1915. The 1916 imports included 1,364,992 tons valued at $3,463,419 from the United States, and 974,685 tons valued at $955,594 from Newfoundland.

The iron ore deposits at Wabana, Newfoundland, are owned and operated by the two Canadian companies operating coal mines and steel plants at Sydney and Sydney Mines, Cape Breton. The shipments from Wabana mines during 1916 were 1,012,060 short tons, all of which went to Cape Breton. The total shipments from Wabana since the mines were first operated in 1895 have amounted to 16,537,696 short tons of which 10,738,941 tons were sent to Nova Scotia, 2,078,197 tons to the United States, and 3,720,558 tons to Great Britain and Europe.

A record of the tonnage of iron ores received from the United States is presented in the table "Exports of Iron Ore from the United States to Canada" compiled from the "United States Report of Commerce and Navigation." According to this record the exports to Canada during the twelve months ending June 1916 were 1,033,930 short tons valued at $2,790,498, as against 455,869 short tons valued at $1,277,247 during the previous year.

Exports of Iron Ore, Calendar Years 1893-1916.

Calendar Year.	Short tons.	Value.	Average value.	Calendar Year.	Short tons.	Value.	Average value.
1893.....	2,419	$ 7,590	$3.14	1905*.....	168,289	$407,881	$2.42
1894.....	.....	21,294	.....	1906.....	74,778	149,177	2.01
1895.....	1,571	3,909	2.49	1907.....	25,901	45,907	1.77
1896.....	1,033	1,911	1.85	1908.....	....(a)	.....	.....
1897.....	403	811	2.01	1909.....	21,956	61,954	2.82
1898.....	182	278	1.54	1910.....	114,499	324,186	2.83
1899.....	4,145	9,538	2.30	1911.....	37,686	133,411	3.54
1900.....	5,527	13,511	2.44	1912.....	118,129	382,005	3.23
1901*.....	306,199	762,283	2.49	1913.....	126,124	426,681	3.38
1902*.....	428,901	1,065,019	2.48	1914.....	135,451	360,974	2.67
1903*.....	368,233	922,571	2.51	1915.....	79,770	206,823	2.59
1904*.....	168,828	401,738	2.38	1916.....	161,260	541,779	3.36

*The export figures for the five years indicated are incorrect owing to a duplication of entries.
(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

Imports* of Iron Ore into the United States from Canada, 1893-1916.

Year ending June 30.	Short tons.	Value.	Average value.	Year ending June 30.	Short tons.	Value.	Average value.
1893.....	7,706	$ 17,186	$2.23	1906.....	113,809	$220,112	$1.93
1894.....	301	756	2.51	1907.....	34,731	52,765	1.52
1895.....	2,681	10,114	3.77	1908.....	32,124	55,617	1.73
1896.....	39	142	3.64	1909.....	3,490	12,660	3.63
1897.....	2,535	5,243	2.07	1910.....	36,070	97,984	2.72
1898.....	1,313	2,904	2.21	1911.....	117,393	264,452	2.25
1899.....	2,585	5,120	1.98	Cal. year			
1900.....	4,477	5,550	1.24	1911.....	56,538	106,038	1.87
1901.....	34,453	76,159	2.21	1912.....	119,476	201,882	1.69
1902.....	309,527	685,540	2.21	1913.....	201,443	409,098	2.03
1903.....	144,725	320,263	2.21	1914.....	58,816	153,415	2.61
1904.....	126,995	283,765	2.23	1915.....	94,219	245,092	2.60
1905.....	120,241	245,623	2.04	1916.....	153,255	509,602	3.32

*Compiled from the "Foreign Commerce and Navigation of the United States."

Imports of Iron Ore, 1912-1916.

Calendar Year.	United States.		Newfoundland.		Other Countries.		Total.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1912(*9 mos.)	1,206,567	$3,090,207	840,892	$840,892	50	$ 975	2,047,509	$3,932,074
1913.....	1,072,156	3,007,653	869,669	869,669	500	502	1,942,325	3,877,824
1914.....	749,979	1,972,550	389,850	389,850	7,279	24,958	1,147,108	2,387,358
1915.....	715,060	1,568,866	789,029	762,328	24	561	1,504,113	2,331,755
1916.....	1,364,992	3,463,419	974,685	955,594	.....	.....	2,339,677	4,419,013

* Imports of iron ore separately stated in Customs Reports from April 1912 only.

Exports* of Iron Ore from the United States to Canada.

Year ending June 30.	Short tons.	Value.	Average value.	Year ending June 30.	Short tons.	Value.	Average value.
1896.....	1,270	$ 4,042	$3.18	1906.....	254,399	$ 608,029	$2.39
1897.....	10,942	34,168	3.12	1907.....	266,103	670,995	2.52
1898.....	12,921	34,224	2.65	1908.....	327,918	880,197	2.68
1899.....	33,598	60,497	1.80	1909.....	449,755	1,264,048	2.81
1900.....	45,237	78,542	1.74	1910.....	609,617	1,636,917	2.69
1901.....	67,994	175,689	2.58	1911.....	826,071	2,496,246	3.02
1902.....	76,457	178,107	2.45	1912.....	931,647	2,806,238	3.01
1903.....	86,258	264,755	3.07	1913.....	1,367,928	3,684,233	2.69
1904.....	92,577	252,254	2.72	1914.....	1,125,090	3,401,146	3.02
1905.....	264,214	529,454	2.00	1915.....	455,869	1,277,247	2.80
				1916.....	1,033,930	2,790,498	2.70

*Compiled from the "Foreign Commerce and Navigation of the United States."

Annual Shipments of Iron Ore from Wabana Mines, Newfoundland.

Calendar Year.	To Nova Scotia.	To United States.	To Great Britain and Europe.	Total shipments.
	Short tons.	Short tons.	Short tons.	Short tons.
1895	2,686	.....	.....	2,686
1896	17,410	22,798	.....	40,208
1897	12,143	33,039	5,651	50,833
1898	34,622	.....	78,640	113,262
1899	26,311	98,485	214,322	339,118
1900	195,507	153,867	14,776	364,150
1901	457,064	84,292	279,102	820,458
1902	376,322	96,702	341,421	814,445
1903	273,283	90,711	287,793	651,787
1904	342,710	6,025	298,694	647,429
1905	506,819	6,490	255,846	769,155
1906	628,152	141,854	213,867	983,873
1907	672,561	123,972	167,074	963,607
1908	713,772	59,532	200,033	973,337
1909	697,068	241,207	171,722	1,109,997
1910	808,762	247,336	203,528	1,259,626
1911	737,261	207,193	237,009	1,181,463
1912	956,458	191,779	183,673	1,331,910
1913	1,048,433	229,402	328,086	1,605,921
1914	417,409	43,513	172,998	633,920
1915	802,128	.....	66,323	868,451
1916	1,012,060	.....	.....	1,012,060
Total	10,738,941	2,078,197	3,720,558	16,537,696

IRON ORE PRICES.

The prices of Canadian iron ores are naturally based on prices current in the United States. "Lake Ores," that is those originating in what is generally known as the Lake Superior iron region, which contributes about 80 per cent of the iron and steel requirements of the United States, are quoted per gross ton delivered at Lake Erie ports. Ore prices and freights are usually fixed at the beginning of each season, and the price of any individual ore then depends on its variation from the standard in iron and phosphorus content, etc.

The urgent demand for iron ore by United States blast furnaces during the later months of 1915 resulted in general buying for 1916 delivery early in December and the fixing of prices for 1916 at 70 cents in advance of the 1914 and 1915 quotations. An increase in Lake ore shipments of 41 per cent in 1916 over 1915 almost completely exhausted stocks at the end of the year and the buying season for 1917 started on November 22, 1916, when prices were fixed for 1917 at $1.50 in advance of 1916 quotations. This advance includes an increase in Lake freights of 50 cents per ton from the head of the lakes, or double the rates in force during 1916.

Bessemer ores are quoted on the basis of 55 per cent iron natural and 0·045 per cent phosphorus dried at 212° F. The base for Non-Bessemer ores is 51·5 per cent iron natural.

Iron ore prices per gross ton during the past four years have been as follows:—

	1914 & 1915.	1916.	1917.
Old Range Bessemer	$3.75	$4.45	$5.95
Mesabi Bessemer	3.50	4.20	5.70
Old Range Non-Bessemer	3.00	3.70	5.20
Mesabi Non-Bessemer	2.85	3.55	5.05

Since 1900 the price of Old Range Bessemer ores has ranged between a minimum of $3.00 in 1904 and a maximum of $6.48 in 1900, non-Bessemer ores being generally from 50 to 80 cents lower. From 1883 to 1908 the price of "Old Range" ore varied during each season, which is not indicated in the accompanying table of "Selling Price of Iron Ore and Price of Pig-iron at Date of Buying Movement."

Ore prices in eastern United States are generally quoted at a rate per unit delivered eastern Pennsylvania points on tidewater. Thus in 1914 and 1915, Newfoundland, Nova Scotia, and New Brunswick ores sold in this market, would bring from 6 to 8 cents per unit, or per cent of iron. The 1916 prices ranged from 8 to 8½ cents per unit for 50% to 65% ore. Quotations in this market for Port Henry ores are in March 1917 from 10·50 to 11·75 cents per unit for ores carrying 58% to 65% iron.

The following record published by the "Iron Trade Review," of Cleveland, O., shows the annual selling price of "Lake iron ore," and the price of pig-iron at the date of buying movement.

Selling Price of Iron Ore and Price of Pig-Iron at Date of Buying Movement. (Per Gross ton).*

Season.	Date buying movement.	Season Iron Ore Prices.				Iron Prices Valley.	
		Old range Bessemer.	Mesabi Bessemer.	Old range Non-Bessemer.	Mesabi Non-Bessemer.	Bessemer.	Foundry Iron No. 2.
1890..	Dec. 15, 1889..	$5.50	no sale	$5.25	no sale	$22.15	$18.15
1891..	June 1, 1891..	4.50	"	4.25	"	15.15	15.00
1892..	Jan. 31, 1892..	4.50	"	3.65	"	15.00	13.65
1893..	Mar. 15, 1893..	3.85	$3.00	3.20	"	12.65	12.15
1894..	Mar. 1, 1894..	2.75	2.35	2.50	"	9.65	9.65
1895..	Apl. 1, 1895..	2.90	2.19	2.25	$1.95	9.40	9.40
1896..	May 1, 1896..	4.00	3.50	2.70	2.25	12.40	11.15
1897..	" 20, 1897..	2.60	2.25	2.15	1.90	8.35	8.40
1898..	Mar. 20, 1898..	2.75	2.25	1.85	1.75	9.55	9.80
1899..	Feb. 1, 1899..	3.00	2.40	2.15	2.00	10.30	9.75
1900..	Dec. 15, 1899..	5.50	4.50	4.25	4.00	24.15	22.15
1901..	Apl. 15, 1901..	4.25	3.25	3.00	2.75	16.15	14.40
1902..	Feb. 1, 1902..	4.25	3.25	3.25	2.75	15.90	15.90
1903..	Mar. 20, 1903..	4.50	4.00	3.60	3.20	21.50	21.65
1904..	Apl. 15, 1904..	3.25	3.00	2.75	2.50	13.35	13.15
1905..	Feb. 1, 1905..	3.75	3.50	3.20	3.00	15.50	16.00
1906..	Dec. 5, 1905..	4.25	4.00	3.70	3.50	17.25	17.25
1907..	Nov. 5, 1906..	5.00	4.75	4.20	4.00	21.50	21.50
1908..	June 15, 1908..	4.50	4.25	3.70	3.50	16.00	15.00
1909..	May 10, 1909..	4.50	4.25	3.70	3.50	14.75	14.25
1910..	Dec. 24, 1909..	5.00	4.75	4.20	4.00	19.00	17.25
1911..	Apl. 21, 1911..	4.50	4.25	3.70	3.50	15.00	13.75
1912..	Mar. 20, 1912..	3.75	3.50	3.00	2.85	14.25	13.25
1913..	Nov. 19, 1912..	4.40	4.15	3.60	3.40	17.25	17.50
1914..	May 1, 1914..	3.75	3.50	3.00	2.85	14.00	13.25
1915..	Apl. 19, 1915..	3.75	3.45	3.00	2.80	13.60	12.75
1916..	Dec. 7, 1915..	4.45	4.20	3.70	3.55	18.50	18.00
1917..	Nov. 22, 1916..	5.95	5.70	5.20	5.05	30.00	26.00

*Iron Trade Review, November 30, 1916, p. 1108.

LAKE FREIGHT RATES.

Lake freight rates on iron ore from upper lake ports to Lake Erie, during the past four years have been as follows, in cents per ton:—

	1914.	1915.	1916.	1917.
From Escanaba, Mich.	35c.	25c.	35c.	75c.
„ Marquette, Minn.	45	35	45	90
„ the head of the Lakes.	50	40	50	100

The Marquette rate which covers shipments from Michipicoten fell from a maximum of 94 cents in 1900 to a minimum of 35 cents in 1915. The 1917 rate approaches very closely to the record.

Shipments from Key Harbour (Moose Mountain ore), have been at the Escanaba rate or 10 to 15 cents lower than Michipicoten.

The above rates are quoted net, there is an additional unloading charge of 10 cents per ton.

IRON ORE PRODUCTION IN THE UNITED STATES.

The total shipments of iron ore from the Lake Superior district during 1916, including both rail and water shipments, were 66,658,466 gross tons, as compared with 47,272,751 tons shipped in 1915, an increase of 41 per cent. The shipments in 1914 were 32,729,726 tons; in 1913, 49,947,116 tons; and in 1912, 48,221,546 tons.

The total production of iron ore in the United States from all sources was in 1916, 75,500,000 gross tons as compared with 55,493,100 gross tons in 1915; 41,439,761 gross tons in 1914, and 61,980,437 gross tons in 1913.

During the past twenty years the Lake Superior district has supplied from 80 to 85 per cent of the total United States production.

PIG-IRON.

The total production of pig-iron in 1916, not including the output of ferro-alloys which is separately tabulated, was 1,169,257 short tons (1,043,-979 long tons), valued at $16,750,898, as compared with 913,775 short tons (815,870 long tons), valued at $11,374,199 in 1915, showing an increase of 255,482 tons, or 27·9 per cent.

The 1916 production was greater than that of any previous year, the second largest production of pig-iron having been 1,128,967 short tons in 1913.

The production in Nova Scotia in 1916 was 470,055 tons, as against 420,275 tons in 1915, an increase of 49,780 tons or 11·8 per cent; while the production in Ontario was 699,202 tons in 1916, compared with 493,500 tons in 1915, an increase of 205,702 tons, or 41·7 per cent.

Of the total output in 1916, 17,304 tons were made with charcoal as fuel, as against 13,692 tons made with charcoal in 1915.

By grades the 1916 production included: Basic 953,627 tons; Bessemer 31,388 tons; Foundry and Malleable, etc., 184,242 tons. The 1915 production included: Basic 739,613 tons; Bessemer 29,052 tons; Foundry and Malleable, etc., 145,110 tons.

The annual production of pig-iron by provinces and by grades is shown in the following tables. The values placed upon the Nova Scotia production are nominal, the greater part of the production being used in the steel plants.

There has been no production of pig-iron in the Province of Quebec during the past five years. Formerly this Province had a continuous though small production of charcoal iron which commanded a high price. The three small furnaces at Radnor Forges and Drummondville, at which this production was made, are now reported as abandoned.

Annual Production of Pig-Iron by Provinces, 1887-1916.

Year.	Nova Scotia.		Ontario.		Quebec.		Total.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1887	19,320	$ 250,000	.....	.....	5,507	$116,192	24,827	$ 366,192
1888	17,556	211,403	.....	.....	4,243	101,832	21,799	313,235
1889	21,289	383,202	.....	.....	4,632	116,670	25,921	499,872
1890	18,382	262,608	.....	.....	3,390	69,080	21,772	331,688
1891	20,840	297,728	.....	.....	3,051	71,173	23,891	368,901
1892	34,393	458,556	.....	.....	8,050	178,865	42,443	637,421
1893	46,472	553,408	.....	.....	9,475	236,875	55,947	790,283
1894	41,344	449,533	.....	.....	8,623	196,914	49,967	646,447
1895	35,192	417,083	.....	.....	7,262	169,653	42,454	586,736
1896	32,351	400,829	28,302	$ 368,942	6,615	154,358	67,268	924,129
1897	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899	31,100	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902	237,244	2,477.767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1903	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,229
1908	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909	345,380	3,453,800	407,012	6,002,441	4,770	125,623	757,162	9,581,864
1910	350,287	4,203,444	447,273	6,956,923	3,237	85,255	800,797	11,245,622
1911	390,242	4,682,904	526,635	7,606,939	658	17,282	917,535	12,307,125
1912	424,994	6,374,910	589,593	8,176,089	.....	.....	1,014,587	14,550,999
1913	480,068	7,201,020	648,899	9,338,992	.....	.....	1,128,967	16,540,012
1914	227,052	2,951,676	556,112	7,051,180	.....	.....	783,164	10,002,856
1915	420,275	5,463,575	493,500	5,910,624	.....	.....	913,775	11,374,199
1916	470,055	7,050,825	699,202	9,700,073	.....	.....	1,169,257	16,750,898

Annual Production of Pig-Iron by Grades, and by Fuels.

IN SHORT TONS.

Year.	By Grades.			By Fuels.	
	Basic.	Bessemer.	Foundry and all other.	Charcoal.	Coke.
1909	400,921	222,931	133,310	17,003	740,159
1910	425,400	219,492	155,905	17,164	783,633
1911	464,221	208,626	244,688	20,759	896,776
1912	544,534	256,191	213,862	21,701	992,886
1913	614,845	265,685	248,437	23,696	1,105,271
1914	346,553	230,817	205,794	9,380	773,784
1915	739,613	29,052	145,110	13,692	900,083
1916	953,627	31,388	184,242	17,304	1,151,953

Monthly Prices of Foundry Pig-Iron at Montreal.*

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	$20.25	$21.00	$18.00	$18.50	$21.00	$19.75	$22.00	$19.75	$19.35	$23.50
February	20.50	21.00	18.00	18.50	21.00	19.00	22.00	19.75	19.35	23.50
March	20.50	22.00	18.00	18.50	21.00	19.00	22.00	19.75	20.10	24.00
April	21.50	20.00	18.00	19.00	21.00	18.50	22.00	19.75	19.90	25.00
May	21.50	19.00	18.75	19.00	19.25	18.50	22.00	19.75	19.90	25.00
June	21.50	18.75	18.75	18.50	19.25	18.50	21.50	19.75	19.90	25.00
July	21.50	18.75	18.50	18.50	19.25	18.50	20.50	19.50	19.90	25.00
August	21.75	18.00	18.50	18.00	19.25	19.00	20.50	19.50	19.90	25.00
September	21.75	18.00	18.50	18.00	19.25	20.00	20.50	19.50	20.00	25.00
October	21.50	17.75	19.00	21.00	19.25	20.50	20.50	19.50	20.00	25.00
November	21.00	18.00	19.00	21.00	19.25	20.50	19.75	19.40	21.00	25.00
December	20.50	18.25	19.00	21.00	19.25	21.50	19.75	19.40	22.00	28.00
Average	21.15	19.21	18.50	19.13	19.83	19.44	21.17	19.61	20.10	24.92

*No. 1 Foundry Pig-iron, f.o.b. cars Montreal, price per ton of 2,240 pounds on the opening market-day of each month. Quotation furnished by the Dominion Iron & Steel Co., Ltd.

Average Monthly Price of Bessemer Pig-Iron at Pittsburgh.*

PER GROSS TON (2240 POUNDS).

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	$23.15	$19.00	$17.34	$19.90	$15.90	$15.05	$18.15	$14.96	$14.59	$21.58
February	22.85	17.90	16.78	19.34	15.90	15.90	18.15	15.09	14.55	21.51
March	22.85	17.86	16.25	18.60	15.90	15.09	18.15	15.09	14.55	21.75
April	23.35	17.49	15.78	18.27	15.90	15.15	17.90	14.90	14.55	21.95
May	24.01	16.93	15.84	17.52	15.90	15.13	17.70	14.90	14.59	21.95
June	24.27	16.90	16.05	16.60	15.90	15.15	17.14	14.90	14.70	21.95
July	23.55	16.83	16.46	16.40	15.90	15.20	16.70	14.90	14.95	21.95
August	22.90	16.23	17.03	16.09	15.90	15.46	16.52	14.90	15.95	21.95
September	22.90	15.90	18.05	15.90	15.90	16.15	16.65	14.90	16.85	22.26
October	22.00	15.71	19.53	15.90	15.44	17.80	16.60	14.84	16.95	24.08
November	20.65	16.59	19.90	15.82	15.00	18.02	16.02	14.59	17.51	30.15
December	19.34	17.40	19.90	15.90	15.03	18.15	15.77	14.70	19.65	35.58

*From "The Iron Age", New York.

Average Monthly Price of Local No. 2 Foundry Pig-Iron at Chicago.*

(AT FURNACE) PER GROSS TON (2240 LBS.).

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
January	$25.85	$18.45	$17.35	$19.00	$15.50	$14.00	$17.90	$13.75	$13.00	$18.50
February	25.85	18.16	16.75	19.00	15.50	14.00	17.31	14.00	13.00	18.50
March	26.10	17.85	16.50	18.30	15.50	14.00	17.25	14.25	12.95	18.70
April	26.35	17.73	16.50	17.50	15.00	14.00	17.00	14.25	13.00	19.00
May	26.85	17.63	16.50	17.06	15.00	14.50	16.00	14.06	13.00	19.00
June	26.60	17.73	16.50	16.75	15.00	14.50	15.62	13.69	13.00	19.00
July	25.55	17.55	17.00	16.56	14.87	14.70	14.70	13.75	13.00	19.00
August	24.85	17.35	17.13	16.50	14.50	15.37	15.00	13.69	13.44	18.40
September	24.10	17.05	18.70	16.40	14.50	16.00	15.00	13.25	13.90	18.13
October	22.45	16.85	19.00	16.06	14.46	17.00	15.00	12.94	14.63	19.63
November	20.66	17.10	19.00	16.00	14.09	17.75	14.87	12.56	17.13	25.80
December	18.80	17.35	19.00	16.00	14.00	18.00	14.60	13.00	18.10	29.50

*From "The Iron Age", New York.

Previous to 1896, pig-iron was made entirely from Canadian ores. Since that date, however, increasing quantities of imported ore have been used as well as imported fuels and fluxes. In 1916 about 90 per cent of the ore charged, 52 per cent of the coke, and a large proportion of the limestone were imported. In 1915 about 83 per cent of the ore charged and 46 per cent of the coke, and in 1914 about 88 per cent of the ore and 64 per cent of the coke, were imported.

The iron industry at Sydney and North Sydney has been built up on the basis of the Newfoundland Wabana ores and the local coal supply, while in recent years a portion of the limestone required has also been obtained from Port au Port, Newfoundland. In Nova Scotia, therefore, while the fuel is all domestic, the ore is practically all imported, though from a British colony.

In Ontario large quantities of United States "Lake ores" are used. All the fuel used, with the exception of a small quantity of charcoal, is imported, either as coke, or as coal for charging the by-product coke ovens at Sault Ste. Marie. A portion of the limestone flux is also obtained from quarries situated in the United States. In 1916 Ontario furnaces used 1,050,404 tons of imported ores and 221,773 tons of Canadian ores, the

percentage being 82·6 per cent imported and 17·4 per cent Canadian. In 1915, 623,094 tons of imported ore, or 68 per cent of the total, and 293,305 tons, or 32 per cent of Canadian ores, were charged. In 1914, 865,004 tons or 82·5 per cent of imported ore, and 182,964 tons, or 17·6 per cent of Canadian ores, were charged.

Iron Ore, Fuel, and Flux, charged to Blast Furnaces.

Calendar Year.	Iron ore charged.		Fuel charged.			Limestone.
	Canadian.	Imported.	Charcoal.	*Coke from Canadian coal.	Coke imported or made from imported coal.	
	Short tons.		Bushels.	Short tons.	Short tons.	Short tons.
1887	60,434	.....	940,400	33,581	.....	17,171
1888	54,956	.....	804,286	30,228	.....	16,857
1889	65,670	.....	755,800	36,333	.....	22,122
1890	57,304	.....	589,860	34,073	.....	18,478
1891	60,933	.....	441,812	32,796	.....	11,377
1892	96,948	.....	1,121,365	52,622	.....	22,967
1893	124,053	.....	1,302,720	65,332	.....	27,797
1894	108,871	.....	1,173,970	60,026	.....	35,101
1895	93,208	.....	789,561	51,629	.....	31,585
1896	96,560	46,300	756,600	50,067	33,990	37,462
1897	53,658	55,722	1,031,800	35,800	27,810	31,273
1898	57,881	77,107	836,400	31,952	50,407	33,913
1899	66,384	120,650	1,928,025	44,844	64,648	51,826
1900	71,341	112.042	1,799,737	45,021	59,345	52,966
1901	156,613	361,010	1,835,736	207,835	115,367	169,399
1902	125,664	559,381	2,146,623	362,208	112,314	293,594
1903	82,035	485,911	2,322,030	350,190	96,540	277,452
1904	180,932	454,671	3,477,470	257,182	130,210	211,278
1905	116,974	861,847	4,404,394	365,897	243,882	369,715
1906	221,733	982,740	2,168,476	462,672	304,676	456,036
1907	244,104	1,117,260	1,682,085	521,068	327,082	488,462
1908	209,266	1,051,445	1,121,990	492,076	325,670	483,065
1909	231,994	1,235,000	1,779,258	412,016	507,255	526,076
1910	149,505	1,377,035	1,615,919	491,281	476,838	569,355
1911	67,434	1,628,368	1,960,459	543,933	577,388	625,216
1912	71,588	2,019,165	1,886,748	609,183	656,815	705,613
1913	139,436	2,110,828	2,206,191	710,260	706,888	630,119
1914	182,964	1,324,326	920,045	330,269	590,902	447,641
1915	293,305	1,463,488	1,314,957	578,743	486,022	573,743
1916	221,773	1,964,598	1,843,209	712,715	645,488	701,690

*Includes for the first ten years small quantity of coal.

IRON BLAST FURNACES IN CANADA IN 1916.

Of 20 furnaces 14 were in blast in 1916, for varying periods of time. The total daily capacity of the 20 furnaces is about 5,135 tons. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron & Steel Co., Sydney, C.B. Six completed furnaces of 280 tons capacity each per day; three operated throughout 1916, one for 257 days, and one for 122 days, one furnace idle throughout the year.

Nova Scotia Steel & Coal Co., Ltd., New Glasgow, N.S. Two stacks and one set of stoves at Sydney Mines, C.B., of 300 tons capacity each, operated throughout 1916.

Londonderry Iron & Mining Co., Ltd., Londonderry, N.S. (in liquidation). One furnace of 100 tons capacity; idle throughout the year, not operated since 1908.

Canada Iron Foundries, Ltd., Montreal, Que. Two furnaces of 125 tons and 250 tons at Midland, Ont., both idle throughout the year, not operated since 1913.

Standard Iron Co., Ltd., Deseronto, Ont. One furnace at Deseronto with a daily capacity of 65 tons, operated throughout 1916; one furnace of 65 tons at Parry Sound, idle throughout the year, not operated since 1913.

The Steel Co. of Canada, Ltd., Hamilton, Ont. Two furnaces, one of 260 tons capacity, operated for 353 days in 1916; a second furnace of 430 tons capacity operated 296 days.

Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont. Three furnaces at Steelton, near Sault Ste. Marie, two of 280 tons capacity each and one of 500 tons capacity, operated throughout the year.

The Atikokan Iron Co. Ltd., Port Arthur, Ont. One furnace of 175 tons capacity, idle throughout the year, not operated since 1911.

The Canadian Furnace Co. Ltd., Port Colborne, Ont. One furnace of 325 tons capacity, operated 316 days in 1916.

EXPORTS AND IMPORTS OF PIG-IRON.

The total exports of pig-iron and ferro-alloys during 1916, were 46,106 tons valued at $1,726,396 and included 23,304 tons of pig-iron valued at $374,383, or an average of $16.07 per ton, and 22,802 tons of ferro-alloys valued at $1,352,013, or an average of $59.29 per ton.

The total exports during 1915 were 26,545 tons, and included 17,307 tons of pig-iron valued at $231,551, or an average of $13.38 per ton, and 9,238 tons of ferro-alloys valued at $537,081, or an average of $58.14 per ton.

The exports between 1905 and 1913 did not exceed 10,000 tons in any one year, and consisted largely, if not entirely, of ferro-alloys. During 1914, however, there was a small export of pig-iron, chiefly from Sydney to Philadelphia. The exports during the first three months of the year were 4,431 tons, which probably included about 4,000 tons of pig-iron. From the first of April the exports were separately classified and during the last nine months of the year included 9,767 tons of pig-iron valued at $118,111, or an average of $12.09 per ton, and 4,865 tons of ferro-alloys valued at $285,221, or an average of $58.63 per ton.

Considerable quantities of pig-iron are annually imported into Canada. During the calendar year 1916 the total imports of pig-iron, excluding ferro-products which are separately stated, were 58,130 tons valued at $1,145,150, and included 57,256 tons valued at $1,129,799, or an average of $19.73 per ton, from the United States, 594 tons valued at $10,614 or an average of $17.87 per ton from Great Britain and 280 tons valued at $4,737 or an average of $16.91, from other countries.

During 1915 the total imports of pig-iron were 47,482 tons, valued at $624,200, and included 46,894 tons, valued at $615,268, or an average of $13.12 per ton, from the United States, and 588 tons valued at $8,932, or an average of $15.19 per ton, from Great Britain.

Annual Exports of Pig-Iron and Ferro-alloys, 1896-1916.

Calendar Year.	Tons.	Value.	Average value.	Calendar Year.	Tons.	Value.	Average value.
1896	2,187	$ 55,448	$25.35	1905	866	$ 22,284	$25.73
1897	3,099	81,381	26.26	1906	305	7,429	24.36
1898	1,278	32,645	25.54	1907	439	13,504	30.76
1899	6,981	149,190	21.37	1908	290	10,614	36.60
1900	3,513	88,052	25.06	1909	5,063	186,778	36.89
1901	57,650	593,739	10.30	1910	9,763	296,310	30.35
1902	75,195	778,619	10.35	1911	5,870	271,968	46.33
1903	4,400	78,382	17.81	1912	6,976	310,702	44.54
1904	21,016	200,363	9.53	1913	6,326	351,646	55.59
				1914	19,063	486,366	25.51

Calendar Year.	Pig-iron.			Ferro-alloys.		
	Short tons.	Value.	Average value.	Short tons.	Value.	Average value.
1915	17,307	$231,551	$13.38	9,238	$ 537,081	$58.14
1916	23,304	374,383	16.07	22,802	1,352,013	59.29

Annual Imports of Pig-Iron showing Country of Origin.

Calendar Year	United States.			Great Britain.			Other Countries.		
	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.
1908	26,434	$ 448,794	$16.98	30,574	$ 414,116	$13.54	335	$8,705	$25.99
1909	50,167	735,138	14.65	87,394	1,055,799	12.08	364	7,255	19.93
1910	107,984	1,516,685	14.05	119,678	1,603,951	13.40	91	2,059	22.63
1911	122,360	1,552,896	12.69	86,125	1,058,078	12.29	2	15	7.50
1912	210,756	2,599,117	12.33	61,809	912,482	14.76	.....	.....	.....
1913	213,969	2,888,974	13.50	22,800	358,431	15.72	.....	.....	.....
1914	69,254	862,598	12.46	9,426	119,591	12.68	.....	.....	.....
1915	46,894	615,268	13.12	588	8,932	15.19	.....	.....	.....
1916	57,256	1,129,799	19.73	594	10,614	17.87	280	4,737	16.91

Annual Imports of Pig-Iron since 1880.

Year.	Pig-iron.			Charcoal Pig-iron.			Total.	
	Short tons.	Value.	Average value.	Short tons.	Value.	Average value.	Short tons.	Value.
1880(c)	(a) 23,159	$ 371,956	$16.06	.....	.....	.....	23,159	$ 371,956
1881	(a) 43,630	715,997	16.41	.....	.....	.....	43,630	715,997
1882	56,594	811,221	14.33	6,837	$211,791	$30.98	63,431	1,023,012
1883	75,295	1,085,755	14.42	2,198	58,994	26.84	77,493	1,144,749
1884	49,291	653,708	13.26	2,893	66,602	23.02	52,184	723,019
1885	42,279	545,426	12.90	1,119	27,333	24.43	43,398	572,759
1886	42,463	528,483	12.45	3,185	60,086	18.87	45,648	588,560
1887	46,295	554,388	11.98	3,919	77,420	19.76	50,214	631,808
1888	(b) 48,973	648,012	13.23	.....	.....	.....	48,973	648,012
1889	(b) 72,115	864,752	11.99	.....	.....	.....	72,115	864,755
1890	(b) 87,613	1,148,078	13.10	.....	.....	.....	87,613	1,148,077
1891	(b) 81,317	1,085,929	13.35	.....	.....	.....	18,317	1,085,920
1892	(b) 68,918	886,485	12.86	.....	.....	.....	68,918	886,484
1893	56,849	682,209	12.00	5,944	84,358	14.19	62,793	766,566
1894	42,376	483,787	11.42	2,906	34,968	12.03	45,282	518,754
1895	31,637	341,259	10.80	2,780	31,171	11.21	34,417	372,433
1896	36,131	394,591	10.92	917	11,726	12.79	37,048	406,313
1897	25,766	291,788	11.32	2,936	35,373	12.05	28,702	327,169
1898	37,186	382,103	10.28	2,250	23,533	10.46	39,436	405,630
1899	44,261	452,911	10.23	1,955	19,123	9.78	46,216	472,037
1900	49,767	811,490	16.31	1,816	38,736	21.33	51,583	850,229
1901	35,293	548,033	15.53	490	7,121	14.53	35,783	555,150
1902	39,978	585,077	14.64	38	726	19.11	40,016	585,805
1903	91,730	1,338,574	14.59	882	16,352	18.54	92,612	1,354,929
1904	62,515	894,728	14.31	.....	.....	.....	62,515	894,729
1905	71,005	857,879	12.08	.....	.....	.....	71,005	857,877
1906(c)	96,797	1,401,047	14.47	.....	.....	.....	96,797	1,401,043
1907(d)	249,582	4,117,887	16.50	2,062	41,806	20.27	251,644	4,159,690
1908	57,343	871,615	15.20	1,022	18,818	18.41	58,365	890,435
1909	137,925	1,798,192	13.04	413	5,727	13.87	138,388	1,803,918
1910	227,753	3,122,695	13.71	16,106	242,152	15.03	243,859	3,364,848
1911	208,487	2,610,989	12.52	.....	.....	.....	208,487	2,610,986
1912	272,565	3,511,599	12.88	115	1,370	11.91	272,680	3,512,967
1913	235,843	3,234,877	13.72	926	12,528	13.53	236,769	3,247,401
1914	78,594	981,107	12.48	86	1,082	12.58	78,680	982,186
1915	47,482	624,200	13.15	.....	.....	.....	47,482	624,209
1916(d)	57,337	1,128,557	19.68	793	16,593	20.92	58,130	1,145,152

(a) Comprises pig-iron of all kinds.
(b) These figures appear in Customs reports under heading "iron in pigs, iron kentledge, and cast iron."
(c) Year ending June 30 from 1880 to 1906 inclusive.
(d) Calendar year from 1907 to date.

FERRO-PRODUCTS.

Ferro-alloys including ferro-silicon, ferro-molybdenum, and ferro-phosphorus, were produced in Canada in electric furnaces during 1916, the total production being 28,628 tons valued at $1,777,615.

The total production of ferro-alloys during 1915, was 10,794 tons valued at $753,404, as against a production of 7,524 tons valued at $478,355 in 1914, and 8,075 tons valued at $493,018 in 1913. In 1912 the production was 7,834 short tons valued at $465,225, and in 1911, 7,507 short tons valued at $376,404.

The exports of ferro-silicon and ferro-compounds during the calendar year 1916, as already stated, were 22,802 tons valued at $1,352,012, or an average of $59.29 per ton, as against exports in 1915 of 9,238 tons valued at $537,081, or an average of $58.14 per ton. During the nine months ending December 1914, the exports were 4,865 tons valued at $285,221. Previous to April 1, 1914, the exports of ferro-alloys were included with pig-iron.

The imports of ferro-silicon, ferro-manganese, etc., during the calendar year 1916, were 14,777 tons valued at $1,879,538, and included 7,875 tons valued at $995,987 from Great Britain, and 6,902 tons valued at $883,551 from the United States. The total imports included 1,572 tons of ferro-silicon valued at $42,291, and 13,205 tons of spiegeleisen, ferro-manganese, and other ferro-alloys valued at $1,837,247.

Imports of Ferro-alloys 1916.

	From United States.		From Great Britain.		Total Imports.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
Ferro-silicon containing not more than 15% silicon	31,273	$ 41,456	.....	.....	31,273	$ 41,456
Ferro-silicon containing more than 15% silicon	158	835	.....	.....	158	835
Spiegeleisen and ferro-manganese containing over 15% manganese	96,980	560,701	156,180	$838,959	253,160	1,399,660
Spiegeleisen and ferro-manganese containing not more than 15% manganese and other ferro-products, n.o.p.	9,625	280,559	1,323	157,028	10,948	437,587
	138,036	883,551	157,503	995,987	295,539	1,879,538

Imports of Ferro-manganese, Ferro-silicon, etc.

Fiscal Year.	Short tons.	Value.	Average value.	Fiscal Year.	Short tons.	Value.	Average value.
*1887	123	$ 1,435	$11.67	1903	6,350	$ 162,710	$ 25.62
1888	1,883	29,812	15.83	1904	2,975	75,554	25.40
1889	5,868	72,108	12.29	1905	12,935	246,815	19.08
1890	696	18,895	27.15	1906	15,023	462,739	30.80
1891	2,707	40,711	15.04				
1892	1,311	23,930	18.25	Calendar Year.			
1893	529	15,858	29.98	1907	15,437	536,285	34.74
*1894	284	9,885	34.81	1908	11,718	401,761	34.29
†1895	164	5,408	32.98	1909	17,699	411,536	23.25
1896	652	12,811	19.65	1910	18,900	464,741	24.59
1897	426	9,233	21.67	1911	17,226	429,465	24.93
1898	1,418	22,516	15.88	1912	19,810	469,884	23.72
1899	1,160	22,539	19.43	1913	30,355	990,443	30.98
1900	1,149	39,064	34.00	1914	22,147	549,485	27.81
1901	1,512	38,954	25.76	1915	13,758	807,312	58.68
1902	6,513	150,977	23.18	†1916	14,777	1,879,538	127.19

*From 1887 to 1894 inclusive, these amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron and steel.
†From 1895 to date, ferro-silicon, spiegeleisen, and ferro-manganese and other ferro-alloys.

CONSUMPTION OF PIG-IRON AND FERRO-ALLOYS.

The total quantity of pig-iron and ferro-alloys used in Canada, arrived at by adding to the production the excess of imports over exports, amounted, in 1916, to 1,224,686 tons, as against 959,254 tons in 1915. Of the total amount consumed in 1916, 975,384 tons are reported as having been used in steel furnaces, leaving 249,302 tons of iron available for foundry and other uses. The consumption of steel furnaces included 949,444 tons of pig-iron and 25,940 tons of ferro-alloys.

The annual consumption since 1910 is shown in the following table:—

Consumption of Pig-Iron and Ferro-alloys.

Year.	Used in steel furnaces.		Available for foundry and other uses.	Total consumption.*
	Pig-iron.	Ferro-alloys.		Short tons.
1910	690,913	8,143	361,914	1,060,970
1911	700,679	21,359	422,847	1,144,885
1912	735,559	24,237	548,024	1,307,820
1913	913,722	29,408	454,710	1,397,840
1914	619,030	20,252	233,170	872,452
1915	748,114	13,941	197,199	959,254
1916	949,444	25,940	249,302	1,224,686

*Production of pig-iron and ferro-alloys plus excess of imports over exports.

STEEL.

Production of steel during 1916 has been reported from 24 separate plants (including 7 electric furnace plants) operated by 21 companies.

The total production of steel ingots and castings during the year was 1,428,249 short tons, as compared with 1,020,896 tons in 1915, and 828,641 tons in 1914. The increase in 1916 over the previous year was 407,353 tons or nearly 40 per cent. The highest previous production was 1,168,993 tons in 1913. The 1916 production included, according to returns furnished: open-hearth ingots 1,377,387 tons; Bessemer ingots 1,416 tons; electric steel ingots 17,939 tons; other steels 961 tons; direct castings open-hearth 23,496 tons; electric 1,700 tons; other castings 5,350 tons. The 1915 production included: open-hearth ingots 962,411 tons; Bessemer ingots 19,448 tons; electric steel and other ingots 7,970 tons; direct open-hearth castings 28,384 tons, and other direct castings 2,683 tons. The total production of electric steel in 1916 was 19,639 tons, as against 5,625 tons in 1915, and 61 tons reported for 1914.

Statistics of the production of steel ingots and castings since 1894 are given in the following table, the figures for 1894 to 1906 inclusive having been collected and published by the American Iron and Steel Association; those for the years 1907 to 1916 have been collected by this Department.

Annual Production of Steel Ingots and Castings.

(IN SHORT TONS.)

	Steel Ingots.				Steel Castings.			Tota ingots and castings.
	Open-hearth.	Bessemer.	Electric and other steels.	Total ingots.	Open-hearth.	Electric and other steels.	Total castings.	
1894	.....	.....	.....	.....	.....	.....	.....	28,767
1895	.....	.....	.....	.....	.....	.....	.....	19,040
1896	.....	.....	.....	.....	.....	.....	.....	17,920
1897	.....	.....	.....	.....	.....	.....	.....	20,608
1898	.....	.....	.....	.....	.....	.....	.....	24,125
1899	.....	.....	.....	.....	.....	.....	.....	24,640
1900	.....	.....	.....	.....	.....	.....	.....	26,406
1901	.....	.....	.....	.....	.....	.....	.....	29,214
1902	.....	.....	.....	197,959	.....	.....	5,922	203,881
1903	.....	.....	.....	198,249	.....	.....	5,047	203,296
1904	.....	.....	.....	159,352	.....	.....	7,286	166,638
1905	.....	.....	.....	441,342	.....	.....	10,521	451,863
1906	.....	.....	.....	622,623	.....	.....	16,773	639,396
1907	459,240	225,989	.....	685,229	20,602	1,151	21,753	706,982
1908	443,442	135,557	.....	578,999	9,051	713	9,764	588,763
1909	535,988	203,715	.....	739,703	14,013	1,003	15,016	754,719
1910	580,932	222,668	.....	803,600	18,085	599	18,684	822,284
1911	651,676	209,817	.....	861,493	20,163	740	20,903	882,396
1912	692,236	231,044	.....	923,280	31,845	2,556	34,401	957,681
1913	824,818	301,932	.....	1,126,750	39,217	3,026	42,243	1,168,993
1914	608,383	203,184	.....	811,567	15,315	1,759	17,074	828,641
1915	962,411	19,448	7,970	989,829	28,384	2,683	31,067	1,020,896
1916	1,377,387	1,416	18,900	1,397,703	23,496	7,050	30,546	1,428,249

Materials charged to steel furnaces.—The total quantity of pig-iron used in steel furnaces during 1916 was 949,444 tons, of which 871,212 tons were produced by the firms reporting, and 78,232 tons purchased. The quantity of ferro-alloys used was 25,940 tons, all purchased. The total quantity of scrap iron and steel used was 679,162 tons, of which 382,427 tons originated with the firms reporting, and 296,735 tons were reported as purchased. Ores used included 1,578 tons of manganese ore and 55,059 tons of iron ore, while 224,772 tons of limestone and dolomite were used, and 13,213 tons of fluorspar. In Ontario, about 1,154 million cu. ft. of natural gas were used, while in Nova Scotia coke oven gas was used at Sydney, of which a record of quantity was not obtained.

A record of materials used in steel furnaces covering the past seven years is shown in the following table:—

Pig-Iron, Scrap Iron, and Other Materials Charged to Steel Furnaces.

(IN SHORT TONS.)

Year.	Pig-iron.	Ferro-alloys	Scrap iron and steel.	Iron ore.	Manganese ore.	Fluorspar.	Limestone and dolomite.
1910.....	690,913	8,143	211,453	39,332	1,317	7,461	144,110
1911.....	700,769	21,359	278,797	42,892	829	8,067	130,270
1912.....	735,559	24,237	336,265	43,006	985	9,709	148,045
1913.....	913,722	29,408	406,403	55,018	1,342	10,687	197,028
1914.....	619,030	20,252	286,863	37,686	723	7,845	114,859
1915.....	748,114	13,941	413,266	74,872	908	13,520	252,045
1916.....	949,444	25,940	679,162	55,059	1,578	13,213	224,772

It will be noted that there is a large consumption of scrap iron and steel in the manufacture of steel ingots and castings. For each 100 tons of pig-iron used in 1916 the quantity of scrap charged was 71.5 tons. In 1915 the proportion was 55·2 tons of scrap to 100 tons of pig, and in 1914 it was 46·3 tons of scrap to 100 tons of pig.

The exports of scrap iron and steel in 1916 are reported as 114,300 tons valued at $1,357,018, or an average of $11.87 per ton, as against exports in 1915 of 89,358 tons valued at $883,134, or an average of $9.88 per ton.

There has been considerable variation in the export of scrap, but during the past three years the exports have greatly increased, as shown in the accompanying table.

The total imports of scrap iron and steel in 1916 is recorded by the Customs Department as 11,574 tons valued at $179,751, or an average of $15.53 per ton, as against imports in 1915 of 11,477 tons valued at $127,614, or an average of $11.12 per ton.

The imports of scrap during the past three years have been comparatively small, compared with the annual imports during the previous twenty years.

Annual Exports of Scrap Iron and Steel.

Calendar Year.	Short tons.	Value.	Value per ton.	Calendar Year.	Short tons.	Value.	Value per ton.
1900	12,548	$257,868	$20.55	1908	4,628	$ 73,807	$15.95
1901	9,718	168,438	17.33	1909	20,525	305,256	14.87
1902	6,691	135,463	20.25	1910	11,663	171,603	14.71
1903	6,563	88,839	13.54	1911	4,208	54,618	12.99
1904	7,859	76,125	9.69	1912	16,632	145,250	8.73
1905	24,109	240,105	9.96	1913	45,556	483,813	10.62
1906	12,947	235,913	18.22	1914	35,405	446,337	12.60
1907	11,461	185,430	16.18	1915	89,358	883,134	9.88
				1916	114,300	1,357,018	11.87

Annual Imports of Scrap Iron and Steel.

Fiscal Year.	Cast Scrap Iron.			Iron or steel, scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets, having been in actual use, crop ends of tin plate, bars, blooms and rails the same not having been in actual use.			Scrap iron and scrap steel, old and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the urisdiction of Canada.			Total.	
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.
1893.....	729	$ 9,317	$12.78	45,459	$574,809	$12.64	.....	.....	.....	46,188	$ 584,126
1894.....	78	771	9.88	30,850	369,682	11.98	.....	.....	.....	30,928	370,453
1895.....	643	4,347	6.76	23,390	244,388	10.45	.....	.....	.....	24,033	248,735
1896.....	93	741	7.97	13,607	157,996	11.61	.....	.....	.....	13,700	158,737
1897.....	238	1,362	5.72	7,903	93,541	11.84	.....	.....	.....	8,141	94,903
1898.....	1,559	13,251	8.50	48,769	533,628	10.94	134	$ 949	$ 7.08	50,462	547,828
1899.....	2,378	22,594	9.50	28,297	298,219	10.54	55	3,049	55.44	30,730	323,862
1900.....	13,747	150,681	10.96	38,586	635,008	16.46	167	3,497	20.94	52,500	789,186
1901.....	4,499	51,032	11.34	17,922	239,582	13.37	343	2,607	7.60	22,764	293,221
1902.....	3,048	38,958	12.78	36,046	519,398	14.41	104	1,511	14.53	39,198	559,867
1903.....	7,137	94,028	13.17	43,078	668,971	15.53	37	1,431	38.68	50,252	764,430
1904.....	11,785	149,923	13.17	20,969	298,196	14.22	58	610	10.52	32,412	448,729
1905.....	6,533	75,521	11.56	15,443	210,561	13.63	36	339	9.42	22,012	286,421
1906.....	4,866	60,086	15.52	21,098	325,269	15.42	125	1,220	9.76	26,089	386,575
1907*.....	13,852	198,686	14.34	25,498	412,666	16.18	600	6,197	10.33	39,950	617,549
1908.....	26,371	458,489	13.59	32,825	506,698	15.43	10,017	176,518	17.62	69,213	1,141,705
1909.....	15,190	202,842	13.35	11,022	140,875	12.78	.....	.....	.....	26,212	343,717
1910.....	12,621	153,578	12.17	15,136	191,782	12.67	40	100	2.50	27,797	345,460
1911.....	20,522	266,626	12.99	30,894	408,075	13.21	62	730	11.77	51,478	675,431
1912.....	34,831	406,154	11.66	43,544	547,942	12.58	3	158	52.67	78,378	954,254
Calendar Year											
1913.....	49,874	659,319	13.22	54,869	828,860	15.10	4	76	20.54	104,747	1,488,255
1914.....	10,162	118,299	11.64	17,446	218,553	12.53	80	554	6.91	27,688	337,406
1915.....	5,136	53,778	10.47	5,912	71,859	12.15	429	1,977	4.61	11,477	127,614
1916.....	1,225	19,134	15.62	10,301	160,267	15.56	48	350	7.37	11,574	179,751

*9 months.

Rolling Mill Production.—Statistics of the production of rolled iron and steel products have been received from all firms operating rolling mills in Canada. The principal rolled products are, in addition to blooms and billets, steel rails, wire rods, bars and rods, and a small tonnage of plates. There is practically no production of structural steel. Other products manufactured at these plants include forgings, angle splice bars, rail fastenings, nails and spikes, wire and wire fencing, and many other classes of finished products of which a detailed record is not obtained.

The quantity of steel used by rolling mills in 1916 included 1,360,797 tons of ingots produced by firms reporting; 83,090 tons of ingots, blooms and billets purchased; and 130,734 tons of scrap iron and steel. In 1915 the quantity of steel used included 1,033,682 tons of ingots produced by firms reporting; 21,975 tons of ingots, blooms and billets purchased; and 57,051 tons of scrap iron and steel. The production in 1916 included: steel rails, 90,123 tons; wire rods 179,226 tons; bars and plates 619,500 tons; forged products, etc., 152,668 tons. The production in 1915 included: steel rails, 232,411 tons; wire rods 124,381 tons; bars and plates 294,595 tons; forged products, etc., 34,358 tons. In addition to the above there was also a small production of billets for export.

The annual production of rolling mills in so far as returns have been furnished to this Department, was as follows:—

Annual Production of Rolling Mills.

(IN SHORT TONS.)

Year.	Steel rails.	Wire rods.	Bars and plates.	Other products*.
1908	300,935	41,420	.....	.....
1909	377,642	81,762	.....	.....
1910	399,762	88,456	128,940	28,354
1911	399,760	85,811	202,023	62,676
1912	471,422	68,174	267,797	36,441
1913	554,481	57,389	269,096	51,654
1914	428,226	63,856	143,754	42,070
1915	232,411	124,381	294,595	34,358
1916	90,123	179,226	619,500	152,668

*Includes forged products, angle splice bars, and rail fastenings.

The record of production of finished rolled iron and steel in Canada, collected and published by the American Iron and Steel Institute and the American Iron and Steel Association, which covers a longer period of time and is possibly more complete than that given above, is shown in the following tables quoted from the annual Statistical Report of the American Iron and Steel Institute for 1915 and special Statistical Bulletin No. 4, 1917.

Finished Rolled Iron and Steel.

PRODUCTION OF FINISHED ROLLED PRODUCTS, 1895-1910.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1895	66,402	1901	112,007	1906	571,742
1896	75,043	1902	161,485	1907	600,179
1897	77,021	1903	129,516	1908	496,517
1898	90,303	1904	180,038	1909	662,741
1899	110,642	1905	385,826	1910	739,811
1900	*100,690				

PRODUCTION OF FINISHED ROLLED FORMS BY LEADING PRODUCTS.

Products.	1911.	1912.	1913.	1914.	1915.	1916.
Rails	360,547	423,885	506,709	382,344	209,752	81,497
Structural shapes, and wire rods	76,617	64,082	68,048	59,050	114,829	174,490
Plates and sheets, nail plate, merchant bars, tie-plate bars, etc	344,760	373,257	392,340	218,125	328,737	707,823
Total, Gross tons	781,924	861,224	967,097	659,519	653,318	963,810

PRODUCTION OF FINISHED ROLLED FORMS, SHOWING IRON AND STEEL SEPARATELY, GROSS TONS, 1904-1916.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total
1904	53,188	126,850	180,038	1911	86,383	695,541	781,924
1905	67,421	318,405	385,826	1912	109,012	752,212	861,224
1906	78,898	492,844	571,742	1913	95,881	871,216	967,097
1907	81,093	519,086	600,179	1914	47,309	612,210	659,519
1908	65,505	431,012	496,517	1915	40,797	612,521	653,318
1909	79,636	583,105	662,741	1916	76,478	887,332	963,810
1910	83,918	655,893	739,811				

PRODUCTION OF STEEL RAILS, 1895-1916.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1895	600	1901	891	1907	311,461	1913	506,709
1896	600	1902	33,950	1908	268,692	1914	382,344
1897	500	1903	1,243	1909	344,830	1915	209,752
1898	600	1904	36,216	1910	366,465	1916	81,497
1899	*835	1905	178,885	1911	360,547		
1900	700	1906	312,877	1912	423,885		

* Includes a few tons of iron rails.

Steel Billets.—A record of monthly prices of mild steel billets at Montreal as quoted by The Dominion Iron & Steel Company, is shown in an accompanying table.[1]

During 1916 prices steadily increased, quotations in January and February being from $38.50 to $40.50 per gross ton, and in December from $52 to $55 per gross ton.

In Pittsburgh, open-hearth billets averaged $32 per gross ton in January, increasing to $45 in April and May. There was a slight decrease during the next three months, followed by further increases to a maximum monthly average of $57.50 in December.

[1]Compiled from the annual records of wholesale prices published by the Department of Labour.

Monthly Prices of Mild Steel Billets at Montreal.*

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	$28.75	$30.00	$26.00	$26.50	$27.00	$24.75	$26.50	$24.50	$24.75	$39.50
February	34.00	30.75	26.00	26.50	27.00	23.75	30.00	24.50	24.75	39.50
March	34.50	31.00	26.25	26.50	27.00	23.75	30.00	24.50	26.50	45.50
April	34.75	30.75	26.25	26.50	27.00	23.75	30.00	25.25	26.50	44.50
May	35.25	31.75	26.25	26.50	26.75	23.75	31.00	25.25	26.50	44.50
June	34.50	33.75	26.50	26.00	25.75	23.75	31.00	25.25	26.50	44.50
July	34.00	26.75	26.50	26.00	25.75	23.75	29.00	25.25	26.50	44.50
August	34.50	27.00	26.50	25.75	25.00	24.25	29.00	25.25	29.50	44.50
September	34.00	27.00	26.25	25.50	25.00	24.75	28.00	25.25	31.00	44.50
October	33.75	27.25	26.25	25.50	23.75	25.25	26.50	25.25	31.00	46.00
November	34.25	27.00	26.25	24.75	23.75	25.25	25.50	24.75	32.00	52.00
December	35.00	26.75	26.50	25.00	24.75	26.00	25.50	24.75	34.00	53.50
Average	33.94	29.15	26.29	25.91	25.71	24.40	28.50	25.23	28.29	45.08

*Average price per ton of 2,240 pounds, f.o.b. Montreal in the first week of each month, quotations supplied by the Dominion Iron & Steel Co., Ltd.

Average Monthly Prices of Bessemer Steel Billets at Pittsburgh.*

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	$29.40	$28.00	$25.00	$27.50	$23.00	$20.00	$28.30	$20.13	$19.25	$32.00
February	29.50	28.00	25.00	27.50	23.00	20.00	28.50	21.00	19.50	33.50
March	29.00	28.00	23.00	27.50	23.00	19.75	28.50	21.00	19.70	42.40
April	30.12	28.00	23.00	26.75	23.00	20.00	28.50	20.80	20.00	45.00
May	30.30	28.00	23.00	26.12	22.60	20.80	27.37	20.00	20.00	45.00
June	29.62	25.75	23.00	25.30	21.00	20.87	26.50	19.50	20.50	43.50
July	30.00	25.00	23.50	25.00	21.00	21.50	26.60	19.00	21.38	41.00
August	29.25	25.00	24.13	24.62	21.00	22.12	26.00	20.25	23.13	44.20
September	29.37	25.00	25.00	24.40	20.75	23.62	24.87	21.00	24.10	45.00
October	28.20	25.00	26.25	23.75	20.00	26.00	23.30	20.00	24.63	46.25
November	28.00	25.00	27.13	23.30	19.50	27.00	21.00	19.25	26.50	52.00
December	28.00	25.00	27.50	23.00	19.25	27.00	20.00	19.00	30.60	57.50

*As compiled and published by "The Iron Age," New York.

Exports and Imports.—The Dominion Iron & Steel Company, has, during the past three years, been making some export of steel billets for European demand, but as yet the Department of Customs has not published any separate record thereof.

There has been a considerable annual importation, as shown in the accompanying tables, of iron and steel billets, and of iron and steel ingots, blooms, slabs, puddled bars, etc. Unfortunately the record for 1916, and possibly also that for 1915, is not complete, large quantities having been imported as "Munitions" and not separately classified.

The export records[1] of the United States, for the year 1916 at least, give a more complete record. According to this authority there was exported from the United States to Canada during the calendar year 1916, billets, ingots and blooms of steel 105,420 gross tons (118,070 short tons) valued at $6,662,860 or an average of $56.43 per short ton, as against corresponding exports in 1915 of 58,486 gross tons (65,504 short tons) valued at $1,528,155 or an average of $23.33 per short ton, and exports in

[1] Monthly Summary of Foreign Commerce of the United States, Department of Commerce, Washington, D.C.

1914 of 14,325 gross tons (16,044 short tons) valued at $311,267, or an average of $19.40 per short ton.

The second following table shows for a number of years the exports of billets, ingots and blooms of steel from the United States to Canada. The principal differences between this and the Canadian record appear to be for the year 1916.

Imports of Iron and Steel Ingots, Blooms, Billets, etc.

Fiscal Year.	Iron and steel billets weighing not less than 60 pounds per lineal yard.			Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms. n.o.p., less finished than iron or steel bars, but more advanced than pig-iron, except castings.			Steel billets, n.o.p.			Total.	
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.
1908.....	14,866	$ 416,163	$27.99	4,722	$135,177	$28.63	1,634	$ 48,672	$29.79	21,222	$ 600,012
1909.....	3,940	95,350	24.20	3,715	53,135	14.30	1,232	31,869	25.86	8,887	180,354
1910.....	28,358	518,102	18.27	5,775	97,333	16.85	2,682	63,089	23.52	36,815	678,524
1911.....	44,457	861,036	19.37	3,228	68,616	21.26	711	19,940	28.05	48,396	949,592
1912.....	85,852	1,593,665	18.56	2,608	52,063	19.97	729	17,242	23.65	89,189	1,662,970
Calendar Year											
1913.....	51,765	1,178,151	22.76	665	19,379	29.61	453	14,784	32.67	52,873	1,212,314
1914.....	12,247	241,234	19.70	155	3,348	21.65	647	15,121	23.37	13,049	259,703
1915.....	32,210	715,493	22.21	10,980	316,814	28.85	10,928	238,380	21.81	54,118	1,270,687
1916*.....	12,627	495,625	39.25	7,946	385,816	47.29	303	14,005	46.24	20,876	895,446

*Import record not complete. See explanation in text.

Exports of Various Iron and Steel Products from the United States to Canada.

Calendar Year.	Billets, Ingots, and Blooms, of Steel.			Steel Rails for Railways.			Sheets and Plates.			Structural Iron and Steel.		
	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.
1910	23,160	$ 461,204	$19.91	28,382	$ 750,424	$26.44	.....	.....	.....	83,838	$ 3,346,393	$39.91
1911	64,020	1,262,732	19.72	98,613	2,499,110	25.34	.....	.....	.....	115,420	4,113,858	35.64
1912	92,976	1,941,015	20.88	149,353	3,799,685	25.44	.....	.....	.....	190,346	6,823,072	35.85
1913	45,568	964,373	21.16	181,408	4,791,559	26.41	356,344	$12,364,721	$34.70	322,766	10,463,154	32.42
1914	16,044	311,267	19.40	25,949	685,468	26.42	207,203	6,855,494	33.09	125,457	3,454,372	27.53
1915	65,504	1,528,155	23.33	8,521	230,637	27.07	223,715	7,781,270	34.78	110,725	3,063,362	27.67
1916	118,070	6,662,860	56.43	46,011	1,586,639	34.48	255,935	14,712,640	57.49	125,169	5,788,908	46.25

Calendar Year.	Tin Plate, Terne Plates and Taggers Tin.			Wire and Manufactures of Wire.			Pipe and Fittings.			Metal Working Machinery.
	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Value.
1910	12,473	$ 881,719	$70.69	47,074	$2,077,092	$44.12	30,008	$1,371,399	$45.70	$ 466,216
1911	32,095	2,243,492	69.90	62,895	2,670,765	42.46	40,485	1,853,764	45.79	1,083,718
1912	52,746	3,662,770	69.44	64,354	2,496,781	38.80	86,103	4,288,887	49.81	1,885,241
1913	51,524	3,842,159	74.57	53,749	2,143,449	39.88	79,929	4,093,699	51.22	1,888,463
1914	39,770	2,614,859	65.75	53,254	2,083,150	39.12	.....	.....	.....	767,064
1915	43,854	2,762,405	62.99	51,963	2,159,436	41.56	15,374	954,817	62.10	4,336,065
1916	57,633	4,694,005	81.45	66,690	4,289,572	64.32	21,859	1,697,511	77.66	7,929,989

Steel Rails.—The production of steel rails in Canada in 1916 was 90,123 short tons, as against 232,411 tons in 1915, and was the smallest output since 1904. The annual production from 1905 to 1915 varied between 200,000 tons and 500,000 tons per annum.

There is no record of exports of steel rails, although in recent years such exports have been made to South Africa and to the United States.

The imports of steel rails during 1916 is recorded by the Customs Department as 11,227 short tons valued at $344,802. This record, however, is possibly not complete, since the United States Department of Commerce reports the exports of steel rails from the United States to Canada during the same period as 46,011 tons valued at $1,586,639.

The annual imports of steel rails, as shown in the following table, from 1895 to 1905 ranged between 50,000 and 212,000 tons, averaging about 125,000 tons. From 1906 to date, however, or since the establishment of rail mills at Sydney and Sault Ste. Marie, the imports have fallen to an annual average of 60,000 tons, the variation being between a minimum of 10,420 tons in 1915 and a maximum of 177,041 tons in 1913.

Annual Imports of Steel Rails, etc.

Fiscal Year.	Steel rails weighing not less than 45 pounds per lineal yard for use in railway tracks.			Steel Rails(a).			Railway Fish Plates.			Railway Tie-plates.			Switches, frogs, crossings and intersections for railways.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
1895	48,629	$ 838,144	$17.24	4,660	$ 94,858	$20.36	2,174(b)	$ 50,412	$23.19	.....	.....	.....	37	$ 3,230	$ 87.29
1896	52,176	1,034,578	19.83	6,692	125,338	18.73	2,233	50,535	22.63	.....	.....	.....	94	4,237	45.07
1897	91,194	1,443,857	15.83	4,095	82,354	20.11	3,226	67,511	20.93	.....	.....	.....	60	3,770	62.83
1898	105,178	1,810,605	17.21	7,290	89,912	12.33	7,828	171,605	21.92	.....	.....	.....	358	3,303	9.23
1899	103,833	1,714,228	16.51	4,823	86,614	17.96	5,821	131,498	22.59	.....	.....	.....	103	3,065	29.75
1900	130,617	2,793,903	21.39	5,384	132,689	24.65	8,478	226,280	26.69	.....	.....	.....	630	41,833	66.40
1901	125,739	3,329,919	26.48	4,947	142,590	28.82	4,618	165,960	35.94	.....	.....	.....	154	17,301	112.34
1902	122,368	2,746,222	22.44	8,285	206,908	24.97	4,094	122,840	30.00	.....	.....	.....	352	20,221	57.45
1903	183,603	4,256,064	23.13	12,301	235,904	19.18	7,047	210,081	29.81	.....	.....	.....	475	34,198	72.00
1904	189,884	4,329,363	22.80	10,600	263,284	24.84	7,000	208,246	29.75	.....	.....	.....	468	24,616	52.60
1905	212,491	5,051,762	23.77	17,904	421,084	23.52	5,396	176,002	32.62	.....	.....	.....	624	41,833	67.04
1906	.....	.....	.....	49,878	1,214,548	24.35	4,387	172,267	39.27	.....	.....	.....	687	55,120	80.23
1907*	.....	.....	.....	72,811	1,867,865	25.65	4,960(b)	215,045	43.36	.....	.....	.....	517	46,550	90.04
1908	.....	.....	.....	49,187	1,278,084	25.98	1,225	55,193	45.06	859	$40,046	$46.62	1,435	143,781	100.20
1909	.....	.....	.....	29,547	797,479	26.99	1,784	67,045	37.58	333	15,147	45.39	879	74,527	84.86
1910	.....	.....	.....	50,108	1,398,373	27.91	2,526	109,114	43.20	1,399	47,275	33.79	1,150	134,734	117.16
1911	.....	.....	.....	32,784	895,984	27.33	1,489	60,788	40.82	957	35,399	36.99	1,460	144,195	98.76
1912	.....	.....	.....	91,132	2,429,318	26.66	3,045	130,436	42.83	441	16,164	36.65	2,450	278,906	113.84
Calendar Year															
1913	.....	.....	.....	177,041	4,886,117	27.59	3,366	146,493	43.52	2,014	88,220	43.80	.....	324,694	.....
1914	.....	.....	.....	38,496	979,723	25.45	2,900	113,913	39.28	668	23,137	34.64	.....	148,848	.....
1915	.....	.....	.....	10,420	297,598	28.56	1,790	69,677	38.92	271	11,943	44.07	.....	39,417	.....
1916**	.....	.....	.....	11,227	344,802	30.71	2,107	97,819	46.43	669	27,402	40.96	.....	109,650	.....

*9 months. (a) Iron and steel railway bars or rails of any form, punched or not, n.o.p., for railways, which term, for the purposes of this item, shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers. (b) Fish plates and tie-plates from 1895 to 1907 inclusive.

**See text explanations and compare with preceding table.

Wire Rods.—The production of wire rods in Canadian rolling mills has shown a further increase in 1916 amounting to 179,226 tons, as against 124,381 tons in 1915, and 63,856 tons in 1914. From 1908 to 1914 inclusive, the average annual production was about 70,000 tons. The imports of wire rods in the coil in 1916 were 66,166 tons valued at $3,069,162, or $46.39 per ton, as compared with imports in 1915 of 71,839 tons valued at $1,695,842 or $23.60 per ton, and imports in 1914 of 65,250 tons valued at $1,472,597, or $22.57 per ton. The annual imports have varied between rather wide limits, as shown by the following table, the highest figure having been reached during the fiscal year of 1913, with a total of 91,919 tons.

The average monthly price of wire rods in Pittsburgh in 1916 advanced from $43 per gross ton in January to $60 during April and May, receding slightly during the next five months, but increasing to an average of $68.75 per ton in December.

Annual Imports of Wire Rods.[1]

Fiscal Year.	Short tons.	Value.	Value per ton.	Fiscal Year.	Short tons.	Value.	Value per ton.
1898.....	33,589	$ 658,153	$19.59	1908.....	9,862	$ 295,122	$29.93
1899.....	34,800	765,777	22.01	1909.....	20,312	538,378	26.51
1900.....	41,994	1,196,593	28.49	1910.....	28,071	749,117	26.69
1901.....	20,505	645,136	31.46	1911.....	36,032	965,912	26.81
1902.....	55,182	1,522,792	27.60	1912.....	43,397	1,033,397	23.81
1903.....	50,624	1,415,447	27.96	1913.....	91,919	2,144,405	23.33
1904.....	42,313	1,134,149	26.80	Calendar Year			
1905.....	31,730	792,078	24.96	1913.....	79,608	1,962,235	24.65
1906.....	18,811	478,991	25.46	1914.....	65,250	1,472,597	22.57
1907.....	11,050	306,039	27.70	1915.....	71,839	1,695,842	23.60
				1916.....	66,166	3,069,162	46.39

[1]Rolled iron wire rods in the coil, of iron or steel, not over ⅜ inch in diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories.
Rolled round rods in the coil, of iron or steel, for the manufacture of chains.

Average Monthly Prices of Bessemer Wire Rods at Pittsburgh.*

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January...	$37.00	$34.30	$33.00	$33.00	$28.00	$24.37½	$30.00	$25.50	$25.00	$43.00
February..	37.00	35.00	33.00	33.00	28.75	25.00	30.00	26.38	25.00	48.00
March.....	37.00	35.00	33.00	33.00	29.00	25.00	30.00	26.50	25.00	54.80
April.....	37.00	35.00	29.00	32.50	29.00	25.00	30.00	26.00	25.00	60.00
May.....	37.00	35.00	27.50	32.00	29.00	25.00	30.00	25.50	25.00	60.00
June.....	37.12½	33.50	27.50	30.80	28.25	25.00	29.50	24.50	25.00	53.75
July.....	36.50	33.00	29.40	29.20	27.00	25.00	28.30	24.50	25.63	53.75
August....	36.10	33.25	31.00	28.25	27.00	25.80	28.00	25.00	27.00	55.00
September	36.00	33.00	31.50	28.00	27.00	27.00	27.37½	26.20	29.40	55.00
October...	35.40	33.00	31.87½	28.50	26.00	28.50	26.60	25.88	31.75	55.00
November.	34.00	33.00	32.50	28.12½	25.30	29.75	25.87½	25.25	36.25	63.00
December..	34.00	33.00	33.00	28.00	24.50	30.00	25.17	25.00	39.50	68.75

* As compiled and published by "The Iron Age," New York.

Tin Plate.—There is no production of tin plate in Canada. The imports during 1916 were 57,543 tons, valued at $5,221,163, as compared with imports in 1915 of 45,165 tons, valued at $2,883,951. The imports during the past ten years have averaged about 42,500 tons per annum.

Annual Imports of Tin Plate.

Year.	Tons.	Value.	Year.	Tons.	Value
Fiscal Year.			Fiscal Year.		
1891	10,734	$ 854,770	1905	30,000	$1,751,507
1892	19,296	1,235,961	1906	30,259	1,869,000
1893	15,131	892,106	1907	22,628	1,516,777
1894	15,369	956,813	1908	34,876	2,437,540
1895	13,022	681,739	1909	26,859	1,682,366
1896	16,910	923,279	Calendar Year.		
1897	18,768	919,596	1909	36,904	2,216,089
1898	22,864	1,150,741	1910	39,101	2,475,010
1899	16,575	927,036	1911	47,006	3,172,943
1900	25,108	1,683,788	1912	60,502	3,826,735
1901	27,165	1,466,965	1913	58,031	3,954,615
1902	27,207	1,528,655	1914	50,791	3,151,385
1903	30,251	1,806,643	1915	45,165	2,883,951
1904	24,820	1,461,811	1916	57,543	5,221,163

EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

Canada imports large quantities of iron and steel, much larger quantities than are manufactured in domestic steel mills. Reference has already been made to exports and imports of a few specific products; the following, however, is a general summary of the available records relating to exports and imports of iron and steel as compiled from the reports of the Customs Department. Mention has already been made of the fact that some of these records, such as imports of billets, etc., are incomplete, because there have been large imports for the manufacture of munitions that have not been entered under the usual classifications but have been included in one general item with many other products. This fact should be kept in mind in analysing the statistics, since it may explain a number of apparent discrepancies between these records and those available from other sources, such, for instance, as the United States Department of Commerce records of foreign trade.

The exports of iron and steel from Canada have consisted chiefly of manufactured goods, such as agricultural implements, automobiles, bicycles, machinery, etc. During the past two years, however, there have been considerable exports of steel rails, billets, rods, and wire products.

The total recorded value of iron and steel exported during the calendar year 1916 was $63,837,681, as compared with a value of exports in 1915 of $48,268,148, and in 1914 of $14,391,746.

The exports during 1916 included: pig-iron and ferro-alloys 46,106 tons valued at $1,726,396; scrap iron and steel 114,300 tons valued at $1,357,018; wire and wire nails 122,526 tons valued at $8,597,320; agricultural implements valued at $3,705,927; automobiles and bicycles, $6,807,499; other manufactures of iron and steel, $41,643,521.

The exports during 1915 included: pig-iron and ferro-alloys, 26,545 tons valued at $768,632; scrap iron and steel 89,358 tons valued at $883,134; wire and wire nails 71,998 tons, valued at $3,224,740; agricultural

implements, valued at $3,417,060; automobiles and bicycles, $7,139,712; other manufactures of iron and steel, $32,834,870.

The exports during 1914 included: pig-iron and ferro-alloys 19,063 tons, valued at $486,366; scrap iron and steel 35,405 tons, valued at $446,337; wire and wire nails 9,663 tons, valued at $355,781; agricultural implements, valued at $5,788,899; automobiles and bicycles, $3,409,749; other manufactures of iron and steel, $3,904,614.

The exports during 1913 in similar groupings were: pig-iron and ferro-alloys 6,326 tons, valued at $351,646; scrap iron and steel 45,556 tons, valued at $483,813; agricultural implements valued at $7,411,246; automobiles and bicycles, $3,630,964; other manufactures of iron and steel, $2,121,480.

A detailed record of these exports during the past four years is shown in the accompanying tables:—

Exports of Iron and Steel Goods, the Products of Canada, during the Calendar Years 1915 and 1916.

	1915.			1916.		
	Quantity.	Value.	Average value.	Quantity.	Value.	Average value.
Stoves.....No.	1,271	$ 18,563	$14.61	.....	$ 29,956	.....
Gas buoys and parts of..... $	.....	2,017	.....	.....	2,484	.....
Castings, n.e.s..... "	.....	143,714	.....	.....	167,881	.....
Pig-iron..... Tons	17,307	231,551	13.38	23,304	374,383	$16.07
Ferro-silicon and ferro-compounds "	9,238	537,081	58.14	22,802	1,352,013	59.29
Wire and wire-nails..... "	71,998	3,224,740	44.79	122,526	8,597,320	70.17
Machinery (linotype machines)... $	.....	6,946	.....	.....	35,465	.....
Machinery n.e.s..... "	.....	536,162	.....	.....	1,206,863	.....
Sewing machines.....No.	2,557	30,479	11.92	.....	82,032	.....
Washing machines, etc..... $	.....	20,334	.....	.....	5,763	.....
Typewriters.....No.	3,175	206,811	65.14	3,597	246,761	68.60
Scrap iron and steel..... Tons	89,358	883,134	9.88	114,300	1,357,018	11.87
Hardware, tools, etc..... $	.....	321,021	.....	.....	376,549	.....
Hardware, n.e.s..... "	.....	401,053	.....	.....	515,613	.....
All other iron and steel..... "	.....	31,147,770	.....	.....	38,974,154	.....
Agricultural implements—						
Mowing machines.....No.	5,031	175,912	34.97	6,672	233,024	34.93
Reapers..... "	471	21,105	44.80	1,115	65,011	58.31
Drills..... "	6,400	422,772	66.06	4,713	317,831	67.44
Harvesters and binders..... "	7,668	809,141	105.52	7,495	814,517	108.67
Ploughs..... "	14,923	309,286	20.73	17,700	483,650	27.32
Harrows..... "	4,459	81,731	18.33	6,691	97,214	14.53
Hay rakes..... "	1,758	40,289	22.92	2,011	43,746	21.75
Seeders..... "	2	87	43.50	2	128	64.00
Threshing machines..... "	1,001	568,401	567.83	1,522	465,209	305.66
Cultivators..... "	5,957	166,602	27.97	4,219	142,028	33.66
All other..... $	.....	302,355	.....	.....	292,603	.....
Parts of..... "	.....	519,379	.....	.....	750,966	.....
Automobiles.....No.	13,475	6,756,395	501.40	12,579	6,078,668	483.24
" parts of..... $	.....	363,178	.....	.....	672,060	.....
Bicycles.....No.	116	4,692	40.45	580	50,894	87.75
" parts of..... $	.....	15,447	.....	.....	5,877	.....
Total.....	.....	48,268,148			63,837,681	

Exports of Iron and Steel Goods, the Product of Canada, during the Calendar Years 1913 and 1914.

	1913.			1914.		
	Quantity.	Value.	Average value.	Quantity.	Value.	Average value.
Stoves.....No.	1,371	$ 23,858	$ 17.40	4,198	$ 25,149	$ 5.99
Gas buoys and parts of..... "	.....	35,462	.....	.....	21,009	.....
Castings, n.e.s..... "	.....	61,362	.....	.....	24,218	.....
Pig-iron.....Tons	6,326	351,646	55.59	14,198	201,145	14.17
Ferro-silicon and ferro-compounds "	.....	.....	.....	4,865	285,221	57.45
Wire and wire-nails..... "	.....	.....	.....	9,663	355,781	36.82
Machinery (linotype machines).. $	.....	9,631	.....	.....	5,562	.....
Machinery, n.e.s..... "	.....	435,333	.....	.....	344,689	.....
Sewing machines.....No.	8,122	114,438	14.09	2,109	31,392	14.88
Washing machines, etc..... $	.....	15,872	.....	.....	33,986	.....
Typewriters.....No.	3,048	201,763	66.20	3,055	200,441	65.61
Scrap iron and steel..... Tons	45,556	483,813	10.62	35,405	446,337	12.60
Hardware, tools, etc..... $	.....	101,990	.....	.....	95,497	.....
Hardware, n.e.s..... "	.....	70,767	.....	.....	190,763	.....
Steel and manufactures of..... "	.....	1,051,004	.....	.....	2,931,908	.....
Agricultural implements—						
Mowing machines.....No.	24,044	847,253	35.24	21,457	725,831	33.83
Reapers..... "	5,604	317,716	56.69	3,919	223,228	56.96
Drills..... "	10,364	634,121	61.18	3,961	259,701	65.56
Harvesters..... "	23,194	2,439,319	105.17	19,474	2,015,996	103.52
Ploughs..... "	15,450	465,505	30.13	12,896	324,349	25.15
Harrows..... "	7,300	127,482	17.46	6,252	92,556	14.80
Hay rakes..... "	9,846	247,445	25.13	6,524	196,519	30.12
Seeders..... "	.....	.....	.....	32	1,810	56.56
Threshing machines..... "	1,928	712,270	369.43	1,965	799,307	406.77
Cultivators..... "	7,795	201,758	25.88	6,030	146,668	24.32
All other..... "	.....	503,235	.....	.....	290,520	.....
Parts of..... "	.....	915,142	.....	.....	712,414	.....
Automobiles..... "	5,997	3,395,382	566.18	5,621	3,011,327	535.73
" parts of..... "	.....	210,623	.....	.....	384,428	.....
Bicycles..... "	90	8,058	89.53	111	10,021	90.28
" parts of..... "	.....	16,901	.....	.....	3,973	.....
Total.....	.....	13,999,149	.....	.....	14,391,746	.....

Annual Exports of Iron and Steel Products since 1884.

Year.	Value.	Year.	Value.	Year.	Value.
1884.....	$186,854	1895.....	$ 174,778	1906.....	$ 1,552,963
1885.....	115,158	1896.....	284,296	1907.....	1,607,368
1886.....	228,027	1897.....	592,849	1908.....	2,098 138
1887.....	251,221	1898.....	593,060	1909*.....	7,172,413
1888.....	184,214	1899.....	975,377	1910.....	7,895,489
1889.....	144,909	1900.....	1,570,013	1911.....	9,907,281
1890.....	133,724	1901.....	1,837,179	1912.....	10,682,484
1891.....	152,919	1902.....	2,751,324	1913.....	13,999,149
1892.....	155,597	1903.....	3,058,320	1914.....	14,391,746
1893.....	214,636	1904.....	1,318,482	1915.....	48,268,148
1894.....	167,183	1905.....	1,287,558	1916.....	63,837,681

*Agricultural implements, automobiles, and bicycles included in 1909 and subsequent years.

Separate records, covering a period of years, of the annual exports of pig-iron and ferro-alloys and of scrap iron and steel have already been given on previous pages.

The total value of the imports of iron and steel goods during the calendar year 1916, subject to the explanation already made in respect to certain products not recorded under the usual and regular classification and there-

fore omitted from this record, was $129,090,241, as compared with a value of $74,308,983 imported during the calendar year 1915, $80,063,679 imported during 1914, and $145,226,972 imported during 1913. Previous to 1913 the record is shown covering the fiscal years. During the twelve months ending March, 1913, the imports were valued at $148,579,272, as against imports valued at $105,614,450 during the twelve months ending March, 1912.

Between 1895 and 1904, the imports of iron and steel increased from about $8,600,000 to over $40,000,000. During the next five years there was comparatively little change, but from 1909 to 1913 the increase was again very rapid. During the latter part of 1913 there was, however, a distinct check to imports with the heavy falling off shown in 1914 and 1915. A detailed statement of the imports of iron and steel during the calendar years 1915 and 1916 is shown in the general tables of imports of iron and steel goods following.

The imports during 1916 subject to duty were valued at $107,863,317, the imports free of duty during the same period being valued at $21,226,931. The imports during 1915 subject to duty were valued at $62,842,171 and the imports free of duty during the same period were valued at $11,466,812. These imports include all classes of manufactured iron and steel goods as well as those of cruder form. In many cases the values only of the imported goods are given, so that a total tonnage of imports cannot be stated. In the case of most of the cruder materials, however, the quantities are given and a compilation of these showing the importation of the cruder forms of iron and steel since 1909 is shown in the accompanying tables. Thus, during the twelve months ending December, 1916, there were imported 864,916 tons of iron and steel valued at $52,114,258, or an average of $60.25 per ton, together with other iron and steel goods of which the quantities are not stated, valued at $76,975,910.

During the twelve months ending December, 1915, there were imported 771,007 tons of iron and steel valued at $27,504,685, or an average value per ton of $35.67, together with other iron and steel goods of which the quantities are not stated, valued at $46,804,298.

Summary of Imports of Iron and Steel,* 1915 and 1916.

Material.	1915			1916.		
	Tons.	Value.	Average.	Tons.	Value.	Average.
Pig-iron	47,482	$ 624,200	$13.15	58,330	$ 1,145,150	$ 19.63
Ferro-products and chrome steel	13,905	820,976	59.04	14,840	1,893,879	127.62
Ingots, blooms, billets, puddled bars, etc.	54,118	1,270,687	23.48	(b) 20,876	895,446	42.89
Scrap iron and scrap steel	11,477	127,614	11·12	11,574	179,751	15.53
Plates and sheets	224,484	7,647,560	34.07	225,439	12,806,096	56.81
Tin plates and sheets	45,165	2,883,951	63.85	57,543	5,221,163	90.73
Bars, rods, hoops, bands, etc.	156,990	5,829,088	37.13	198,652	13,362,807	67.27
Structural iron and steel	126,780	3,615,333	28.52	158,905	8,042,127	50.61
Rails and connexions	12,481	379,218	30.38	14,003	470,023	33.57
Pipe and fittings (a)	4,489	110,978	24.72	5,399	165,576	30.67
Nails and spikes	1,522	86,876	57.08	4,103	283,007	68.98
Wire (a)	49,529	2,175,834	43.93	66,115	4,305,674	65.12
Forgings, castings, and manufactures	22,585	1,932,370	85.56	29,137	3,343,559	114.75
Total	771,007	27,504,685	35.67	(b) 864,916	52,114,258	60.25
Other iron and steel products valued at	.....	46,804,298	.....	.....	76,975,990	.....
Total value of imports of iron and steel	.....	74,308,983	.....	.....	129,090,248	.....

*For details of these items see general tables following.
(a) There are additional imports of pipe and wire included under "other iron and steel products."
(b) This figure should be increased by nearly 100,000 tons and the value in proportion because of the imports of steel billets entered under a general classification. See explanation under steel billets page No 24.

Summary of Imports of Iron and Steel, 1913 and 1914.

Material.	1913.			1914.		
	Tons.	Value.	Average.	Tons.	Value.	Average.
Pig-iron	236,769	$ 3,247,405	$13.72	78,680	$ 982,189	$12.48
Ferro-products and chrome steel	30,678	970,100	31.62	22,271	560,686	25.18
Ingots, blooms, billets, puddled bars etc.	52,872	1,212,314	22.93	13,049	259,703	19.90
Scrap iron and scrap steel	104,747	1,488,255	14.21	27,688	337,406	12.19
Plates and sheets	365,675	13,965,865	38.19	227,633	7,877,729	34.61
Tin plates and sheets	58,031	3,954,615	68.14	50,791	3,151,385	62.05
Bars, rods, hoops, bands, etc.	277,879	10,195,280	36.69	148,368	5,138,193	34.63
Structural iron and steel	439,871	12,739,954	28.96	160,538	4,214,520	26.25
Rails and connexions	182,421	5,120,830	28.07	42,064	1,116,773	26.55
Pipe and fittings (a)	30,663	847,922	27.65	15,614	395,466	25.33
Nails and spikes	7,584	360,489	47.53	4,864	210,098	43.20
Wire (a)	70,712	3,688,660	52.16	66,280	3,205,635	48.37
Forgings, castings, and manufactures	32,604	2,090,533	64.12	20,339	1,375,590	67.63
Total	1,890,506	59,882,222	31.67	878,179	28,825,373	32.82
Other iron and steel products valued at	.....	85,344,750	.....	.....	51,238,306	.....
Total value of imports of iron and steel	.....	145,226,972	.....	.....	80,063,679	.....

(a) There are additional imports of pipe and wire included under "other iron and steel products."

Summary of Tonnage of Iron and Steel Imported 1909-1913.

(IN SHORT TONS.)

Material.	TWELVE MONTHS ENDING MARCH.				
	1909.	1910.	1911.	1912.	1913.
Pig-iron	58,591	159,506	270,102	201,112	291,904
Ferro-products and chrome steel	13,206	15,153	19,182	18,548	23,378
Ingots, blooms, billets, puddled bars, etc	8,887	36,819	48,395	89,190	86,745
Scrap iron and scrap steel	26,212	28,797	53,824	78,378	103,317
Plates and sheets	116,610	200,575	205,690	243,461	376,633
Tin plates and sheets	26,859	39,866	44,025	45,802	64,571
Bars, rods, hoops, bands, etc	73,261	117,159	183,865	195,139	278,878
Structural iron and steel	162,735	195,748	232,585	268,572	377,551
Rails and connexions	32,543	55,183	36,690	97,062	156,318
Pipe and fittings	18,309	16,705	28,831	26,627	40,987
Nails and spikes	1,611	3,476	3,374	7,201	11,420
Wire	39,375	68,211	64,850	69,597	80,846
Forgings, castings, and manufactures	14,394	18,093	24,523	27,668	47,195
Total	592,593	955,291	1,215,936	1,368,357	1,939,743

Annual Imports of Iron and Steel Products since 1895.

Year.	Value.	Year.	Value.
1895(a)	$ 8,684,024	1906(a)	$ 42,210,305
1896	10,206,759	1907*	44,739,403
1897	11,063,156	1908(b)	64,257,238
1898	16,340,992	1909	42,075,797
1899	19,463,329	1910	62,356,974
1900	27,926,766	1911	88,179,152
1901	25,023,453	1912	105,614,450
1902	31,591,488	1913(b)	148,579,272
1903	39,536,867	1913(c)	145,226,972
1904	40,449,175	1914	80,063,679
1905	40,820,233	1915	74,308,983
		1916(c)	129,090,248

*Nine months ending March, 1907.
(a) Twelve months ending June from 1895 to 1906 inclusive.
(b) Twelve months ending March from 1908 to 1913 inclusive.
(c) Twelve months ending December from 1913 to date.

Imports of Iron and Steel Goods Subject to Duty, 1915 and 1916.

Material.		Calendar Year, 1915.			Calendar Year, 1916.		
		Quantity	Value	Value per unit.	Quantity.	Value.	Value per unit.
Agricultural implements, n.o.p., viz.—							
Binding attachments	$	.....	$ 5,728	.....	.....	$ 1,408	.....
Cultivators and weeders and parts of	"	.....	43,089	.....	.....	43,451	.....
Drills, seed	No.	4,033	47,505	$ 11.78	9,610	89,754	$ 9.34
Farm, road, or field rollers	"	242	19,639	81.15	252	4,999	19.84
Forks, pronged	"	6,978	3,383	0.48	25,032	11,418	0.46
Harrows and parts of	$	.....	53,354	.....	.....	154,393	.....
Harvesters, self-binding	No.	3,041	330,602	108.71	6,185	714,876	115.58
Hay loaders	"	105	4,507	42.92	94	5,045	53.67
Hay tedders	"	48	1,302	27.13	8	302	37.75
Hoes	"	3,894	1,131	0.29	12,089	3,252	0.27
Horse rakes	"	997	18,749	18.81	1,237	28,022	22.65
Knives, hay or straw	"	2,530	834	0.31	4,817	2,323	0.48
Knives edging	"	230	87	0.38	2,656	712	0.27
Lawn mowers	"	10,486	41,149	3.92	9,001	38,574	4.29
Manure spreaders	"	487	31,063	63.78	1,080	71,262	65.98
Mowing machines	"	2,189	72,431	33.09	1,659	57,656	34.75
Ploughs and parts of	$	.....	524,124	.....	.....	1,060,602	.....
Post hole diggers	No.	2,862	2,538	0.89	3,808	2,950	0.77
Potato diggers	"	543	19,393	35.71	315	9,541	30.29
Rakes	"	9,878	2,473	0.25	11,127	2,558	0.23
Reapers	"	155	8,369	53.99	346	11,794	34.09
Scythes	Doz.	2,884	14,873	5.16	4,177	21,832	5.23
Sickles or reaping hooks	"	399	669	1.68	558	1,133	2.03
Snaths	"	241	1,037	4.30	292	1,301	4.46
Spades and shovels of iron or steel, n.o.p.	"	3,038	8,315	2.74	3,092	13,292	4.30
Spade and shovel blanks, and iron or steel cut to shape for the same	"	2,343	1,935	0.83	621	999	1.61
Parts of agricultural implements paying 12½, 17½ and 17½ per cent*	$	.....	90,310	.....	.....	173,176	.....
Parts of agricultural implements paying 12½, 17½, and 20 per cent, n.o.p.	"	.....	108,982	.....	.....	202,602	.....
All other agricultural implements, n.o.p.	"	.....	71,776	.....	.....	62,622	.....
Anvils and vises	"	.....	44,559	.....	.....	76,591	.....
Cart or wagon skeins or boxes	Tons	51·4	5,787	112.59	59.1	7,641	129.29
Springs, n.o.p., and parts thereof, of iron or steel, for railway, tramway, or other vehicles	$	.....	166,135	.....	.....	268,013	.....
Axles and axle parts, n.o.p., and axle blanks and parts thereof, of iron or steel for railway, tramway, or other vehicles	"	.....	751,344	.....	.....	1,699,319	.....
Bar iron or steel, rolled, whether in coils, bundles, rod or bars, comprising rounds, ovals, squares, and flats, n.o.p.	Tons	57,813	1,858,487	32.15	82,236.6	4,001,597	48.66
Butts and hinges, n.o.p.	$	.....	55,071	.....	.....	81,072	.....

*12½, 12½, and 12½ per cent from April, 1915.

Imports of Iron and Steel Goods Subject to Duty.—*Continued.*

Material.	Calendar Year, 1915.			Calendar Year, 1916.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Canada plates, Russia iron, terne plate, and rolled sheets of iron or steel coated with zinc spelter or other metal, of all widths or thicknesses, n.o.p. ..... Tons	9,363·3	$ 487,797	$ 52.10	14,017·3	$ 891,550	$ 63.60
Castings, iron or steel, n.o.p. ..... $	.....	994,956	.....	.....	1,061,668	.....
Castings, malleable iron, when imported by manufacturers of mowers, binders, harvesters and reapers for use exclusively in their own factories ..... $	.....	121,232	.....	.....	164,475	.....
Cast-iron pipe of every description ..... Tons	4,489	110,978	24.72	5,398·6	165,576	30.67
Cast scrap iron ..... "	5,136	53,778	10.47	1,225	19,134	15.62
Chain, coil chain, chain links, including repair links and chain shackles, of iron or steel, 1¼ of an inch. in diameter and over ..... "	343·8	31,191	90.72	203·5	25,044	123.07
Chains, coil chains and links, including repair links and chain shackles of iron or steel, n.o.p. ..... "	943·7	71,479	75.74	1,183	110,121	93.09
Chains, n.o.p. ..... $	.....	80,668	.....	.....	153,979	.....
Tacks, shoe ..... Tons	24	3,193	133.04	5·9	1,660	281.36
Nails, brads, spikes, and tacks of all kinds, n.o.p. ..... "	151·2	24,895	164.65	177·4	42,859	241.60
Engines, etc.—						
Locomotives for railways ..... No.	46	148,022	3,217.87	69	682,270	9,887.97
Locomotive parts ..... $	.....	80,519	.....	.....	130,279	.....
Motor cars for railways and tramways ..... No.	78	42,451	544.24	67	47,311	706.13
Engines, fire ..... "	13	55,785	4,291.15	5	7,720	1,544.00
Engines, gasoline and gas ..... "	20,981	2,786,559	132.81	39,856	4,306,003	108.04
Engines, steam ..... "	124	142,533	1,149.46	110	131,894	1,199.04
Boilers, steam and parts of ..... $	.....	86,839	.....	.....	234,877	.....
Boilers, n.o.p., and parts of ..... "	.....	117,657	.....	.....	216,881	.....
Fire extinguishing machines, including sprinklers for fire protection ..... "	.....	94,735	.....	.....	118,800	.....
Fittings, iron or steel, for iron or steel pipe of every description ..... "	.....	485,205	.....	.....	636,241	.....
Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction ..... Tons	4,070	267,644	65.70	944	111,526	118.14
Ferro-silicon, spiegeleisen and ferro-manganese ..... "	(a) 120	3,225	26.88	.....	.....	.....
Ferro-silicon, containing more than 15 per cent silicon ..... "	2	163	81.50	7·9	835	105.70
Ferro-silicon, containing not more than 15 per cent silicon ..... "	(b) 840	35,214	41.92	1,563·7	41,456	26.51
Spiegeleisen and ferro-manganese containing not more than 15 per cent manganese and other ferro-alloys, n.o.p. ..... "	156	44,972	288.28	547·4	437,587	799.39
Forgings of iron or steel of whatever size or shape, or in whatever stage of manufacture, n.o.p., and steel shafting turned, compressed or polished, and hammered, drawn or cold rolled iron or steel bars or shapes, n.o.p. ..... "	6,697·3	814,083	121.55	5,483·6	887,474	161.84
Hardware, viz., builders', cabinet-makers', upholsterers', harness-makers', saddlers', and carriage hardware, including curry-combs, n.o.p. ..... $	.....	524,876	.....	.....	668,622	.....
Horse, mule, and ox shoes ..... "	.....	23,318	.....	.....	33,997	.....
Iron or steel billets, weighing not less than 60 pounds per lineal yard ..... Tons	32,209·9	715,493	22.21	12,626·7	495,625	39.25
Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms, n.o.p., less finished than iron or steel bars, but more advanced than pig-iron except castings ..... "	10,979.9	316,814	28.85	7,946·7	385,816	47.29
Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched, or in any further stage of manufacture, than as rolled or cast, n.o.p. ..... $	.....	49,284	.....	.....	132,408	.....

Iron in pig	Tons	47,482	$ 624,200	$ 13.15	57,337	$1,128,557	$ 19.68
Iron in pig, charcoal	"	.....	.....	.....	793	16,593	20.92
Locks of all kinds	$	.....	181,597	.....	.....	296,431	.....
Machines, machinery, etc.—							
Automobiles and motor vehicles of all kinds	No.	6,210	4,223,233	680.07	12,897	8,056,716	702.23
Automobiles and motor vehicles, parts of	$	.....	3,696,267	.....	.....	6,481,703	.....
Cranes and derricks	No.	90	232,508	2,583.42	165	413,956	2,508.82
Dental engines, electric	"	59	5,571	94.42	131	12,186	93.02
Fanning mills	"	773	14,718	19.04	2,084	36,537	17.53
Grain crushers	"	193	6,579	34.09	157	4,750	30.25
Hay presses	"	143	36,843	257.64	239	61,720	258.24
Windmills and complete parts thereof	"	.....	38,845	.....	.....	57,143	.....
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, and percussion coal cutters	"	.....	300,544	.....	.....	583,991	.....
Portable machines:—							
Fodder or feed cutters	No.	947	33,868	35.76	1,510	51,392	34.03
Horse power for farm purposes	"	1	23	23.00	.....	.....	.....
Portable engines with boilers in combination and traction engines for farm purposes	"	497	870,756	1,752.02	2,140	2,668.239	1,246.84
Portable sawmills and planing mills	"	10	4,270	427.00	5	2,732	546.40
Steam shovels and electric shovels	"	25	99,681	3,987.24	15	58,212	3,880.80
Threshing machine separators	"	983	616,258	626.92	1,893	1,235,408	652.62
Threshing machine separators, parts of, including wind-stackers, baggers, weighers, and self-feeders for same, and finished parts thereof for repairs, when imported separately	$	.....	279,225	.....	.....	440,501	.....
All other portable machines, n.o.p., and parts of	"	.....	16,703	.....	.....	70,203	.....
Concrete mixing machines	No.	79	31,369	397.08	72	32,628	453.17
Sewing machines	"	14,814	328,582	22.18	18,010	377,329	20.95
Sewing machines, parts of	$	.....	92,613	.....	.....	146,787	.....
Adding machines	No.	590	134,894	228.63	1,253	262,540	209.53
Machines, typewriting	"	5,622	297,123	52.85	11,835	642,739	54.31
Machines specially designed for ruling, folding, binding, embossing, creasing, or cutting paper or cardboard, when for use exclusively by printers, bookbinders, and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood	$	.....	136,999	.....	.....	266,814	.....
Printing presses and lithographic presses	"	.....	224,551	.....	.....	364,789	.....
Type-making accessories for printing presses	"	.....	24,814	.....	.....	13,278	.....
Cement making machinery	"	.....	20,053	.....	.....	40,535	.....
Coal handling machinery	"	.....	36,764	.....	.....	90,398	.....
Paper and pulp mill machinery	"	.....	443,959	.....	.....	750,727	.....
Rolling mill machinery	"	.....	150,841	.....	.....	225,351	.....
Sawmill machinery	"	.....	137,086	.....	.....	169,250	.....
Machinery of a class or kind not made in Canada and parts thereof adapted for carding, spinning, weaving, braiding, or knitting fibrous material, when imported by manufacturers for such purpose	"	.....	843,040	.....	.....	1,518,080	.....
All machinery composed wholly or in part of iron or steel, n.o.p., and iron or steel integral parts of	"	.....	11,112,673	.....	.....	16,924,492	.....
Machines, washing, domestic	No.	7,120	61,838	8.69	9,169	137,752	15.02
Nails and spikes, composition and sheathing nails	Tons	45·4	2,601	57.29	23·2	2,969	127.97
Nails and spikes, cut (ordinary builders')	"	41·3	1,619	39.20	18	1,494	83.00
Railway spikes	"	798·7	25,102	31.43	644·6	31,828	49.38
Nails, wire of all kinds, n.o.p.	"	461·4	29,466	63.86	3,234·1	202,197	62.52

(a) Three months, January, February, March.
(b) Nine months, April to December inclusive.

Imports of Iron and Steel Goods Subject to Duty.—*Continued.*

Material.	Calendar year, 1915.			Calendar year, 1916.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Pumps, hand, n.o.p. ..... No.	21,630	$ 112,010	$ 5.18	26,209	$ 162,290	$ 6.19
Pumps, power and parts of ..... "	3,804	607,391	159.67	5,769	842,701	146.07
Iron and steel railway bars or rails of any form, punched or not, n.o.p., for railways which term for the purposes of this item shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers ..... Tons	10,420	297,598	28.56	11,227	344,802	30.71
Railway fish plates ..... "	1,790	69,677	38.93	2,106·8	97,819	46.43
Railway tie-plates ..... "	271	11,943	44.07	669	27,402	40.96
Rolled iron or steel angles, tees, beams, channels, girders and other rolled shapes or section, not punched or drilled or further manufactured than rolled, n.o.p. ..... "	32,770·7	859,989	26.24	46,052·2	2,269,857	49.29
Rolled iron or steel beams, channels, angles, and other rolled shapes of iron and steel, not punched, drilled or further manufactured than rolled, weighing not less than 35 pounds per lineal yard, not being square, flat, oval, or round shaped, and not being railway bars or rails ..... "	57,221·8	1,552,853	27.14	73,043	3,589,956	49.15
Rolled iron or steel hoop, band, scroll, or strip, 12 inches or less in width, No. 13 gauge and thicker, n.o.p. ..... "	3,152·3	103,006	32.68	3,765·2	188,872	50.16
Rolled hoop iron or hoop steel galvanized, No. 12 and 13 gauge ..... "	77·1	3,053	39.60	119	6,639	55.79
Rolled iron or steel, hoop, band, scroll, or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, n.o.p., including drawn iron or steel of this description for the manufacture of mats ..... "	11,365·7	518,920	45.66	16,152·7	1,140,091	70.58
Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled in grooves, n.o.p. ..... "	16,018·5	476,898	29.77	24,670·7	1,468,617	59.53
Rolled iron or steel plates not less than 30 in. in width and not less than ¼ in. in thickness, n.o.p. ..... "	22,610·9	701,933	31.04	28,241·4	1,562,178	55.32
Rolled iron or steel sheets, polished or not, No. 14 gauge and thinner, n.o.p. ..... "	37,349·9	1,596,213	42.74	57,883·5	3,602,610	62.24
Rolls of chilled iron or steel ..... "	96·3	5,445	56.54	111·5	9,464	84.88
Rolled iron wire rods in the coil of iron or steel not over ⅜ inch in diameter when imported by wire manufacturers for use in making wire in the coil in their own factories ..... "	69,653·9	1,641,728	23.57	64,831	3,008,719	46.41
Rolled round rods in the coil of iron or steel for the manufacture of chains ..... "	2,185·1	54,114	24.76	1,335·2	60,443	45.27
Sad or smoothing hatters' and tailors' irons, not plated ..... "	.....	3,563	.....	.....	6,899	.....
Safes, doors for safes and vaults ..... "	.....	41,799	.....	.....	62,426	.....
Screws, iron and steel, commonly called wood screws n.o.p., including lag or coach screws, plated or not, and machine or other screws n.o.p. ..... "	.....	52,497	.....	.....	177,962	.....
Scales, balances, weighing beams, and strength-testing machines of all kinds ..... "	.....	75,942	.....	.....	128,844	.....
Shafting, round, steel, in bars not exceeding 2½ in. diameter ..... Tons	1,173·7	50,015	42.61	3,396·2	251,964	74.19
Shafting, steel, turned compressed or polished ..... $	.....	12,599	.....	.....	23,113	.....
Sheets or plates of steel, cold rolled with sheared edges over 14 gauge, and not less than 1½ in. wide for the manufacture of mower bars, hinges, typewriters, and sewing machines ..... Tons	507·2	23,132	45.61	716·7	49,964	69.71
Sheets, flat, of galvanized iron or steel ..... "	17,863·2	1,119,524	62.67	10,667·4	919,089	86.16
Sheets, iron or steel, corrugated, galvanized ..... "	65·7	4,182	63.65	260·5	23,567	90.47
Sheets, iron or steal, corrugated, not galvanized ..... "	0.7	45	64.29	32.6	2,430	74.54
Skates, of all kinds, roller or other, and parts thereof ..... $	.....	31,920	.....	.....	31,063	.....

Skelp iron or steel, sheared or rolled in grooves, imported by manufacturers of wrought iron or steel pipe, for use exclusively in the manufacture of wrought iron or steel pipe in their own factories	Tons	100,616·4	$2,268,976	$ 22.55	72,021·9	$3,123,133	$ 43.36
Steel billets, n.o.p.	Tons	10,928·4	238,380	21.81	302·9	14,005	46.24
Stoves, of all kinds, for coal, wood, oil, spirits or gas	$	.....	253,194	.....	.....	340,494	.....
Stove urns of metal, and dovetails, chaplet and hinge tubes of tin for use in the manufacture of stoves	„	.....	9,801	.....	.....	16,861	.....
Switches, frogs, crossings, and intersections for railways	„	.....	39,417	.....	.....	109,650	.....
Tubing:—							
Wrought or seamless tubing, plain or galvanized, threaded and coupled or not, over 10 in. in diameter, n.o.p.	„	.....	112,692	.....	.....	91,683	.....
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4 in. but not exceeding 10 in. in diameter, n.o.p.	„	.....	74,893	.....	.....	263,723	.....
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4 in. or less in diameter, n.o.p.	„	.....	109,536	.....	.....	278,948	.....
Seamless steel tubing, valued at not less than 3½ cents per lb.	Tons	383·0	56,347	147.12	831·1	136,113	163.77
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements	$	.....	94	.....	.....	2,272	.....
Iron or steel pipe or tubing, plain or galvanized riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, n.o.p.	„	.....	181,607	.....	.....	300,268	.....
Iron or steel pipe, not built or lap welded, and wire bound wooden pipe, not less than 30 in. internal diameter when for use exclusively in alluvial gold mining	„	.....	597	.....	.....	.....	.....
Ware—Agate, granite, or enamelled iron or steel ware	„	.....	117,215	.....	.....	195,776	.....
Ware—Iron or steel hollow ware, plain black or coated, n.o.p., and nickel and aluminium kitchen or household hollow ware, n.o.p.	„	.....	150,063	.....	.....	138,890	.....
Wire ball ties	„	.....	5,401	.....	.....	6,523	.....
Wire bound wooden pipe, n.o.p.	„	.....	38	.....	.....	219	.....
Wire cloth or woven wire and netting of iron and steel	Tons	.....	204,055	.....	.....	200,230	.....
Wire, crucible cast steel, valued at not less than 6 cents per lb.	„	136·7	47,619	348.35	183·5	94,015	512.34
Wire screens, doors, and windows	$	.....	17,182	.....	.....	15,689	.....
Wire buckthorn strip fencing, woven wire fencing, and wire fencing, of iron and steel, n.o.p., not to include woven wire or netting made from wire, smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge	Tons	.....	29,778	.....	.....	43,562	.....
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered	$	.....	176,657	.....	.....	203,276	.....
Wire of iron and steel all kinds, n.o.p.	Tons	2,647·8	152,674	57.66	4,129·1	310,448	75.19
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, n.o.p.	„	.....	272,604	.....	.....	346,919	.....
Iron or steel nuts, rivets, or bolts with or without threads, nut, bolt, and hinge blanks, and T and strap hinges of all kinds, n.o.p.	„	1,780·2	156,960	88.17	2,618·3	429,602	164.08
Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets having been in actual use: crop ends of tin plate bars, blooms, and rails, the same not having been in actual use	„	5,911·7	71,859	12.16	10,301.2	160,267	15.56
Penknives, jack-knives, and pocket knives of all kinds	$	.....	94,585	.....	.....	195,425	.....
Knives and forks of steel, plated or not, n.o.p.	„	.....	150,145	.....	.....	206,105	.....
All other cutlery, n.o.p.	„	.....	314,813	.....	.....	437,855	.....
Guns, rifles, including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms	„	.....	484,149	.....	.....	624,738	.....
Bayonets, swords, fencing foils, and masks	„	.....	11,331	.....	.....	5,818	.....
Needles of any material or kind, n.o.p.	„	.....	146,480	.....	.....	233,204	.....
Steel, chrome steel	Tons	146·6	13,664	93.21	63·4	14,341	226.20
Steel plate, universal mill or rolled edge plates of steel over 12 in. wide, imported by manufacturers of bridges or of structural work, or for use in car construction	„	24,684·8	849,597	34.42	19,715·8	1,120,608	56.84
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels	„	1,794	47,368	26.40	2,431·1	99,463	40.91

Imports of Iron and Steel Goods Subject to Duty.—*Continued.*

Material.	Calendar year, 1915.			Calendar year, 1916.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Rolled iron or steel, or cast steel in bars, bands, hoops, scroll, or strip, sheet, or plate of any size, thickness, or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cents per pound	7,898·8	$1,104,073	$ 139·78	23,937·2	$3,656,337	$ 152·75
Steel balls adapted for use in bearings of machinery and vehicles	$	22,691			51,521	
Flat steel, cold rolled, not over ½ in. thick, for the manufacture of cups and cones for ball bearings	Tons 39·7	2,654	66.85	32·8	2,749	83.81
Steel wool	"	2,468			5,570	
Tools and implements—						
Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs, and track tools, picks, mattocks and eyes and poles for the same	"	22,995			41,444	
Axes	Doz. 1,549	8,363	5.40	1,931	12,353	6.40
Saws	$	80,996			107,554	
Files and rasps, n.o.p.	"	97,529			162,531	
Tools, hand of all kinds, n.o.p.	"	510,268			839,181	
Knife blades or blanks, and table forks of iron or steel, in the rough, not handled, filed, ground, or otherwise manufactured	"	126			658	
Manufactures, articles or wares of iron or steel, or of which iron and steel (or either) are the component materials of chief value, n.o.p.	"	5,458,284			8,014,718	
		62,842,171			107,863,317	

Imports of Iron and Steel Goods, Free of Duty, 1915 and 1916.

Materials.		Calendar year, 1915.			Calendar year, 1916.		
		Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Anchors for vessels	Tons	283·0	$ 27,669	$ 97.77	354·9	$ 39,747	$111.99
Canada plates, Russia iron, terne plates and rolled sheets of iron, or steel coated with zinc, spelter or other metal, of all widths or thicknesses, n.o.p.	"	2,190·8	115,003	52.49	524·3	42,976	81.97
Chain coil, coil chain links including repair links and chain shackles of iron or steel 1⅛ in. in diameter and over	"	50·3	3,939	78.31	50·2	4,293	85.52
Chain, malleable sprocket or link belting when imported by manufacturers of agricultural implements for use in the manufacture of such implements in their own factories	$	.....	89,781	.....	.....	159,122	.....
Cream separators, and steel bowls for	"	.....	208,855	.....	.....	348,186	.....
Cream separators—materials which enter into the construction and form part of, when imported by manufacturers of cream separators to be used in the manufacture thereof, and articles of metal for use in the manufacture of cream separator parts	"	.....	216,313	.....	.....	249,333	.....
Ferro-manganese and spiegeleisen containing over 15 per cent manganese	Tons	12,640	723,738	57.26	12,658	1,399,660	110.58
Gas buoys—The following articles and materials, when imported by manufacturers of automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16 in. in diameter; flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3 in. in diameter; acetylene gas lanterns and parts thereof, and tobin bronze in bars or rods	$	.....	10,160	.....	.....	23,237	.....
Gun barrels, in single tubes, forged, rough bored	"	.....	.....	.....	.....	.....	.....
Boiler plate of iron or steel not less than 30 in. in width, and not less than ¼ in. in thickness, for use exclusively in the manufacture of boilers	Tons	5,758·3	162,517	28.22	7,786·3	535,137	68.73
Flat galvanized iron or steel sheets	"	7,022·5	446,538	63.59	861·6	56,259	65.30
Rolled iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness, or width; galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cents per lb	"	1,663·1	380,135	228.57	3,922·5	1,141,871	291.11
Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, n.o.p.	"	2,130·3	118,107	55.44	1,344·9	109,708	81.57
Rolled iron or steel, hoop, band, scroll, or strip, No. 14 gauge or thinner, galvanized or coated with other metal or not, n.o.p.	"	144·5	9,334	64.60	57·1	6,104	106.90
Iron tubing, brass covered, not over 3 in. in diameter, and brass trimmings, not polished, lacquered or otherwise manufactured, when imported by manufacturers of iron or brass bedsteads, for use exclusively for the manufacture of such articles in their own factories	$	.....	137,635	.....	.....	228,068	.....
Iron tubing, brass covered, not over 2 in. in diameter, in the rough where imported by manufacturers for use only in their own factories, in the manufacture of towel bars, bath tub rails and clothes carriers	"	.....	82	.....	.....	406	.....
Iron tubing, lacquered or brass covered, not over 2 in. in diameter, brass covered rods and brass trimmings, when imported by manufacturers of carriage rails, for use exclusively in the manufacture of such articles in their own factories	"	.....	4,604	.....	.....	3,625	.....
Iron tubing, lacquered or brass covered, for manufacture of extension rods for windows	"	.....	5,756	.....	.....	6,295	.....
Iron or steel beams, sheets, plates, angles, knees, masts or parts thereof and cable chains for wooden, iron, steel or composite ships or vessels	Tons	12,102·7	352,394	29.16	20,093·7	1,061,706	52.84

Imports of Iron and Steel Goods Free of Duty.—*Continued.*

Material.		Calendar Year, 1915.			Calendar Year, 1916.		
		Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Iron and steel bands, strips or sheets, No. 14 gauge or thinner, coated, polished or not, and rolled iron or steel sections, not being ordinary square, flat or round bars, when imported by manufacturers of saddlery, hardware and hames, for use exclusively in the manufacture of such articles in their own factories	$	.....	$ 7,354	.....	.....	$ 50,485	.....
Locomotive and car wheel tires of steel in the rough	Tons	3,841·4	247,286	$ 64.37	9,624·1	900,553	$ 93.57
Manufactured articles of iron or steel or brass, which, at the time of their importation, are of a class or kind not manufactured in Canada, imported for use in the construction or equipment of ships or vessels	$	.....	237,376	.....	.....	193,240	.....
Scrap iron and scrap steel, old, and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada	Tons	429·3	1,977	4.61	47·5	350	7.37
Skelp iron or steel, sheared or rolled in grooves, not over 4¾ in. wide, for the manufacture of rolled iron tubes not over 1½ in. in diameter	„	935·3	24,204	25.88	1,648·7	79,579	48.27
Machinery:—							
Articles of metals as follows when for use exclusively in mining or metallurgical operations, viz: coal cutting machines, except percussion coal cutters, coal heading machines; coal augers; rotary coal drills; core drills; miners safety lamps and parts thereof, also accessories for cleaning, filling, and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc, and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not, machinery for extraction of precious metals by the chlorination or cyanide process; amalgam safes; automatic ore samplers; automatic feeders; retorts, mercury pumps, pyrometers; bullion furnaces; amalgam cleaners; blast furnace blowing engines; and integral parts of all machinery mentioned in this item; blowers of iron or steel for use in the smelting of ores, or in the reduction, separation, or refining of metals, rotary kilns, revolving roasters and furnaces of metal designed for roasting ore, mineral rock or clay; furnace slag trucks, and slag pots of a class or kind not made in Canada, buddles, vanners, and slime tables adapted for use in gold mining	$	.....	347,756	.....	.....	933,673	.....
Diamond drills and parts of, not to include motive power	„	.....	14,678	.....	.....	66,237	.....
Appliances of iron or steel, of a class or kind not made in Canada; and elevators and machinery of floating dredges, when for use exclusively in alluvial gold mining	„	.....	137,967	.....	.....	140,204	.....
Well-drilling, and apparatus of a class or kind not made in Canada for drilling for water, natural gas or oil, and for prospecting for minerals, not to include motive power	„	.....	8,017	.....	.....	3,478	.....
Briquette making machines	„	.....	1,176	.....	.....	1,604	.....
Newspaper printing presses, of not less value by retail than $1,500 each, of a class or kind not made in Canada	No.	33	180,349	5,465.12	60	318,054	5,300.90
Machinery or tools not manufactured in Canada up to the required standard necessary for any factory to be established in Canada for the manufacture of rifles for the Government of Canada	$	.....	572,850	.....	.....	203,958	.....
All materials, or parts in the rough, unfinished, and screws, nuts, bands, and springs and steel for rough, unfinished parts, to be used in rifles to be manufactured at any such factory for the Government of Canada	„	.....	653,950	.....	.....	730,865	.....
Machines, typecasting and typesetting and parts thereof, adapted for use in printing offices	„	.....	285,644	.....	.....	613,392	.....

Machinery of every kind, and structural iron and steel for use in the construction and equipment of factories for the manufacture of sugar from beet root	„	.....	$ 16,533	.....	.....	$ 434,490	.....
Machinery of a class or kind not made in Canada and parts thereof, for the manufacture of twine, cordage, or linen, or for the preparation of flax fibre	„	.....	15,240	.....	.....	42,627	.....
Machines, traction ditching (not being ploughs) adapted for tile drainage on farms, valued at retail at not more than $3,000 each, and parts of, for repairs	No.	31	79,953	$2,579.13	19	56,935	$2,996.58
Mouldboards or shares, or plough plates, land sides, and other plates for agricultural implements, when cut to shape from rolled plates of steel, but not moulded, punched, polished, or otherwise manufactured	Tons	4,140·5	217,723	52.58	6,033·2	435,204	72.13
Sewing machine attachments	$	.....	22,272	.....	.....	32,009	.....
Steel for manufacturing ball bearings	„	.....	.....	.....	.....	.....	.....
Steel balls adapted for use on bearings on machinery and vehicles	$	.....	3,912	.....	.....	445	.....
Steel, rolled, for saws and straw cutters, not tempered, or ground, nor further manufactured than cut to shape without indented edges	Tons	788·2	125,182	158.82	1,087·8	245,943	226.09
Steel strips, and flat steel wire when imported into Canada by manufacturers of buckthorn and plain strip fencing for use exclusively in their own factories in the manufacture thereof	$	.....	.....	.....	.....	.....	.....
Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo steel spring wire of Nos. 11 and 12 gauge, respectively, when imported by manufacturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles	Tons	807	37,322	46.25	1,585·9	100,376	63.29
Steel, crucible sheet, 11 to 16 gauge, 2½ in. to 18 in. wide for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories	„	278·4	19,904	71.49	744	77.971	104.80
Steel, No. 20 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufactures of such articles for exclusive use in the manufacture of such articles in their own factories	„	1·2	221	184·17	40·2	11,054	274.98
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, or corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories	„	364·2	50,818	139.53	479.6	75,522	157.47
Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-creepers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories	„	102·9	5,539	53.83	124	10,938	88.21
Steel No. 24 and 17 gauge, in the sheets 63 in. long and from 18 in. to 32 in. wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories	„	111·7	4,235	37.91	177.5	9,896	52.78
Steel springs for the manufacture of surgical trusses, when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories	„	0·3	264	880.00	.3	293	976.67
Rolled iron, and rolled steel nail rods, under half an inch in diameter, for the manufacture of horseshoe nails	„	906·3	38,131	42.07	950·7	42,426	44.63
Tin plates and sheets	„	45,164·8	2,883,951	63.85	57,542·5	5,221,163	90.74
Steel seamless tubing valued at not less than 3½ cents per pound	„	9·8	1,807	184.39	14	6,347	453.36
Steel rolled or drawn square tubing adapted for use in the manufacture of agricultural implements	$	.....	.....	.....	.....	.....	.....
Steel or iron tubes, rolled, not joined or welded, not more than 1½ in. in diameter, n.o.p	„	.....	21,654	.....	.....	60,450	.....
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers	„	.....	310,880	.....	.....	1,006,958	.....
Barbed fencing wire of iron or steel	Tons	11,499·6	526,347	45.77	27,934	1,800,447	64.45
Wire, crucible cast steel, valued at not less than 6 cents per pound	„	8·7	2,116	243.22	41·3	12,694	307.36

Imports of Iron and Steel Goods Free of Duty.—*Continued.*

Material.	Calendar Year, 1916.			Calendar Year, 1915.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge..... „	32,631·7	$1,233,572	$ 37.80	29,785·6	$1,727,852	$ 58·01
Wire rope for use exclusively for rigging of ships and vessels..... „	27·5	5,055	183.82	16	3,895	243.44
Wire, steel, valued at not less than 2¾ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope..... „	1,191·1	110,537	92.80	1,648·5	159,591	96.81
Total.....	.....	11,466,812	.....	.....	21,226,931	.....

A very large proportion of the imports of iron and steel into Canada having been derived from the United States, a record has been compiled from the annual report of Commerce and Navigation of the United States published at Washington, showing the exports of iron and steel goods from that country to Canada.

According to this authority there was exported to Canada from the United States during the twelve months ending June 30, 1916, 992,563 tons of iron and steel goods, valued at $39,723,162, together with other iron and steel goods, the weight of which is not given, valued at $55,442,713, or a total value of $95,165,875.

During the twelve months ending June 30, 1915, the corresponding exports to Canada were 596,323 tons of iron and steel goods valued at $19,-697,148, together with other iron and steel goods, the weight of which is not given, valued at $28,713,872, or a total value of $48,411,020.

During the twelve months ending June 30, 1914, the exports to Canada were 1,169,349 tons of iron and steel goods, valued at $35,921,812, together with other iron and steel goods of which the weight is not given, valued at $40,780,471, or a total value of $76,702,283.

During the twelve months ending June 30, 1913, exports to Canada were 1,695,916 tons of iron and steel goods, valued at $51,936,616, together with other iron and steel goods of which the weight is not given, valued at $54,673,774, or a total value of $106,610,390.

During the twelve months ending June 30, 1912, exports to Canada were 1,175,464 tons, valued at $36,637,305, together with other iron and steel goods, valued at $46,020,989, or a total value of $82,658,294.

Exports of Iron and Steel to Canada from the United States.

Material.		Twelve months ending June, 1914.			Twelve months ending June, 1915.			Twelve months ending June, 1916.		
		Quantity.	Value.	Average.	Quantity.	Value.	Average.	Quantity.	Value.	Average.
Bar iron	Short Tons	6,544·2	$ 308,248	$47.10	2,393·0	$ 81,766	$ 34.17	5,056·8	$ 220,944	$43·69
Bars or rods of steel—										
Wire rods	"	63,108·3	1,617,939	25.64	40,961·9	937,836	22.90	77,491·4	2,200,402	28.40
All others	"	92,791·8	3,019,274	32·54	67,146·9	2,111,489	31·45	126,995·7	5,321,000	41.90
Billets, ingots, and blooms of steel	"	24,243·5	487,089	20.09	18,426·2	394,946	21.43	103,708·6	3,733,393	36.00
Bolts, nuts, rivets and washers	"	2,603·4	181,072	69.55	1,229·2	90,572	73.68	3,725·7	262,987	70.59
Hoop, band and scroll	"	9,157·1	376,999	41.17	7,114·9	299,668	42.12	11,786·4	654,689	55.55
Horseshoes	"	248·3	22,941	92.21	196·9	20,425	103.73	228·7	20,262	88.60
Nails and spikes—										
Cut	"	21·3	932	43.76	.....	.....	.....	6·7	420	62.69
Railroad spikes	"	3,543·2	121,999	34.43	1,393·9	42,102	30.20	741·1	30,474	47.12
Wire	"	1,342·3	62,046	46.22	1,054·8	52,689	49.95	1,122·8	66,582	59.30
All others, including tacks	"	398·2	34,164	85.80	213·5	19,635	91.97	247·4	19,724	79.73
Pig-iron	"	140,510·7	1,782,862	12.69	43,176·0	602,058	13·94	100,581·6	1,821,273	18·11
Pipes and fittings—										
Cast	"	(a)52,674·8	2,732,573	51.88	11,779·1	532,690	45.22	4,780·2	308,972	64.64
Wrought	"	.....	.....	.....	14,980·1	862,476	57.57	11,221·9	830,258	73.99
Radiators and cast-iron heating boilers	"	5,722·7	401,980	70.24	2,615·3	180,640	69.07	1,406·6	116,772	83.02
Rails for railways	"	129,545·9	3,415,167	26·36	8,597·1	230,111	26.77	12,438·7	369,650	29.72
Scrap and old, fit only for remanufacture	"	49,570·0	577,917	11.66	9,962·4	114,542	11.50	24,062·0	381,719	15.86
Sheets and plates—										
Iron, galvanized	"	26,827·5	1,595,003	59.45	24,779·9	1,471,841	59.40	27,116·8	2,309,193	85.16
Iron, all other	"	9,763·2	434,525	44.51	6,169·1	280,524	45.47	18,218·2	888,303	48.76
Steel, plates	"	141,842·1	4,245,763	29.93	77,580·4	2,253,580	29·05	134,831·7	5,113,976	37.93
Steel, sheets	"	97,516·2	3,014,796	30.92	66,360·2	1,922,088	28·96	79,206·6	3,113,493	39.31
Structural iron and steel	"	224,666·4	6,990,022	31.01	94,545·9	2,535,404	26.82	123,958·2	4,284,757	34.57
Tin plates, terne plates, and taggers tin	"	36,582·3	2,513,867	68.72	38,299·5	2,445,529	63.85	58,682·1	3,979,069	67.81
Wire and manufacture of:—										
Wire, barbed	"	12,688·9	508,337	40.06	15,027·9	603,083	40.13	21,786·2	1,362,125	62.52
Wire, all other	"	37,436·5	1,476,297	39.43	42,319·3	1,611,454	38.08	43,161·0	2,312,725	53.58
		1,169,349·3	35,921,812	30.72	596,323·4	19,697,148	33.03	992,563·1	39,723,162	40.02
Builders' hardware and tools—										
Locks	$		303,601	.....	.....	180,917	.....	.....	246,585	.....
Hinges and other builders' hardware	"	.....	1,365,987	.....	.....	1,065,804	.....	.....	1,409,414	.....
Car wheels	No.	11,696	108,174	9.25	3,976	54,089	13.60	16,903	370,183	21.90
Castings, not elsewhere specified	$	.....	1,626,211	.....	.....	692,678	.....	.....	1,291,456	.....
Cutlery—										
Razors	"	.....	39,099	.....	.....	45,675	.....	.....	158,826	.....
Table	"	.....	31,870	.....	.....	24,778	.....	.....	50,169	.....
All other	"	.....	102,870	.....	.....	118,581	.....	.....	311,566	.....
Enamelware—										
Baths, tubs	No.	1,718	25,090	14.60	916	11,905	13.00	862	9,755	11.32
Lavatories and sinks	$	.....	158,889	.....	.....	76,965	.....	.....	31,844	.....
All other	"	.....	140,664	.....	.....	105,069	.....	.....	177,440	.....

Firearms	"	.....	$ 529,528	.....	.....	$ 823,404	.....	.....	$3,019,690	.....
Machinery, machines and parts of—											
Adding machines	No.	2,472	405,125	$ 163.89	646	132,192	$ 204.63	917	166,810	$ 181.91
Air-compressing machinery	$	.....	224,275	.....	.....	94,703	.....	.....	172,446	.....
Brewers' machinery	"	.....	189,008	.....	.....	29,503	.....	.....	2,178	.....
Cash registers	No.	848	90,145	106.30	412	35,852	87.02	412	25,942	61.62
Cash registers, parts of	$	.....	(b).....	.....	.....	71,383	.....	.....	61,959	.....
Cotton gins	No.	.....	.....	.....	.....	.....	.....	1	475	475.00
Cream separators	"	7,518	287,242	38.21	5,142	151,374	29.44	15,862	396,786	25.01
Elevators and elevator machinery	$	.....	468,800	.....	.....	147,032	.....	.....	99,463	.....
Laundry machinery—										
Power	"	.....	119,491	.....	.....	56,036	.....	.....	58,470	.....
All other	"	.....	49,153	.....	.....	38,694	.....	.....	42,706	.....
Lawn mowers	"	.....	49,902	.....	.....	40,130	.....	.....	33,914	.....
Metal working machinery (including metal working machine tools)	"	.....	1,199,356	.....	.....	1,813,188	.....	.....	6,464,332	.....
Meters, gas and water	"	.....	(b).....	.....	.....	102,089	.....	.....	106,429	.....
Milling machinery (flour and grist)	"	.....	197,029	.....	.....	168,988	.....	.....	115,898	.....
Mining machinery—										
Oil-well machinery	"	.....	.....	.....	.....	247,244	.....	.....	43,736	.....
All other	"	.....	1,210,884	.....	.....	587,092	.....	.....	782,718	.....
Paper-mill machinery	"	.....	317,317	.....	.....	466,280	.....	.....	457,444	.....
Printing presses and parts of	"	.....	770,417	.....	.....	376,510	.....	.....	399,295	.....
Pumps and pumping machinery	"	.....	723,447	.....	.....	615,903	.....	.....	936,689	.....
Refrigerating machinery, ice-making machinery, etc.	"	.....	199,540	.....	.....	95,326	.....	.....	85,198	.....
Sewing machines and parts of	"	.....	412,422	.....	.....	335,368	.....	.....	480,687	.....
Shoe machinery	"	.....	192,035	.....	.....	130,437	.....	.....	113,884	.....
Steam and other power engines and parts of—										
Electric locomotives	No.	12	27,623	2,301.92	18	109,513	6,084.06	16	71,633	4,477.06
Gas, stationary	"	1,097	143,546	130.85	804	83,342	103.66	678	58,109	85.71
Gasoline, automobile	"	353	71,070	201.33	465	70,597	151.82	8,426	1,094,354	129.88
" marine	"	1,747	302,391	173.09	1,042	147,730	141.28	1,761	1,780,873	1,011.26
" stationary	"	9,885	1,009,443	102.12	8,221	607,830	73.94	20,492	1,533,568	74.84
" traction	"	382	637,162	1,667.96	252	281,867	1,118.52	689	693,328	1,006.28
Steam, locomotives	"	86	502,253	5,840.15	23	111,063	4,828.83	41	333,318	8,129.71
" marine	"	35	100,857	2,881.63	6	34,774	5,795.67	20	7,184	359.20
" stationary	"	236	189,786	804.18	113	103,137	912.71	173	142,049	821.09
" traction	"	228	388,477	1,703.85	59	106,753	1,809.37	76	159,211	2,094.88
Engines, all other	"	1,336	444,255	332.53	1,167	541,992	464.43	2,396	2,200,501	918.41
All other engines and parts of	$	.....	988,735	.....	.....	868,602	.....	.....	2,162,951	.....
Sugar-mill machinery	"	.....	186,567	.....	.....	38,387	.....	.....	72,277	.....
Textile machinery	"	.....	670,799	.....	.....	385,901	.....	.....	1,146,455	.....
Typesetting machines, linotypes and others	"	.....	506,459	.....	.....	258,274	.....	.....	410,202	.....
Typewriting machines and parts of	"	.....	602,792	.....	.....	259,826	.....	.....	466,600	.....
Windmills and parts of	"	.....	72,099	.....	.....	47,949	.....	.....	39,480	.....
Woodworking machinery, sawmill machinery	$	.....	221,283	.....	.....	171,678	.....	.....	135,962	.....
Woodworking machinery, all other	"	.....	511,400	.....	.....	177,877	.....	.....	161,777	.....
All other, and parts of	"	.....	10,095,534	.....	.....	7,297,541	.....	.....	8,892,411	.....
Railway track material (except rails and spikes) such as switches, frogs, fish plates, splice-bars, etc.	"	.....	793,134	.....	.....	260,981	.....	.....	348,554	.....
Safes	No.	3,070	135,612	44.17	1,571	57,469	36.58	1,050	40,483	38.56

Exports of Iron and Steel to Canada from the United States.—*Continued.*

Material.		Twelve months ending June, 1914.			Twelve months ending June, 1915.			Twelve months ending June, 1916.		
		Quantity.	Value.	Average.	Quantity.	Value.	Average.	Quantity.	Value.	Average.
Scales, and balances	$	.....	$ 134,191	.....	.....	$ 80,265	.....	.....	$ 93,874	.....
Stoves, ranges and parts of	"	.....	975,460	.....	.....	450,837	.....	.....	413,067	.....
Tools not elsewhere specified—										
Axes	No.	70,548	38,493	$0.55	20,183	11,288	$ 0.56	13,048	6,724	$ 0.52
Hammers and hatchets	$	.....	38,979	.....	.....	12,843	.....	.....	14,931	.....
Saws	"	.....	234,721	.....	.....	142,507	.....	.....	295,021	.....
Shovels and spades	"	.....	14,087	.....	.....	19,067	.....	.....	10,074	.....
All other	"	.....	1,371,832	.....	.....	925,052	.....	.....	1,351,872	.....
Wire manufactures—woven wire fencing	"	.....	93,370	.....	.....	112,226	.....	.....	117,340	.....
Wire manufactures—all others	"	.....	365,327	.....	.....	333,556	.....	.....	625,739	.....
All other manufactures of steel	"	.....	7,375,163	.....	.....	5,667,959	.....	.....	12,437,404	.....
		.....	40,780,471	.....	.....	28,713,872	.....	.....	55,442,713	.....
Total value		.....	76,702,283	.....	.....	48,411,020	.....	.....	95,165,875	.....

*Compiled from Commerce and Navigation of the United States, Washington, D.C.

(a) Not separately stated.

(b) Included in all other machinery and parts of.

LEAD.

The production of lead in Canada in 1916 amounted to 41,497,615 pounds valued at $3,532,692, as compared with 46,316,450 pounds valued at $2,593,721 in 1915, a decrease of 10·4 per cent in quantity, but an increase of 40·0 per cent in value.

The statistics of lead production since 1909 as given in the accompanying table represent the quantity of refined lead produced in Canada from domestic ores, together with a small quantity of lead contained in lead ores or bullion exported. The production has been mainly from British Columbia with occasional small amounts from other provinces and the Yukon Territory.

Annual Production of Lead.

Year.	Pounds.	Cents per pound.	Value.	Year.	Pounds.	Cents per pound.	Value.
1887.....	204,800	5·400	$ 9,216	1902.....	22,956,381	4·069	$ 934,095
1888.....	674,500	4·420	29,812	1903.....	18,139,283	4·237	768,562
1889.....	165,100	3·930	6,488	1904.....	37,531,244	4·309	1,617,221
1890.....	105,000	4·480	4,704	1905.....	56,864,915	4·707	2,676,632
1891.....	88,665	4·350	3,857	1906.....	54,608,217	5·657	3,089,187
1892.....	808,420	4·090	33,064	1907.....	47,738,703	5·325	2,542,086
1893.....	2,135,023	3·730	79,636	1908.....	43,195,733	4·200	1,814,221
1894.....	5,703,222	3·290	187,636	1909.....	45,857,424	*3·690	1,692,139
1895.....	16,461,794	3·230	531,716	1910.....	32,987,508	*3·687	1,216,249
1896.....	24,199,977	2·980	721,159	1911.....	23,784,969	†3·480	827,717
1897.....	39,018,219	3·580	1,396,853	1912.....	35,763,476	†4·467	1,597,554
1898.....	31,915,319	3·780	1,206,399	1913.....	37,662,703	†4·659	1,754,705
1899.....	21,862,436	4·470	977,250	1914.....	36,337,765	†4·479	1,627,568
1900.....	63,169,821	4·370	2,760,521	1915.....	46,316,450	†5·600	2,593,721
1901.....	51,900,958	4·334	2,249,387	1916.....	41,497,615	†8·513	3,532,692

*In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*, in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.

†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

For a number of years there has been a very wide divergence between the record of lead recovery and the statements of lead contained in ores shipped from the mines. While the difference is due in part to smelter losses, there was also, during 1912 and 1913 especially, a considerable accumulation of lead ores at the Trail smelter. In 1915, however, the recovery of lead in smelters was but little less than that contained in ores shipped from mines, apparently indicating a reduction in stocks of ores at the smelter, but in 1916 the metal contents of lead ores shipped from mines exceeded by far the recovery in smelter.

Ores Shipped and Metal Contents.

Year.	Lead ores shipped in tons.	Lead contents in pounds.	Silver contents in ounces.
1912	59,814	45,896,537	2,366,294
1913	85,978	53,807,570	2,564,155
1914	70,207	50,527,130	2,501,820
1915	88,647	48,708,005	2,954,175
1916	84,516	54,124,628	2,582,952

Previous to 1904 lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Betts electrolytic process has been in operation at Trail, B.C., since 1904, treating the base bullion produced by the lead blast furnaces.

The North American Smelting Company erected a plant at Kingston, Ontario, which started operations during the latter part of 1912, treating scrap and lead dross, as well as ores from the United States, British Columbia, and Ontario. This plant closed down November 1, 1913, but operations were resumed during the latter part of 1916 by the Kingston Smelting Co., Ltd., under lease.

The Estate of James Robertson, operating the Kingdon Lead Mine at Galetta, put in a 20-ton open-hearth lead furnace which was operated in October and November, 1916.

Refined Lead Produced.

Year.	Pounds of refined lead produced.	Year.	Pounds of refined lead produced.	Year.	Pounds of refined lead produced.
1904	7,519,440	1909	41,883,614	1913	39,663,766
1905	15,804,509	1910	32,987,508	1914	36,443,706
1906	20,471,314	1911	23,525,050	1915	43,518,618
1907	26,607,461	1912	37,008,490	1916	43,100,236
1908	36,549,274				

*The refined lead reported includes also that from foreign ores.

Prices.—The average price for soft lead in 1916 on the London market was £30 19s 6d, as compared with £22 17s 10d in 1915, and £18 13s 9d in 1914.

The price of lead at Montreal, the main Canadian market, has been higher than the New York and London values for the past four years. The average price of lead at Montreal in 1916 was 8·513 cents per pound, as against 6·858 cents in New York, 6·777 cents in St. Louis, and 6·715 cents in London. In 1915 the Montreal price was 5·600 cents per pound, as against 4·673 cents in New York, 4·567 cents in St. Louis, and 4·979 cents in London.

The Toronto price in winter is about the same as that at Montreal, but the latter falls during the period of summer freight rates, about 10 cents per 100 pounds below the former.

Yearly Average Prices of Lead in Montreal, London, New York, and St. Louis.

(Values in cents per pound.)

	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Montreal	3·246	3·480	4·467	4·659	4·479	5·600	8·513
London	2·775	2·992	3·921	4·072	4·146	4·979	6·715
New York	4·446	4·420	4·471	4·370	3·862	4·673	6·858
St. Louis	4·312	4·286	4·360	4·238	3·737	4·567	6·777

Monthly Average Prices of Pig-Lead at Montreal.*

(Values in cents per pound.)

Month.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	4·94	3·67	3·35	3·48	3·31	3·93	4·32	4·78	4·27	7·29
February	4·88	3·60	3·38	3·40	3·32	3·97	4·18	4·73	4·58	7·73
March	4·92	3·54	3·42	3·34	3·34	4·03	4·05	4·57	5·04	9·25
April	4·92	3·44	3·35	3·21	3·26	4·10	4·42	4·41	5·21	9·60
May	4·84	3·21	3·26	3·13	3·20	4·08	4·66	4·54	5·26	9·10
June	4·93	3·11	3·23	3·15	3·27	4·34	4·98	4·55	6·53	8·48
July	4·98	3·17	3·12	3·13	3·33	4·57	4·93	4·49	6·35	7·79
August	4·69	3·31	3·08	3·11	3·45	4·84	5·02	4·48	5·62	7·76
September	4·85	3·24	3·14	3·11	3·63	5·47	5·02	4·42	5·63	8·41
October	4·56	3·29	3·26	3·23	3·77	5·07	4·99	4·07	5·71	8·61
November	4·25	3·42	3·28	3·31	3·93	4·53	4·82	4·29	6·39	8·72
December	3·65	3·37	3·34	3·35	3·95	4·55	4·52	4·41	6·61	9·42
Average	4·701	3·364	3·268	3·246	3·480	4·467	4·659	4·479	5·600	8·513

*Producers' prices for car-load quantities ex-cars Montreal as furnished by Messrs. Thos. Robertson Co., Ltd., of Montreal.

Monthly Average Prices of Lead in New York.†

(Values in cents per pound.)

Month.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	4·552	5·600	6·000	3·691	4·175	4·700	4·483	4·435	4·321	4·111	3·729	5·921
February	4·450	5·465	6·000	3·725	4·018	4·613	4·440	4·026	4·325	4·048	3·827	6·246
March	4·470	5·350	6·000	3·838	3·986	4·459	4·394	4·073	4·327	3·970	4·053	7·136
April	4·500	5·404	6·000	3·993	4·168	4·376	4·412	4·200	4·381	3·810	4·221	7·630
May	4·500	5·685	6·000	4·253	4·287	4·315	4·373	4·194	4·342	3·900	4·274	7·463
June	4·500	5·750	5·760	4·466	4·350	4·343	4·435	4·392	4·325	3·900	5·932	6·936
July	4·524	5·750	5·288	4·447	4·321	4·404	4·499	4·720	4·353	3·891	5·659	6·352
August	4·665	5·750	5·250	4·580	4·363	4·400	4·500	4·569	4·624	3·875	4·656	6·244
September	4·850	5·750	4·813	4·515	4·342	4·400	4·485	5·048	4·698	3·828	4·610	6·810
October	4·850	5·750	4·750	4·351	4·341	4·400	4·265	5·071	4·402	3·528	4·600	7·000
November	5·200	5·750	4·376	4·330	4·370	4·442	4·298	4·615	4·293	3·683	5·155	7·042
December	5·422	5·900	3·658	4·213	4·560	4·500	4·450	4·303	4·047	3·800	5·355	7·513
Average	4·707	5·657	5·325	4·200	4·273	4·446	4·420	4·471	4·370	3·862	4·673	6·858

†From the *Engineering and Mining Journal.*

Monthly Average Prices of Lead in London.‡

(In £ Sterling per ton of 2,240 pounds.)

Month.	1907.	1908.	1909.	1910.	1911.
January	19 16 0	14 10 6	13 3 6	13 3 11	13 0 8
February	19 11 8	14 5 6	13 5 5	13 7 3	13 1 11
March	19 14 6	14 1 4	13 8 8½	13 2 9	13 2 11
April	19 16 7	13 13 10	13 7 0	12 13 9	12 18 5
May	19 17 7	13 2 7	13 5 3	12 11 8	12 19 2
June	20 6 0	12 15 7	13 2 4	12 13 9	13 5 5
July	20 8 2	12 19 6	12 13 3	12 11 8	13 10 11
August	19 0 3	13 9 10½	12 10 6	12 10 10	14 1 4
September	19 17 6	13 3 6	12 15 3	12 12 6	14 15 1
October	18 13 0	13 7 3	13 4 4	13 2 0	15 6 1
November	17 4 11	13 12 2	13 1 4½	13 4 6	15 15 5
December	14 9 4	13 3 6	13 2 11½	13 3 9	15 13 4
Yearly average	19 1 10	13 10 5	13 1 8	12 19 0	13 19 3

Month.	1912.	1913.	1914.	1915.	1916.
January	15 11 3	17 1 11	18 19 10	18 12 0	30 17 5
February	15 13 9	16 8 5	19 2 8	19 3 7	31 18 9
March	15 19 8	15 19 8	19 2 3	21 17 8	34 7 8
April	16 6 6	17 8 10	17 19 8	21 2 1	34 8 0
May	16 10 2	18 14 3	18 4 8	20 9 2	32 19 5
June	17 11 8	19 10 8	18 13 11	25 4 1	30 14 0
July	18 8 9	19 7 10	18 8 6	24 12 3	27 8 11
August	19 5 8	19 15 8	20 9 9	21 18 11	29 2 7
September	21 9 0	19 14 10	18 16 3	23 3 0	29 17 4
October	20 8 0	19 9 5	17 9 8	23 19 9	30 0 0
November	18 4 7	18 13 9	17 19 9	26 2 9	30 0 0
December	18 1 6	17 8 8	18 18 6	28 8 8	30 0 0
Yearly average	17 15 11	18 6 2	18 13 9	22 17 10	30 19 6

‡As published by the Metal Information Bureau, London.

Exports.—The exports of lead in 1916 amounted to 9,160,500 pounds, valued at $565,890, and consisted of pig-lead 112,100 pounds, valued at $7,710, and lead in ores, concentrates, bullion, etc., 9,048,400 pounds, valued at $558,180. A few thousand tons of base bullion were exported from Trail, B.C., for refining in the United States, which fact explains the large increase in exports for 1916.

The exports in 1915 amounted to 3,912,029 pounds, valued at $119,340, and consisted of pig-lead 2,066,929 pounds, valued at $79,067, and lead in ore, concentrates, etc., 1,845,100 pounds, valued at $40,273.

Exports of Lead, 1910 to 1916.

	Lead in ore, concentrates, etc.		Pig-lead.	
	Pounds.	Value.	Pounds.	Value.
1910—To United States	46,800	$ 1,308	59,605	$ 2,295
" " Other countries	.....	.....	7,652,648	245,879
1911— " United States	65,100	1,826	71,961	2,806
1912— " " "	299,240	8,193	.....	.....
1913— " " "	329,960	9,136	.....	.....
1914— " " "	246,100	2,681	510,573	19,507
1915— " " "	1,845,100	40,273	47,540	1,494
" " Newfoundland	.....	.....	1,600	40
" " Other countries	.....	.....	2,017,789	77,533
1916— " United States	9,048,400	558,180	7,500	300
" " Other countries	.....	.....	104,600	7,410
Total for 1916	9,048,400	$558,180	112,100	$7,710

Exports of Lead, 1873 to 1916.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1873	.....	$1,993	1888	.....	$ 18	1903	18,624,303	$ 426,466
1874	.....	127	1889	.....	18	1904	25,868,823	559,461
1875	.....	7,510	1890	.....	.....	1905	41,657,403	1,046,541
1876	.....	66	1891	.....	5,000	1906	21,436,022	736,007
1877	.....	720	1892	.....	2,509	1907	25,591,883	1,029,898
1878	.....	.....	1893	.....	3,099	1908	18,454,594	622,454
1879	.....	230	1894	5,792,700	144,509	1909	17,528,028	493,642
1880	.....	.....	1895	23,075,892	435,071	1910	7,759,053	249,487
1881	.....	.....	1896	26,480,320	462,095	1911	137,061	4,632
1882	.....	32	1897	43,802,697	925,144	1912	299,240	8,193
1883	.....	5	1898	37,375,678	885,485	1913	329,960	9,136
1884	.....	36	1899	15,799,518	466,950	1914	756,673	22,188
1885	.....	.....	1900	57,642,029	1,917,690	1915	3,912,029	119,340
1886	.....	.....	1901	45,590,995	1,804,687	1916	9,160,500	565,890
1887	.....	724	1902	17,761,484	457,170			

Imports.—The imports of lead in 1916 were 13,580 tons, valued at $2,077,896, and included certain manufactures of lead, valued at $155,278, for which no equivalent quantity is given.

In 1915 the imports were 24,369 tons, valued at $2,482,916, and included manufactures of lead valued at $102,439.

Imports of Lead, 1914, 1915, and 1916.

	1914.		1915.		1916.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Old scrap, pig and block	7,722	$590,557	21,308	$2,010,006	9,933	$1,258,284
Bars and sheets	481	41,244	456	56,331	492	85,686
Pipe	283	26,282	73	8,708	109	21,450
Shot and bullets	90	10,542	543	51,890	39	6,390
Manufactures of lead (*a*)	.....	99,285	.....	102,439	.....	155,278
Tea lead	844	108,097	480	67,652	1,073	198,541
Litharge	543	52,525	790	89,232	1,384	211,359
Total	9,963	928,532	23,650	2,386,258	13,030	1,936,988
Metallic lead contained in imported lead pigments	961	114,006	719	96,658	550	140,908
	10,924	1,042,538	24,369	2,482,916	13,580	2,077,896

(*a*) Includes nitrate and acetate of lead in 1915, 250,921 pounds valued at $23,269 and in 1916, 224,648 pounds valued at $30,445.

Imports of Lead in Pigs, Bars, Sheets, Etc.

Fiscal Year.	Old, scrap, and pig.		Average price.	Bars, blocks, sheets.		Average price.	Total.	
	Cwt.	Value.		Cwt.	Value		Cwt.	Value.
1880							30,298	$124,117
1881	16,236	$ 56,919	$3.51	18,222	$70,744	$3.88	34,458	127,663
1882	36,655	120,870	3.30	10,540	35,728	3.39	47,195	156,598
1883	48,680	148,759	3.06	8,591	28,785	3.35	57,371	177,544
1884	39,409	103,413	2.62	9,704	28,458	2.93	49,113	131,871
1885	36,106	87,038	2.41	9,362	24,396	2.61	45,468	111,434
1886	39,945	110,947	2.78	9,793	28,948	2.96	49,738	139,895
1887	61,160	173,477	2.84	14,153	41,746	2.95	75,313	215,223
1888	68,678	196,845	2.87	14,957	45,900	3.06	83,635	242,745
1889	74,223	213,132	2.87	14,173	43,482	3.07	88,396	256,614
1890	101,197	283,096	2.80	19,083	59,484	3.12	120,280	342,580
1891	86,382	243,033	2.81	15,646	48,220	3.08	102,028	291,253
1892	97,375	254,384	2.61	11,299	32,368	2.86	108,674	286,752
1893	94,485	215,521	2.28	12,403	32,286	2.60	106,888	247,807
1894	70,223	149,440	2.13	8,486	20,451	2.41	78,709	169,891
1895	67,261	139,290	2.07	6,739	16,315	2.42	74,000	155,605
1896	72,433	173,162	2.39	8,575	23,169	2.70	81,008	196,331
1897	65,279	158,381	2.43	10,516	29,175	2.77	75,795	187,556
	Old, scrap, pig, and block.*			Bars, and sheets.†			Total.	
1898	88,420	$ 260,779	$2.95	22,214	$39,041	$1.76	110,634	$299,820
1899	114,659	283,432	2.47	44,796	39,833	0.89	159,455	323,265
1900	62,361	207,819	3.33	15,493	53,506	3.45	77,854	251,325
1901	(a) 85,321	97,011	1.14	16,295	78,316	4.81	101,616	175,327
1902	(a) 122,279	104,672	0.86	18,596	49,261	2.65	140,875	153,933
1903	(a) 98,530	67,821	0.69	11,535	35,398	3.07	110,065	103,219
1904	(a) 94,602	121,165	1.28	14,102	39,644	2.81	108,704	160,809
1905	(a) 57,074	133,775	2.34	17,792	51,972	2.92	74,866	185,747
1906	82,729	271,105	3.28	16,106	57,185	3.55	98,835	328,290
Calendar Year.								
1907	79,673	363,655	4.56	19,177	86,338	4.50	98,850	449,993
1908	49,825	155,513	3.12	14,402	49,527	3.44	64,227	205,040
1909	112,980	184,572	1.63	13,412	44,071	3.29	126,392	228,645
1910	120,591	346,516	2.87	17,697	45,674	2.58	138,288	392,190
1911	199,774	495,923	2.48	30,837	55,458	1.80	230,611	551,381
1912	281,787	940,583	3.34	19,212	93,702	4.88	300,999	1,034,285
1913	111,995	464,117	4.14	14,944	62,527	4.18	126,939	526,644
1914	154,441	590,557	3.82	9,615	41,244	4.29	164,056	631,801
1915	426,162	2,010,006	4.72	9,125	56,331	6.17	435,287	2,066,337
1916	198,658	1,258,284	6.33	9,850	85,686	8.70	208,508	1,343,970

*Duty 15 per cent.
†Duty 25 per cent.
(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

Imports of Lead Manufactures.

Calendar Year.	Pipe Lead.		Shot and Bullets.		Tea Lead.		Other manufactures of lead.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Value.
1910	403,012	$15,365	6,903	$ 311	2,371,136	$117,399	$107,688
1911	512,737	19,426	8,912	1,053	2,688,211	134,160	108,012
1912	688,383	32,423	477,047	23,163	3,212,861	167,716	144,571
1913	466,753	21,679	429,656	19,582	3,475,171	217,009	155,178
1914	565,762	26,282	180,639	10,542	1,687,029	108,097	99,285
1915	145,953	8,708	1,085,196	51,890	959,189	67,652	102,439
1916	217,905	21,450	78,474	6,390	2,145,854	198,541	124,833

Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	3,041	$14,334	1893....	7,685	24,401	1906....	10,165	$ 39,836
1881.....	6,126	22,129	1894....	38,547	28,685	Calendar		
1882.....	4,900	16,651	1895....	11,955	32,953	Year:—		
1883.....	1,532	6,173	1896....	10,710	32,817	1907....	17,546	85,557
1884.....	5,235	18,132	1897....	12,028	34,538	1908....	15,524	57,929
1885.....	4,990	16,156	1898....	10,446	32,904	1909....	17,049	58,100
1886.....	4,928	16,003	1899....	9,530	32,518	1910....	15,541	56,049
1887.....	6,397	21,865	1900....	9,139	29,176	1911....	17,979	65,743
1888.....	7,010	23,808	1901....	11,132	51,944	1912....	25,925	113,941
1889.....	8,089	31,082	1902....	13,002	47,021	1913....	10,009	50,734
1890.....	9,453	31,401	1903....	13,921	47,761	1914....	10,863	52,525
1891.....	7,979	27,613	1904....	9,894	32,633	1915....	15,798	89,232
1892.....	10,384	34,343	1905....	17,865	57,736	1916....	27,672	211,359

Imports of Dry White and Red Lead and Orange Mineral, and White Lead Ground in Oil.

Fiscal Year.	Pounds.	Value.	Cents per pound.	Fiscal Year.	Pounds.	Value.	Cents per pound.
1885.....	5,540,753	$198,913	3·69	1896.....	11,711,496	$367,569	3·14
1886.....	6,703,077	213,258	3·18	1897.....	10,310,463	347,539	3·37
1887.....	6,998,820	233,725	3·34	1898.....	12,682,808	448,659	3·54
1888.....	6,361,334	216,654	3·41	1899.....	14,507,945	514,842	3·55
1889.....	7,066,465	267,236	3·78	1900.....	14,679,920	634,492	4·32
1890.....	10,859,672	381,959	3·52	1901.....	10,241,601	461,368	4·50
1891.....	8,560,615	337,407	3·94	1902.....	15,584,164	603,582	3·87
1892.....	10,288,766	351,686	3·42	1903.....	19,208,786	758,371	3·95
1893.....	10,865,183	364,680	3·36	1904.....	16,925,585	662,098	3·91
1894.....	10,958,170	353,053	3·22	1905.....	17,376,588	638,381	3·67
1895.....	8,780,052	282,353	3·22	1906.....	10,412,891	417,444	4·01

Calendar Year.	Dry White Lead.		Dry White Lead, Ground in Oil.		Dry Red Lead and Orange Mineral.		Total Imports.		Cents per pound.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
1907.....	7,560,185	$403,941	512,473	$29,063	443,905	$ 30,203	8,516,563	$463,207	5·44
1908.....	2,913,799	119,860	415,606	18,429	638,518	25,367	3,967,923	163,656	4·12
1909.....	2,690,575	95,894	730,001	32,678	516,032	25,341	3,936,608	153,913	3·91
1910.....	2,076,629	75,463	811,510	37,475	881,788	31,803	3,769,927	144,741	3·84
1911.....	1,467,193	58,335	1,033,732	46,986	1,571,508	64,180	4,072,433	169,501	4·16
1912.....	2,499,725	138,627	714,362	37,916	2,539,767	113,579	5,753,854	290,122	5·04
1913.....	1,162,082	61,424	1,057,683	59,444	2,389,460	103,739	4,609,225	224,607	4·87
1914.....	363,136	20,279	546,961	31,654	1,451,264	62,073	2,361,361	114,006	4·83
1915.....	448,920	23,393	169,095	9,590	1,091,120	63,675	1,709,135	96,658	5·66
1916.....	200,256	15,746	59,601	5,203	1,423,351	119,959	1,683,208	140,908	8·37

Consumption.—The production of lead, as already stated, was in 1916, 20,749 tons, while the exports were 4,580 tons, leaving a balance of 16,169 tons; by adding this amount to the 13,580 tons of imports and the manufactures, we get a total consumption for Canada of over 30,000 tons of lead, as against 46,000 tons in 1915, and 29,000 in 1914.

This estimate of consumption for 1916 is probably incomplete because of the fact that very large quantities of materials chiefly for munitions,

and no doubt including lead, have been imported for the use of the Imperial Government. These imports for record purposes have been entered under one general item and not separately classified. Information received from other sources shows that the total consumption in 1916 amounted to at least 55,000 tons.

Estimated Consumption of Lead.

Year.	Tons.	Year.	Tons.	Year.	Tons.
1908	22,000	1911	28,000	1914	29,000
1909	25,000	1912	39,000	1915	46,000
1910	24,000	1913	30,000	1916	55,000

Quebec.

The production of lead in Quebec during 1916 amounted to 698,760 pounds, valued at $59,485, as against 40,401 pounds, valued at $2,262 in 1915. This production was wholly from the zinc-lead deposits of Notre-Dame des Anges.

Ontario.

The Ontario production of lead in 1916 was 685,932 pounds, valued at $58,393, as against 88,985 pounds, valued at $4,983 in 1915. The two principal producers were: the property of the James Robertson Estate at Galetta, and the Hollandia Mine at Bannockburn.

British Columbia.

The production of refined lead together with lead in ores exported amounted in 1916 to 39,157,701 pounds, valued at $3,333,496, as against 45,377,064 pounds, valued at $2,541,116 in 1915, a decrease of 13·7 per cent in quantity, but an increase of 31·1 per cent in value.

Almost all of the lead ore mined in British Columbia is smelted and refined at Trail, B.C. In 1915 and 1916, however, the Surprise mine shipped its total output, amounting to a considerable tonnage, to the United States.

According to the Provincial Department of Mines, 48,727,516 pounds of lead were contained in the lead ores shipped to the smelters for which returns had been received during 1916.

The record given in the following table for the years 1909 to 1916, inclusive, represents the recovery of lead at smelter or refinery as distintinguished from the figures given for the same year in the table next succeeding, which indicate the quantities of lead contained in ore sent to the smelters.

It will be noticed also that the Fort Steele district produced about 49·6 per cent of the total, the Slocan 29·6 per cent, and Ainsworth about 16.1 per cent.

British Columbia: Production of Lead.

Year	Pounds.	Value.	Cents per pound.	Year.	Pounds.	Value.	Cents per pound.
1887.....	204,800	$ 9,216	4·40	1902.....	22,536,381	$ 917,005	4·069
1888.....	674,500	29,813	4·42	1903.....	18,089,283	766,443	4·237
1889.....	165,100	6,488	3·93	1904.....	36,646,244	1,579,086	4·309
1890.....	.....	.....	.....	1905.....	56,580,703	2,663,254	4·707
1891.....	.....	.....	.....	1906.....	52,408,217	2,964,733	5·657
1892.....	808,420	33,064	4·09	1907.....	47,738,703	2,542,086	5·325
1893.....	2,131,092	79,490	3·73	1908.....	43,195,733	1,814,221	4·200
1894.....	5,703,222	187,636	3·29	1909.....	45,857,424	1,692,139	*3·690
1895.....	16,461,794	531,716	3·23	1910.....	32,987,508	1,216,249	*3·687
1896.....	24,199,977	721,159	2·98	1911.....	23,784,969	827,717	‡3·480
1897.....	38,841,135	1,390,513	3·58	1912.....	35,763,476	1,597,554	‡4·467
1898.....	31,693,559	1,198,017	3·78	1913.....	37,626,899	1,753,037	‡4·659
1899.....	21,862,436	977,250	4·47	1914.....	36,289,845	1,625,422	‡4·479
1900.....	62,158,621	2,760,031	4·37	1915.....	45,377,064	2,541,116	‡5·600
1901.....	51,582,906	2,235,603	4·334	1916.....	39,157,701	3,333,496	‡8·513

*Average prices at Toronto for years 1909 and 1910. For previous years average prices at New York.
‡Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

British Columbia: Production of Lead by Districts.*

(Lead contained in Ore shipped from Mines, in pounds.)

District.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
Cassiar—							
Atlin.....	.....	.....	.....	.....	.....	.....	7,260
Skeena, etc.....	1,695	238,578	41,512	6,579	.....	30,462	1,077
East Kootenay—							
Fort Steele.....	23,874,562	17,158,069	18,238,238	18,525,083	24,863,105	26,582,050	24,156,143
Other districts.....	66,010	.....	2,249,237	2,495,355	.....	216,327	571,244
West Kootenay—							
Ainsworth.....	2,558,353	289,009	4,863,894	9,027,861	8,069,525	3,436,184	7,841,869
Nelson.....	1,245,844	1,928,836	2,293,000	1,936,418	2,004,436	967,775	1,240,784
Slocan.....	6,406,358	6,705,571	16,944,811	22,648,766	15,233,910	14,925,345	14,415,645
Other districts.....	470,241	522,615	240,762	521,771	128,912	89,041	206,741
Yale—							
Yale-Kamloops.....	.....	.....	.....	.....	.....	.....	47,380
Grand Forks, etc.....	35,683	29,719	.....	45,982	1,678	7,127	14,922
Cariboo—							
Omineca.....	.....	.....	.....	156,862	323,482	249,279	224,451
	34,658,746	26,872,397	44,871,454	55,364,677	50,625,048	46,503,590	48,727,516

*From the Report of the Minister of Mines, B.C.

Yukon.

During the last few years, several properties have been developed and have shipped occasionally, but they have been handicapped by the high cost of development and supplies, and by the heavy transportation charges.

The most important operations being conducted during 1916 were in what is known as the "Mayo" area, north of the Stewart river. About 1,500 tons of very rich silver-lead ore were shipped from the Silver King property on Galena creek to the Selby smelter at San Francisco. This area is one of the most important placer gold producing districts of Yukon Territory but valuable lode deposits have also been discovered.

Bounties.—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment, under certain restrictions, of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig-lead in London, England, exceeded £12 10s per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16, or over, per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at the rate of 75 cents per hundred pounds, or approximately £3 10s per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s the bounty shall be reduced by such excess.

The Act of 1908 expired in 1913, and a new Act was passed extending the bounty for a further period of five years, with the same provisions. The text of this Act and of the regulations under which the Act is administered may be consulted in the "Annual Report on Mineral Production for 1914," and previous years.

There was no bounty paid on lead during the fiscal year ending March 31, 1917.

Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1917.

Year ending.	Bounty paid.	Year ending.	Bounty paid.	Year ending.	Bounty paid.
June 30, 1899.....	$ 76,665	June 30, 1906.....	$ 90,196	March 31, 1913.....	$ 68,065
" 30, 1900.....	43,335	March 31, 1907.....	1,995	" 31, 1914.....	8,179
" 30, 1901.....	30,000	" 31, 1908.....	51,001	" 31, 1915.....	3,217
" 30, 1902.....	.....	" 31, 1909.....	307,433	" 31, 1916.....	59
" 30, 1903.....	4,380	" 31, 1910.....	340,542	" 31, 1917.....	.....
" 30, 1904.....	195,627	" 31, 1911.....	248,534	.....	.....
" 30, 1905.....	330,645	" 31, 1912.....	179,288	Total	1,979,164

MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897 was derived from the deposits at the western end of Kamloops lake, B.C. These deposits occur in irregular veins, consisting chiefly of calcite and quartz, with some dolomite, containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks.

Elsewhere in Canada mercury has been reported as occurring in ores of the Cobalt district, in the neighbourhood of Field, B.C., and at the eastern entrance to Sechart channel, Barclay sound, Vancouver island.

The imports of mercury during 1916 were 79,204 pounds, valued at $74,461, as against 184,432 pounds, valued at $159,184 in 1915.

Production of Mercury.

Calendar Year.	Flasks.*	Price per flask.	Value.
1895	71	$33.00	$2,343
1896	58	33.44	1,940
1897	9	36.00	324

*Seventy-six and one half (76½) pounds each.

Imports of Mercury.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value
1882	2,443	$ 965	1894	36,914	$14,483	1906	150,364	$ 69,505
1883	7,410	2,991	1895	63,732	25,703	Calendar Year.		
1884	5,848	2,441	1896	77,869	32,353	1907	189,841	82,873
1885	14,490	4,781	1897	76,058	33,534	1908	87,620	44,030
1886	13,316	7,142	1898	59,759	36,425	1909	285,958	147,625
1887	18,409	10,618	1899	103,017	51,695	1910	107,888	63,450
1888	27,951	14,943	1900	85,342	51,987	1911	118,336	67,416
1889	22,931	11,844	1901	140,610	94,564	1912	137,474	72,171
1890	15,912	7,677	1902	97,283	56,615	1913	219,442	109,493
1891	29,775	20,223	1903	164,968	91,625	1914	204,229	97,449
1892	30,936	15,038	1904	151,107	80,658	1915	184,432	159,184
1893	50,711	22,998	1905	103,330	48,412	1916*	79,204	74,461

*Duty free.

Average Monthly Price of Mercury.

(Per flask of 75 pounds).

Month.	1915.			1916.		
	New York.	San Francisco.	London.	New York.	San Francisco.	London.
January	$ 51.60	$ 50.80	£11.35	$231.50	$200.50	£16.75
February	59.38	58.00	12.28	283.50	300.63	17.88
March	73.13	62.16	12.50	213.75	223.75	19.00
April	71.50	64.31	12.44	140.78	147.50	17.75
May	77.20	67.50	11.80	95.10	97.50	16.50
June	95.63	88.13	15.13	73.00	73.81	16.50
July	95.50	92.50	17.94	79.80	79.90	17.30
August	92.50	89.25	18.15	74.75	75.00	17.50
September	89.50	88.00	16.50	75.50	75.06	17.50
October	94.70	90.80	15.90	79.40	75.80	19.50
November	108.13	102.00	16.38	79.25	75.50	18.25
December	135.00	121.25	16.63	80.00	78.00	18.63
Year	$ 87.01	$ 81.23	£14.75	$125.49	$125.25	£17.75

MOLYBDENUM.

There are numerous mineralogical occurrences of molybdenite in Canada, many of which during the past ten or fifteen years have attracted more or less attention because of the possibility of their development indicating deposits of commercial importance. As a result of this work, small shipments of ore were made in 1902 and 1903. The high prices offered in 1914 and 1915 resulted in an active renewal of this development, but it was not until 1916 that really important contributions have been made to the market demands for this metal. While a large proportion of the 1916 production has been derived from one property at Quyon in the Province of Quebec, nevertheless important contributions have been made from a number of other deposits which, in the aggregate, give promise of increasing contributions to the supply.

The ore produced was chiefly low grade material carrying less than 2 per cent MoS_2, but included small quantities of ore running from 2 to 15 per cent MoS_2, and some higher grade hand picked material.

The owners of the Quyon mine were authorized to export a portion of their ore for concentration in their own plant at Denver, Col.; with this exception, all of the ore production was concentrated in Canadian mills erected for the purpose, and marketed either as concentrates, ferro-molybdenum, for the manufacture of which two electric furnace plants have been established, or as molybdic acid or ammonia molybdate.

The total production in 1916, representing the MoS_2 contents of concentrates produced was 156,461 pounds which at $1.00 per pound, the approximate equivalent at Ottawa of the British official price, would have a total value of $156,461. The actual marketing value would probably exceed this figure since, as already stated, the output was sold in various forms, and some of the concentrates sold in the United States possibly brought a higher price.

The production in 1915 was equivalent to 29,210 pounds of concentrate valued at $28,450, as compared with a production in 1914 equivalent to 3,814 pounds of concentrate, valued at $2,063.

Early in 1915 the export of molybdenite to foreign destinations was prohibited except under license. Since September of 1915, the Imperial Government has requisitioned all supplies of molybdenite arriving in the United Kingdom at the price of five pounds, five shillings (105s.) per unit, cost, insurance and freight or ex. warehouse, on the basis of 90 per cent MoS_2, less one per cent brokerage charges. Subsequently the basis was reduced to a minimum of 85 per cent MoS_2. The firm of H. H. Watson & Co., Liverpool, was appointed by His Majesty's Government to act as brokers for the purchase of these ores. At a later date the Imperial Munitions Board of Ottawa was authorized to purchase molybdenite in Canada.

Prices in the United States during 1916 for molybdenite concentrates 85 to 90 per cent MoS_2 ranged from $1.40 to $1.85 per pound.

Mining.

During 1916 shipments were made from the following properties:—

QUEBEC

Pontiac County.—Moss mine near Quyon in Onslow tp., lots 9 and 10, range VII. This has so far proved the most important molybdenite mine developed. Ore shipments were made during 1916 to Denver, Col., to the concentrating plant at Renfrew operated by the International Molybdenum Company, and to the Mines Branch concentration plant, Department of Mines, Ottawa. A concentrating plant was built at the mine and placed in operation, and a second mill was installed at Hull, Que., on the property of the Canada Cement Co., the cement plant ball mills being used for grinding the molybdenite ore. The property was operated by the Canadian Wood Molybdenite Company, and has recently been sold to the Dominion Molybdenite Co., Ltd.[1]

Abitibi District.—A small shipment of hand picked ore was made from the property of the Height of Land Mining Company in Preissac tp., south of Amos on the Canadian Government Railways.

ONTARIO

Renfrew County.—Several properties in this county made shipments during 1916 including: the Jamieson mine in the township of Lyndeck, lots 5 and 6, con. VIII, operated by the International Molybdenum Company; the Spain or Legree mine in Griffith tp., lots 30 and 31, con. IV, operated by W. J. Spain, a concentrating mill was erected at this property which was, however, operated but a short time during 1916; Brougham tp., lots 7, 8, and 9, con. XII, operated by the Renfrew Molybdenum Mines, Ltd., a vacuum oil flotation mill was placed in operation just at the close of the year and was producing at the rate of about a ton per week; the Moran and O'Brien properties, Brougham tp., lots 16 and 17, con. XII, operated by M. J. O'Brien of Renfrew; the Ross mine, Brougham tp., lots 1 and 2, con. III, operated by the Aldfield Mineral Syndicate, and sold to Molybdenum Ltd., of Montreal.

Haliburton County.—Mr. George Padwell operated a property near Tory Hill.

Victoria County.—Shipments were made from properties in Somerville tp., and in Laxton tp., operated by Mr. T. Horscroft.

Lennox and Addington Counties.—Shipments were made from the Chisholm mine in Sheffield tp.

[1] Report on the Molybdenite deposits of the Moss mine, Quyon, Que., by Charles Camsell. Summary Report, Geol. Survey, 1916, p. 207.

BRITISH COLUMBIA

West Kootenay District.—The Molly mine at Salmo, B.C., was operated by the International Molybdenum Co., of Orillia, Ont., and the ore shipped to Renfrew, Ont., for concentration.

Skeena District.—A property has been developed at Alice Arm at the head of Observatory inlet, Portland canal, by the Molybdenum Mining and Reduction Co., Ltd. Shipments were made to Renfrew, Ont.

Lillooet District.—From the Index claim on Texas creek about 9 tons of ore were shipped to Renfrew.[1]

Concentration of Molybdenite.

The concentration of molybdenite ores was undertaken to a greater or less extent in five mills, two of which were operated as Custom plants, and three treated only the ores produced by the operators.

Mines Branch Plant, Ottawa.—The Department of Mines had, through its Ore Testing and Metallurgical Division, already undertaken an investigation of the concentration of molybdenite ores as a result of which a successful water flotation concentration process was developed. Through an arrangement with the Imperial Munitions Board, the plant was increased in size and placed upon a commercial basis, and has been in practically continuous operation throughout 1916. During the year a total of 2,397·4 tons of ore were treated in this plant containing an average of 1·84 per cent MoS_2. There was recovered 43·58 tons of concentrates containing an average of 79·95 per cent MoS_2.

Ores have been purchased on the basis of the following schedule:—

Schedule of Prices governing purchase of Molybdenite Ores and Concentrates Delivered f.o.b. Dominion Government Testing Plant, *Ottawa.*

Payments will be made upon the following terms:—

(1) On assay returns from samples dried at 212°F.
(2) Moisture will be deducted.
(3) The treatment charge to be $5.65 per ton of 2,000 lbs. of crude oil.
(4) The value of molybdenite (MoS_2) to be $1.00 per pound delivered in Ottawa unless otherwise stated.
(5) Payments will be made for molybdenite only. No allowance will be made for Molybdite or Wulfenite.
(6) Payments will be calculated as follows, per ton of 2,000 lbs. dry ore or concentrates, delivered railway siding, Mines Branch Testing Laboratories, Ottawa:—

[1] Report on the Index molybdenite mine, Lillooet, B.C., by Dr. C. W. Drysdale. Summary Report of the Geol. Survey, 1916, p. 54.

Schedule A. Treatment charge $5.65 per ton.

For Molybdenite ores containing:—

(a)	Between	0·5 %	and	1·0%	inc.	for	70%	of	the	total molybdenite content.
(b)	,,	1·1 %	,,	1·5%	,,	,,	78%	,,	,,	,, ,,
(c)	,,	1·51%	,,	2·0%	,,	,,	84%	,,	,,	,, ,,
(d)	,,	2·1 %	,,	2·5%	,,	,,	87%	,,	,,	,, ,,
(e)	,,	2·51%	,,	3·0%	,,	,,	90%	,,	,,	,, ,,
(f)	,,	3·0 %	,,	.....	,,	,,	92%	,,	,,	,, ,,

Net returns to the miner will be the value of the ore calculated as indicated above less $5.65 per net ton concentration charges.

Schedule B. No treatment charge.

For Molybdenite Middling Product containing:—

(a)	Between	3·1%	and	10%	inc.	molybdenite	content	83c	per	pound.
(b)	,,	10·1%	,,	15%	,,	,,	,,	85c	,,	,,
(c)	,,	15·1%	,,	20%	,,	,,	,,	87c	,,	,,
(d)	,,	20·1%	,,	25%	,,	,,	,,	88·5c	,,	,,
(e)	,,	25·1%	,,	30%	,,	,,	,,	90c	,,	,,
(f)	,,	30·1%	,,	35%	,,	,,	,,	91·6c	,,	,,
(g)	,,	35·1%	,,	40%	,,	,,	,,	92·6c	,,	,,
(h)	,,	40·1%	,,	45%	,,	,,	,,	93·6c	,,	,,
(i)	,,	45·1%	,,	50%	,,	,,	,,	94·6c	,,	,,
(j)	,,	50·1%	,,	55%	,,	,,	,,	95·6c	,,	,,
(k)	,,	55·1%	,,	60%	,,	,,	,,	96·6c	,,	,,
(l)	,,	60·1%	,,	65%	,,	,,	,,	97·6c	,,	,,
(m)	,,	65·1%	,,	70%	,,	,,	,,	98·6c	,,	,,

Schedule C. No treatment charges.

For Molybdenite Concentrates:—

Containing	not	less	than	70%	molybdenite	content	$1.00	per	pound.
,,	,,	,,	,,	75%	,,	,,	$1.02	,,	,,
,,	,,	,,	,,	80%	,,	,,	$1.05	,,	,,
,,	,,	,,	,,	85%	,,	,,	$1.09	,,	,,

Prices on *Schedule C* to include cost of delivery to Mines Branch, in suitable packages for either local or export shipment.

The International Molybdenum Company's Mill, Renfrew:—

The International Molybdenum Company built a flotation concentration mill at Renfrew which was placed in operation during the latter part of the year. Custom ores from Quebec, Ontario, and British Columbia were treated as well as ores mined by the Company. The concentrates produced were shipped to the Company's Refinery at Orillia, Ontario. Custom ores were purchased on the basis of the following prices:—

Schedule of prices per unit (20 lbs.) of molybdenite in ore delivered at concentrator, Renfrew.

Ores carrying	between	2%	and	3%	MoS_2	—	$13.00	per	unit.
,,	,,	,,	3%	,,	5%	,,	—	14.50	,,
,,	,,	,,	5%	,,	10%	,,	—	16.00	,,
,,	,,	,,	10%	,,	15%	,,	—	17.00	,,
,,	,,	,,	15%	,,	20%	,,	—	18.00	,,

80% concentrates $1.00 per lb. of MoS_2.

Penalties imposed for copper and bismuth.

No settlement made for any molybdic oxide in ores.

Settlement 10 days after sampling.

Samples of ores to be submitted before any shipment made.

Ferro-Molybdenum, Etc.

The production of ferro-molybdenum in electric furnaces was begun in October of 1916 at Orillia by the International Molybdenum Company. This firm has also undertaken the production of molybdic acid and ammonia molybdate. Ferro-molybdenum is also being made in electric furnaces at Belleville, Ont., by the Tivani Electric Steel Co.

Estimated World's Production of Molybdenum Ores, 1915*.

Country.	Ore Mineral.	Quantity (short tons).	Estimated per cent of molybdenum.	Weight of molybdenum, (short tons).
Canada	Molybdenite	14·3	50	7·2
New South Wales	"	35·5	54	19·2
Norway	"	87·0	45	39·1
Peru	"	3·0	49	1·5
Queensland	"	109·0	54	58·8
Spain	Wulfenite	29·0	20	5·8
United States	Molybdenite & wulfenite	3,498·0	2·6	91·0
				222·6

*Estimated by Frank L. Hess of the United States Geological Survey, Mineral Resources, United States, 1915, p. 810.

NICKEL.

The industry based on the mining and metallurgical treatment of the nickel-copper ores of the Subdury district, Ontario, ranks among the most important of Canada. Not only is there a considerable production of copper, but the nickel, which is the important product, supplies a very large proportion of the world's consumption of the metal.

The past few years development has very largely increased the known ore reserves of the district. These nickel-copper deposits have been the subject of special reports by the Mines Branch and Geological Survey at Ottawa, by the Ontario Bureau of Mines, Toronto, and just recently by the Royal Ontario Nickel Commission.[1]

The production of nickel in 1916 amounted to 82,958,564 pounds, valued at $29,035,497, as compared with 68,308,657 pounds, valued at $20,492,597 in 1915, an increase of 21·4 per cent over that of 1915, and of 82·2 per cent over the production of 1914.

There were mined in 1916, 1,566,333 tons of ore, and smelted 1,521,689 tons, from which were produced 80,011 tons of Bessemer matte, carrying approximately 41,298 tons of nickel, and 22,430 tons of copper. The net value of the matte, as reported by operators was $12,116,333, which is based on an average value of 7·2 cents per pound for the copper, and 10·8 cents per pound for the nickel. The average metal recovery in matte from the ores treated was 1·474 per cent copper and 2·714 per cent nickel, as against 1·541 per cent copper, and 2·675 per cent nickel in 1915.

The nickel-copper ore is reduced in smelters and converters to a Bessemer matte, containing from 77 to 82 per cent of the combined metals; in 1916 it averaged 51·6 per cent nickel and 28·0 per cent copper, as against 50·3 per cent nickel and 29·0 per cent copper in 1915; 49·0 and 31·1 respectively in 1914; and 52·7 and 27·4 respectively in 1913.

For the production of monel metal, a special matte is produced with contents of about 22 per cent copper, and 58 per cent nickel, which is included in the total given above. Monel metal is produced directly from this matte without the intermediate refining of either the nickel or the copper.

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[1]Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada. No. 873, 1901.
The Sudbury Nickel Region, by A. P. Coleman, Ph.D., Bureau of Mines, Vol. X IV, Part III, 1904.
The Nickel Industry, with special reference to the Sudbury Region, Ontario. Report by A. P. Coleman, Ph.D., Mines Branch, Ottawa, No. 170, 1913.
Report of The Royal Ontario Nickel Commission with Appendix, Toronto, 1917.

Production of Nickel.

——	1913.	1914.	1915.	1916.
Ore mined.....Short tons.	784,697	1,000,364	1,364,048	1,566,333
Ore smelted..... "	823,403	947,053	1,272,283	1,521,689
Bessemer matte produced..... "	47,150	46,396	67,703	80,011
Copper content of matte..... "	12,938	14,448	19,608	22,430
Nickel " " ..... "	24,838	22,759	34,039	41,298
Spot value of matte.....	$7,076,945	$7,189,031	$10,352,344	$12,116,333
Wages paid miners and smelters.....	$3,291,956	$3,096,911	$3,555,912	$4,841,662
Men employed.....	3,486	3,379	4,033	4,656

Annual Production of Nickel.

Calendar Year.	Pounds of nickel in matte shipped.	Cents per pound.	Value.	Calendar Year.	Pounds of nickel in matte shipped.	Cents per pound.	Value.
1889 (a).....	830,477	60	$ 498,286	1903.....	12,505,510	40	$5,002,204
1890.....	1,435,742	65	933,232	1904.....	10,547,883	40	4,219,153
1891.....	4,035,347	60	2,421,208	1905.....	18,876,315	40	7,550,526
1892.....	2,413,717	58	1,399,956	1906.....	21,490,955	42	8,948,834
1893.....	3,982,982	52	2,071,151	1907.....	21,189,793	45	9,535,407
1894.....	4,907,430	38½	1,870,958	1908.....	19,143,111	43	8,231,538
1895.....	3,888,525	35	1,360,984	1909.....	26,282,991	36	9,461,877
1896.....	3,397,113	35	1,188,990	1910.....	37,271,033	30	11,181,310
1897.....	3,997,647	35	1,399,176	1911.....	34,098,744	30	10,229,623
1898.....	5,517,690	33	1,820,838	1912.....	44,841,542	30	13,452,463
1899.....	5,744,000	36	2,067,840	1913.....	49,676,772	30	14,903,032
1900.....	7,080,227	47	3,327,707	1914.....	45,517,937	30	13,655,381
1901.....	9,189,047	50	4,594,523	1915.....	68,308,657	30	20,492,597
1902.....	10,693,410	47	5,025,903	1916.....	82,958,564	35	29,035,497

(a) Calculated from shipments made by rail.

Refined metallic nickel is now being recovered in Canadian refineries but only in small quantities and as a by-product in the smelting and refining of the silver-cobalt-nickel ores, nickel-oxide having been recovered in these smelters for several years. The recovery of nickel-sulphate was also reported for the first time in 1915. A considerable amount of nickel is probably contained in ores exported for smelting, for which no payment is received by the mines shipping and the amount finally recovered is impossible to ascertain.

The production of metallic nickel during 1916 was reported as 79,360 pounds, valued by the operators at $31,538, as against 55,325 pounds, valued at $22,130 in 1915; that of nickel-oxide and nickel-sulphate was reported as 555,868 pounds valued at $101,358, as against 282,025 pounds valued at $31,262 in 1915.

The total estimated nickel content of recoveries from silver-cobalt-nickel ores was in 1916, 361,702 pounds, as against 231,634 pounds in 1915.[1]

The companies engaged in mining and smelting nickel ores are:—

The Canadian Copper Company, subsidiary to the International Nickel Company, with smelter at Copper Cliff, Ontario, and refinery at Bayonne, New Jersey. This company is erecting a new refining

[1] See chapter on "Cobalt."

plant at Port Colborne, Ontario, which will probably be in operation late in 1917.

The Mond Nickel Company of London, England, with smelter at Coniston, Ontario, and refinery at Clydach, Swansea, Wales.

The British American Nickel Corporation, Ltd., which started erecting a smelter and refinery at the Murray mine, late in 1916, although not shipping during the year, development was actively carried on.

The Alexo Mining Company, Ltd., which operated its mine at Porquis Junction on the Porcupine Branch of the Timiskaming and Northern Ontario Railway, shipping nickel-copper ore to the Mond smelter at Coniston.

Nickel was recovered as a by-product in the smelters at Deloro, Thorold, and Welland, from the silver-cobalt-nickel ores of the Cobalt district.

Prices.—The price of refined nickel in New York according to quotations published by the Engineering and Mining Journal remained throughout the year at from 45 to 50 cents per pound for ordinary forms with 5 cents more per pound asked for electrolytic nickel.

The price during 1915 remained fairly constant between 40 and 45 cents during the first seven months, and ranging between 45 and 50 cents for the last five months for ordinary forms. Electrolytic nickel was five cents higher per pound.

The price of nickel in Europe in 1916, as given by the "London Mining Journal," was quoted throughout the year at £225, or 48·9 cents per pound while as in 1915 it was quoted between £186 and £206 (40·4 to 44·7 cents per pound) from January 1st, until the end of May, when it rose to £210, and gradually increased until it reached in the last week in July a quotation of £225 per long ton (48·8 cents per pound) and remained at that price until the close of the year.

Exports and Imports.—The exports in 1916 amounted to 80,441,700 pounds, of which 11,136,900 pounds or 13·8 per cent went to Great Britain, and 69,304,800 pounds, or 86·2 per cent to the United States. In 1915, 20·7 per cent of the total went to Great Britain, and 79·3 per cent to the United States; and in 1914, 22·1 per cent went to Great Britain, and 77·4 per cent to the United States.

The exports to the United States, which had fallen off nearly 20 per cent in 1914 showed an increase in 1915 of over 46 per cent, and in 1916 of over 31 per cent.

Exports of Nickel, 1912-1916.

Destination.	1912.	1913.	1914.	1915.	1916.
To Great Britain.....Pounds.	5,072,867	5,164,512	10,291,979	13,747,991	11,136,900
To United States..... "	39,148,993	44,224,119	36,015,642	52,662,451	69,304,800
To other countries..... "	.....	70,386	220,706	.....	.....
Total.....	44,221,860	49,459,017	46,528,327	66,410,442	80,441,700

Exports of Nickel since 1890.

Calendar Year.	Value.	Calendar Year.	Pounds.	Value.	Cents per pound.
1890	$ 89,568	1903	12,699,227	$1,116,099	8·78
1891	667,280	1904	11,233,869	1,091,349	9·71
1892	293,149	1905	17,318,059	1,569,693	9·06
1893	629,692	1906	20,653,845	2,042,965	9·89
1894	559,356	1907	19,376,335	2,280,374	11·76
1895	521,783	1908	19,419,893	1,866,624	9·61
1896	658,213	1909	25,616,398	2,676,483	10·45
1897	723,130	1910	36,014,782	4,030,040	11·19
1898	1,019,363	1911	32,619,971	3,676,396	11·27
1899	939,915	1912	44,221,860	4,661,758	10·54
1900	1,031,030	1913	49,459,017	5,195,560	10·50
1901	751,080	1914	46,528,327	5,149,427	11·07
1902	1,007,211	1915	66,410,442	7,394,446	11·13
		1916	80,441,700	8,662,179	10·77

The imports of nickel are classed with those of nickel-silver and German-silver and manufactures of these metals. There is also a considerable import of nickel-plated ware. The imports in 1916 consisted of nickel in ingots, bars, sheets, etc., to the amount of 892,439 pounds, valued at $325,326, and manufactures of nickel, valued at $89,084.

Imports of Nickel, Nickel-Silver, and German Silver, 1915 and 1916.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Nickel, nickel-silver, and German silver in ingots or blocks	74,381	$ 27,361	179,367	$ 66,515
Nickel, nickel-silver, and German silver in bars and rods, and also in strips, sheets or plates	635,963	169,807	713,072	258,811
Manufactures of German, Nevada, and nickel-silver, not plated	.....	77,538	.....	89,084

In view of the large export of nickel from Canada to the United States, and its refinement in that country, a record of the imports into, and exports of nickel from the United States, may be of special interest and is shown below as compiled from the "Foreign Commerce of the United States."

The values of the United States exports ranged from 37 to 46 cents per pound, with an average of 38·5 cents in 1916, as against 34 to 43 cents per pound with an average of 38 cents per pound in 1915, and 32 to 39 cents per pound with an average of 34 cents per pound in 1914.

United States: Imports and Exports of Nickel.*

	1915.			1916.		
	Quantity.	Value.	Cents per pound.	Quantity.	Value.	Cents per pound.
Imports into United States—						
(Ore and matte.....Gross tons	45,798	$7,615,999	13·52	59,741	$9,889,122	13·62
Nickel content.....Pounds.	56,352,582			72,611,492		
Exports from United States—						
(To France.....Pounds.	3,018,354	1,124,382	37·25	2,823,132	1,101,813	39·02
„ Italy (a)..... „	.....	.....	.....	2,715,521	1,110,035	40·88
„ Netherlands..... „	129,557	55,954	43·29	516,331	224,872	43·55
„ Russia in Europe(a) „	.....	.....	.....	7,767,875	3,010,599	38·76
„ United Kingdom... „	14,801,565	5,317,532	35·92	16,674,487	6,191,029	37·13
„ Other countries..... „	8,469,074	3,540,646	41·80	2,906,665	1,314,145	46·21
Totals	26,418,550	10,038,514	38·00	33,494,011	12,952,493	38·67

*From the "Foreign Commerce of the United States," Dec., 1916.
(a) Not separately stated prior to Jan. 1, 1916.

Imports of Nickel Ore and Matte into the United States during the following fiscal years ending June 30th.*

From		1912.	1913.	1914.	1915.	1916.†
Belgium	Tons.	1,078	1,371	1,243	242	.....
	Pounds.	1,587,598	2,498,262	2,037,008	317,971	.....
France	Tons.	.....	.....	.....	.....	297
	Pounds.	.....	.....	.....	.....	514,828
Norway	Tons.	.....	.....	3	366	.....
	Pounds.	.....	.....	5,040	530,704	.....
Canada	Tons.	26,373	35,597	35,174	29,592	52,742
	Pounds.	32,414,454	(a)45,010,108	(b)41,507,255	(c)36,607,235	(d)64,622,286
Oceania—French	Tons.	.....	.....	.....	.....	2,618
	Pounds.	.....	.....	.....	.....	2,391,922
—Australia	Tons.	.....	.....	.....	601	1,329
	Pounds.	.....	.....	.....	539,109	1,268,084
Peru	Tons.	.....	.....	.....	.....	1
	Pounds.	.....	.....	.....	.....	118
Totals	Tons.	27,451	36,968	36,420	30,801	56,987
	Pounds.	34,002,052	47,508,370	43,549,303	37,995,019	68,797,238

(a) Value, $5,825,642. (b) Value, $5,621,480. (c) Value, $4,788,145. (d) $8,596,921.
*From the "Foreign Commerce of the United States," Dec., 1916.
†From Reports on the commerce and navigation of the United States, Department of Commerce, Washington, D.C.

Exports of Nickel, Nickel-Oxide, and Matte from the United States during the following fiscal years, ending June.*

(in pounds.)

To	1911.	1912.	1913.	1914.	1915.	1916.
Austria-Hungary	.....	.....	134,400	672,043	67,200	.....
Belgium	.....	551,740	1,719,285	1,230,274	210,612	.....
Denmark	.....	.....	.....	.....	43,830	2,174
France	3,765,510	5,579,335	4,197,110	4,419,663	3,210,980	1,871,595
Germany	1,902,393	2,527,273	2,346,325	11,084,366	1,036,242	.....
Italy	604,938	1,321,733	1,075,303	1,276,905	2,365,177	1,880,661
Netherlands	8,205,836	7,584,653	9,164,012	2,376,216	22,033	139,300
Norway	.....	.....	.....	.....	31,158	34,460
Russia in Europe	.....	.....	7,250	186,626	4,082,280	5,371,089
Spain	.....	.....	.....	.....	700	112,450
Sweden	.....	.....	.....	.....	367,696	313,958
U. Kingdom:—						
England	1,342,714	3,019,833	2,334,845	2,171,511	8,535,418	7,973,478
Scotland	3,114,166	5,970,045	6,878,264	5,433,081	7,817,384	6,113,198
N. America:—						
Canada	8,926	3,373	16,379	42,529	52,949	11,646
Cuba	.....	.....	.....	.....	.....	10
Mexico	40	.....	.....	.....	1,779	.....
W. Indies (Brit.)	.....	.....	.....	.....	300	.....
West Indies (Dutch)	.....	.....	.....	.....	.....	10
S. America:—						
Brazil	.....	.....	1,796	.....	.....	473
Chili	.....	.....	.....	.....	.....	100
Colombia	.....	.....	32	.....	.....	.....
Asia:—						
British India	.....	.....	.....	.....	.....	411
Japan	1,957	4,005	5,447	2,028	308,444	597,257
Russia in Asia	.....	.....	.....	.....	1,423,030	1,226,990
Oceania:—						
Brit. Australia and Tasmania	1,330	.....	829	.....	22,400	679
Philippine Islands	.....	.....	.....	.....	.....	56
	18,947,810	26,561,990	27,881,277	28,895,242	29,599,612	25,649,995

*From Reports on the commerce and navigation of the United States, Department of Commerce, Washington, D.C.

Bounty on Refined Nickel and Nickel-oxide.—Under the terms of "The Metal Refining Act, 1907." of the Province of Ontario (7 Edward VII, Chap XIV) a bounty is authorized to be paid on nickel, cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907). In March, 1912, the Act was amended to cover a further period of five years.

The sections affecting nickel are as follows:—

The Treasurer of the Province may under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant Governor in Council pay in each year to the refiners of the metals or metal compounds hereinafter specified when refined in the Province from ores raised and mined in the Province, a bounty on each pound of such metal or compound so refined, as follows:—

Class 1. On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel-oxide, but nickel on which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form, and the amount to be paid as bounty on the nickel products therein mentioned is not to exceed in all $60,000 in any one year.

PLATINUM AND PALLADIUM.

In past years, the chief source of the platinum production of Canada was the placer gravels of British Columbia, principally in the Similkameen district.

During 1916, the reported recovery was only 15 crude ounces, valued at $600, as against 23 crude ounces, valued at $1,063 in 1915. It is possible that the production of platinum is considerably greater than actually reported. A perusal of the imports from Canada to the United States, as given by the United States Department of Commerce, and the exports from Canada into the United States, as given by the Canadian Department of Customs, shows that much larger quantities are leaving Canada. There is a possibility, of course, that the Canadian export record may include old and scrap platinum.

The exports from Canada into the United States were, in 1916, 532 ounces, valued at $41,945, against 236 ounces, valued at $11,052 in 1915.

Annual Production of Platinum.

Year.	Value.	Year.	Value.	Year.	Crude ounces.	Value.
1887	$ 5,600	1895	$ 3,800	1903	.....	$33,345
1888	6,000	1896	750	1904	.....	10,872
1889	3,500	1897	1,600	1905	.....	500
1890	4,500	1898	1,500	1906	.....	*
1891	10,000	1899	825	1907–1912	.....	**
1892	3,500	1900	.....	1913	18	489
1893	1,800	1901	457	1914	.....	.....
1894	950	1902	46,502	1915	23	1,063
				1916	15	600

*See under Palladium.
**See explanation in text.

Annual Production of Palladium.

	Ounces.	Value.
1902 Palladium	4,411	$86,014
1903 "	3,177	61,952
1904 "	952	18,564
1905 Metals of the platinum group	1,562	28,116
1906 " "	314	5,652
1907-1916	(a)	.....

(a) See explanation in text.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and from 1902 to 1912, considerable quantities of these metals were recovered from the residues resulting from the treatment of the mattes from Sudbury. In view, however, of the fact that other material has been treated in the works of the International

Nickel Company in addition to the nickel-copper mattes from Copper Cliff, Ontario, it is impossible to state what proportion of the above recoveries was from Canadian sources, although it is, of course, safe to assume that part of these metals has been derived from the Sudbury district mattes. The Company reported there has been no production in 1913, 1914, 1915, or 1916 from Canadian ores.

The recovery of gold, silver, platinum, and palladium at the works of the International Nickel Company in New Jersey for the six years ending December 31, 1912, was as follows:—

Recovery at the International Nickel Co.'s Works—New Jersey.

Year.	Gold.	Silver.	Platinum.	Palladium.
1907.....Ounces.	993·572	63,400·70	226·800	607·300
1908..... "	5,238·181	139,329·29	172·316	328·287
1909..... "	2,113·669	63,138·66	546·627	1,270·598
1910..... "	2,649·799	60,256·83	258·325	522·804
1911..... "	2,203·052	70,954·38	665·552	753·363
1912..... "	2,476·558	62,169·66	496·850	680·130
	15,674·831	459,249·52	2,366·470	4,216·482

During 1915, the average monthly price of refined platinum in New York, fell from $41.10 per ounce in January to $38.00 in June and July, but increased rapidly during the last five months of the year to an average of $85.50 in December. The price remained firm throughout 1916, reaching a maximum of $101.25 for November, and an average for 1916 of $83.40.

Average Monthly Prices of Platinum, 1915 and 1916.*

(In dollars per ounce troy).

Month.	1915.			1916.		
	New York refined platinum	St. Petersburg 83%.	Ekaterinburg crude metal platinum.	New York refined platinum	St. Petersburg 83%.	Ekaterinburg crude metal platinum.
January.....	41·10	.....	.....	90·05	61·25	61·10
February.....	40·00	30·38	30·08	90·00	61·14	62·63
March.....	39·50	30·38	30·08	90·75	.....	.....
April.....	38·63	30·38	30·08	83·10	63·70	63·70
May.....	38·50	30·57	30·08	80·50	66·64	65·92
June.....	38·00	32·39	31·02	78·13	63·70	63·92
July.....	38·00	32·39	31·02	63·60	63·21	63·92
August.....	39·25	32·30	30·73	62·56	67·41	66·45
September.....	50·00	.....	.....	84·25	67·41	66·45
October.....	54·50	37·98	38·70	89·75	77·42	71·44
November.....	62·63	47·46	46·64	101·25	.....	.....
December.....	85·50	56·40	56·25	86·87	.....	.....
Year.....	47·13	.....	.....	83·40	.....	.....

*From the "Engineering and Mining Journal."

Average Yearly Prices of Platinum.*

(In dollars per ounce troy).

	1911.	1912.	1913.	1914.	1915.	1916.
New York refined platinum	43.12	45.55	44.88	45.14	47.13	83.40
St. Petersburg, Russia, 83%	35.21	37.08	36.54	.....	.....	.....
Ekaterinburg crude metal platinum.	35.09	37.05	36.25	.....	.....	.....

*From quotation in "Engineering and Mining Journal," p. 47, January 8, 1916.

Imports of Platinum.*

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1883	$ 113	1889	$ 3,167	1895	$ 3,937	1901	$20,263
1884	576	1890	5,215	1896	6,185	1902	19,357
1885	792	1891	4,055	1897	9,031	1903	21,251
1886	1,154	1892	1,952	1898	9,781	1904	28,112
1887	1,422	1893	14,082	1899	9,671	1905	61,719
1888	13,475	1894	7,151	1900	57,910	1906	54,494

Calendar Year.	Crucibles.	Wire and bars, strips, sheets, or plates.	Retorts, pans, condensers, etc.	Total Imports.
	Value.	Value.	Value.	Value.
1907	$2,974	$ 89,719	$ 3,415	$ 96,108
1908	1,709	37,223	5,321	44,253
1909	3,617	61,441	9,432	74,590
1910	2,133	100,185	10,744	113,062
1911	4,549	170,944	.....	175,493
1912	7,874	224,216	73	232,163
1913	4,557	141,117	.....	145,674
1914	9,795	69,736	142	79,673
1915	5,147	65,040	13,900	84,087
1916	5,430	68,633	14,480	88,543

*Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

(a)Estimate of World's Production of Crude Platinum.

Country.	1911.	1912.	1913.	1914.	1915.	1916.
Borneo and Sumatra	.....	200	200	*	*	*
Canada	30	30	50	30	100	60
Colombia	12,000	12,000	15,000	17,500	18,000	25,000
New South Wales	470	778	1,275	1,248	303	222
Russia	300,000	300,000	250,000	241,200	124,000	63,900
United States	628	721	483	570	742	750
	313,128	313,729	267,008	260,548	143,145	89,932

*No basis for estimate.
(a) From the Mineral Resources of the United States, July, 1917.

SILVER.

The total production of silver in 1916, amounted to 25,459,741 fine ounces, valued at $16,717,121, and included: (a) refined silver, or silver contained in silver or gold bullion, 20,465,384 ounces, or 80·3 per cent; (b) silver contained in blister copper and copper matte, 779,916 ounces, or 3·1 per cent; and (c) silver estimated as recoverable from ores exported 4,214,441 ounces, or 16·6 per cent.

In 1915, the total production was 26,625,960 fine ounces, valued at $13,228,842, and included: (a) refined silver, 81 per cent; (b) silver in blister copper and copper matte produced 2·6 per cent; and (c) silver estimated as recoverable from ores exported 16·4 per cent.

For the last few years, the production has shown a falling off both in quantity and value, while in 1916, the production decreased 4·4 per cent, and the value increased 26·3 per cent.

From 1887 to 1893, the production ranged in value between $300,000 and $400,000, and was derived chiefly from Ontario and Quebec. The next three years saw a rapid increase in production, due to the development of the silver-lead deposits of British Columbia, and in 1896 a production of over $2,000,000 is recorded. From that year until 1905, the production varied between $2,000,000 and $3,500,000 rising rapidly during the next six years to $17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt district. Since then, there has been a falling off in quantity, but owing to the higher price of the metal, the total value was higher in 1912, 1913, and 1916.

Annual Production of Silver, 1887 to 1916.

Year.	Ounces.	Value.	Cents per ounce.	Year.	Ounces.	Value.	Cents per ounce.
1887	355,083	$ 347,271	98·00	1902	4,291,317	$2,238,351	52·16
1888	437,232	410,998	94·00	1903	3,198,581	1,709,642	53·45
1889	383,318	358,785	93·60	1904	3,577,526	2,047,095	57·22
1890	400,687	419,118	104·60	1905	6,000,023	3,621,133	60·35
1891	414,523	409,549	98·00	1906	8,473,379	5,659,455	66·79
1892	310,651	272,130	86·00	1907	12,779,799	8,348,659	65·33
1893	.....	330,128	77·00	1908	22,106,233	11,686,239	52·86
1894	847,697	534,049	63·00	1909	27,529,473	14,178,504	51·50
1895	1,578,275	1,030,299	65·28	1910	32,869,264	17,580,455	53·49
1896	3,205,343	2,149,503	67·06	1911	32,559,044	17,355,272	53·30
1897	5,558,456	3,323,395	59·79	1912	31,955,560	19,440,165	60·83
1898	4,452,333	2,593,929	58·26	1913	31,845,803	19,040,924	59·79
1899	3,411,644	2,032,658	59·58	1914	28,449,821	15,593,630	54·81
1900	4,468,225	2,740,362	61·33	1915	26,625,960	13,228,842	49·68
1901	5,539,192	3,265,354	58·95	1916	25,459,741	16,717,121	65·66

Ontario produced in 1905, 40·9 per cent of the output of Canada, in 1911 its percentage was 93·8; in 1914 it had fallen to 88·4 per cent, and in

1915 it decreased again to 85·4 per cent, while in 1916 it amounted to 84·9 per cent of the total.

Quebec and the Yukon, have produced but a small proportion of the total, being in 1915, 0·3 per cent for Quebec, and 0·9 per cent for the Yukon; while in 1916, Quebec produced 0·4 per cent and the Yukon, 1·4 per cent.

The production of British Columbia, which has varied between two and five million ounces for the last twenty years, was in 1914, 11·1 per cent of the total production of Canada; in 1915 it increased to 13·4 per cent, and in 1916 it was 13·3 per cent of the total.

Production of Silver by Provinces, 1887-1916.

Year.	Ontario.		Quebec.		British Columbia.		Yukon Territory.	
	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
1887	190,495	$ 186,304	146,898	$143,666	17,690	$ 17,301	.....	.....
1888	208,064	195,580	149,388	140,425	79,780	74,993	.....	.....
1889	181,609	169,986	148,517	139,012	53,192	49,787	.....	.....
1890	158,715	166,016	171,545	179,436	70,427	73,666	.....	.....
1891	225,633	222,926	185,584	183,357	3,306	3,266	.....	.....
1892	41,581	36,425	191,910	168,113	77,160	67,592	.....	.....
1893	.....	8,689	.....	126,439	.....	195,000	.....	.....
1894	.....	.....	101,318	63,830	746,379	470,219	.....	.....
1895	.....	.....	81,753	53,369	1,496,522	976,930	.....	.....
1896	.....	.....	70,000	46,942	3,135,343	2,102,561	.....	.....
1897	5,000	2,990	80,475	48,116	5,472,971	3,272,289	.....	.....
1898	85,000	49,521	74,932	43,655	4,292,401	2,500,753	.....	.....
1899	202,000	120,352	40,231	23,970	2,939,413	1,751,302	230,000	$137,034
1900	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901	151,400	89,250	41,459	24,440	5,151,333	3,036,711	195,000	114,953
1902	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,985
1903	17,777	9,502	28,600	15,287	2,966,204	1,601,471	156,000	83,362
1904	206,875	118,376	15,000	8,583	3,222,481	1,843,935	133,170	76,201
1905	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304
1909	24,822,099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176
1910	30,366,366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46,756
1911	30,540,754	16,279,443	18,435	9,827	1,887,147	1,005,924	112,708	60,078
1912	29,214,025	17,772,352	9,465	5,758	2,651,002	1,612,737	81,068	49,318
1913	28,411,261	16,987,377	34,573	20,672	3,312,343	1,980,483	87,626	52,392
1914	25,139,214	13,779,055	57,737	31,646	3,159,897	1,731,971	92,973	50,959
1915	22,748,609	11,302,419	63,450	31,524	3,565,852	1,771,658	248,049	123,241
1916	21,608,158	14,188,133	98,610	64,748	3,392,872	2,227,794	360,101	236,446

Prices.—The average price of silver in New York for the year 1916 was 65·661 cents per ounce, as against 49·684 cents in 1915.

The price, which was 56½ cents during the first week of January, gradually increased, reaching a maximum of 77¼ cents early in May; it then receded gradually to 61⅞ cents towards the middle of July, to again increase to 76⅝ cents in the last week of the year.

In London, the average price for the year was 31·315 pence per standard ounce (925 parts fine), as against 23·675 pence in 1915. The minimum prices were 26⅞ pence early in January, and 29½ pence in the middle of July; while the maximum prices were 37½ pence early in May, and 36 13/16 pence at the end of December.

The high silver prices in 1916 were due to the augmented demand from the Mints of the Entente Powers, a diminished supply, and also increased consumption in India, and the United States.

Yearly Average Prices of Silver in New York and London.

Year.	New York. Cents per fine ounce.	London. Pence per Standard ounce.(a)	Year.	New York. Cents per fine ounce.	London. Pence per Standard ounce. (a)
1908	52·864	24·402	1913	59·791	27·576
1909	51·503	23·726	1914	54·811	25·313
1910	53·486	24·670	1915	49·684	23·675
1911	53·304	24·592	1916	65·661	31·315
1912	60·835	28·042			

(a) 925 parts fine.

Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.						London—Pence per Standard ounce (a).
	1911.	1912.	1913.	1914.	1915.	1916.	1916.
January	53·795	56·260	62·938	57·572	48·855	56·775	26·960
February	52·222	59·043	61·642	57·506	48·477	56·755	26·975
March	52·745	58·375	57·870	58·067	50·241	57·935	27·597
April	53·325	59·207	59·490	58·519	50·250	64·415	30·662
May	53·308	60·880	60·361	58·175	49·915	74·269	35·477
June	53·043	61·290	58·990	56·471	49·034	65·024	31·060
July	52·630	60·654	58·721	54·678	47·519	62·940	30·000
August	52·171	61·606	59·293	54·344	47·163	66·083	31·498
September	52·440	63·078	60·640	53·290	48·680	68·515	32·584
October	53·340	63·471	60·793	50·654	49·385	67·855	32·361
November	55·719	62·792	58·995	49·082	51·714	71·604	34·192
December	54·905	63·365	57·760	49·375	54·971	75·765	36·410
Average for the year	53·304	60·835	59·791	54·811	49·684	65·661	31·315

(a) 925 parts fine. From "Engineering and Mining Journal," Jan. 6, 1917.

Important quantities of silver are being produced in Canada, both as fine metal and as silver bullion, ranging in fineness from 850 to 998·2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, being derived chiefly from the silver-lead ores of the Province, and finds a market in Canada, the United States, and China.

In Ontario, ores from the Cobalt district are treated by the Coniagas Reduction Co., Thorold, Ontario; the Deloro Smelting and Refining Co., Deloro, Ontario; the Metals Chemical Co., Welland, Ontario; and the Standard Smelting and Refining Co., Chippewa, Ontario.

Silver bullion varying from 850 to 998·2 is produced at these works, other products being white arsenic, metallic nickel and cobalt, sulphate of nickel and cobalt, nickel and cobalt-oxides, and mixed oxides. The silver bullion as a rule finds a market in the United States and in England.

Bullion shipped by these Ontario smelters in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1911, 17,753,167 ounces;

in 1913, 11,356,707 ounces; in 1915, 9,885,989 fine ounces, and in 1916, 9,665,516 fine ounces.

The bullion shipped from the mines and mills in the Cobalt district in 1916, is reported as 8,551,070 fine ounces, as against 9,204,893 fine ounces in 1915, and 10,335,527 in 1914.

United States smelters report the receipt in 1916 of 7,072 tons of ore from Cobalt district, containing 3,238,795 fine ounces of silver, as against 7,310 tons, containing 3,580,843 fine ounces in 1915.

Exports and Imports.—The exports of silver as metallic or contained in ores, concentrates, etc., during 1916 were 25,279,359 fine ounces valued at $15,637,885, as against 27,672,481 fine ounces, valued at $13,812,038 in 1915.

The imports of silver bullion into Canada in 1916 were valued at $875,157, as against imports to the value of $337,254 in 1915.

Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1886	$ 25,957	1896	$2,271,959	1906	$ 5,686,444
1887	206,284	1897	3,576,391	1907	9,941,849
1888	219,008	1898	2,902,277	1908	12,403,482
1889	212,163	1899	1,623,905	1909	15,719,909
1890	204,142	1900	2,341,872	1910	15,649,537
1891	225,312	1901	2,026,727	1911	15,807,366
1892	56,688	1902	1,820,058	1912	19,494,416
1893	213,695	1903	1,989,474	1913	21,441,220
1894	359,731	1904	1,904,394	1914	15,584,813
1895	994,354	1905	2,777,218	1915	13,812,038
				1916	15,637,885

Imports of Silver Bullion.

Calendar Year.	Value.	Calendar Year.	Value.
1910	$ 975,045	1913	$840,245
1911	847,645	1914	629,279
1912	1,100,344	1915	337,254
		1916	875,157

Quebec.

The small quantity of silver credited to Quebec province for a number of years represents a small silver content of the pyritic ores mined at Eustis and Weedon, in the Eastern Townships, and the lead-zinc ores of Notre-Dame des Anges, Portneuf county. The production in 1916 was 98,610 fine ounces, valued at $64,748, as against 63,450 fine ounces, valued at $31,524 in 1915.

Ontario.

The production of silver in Ontario increased from 17,777 fine ounces in 1903 to 2,451,356 fine ounces in 1905, and reached a maximum of 30,-540,754 fine ounces in 1911. The maximum value, $17,772,352, was reached in 1912.

In 1916 the production was 21,608,158 fine ounces, valued at $14,188,133, as against 22,748,609 fine ounces, valued at $11,302,419 in 1915, a decrease of 5·0 per cent in quantity, but an increase of 15·5 per cent in value. The production included in addition to the production of the Cobalt and adjacent silver camps, 86,974 ounces contained in gold bullion, as against 74,784 ounces in 1915.

The silver ores of the Cobalt district, which in the early days of the camp were all exported for treatment, are being reduced to an increasing extent each year within the camp by a combination of amalgamation cyanide process, with recovery of silver bullion. During 1916, 8,551,070 ounces, or 39·5 per cent of the output was thus recovered as bullion in the district, while 9,665,516 ounces, or 44·7 per cent of the total was recovered by the silver smelters of the Province, so that over 18 millions or 84·2 per cent of the Ontario production was recovered in the form of bullion within the Province, leaving a balance of 15·8 per cent treated in the United States. In 1915 about 41 per cent was recovered as bullion in the district and 43 per cent by the silver smelters, giving a total of 84 per cent as recovered in the form of bullion within the Province, while in 1914, the recovery in the district was 41 per cent, and that by the silver smelters 36 per cent, or a total of 77 per cent as recovered within the Province.

The following notes are taken from the respective company's reports:—

Canadian Mining Corporation, Ltd.

Record of production for 12 months ending December 31, 1916:—

Tons of ore broken	65,645
" " hoisted	101,271
" " treated	114,392
Silver content in ounces	4,837,667·78
" " per ton	42·29
" recovered	3,884,427·54
Percentage of recovery	80·29
Tons of slimes, treated by cyanidation	51,171·75
Silver content of slimes, in ounces	705,887·81
" recovered from slimes, in ounces	573,013·26
Percentage of recovery, in ounces	81·18
Total silver recovered, in ounces	4,457,440·80
" percentage of extraction	92·14
" average silver production per ton of ore, in ounces	38·97

The proportion of silver produced from high grade and other shipping ore, as compared with the total silver produced, was 32·85% in 1916, as against 35·90% in 1915.

The total production from the Company's mines since the commencement of operations up to December 31, 1916, was 23,129,040 ounces.

The total cost per ton of ore treated was $13.43 in 1916, as against $10.15 in 1915, and $9.16 for the nine months in 1914; and the cost per ounce of silver was 34·46 cents as against 29·57 cents in 1915, and 30·91 cents in 1914.

The ore reserves estimated at December 31, 1916, are reported as 67,752 tons, containing 3,235,000 ounces of silver.

Nipissing Mines Company.

Year ending December 31, 1916:—(Nipissing production only).

Total tonnage of ore produced (high grade 1,269 tons)	78,120
" tonnage of ore treated (high grade 1,064 tons)	78,021
" silver produced, in ounces	4,044,668·49
" gross value of production	$3,027,668.83
" net value of production	$2,955,062.16
" tonnage of ore produced since 1904, inclusive	30,413·74
" gross ounces of silver produced	45,029,006·52
" " value	$26,180,028.71
" Net "	$24,846,967.90

"The high grade mill ran at full capacity throughout the year, and treated 1,064 tons of Nipissing ore and metallics, assaying 1,800 ounces per ton and 598 tons of custom ore and metallics, with an average assay of 3,113 ounces per ton.

"The precipitate from the low grade mill, containing over two million ounces was also refined at the high grade plant.

"Shipments of bullion amounted to 192 tons, averaging 998 fine, and contained 5,578,-162 fine ounces.

"The treatment cost was higher on account of the largely increased cost of mercury and cyanide, due to the war. The same cause, however, produced an active demand for cobalt, so that we were enabled to sell our entire stock of cobalt residue and to contract for the whole of our 1917 output.

"Shipments of residue in 1916 amounted to 2,506 tons, compared with 326 tons in 1915.

"The low grade mill treated 76,851 tons of Nipissing ore, averaging 29·61 ounces per ton, and 106 tons of by-products, assaying 1,732·38 ounces with a recovery of 2,133,681 ounces in the cyanide plant, or an extraction of 86·76 per cent.

"The above recovery does not include the silver saved by flotation of the cyanide tailing.

"Forty stamps ran 286·71 days or 78·33% of possible running time, crushing 268·04 tons per day, and 6·70 tons per stamp per day.

"The ore coming from the lower levels of the mine is more difficult to treat and consumes more cyanide. This, together with rapid rise in prices of all chemicals and supplies, and the advance in wages, brought the mill costs up to $4.60 per ton, compared with $3.91 in 1915; of this increase $0.34 is due to cyanide and $0.15 to wages.

"The high cost of aluminum dust necessitated the adoption of some other method of precipitation, and after exhaustive experiments precipitation by sodium sulphide was substituted. A solution of caustic soda is added to the precipitate, which is then desulphurized by circulating it through a small tube mill filled with aluminium ingots. The precipitate is then melted down to fine silver. The new practice is very satisfactory, and is cheaper even should the prices of all supplies drop to the pre-war basis.

"Experiments with the flotation of the tailing from the cyanide plant have been carried on throughout the year; the results are not yet satisfactory. The extraction is low, notwithstanding many variations in the method of applying the flotation treatment. By supplementing the treatment with concentration, either before or after flotation, much better results can probably be obtained and experiments are now being conducted along this line."

Coniagas Mines, Ltd.

Year ending October 31, 1916:—

Tons of ore treated	56,973
" " high grade concentrates shipped	492
Average silver content, in ounces	2,276·6
Tons of low grade slime	152·4
Average silver content, in ounces	329·8
Tons of mine ore shipped	193·2
Average silver content, in ounces	2,710·3
Tons of precipitate shipped	3·5
Average silver content, in ounces	20,494·6
Per cent of possible running time	99·83

"Mill heads averaged 25·76 ounces per ton as compared with 23 ounces for 1915. The sand tailings from the mill averaged 3·33 ounces per ton, and the slime tailings 4·90 ounces per ton, or an average for general tailings of 3·99 ounces.

"A recovery of 131·3 tons of slime concentrates containing 26,986 ounces of silver was made in the canvas plant which was erected to re-treat the slime tailings. Forty-four tons containing 8,968 ounces were shipped to the Coniagas Reduction Company, and 87·3 tons containing 18,018 ounces were treated in the cyanide mill.

"Cyanidation of canvas table concentrates and of the primary slime from the mine was begun February 26, 1916, and was continued during the remainder of the year. During this period 87·3 tons, dry weight, of canvas table concentrates, averaging 206·40 ounces per ton, and 889·3 tons, dry weight, of mine slime averaging 81·62 ounces per ton were treated, or a total of 976·6 tons, dry weight, containing 81,916 ounces of silver, of which 71,731·24 ounces of silver were recovered.

"The ore has been mined and concentrated during the past year at the net cost of 15·24 cents per ounce as compared with 13·618 cents per ounce for the previous year. This cost includes all overhead expenses, royalties, and all other expenses, exclusive of shipping, smelting, refining, and marketing charges which amounted to 4·27 cents per ounce of silver as compared with 3·252 cents for the previous year. It also includes the cost of development of the Agaunico property amounting to about 1 cent per ounce, but excludes an undetermined War Tax."

Buffalo Mines, Ltd.

Year ending April 30, 1917:—

Tonnage of ore treated by combination concentration and oil flotation methods	14,452
Tonnage of sand tailings treated by flotation process	35,507
Recovery from combination concentration and oil flotation, in ounces	324,636
Tonnage of slime from concentrator cyanided	3,038
Recovery from slimes, in ounces	37,089
" " shipments of concentrates, residues, etc., in ounces	205,194
" " bullion shipments, in ounces	36,715
Total production of silver for year	394,587

"The ore reserves amount to 40,900 tons with a total content of 1,071,125 ounces.

"The sand tailings approximate 275,000 with an estimated content of 1,400,000 ounces, and there also 3,000 tons of residues at the high grade plant.

"The reconstruction of plant is still under way and refining plant is not yet completed for the final treatment of flotation concentrates. This has been considerably delayed, due to our inability to get the equipment required and delay in making the installation, but it is probable the refining plant will again be in operation, treating both high grade and low grade ore by the new process in the latter part of June.

"This should materially decrease the cost of treatment both for high grade ore and flotation concentrates, and is a possible solution of the residue pile with its additional values in cobalt and nickel. The completion of the present process should for the present end the matter of reconstruction and allow us to get down to systematic work again."

Kerr Lake Mining Company.

Year ending August 31, 1916:—

Tonnage of ore treated (10,354 tons from dump)	36,129
Average grade ore treated in ounces	27·55
High grade ore shipped, in tons	493
Production from shipping ore, in ounces	1,438,600·80
" " milling ore, in ounces	995,192·27
Total gross production, in ounces	2,433,793·07

The cost of mining was $3.68 per ton, and 8·89 cents per ounce. The ore reserves are estimated at 3,827,000 ounces.

British Columbia.

The silver production of British Columbia based on smelter recoveries in 1916 was 3,392,872 fine ounces, valued at $2,227,794, as against 3,565,852 fine ounces, valued at $1,771,658 in 1915, a decrease of 4·8 per cent in quantity, but an increase of 25·7 per cent in value.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenays, supplemented by the silver contained in the gold-copper ores of Rossland, the Boundary, and Coast districts.

The leading silver producers, in order of importance were:—

Silver-Lead Mines.—Sullivan, Standard, Utica, Rambler, Cariboo, Galena Farm, Surprise, Ruth-Hope, Slocan Star, Silver Standard, and Blue Bell.

Copper-Gold Mines.—Hidden Creek, Granby, Centre Star, Le Roi, Britannia, Le Roi No. 2, Mother Lode, Rocher Deboule, and Marble Bay.

Gold-Silver Mines.—Union, Horn-Silver, Nickel Plate, and Jewel.

Production of Silver in British Columbia by Districts, 1912-1916.

(Silver contents of ores shipped, in fine ounces.)

——	1912.	1913.	1914.	1915.	1916.
Cariboo—					
Omineca division	.....	46,298	135,265	79,155	112,635
Cassiar:—					
Atlin	.....	.....	.....	.....	3,054
Skeena, etc.	5,868	4,714	131,509	175,179	256,802
Kootenay, East—					
Fort Steel division	376,918	362,311	492,080	481,258	509,693
Other divisions	7,405	4,756	.....	1,188	29,178
Kootenay, West—					
Ainsworth division	301,755	477,015	329,586	289,565	321,202
Slocan division	1,657,105	1,841,226	1,775,975	1,812,550	1,480,571
Nelson division	164,182	129,011	150,268	9,405	32,547
Trail Creek division	87,530	109,585	136,185	159,584	132,080
Revelstoke, Trout Lake, and Lardeau	43,536	23,397	11,295	16,740	22,419
Yale—					
Boundary	389,341	394,048	347,981	273,795	280,578
Similkameen Nicola	.....	335	15	347	830
Yale, Ashcroft and Kamloops	.....	126	57	1,702	4,215
Lillooet	.....	295	390	5	.....
Coast and other districts	98,468	103,034	91,574	66,033	116,119
Total	3,132,108	3,465,856	3,602,180	3,366,506	3,301,923

*From the Minister of Mines Reports, British Columbia.

Yukon.

The silver production of the Yukon in 1916 amounted to 360,101 fine ounces, valued at $236,466, as against 248,049 ounces valued at $132,241 in 1915, and 92,973 ounces, valued at $50,959 in 1914.

The comparatively large increase in the production for the past two years is due to the shipments of high grade silver-lead ores from the Silver-King property in the Mayo area, north of the Stewart river.

Thus lode mining, including recovery from the gold, copper and silver-lead ores, produced in 1916, 13 per cent of the total output, leaving 87 per cent as the production from the alluvial workings.

On an average about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings.

TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. Reports upon it may be found in the Summary Report of the Geological Survey Branch of the Department of Mines, for 1907, 1908, 1910, 1911, and 1912.

Tin has also been found in black sands in the Atlin district of British Columbia.

The imports of 1916 were valued at $2,999,675, and included: tin in blocks, pigs, and bars, 3,457,500 pounds, valued at $1,372,200; tin foil, bichloride of tin and strip waste, $1,544,420; and tin ware and crystals, valued at $1,311,482. There is also a large annual import of tin plate, the quantity in 1916 being 115,084,900 pounds, valued at $5,221,163.

Annual Imports of Tin.

Calendar Year.	Tin in blocks, pigs and bars.		Tin foil.		(a) Tinware, etc.	Tin crystals.	Bichloride of tin.		Strip waste.	
	Pounds.	Value.	Pounds.	Value.	Value.	Value.	Pounds.	Value.	Pounds.	Value.
1910	3,231,100	$1,058,778	866,751	$114,602	$389,040	$3,903	31,219	$3,846	.....	.....
1911	4,047,500	1,623,670	1,531,877	176,602	461,029	4,370	25,797	3,876	.....	.....
1912	4,894,700	2,134,221	1,316,882	183,707	540,599	6,308	36,045	5,595	.....	.....
1913	5,085,700	2,252,324	1,074,131	188,779	667,158	8,077	19,114	2,422	.....	.....
1914	3,382,700	1,191,466	1,244,628	173,088	650,987	7,759	200	29	.....	.....
1915	2,912,600	1,009,597	1,002,413	151,599	463,610	9,852	.....	.....	5,335	$138
1916	3,457,500	1,372,200	1,507,318	314,970	1,301,008	10,474	81	48	37,021	975

(a) Tinware, plain, japanned or lithographed, and all manufactures of tin n.e.s.

TUNGSTEN.

No production of tungsten is reported during 1916.

Scheelite was discovered in Halifax county, Nova Scotia, in 1908. Mr. Faribault, of the Geological Survey, visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, pages 228 to 234. During 1910 and 1912 these deposits were developed by the Scheelite Mines, Limited, who constructed a mill and made a shipment of 14 tons of tungsten concentrates —the first shipment from Nova Scotia—carrying 72 per cent tungstic acid.

The occurrence of wolframite has also been noted in association with molybdenite, by Dr. Walker, in New Brunswick, near the confluence of Burnt Hill brook and southwest Miramichi river. The property was tested by Mr. Freeze, of Doaktown, New Brunswick, and Mr. Matthew Lodge, of Moncton, who formed the Acadia Tungsten Mines Company. This Company has done a little development and had under construction a 30-ton concentrator, during 1916.

The tungsten ore deposits of Nova Scotia and New Brunswick were reported on by Mr. Charles Camsell and Dr. D. D. Cairnes, in the Summary Report of the Geological Survey Branch for 1916.

During September 1916, Dr. D. D. Cairnes investigated the possibility of important deposits of scheelite on Dublin gulch, Mayo district, Yukon territory, and reports rather favourably on these deposits, stating that the ore is found as alluvial with the gold placer and in lodes associated with small, barren, ramifying quartz veinlets which occur very plentifully intersecting pegmatitic zones within the granite. The scheelite, where found, occurs in the form of crystals along the edges of and between the veinlets.

He states that between $1\frac{1}{2}$ and 2 tons of scheelite concentrates should be freighted to Mayo during the winter and be available early in the summer of 1917. He looked to a recovery for the season of 1917 of from 10 to 20 tons of concentrates in addition to the gold.[1]

Prices.—The most spectacular advance in the price of metal known in recent years was in tungsten, both metal and ore.

During the first quarter of 1915, the New York market was very poor, ranging from $6.00 to $9.00 per unit. Following enormous orders for war requirements, in April and May, 1915, the price reached $10.00 per unit and continued rising by leaps and bounds. Large quantities of tungsten ore were booked in December at $44.00 per unit and also at $50.00 per unit. Ammunition buyers have paid as much as $62.50 per unit or even more.

[1] Summary Report of the Geol. Survey for 1916, pp. 12-19.

Early in 1916 the demand for tungsten ore advanced the price rapidly to $60.00 per unit by the end of January, and $70.00 in the latter part of February. Spot tungsten in March realized $85.00 per unit, in New York, and even a higher figure was paid in the West for immediate delivery. And towards the middle of April sales at round $100.00 per unit were reported, but at the close of the month the quotations for tungsten ore experienced a heavy break caused mostly by the great increase in production which soon satisfied consumers as to their requirements. By the middle of May prices had dropped, and ranged from $40.00 to $45.00 per unit. By the middle of August, the price had gone to $20.00.

Orders from the allied countries found sellers willing to accept $15.00 early in September. The market strengthened, and $18.00 and $20.00 were paid for prompt delivery towards the close of 1916.[1]

"The average price obtained in the United States the first six months of 1916 was $2,700 per ton; the average price in 1915 was $970; in 1914 it was $400; in 1913, $438; and in 1912, $377 per ton. Early in 1917 the price ranged from $1,800 to $2,000 per ton."[2]

The official prices in London for tungsten powder were 6s 3d ($1.52) per pound for the whole year, with the exception of the period from May 26th. until September 22nd., when it was fixed at 5s 10d ($1.42) per pound. The price for ferro-tungsten varied between 6s 1d ($1.48) and 5s 6d ($1.34) per pound.

[1] From quotations by the Engineering and Mining Journal.
[2] From the Denver Mining and Financial Record.

ZINC.

With the exception of a small production in experimental work, there was no recovery of zinc spelter, or refined zinc in Canada previous to 1916. Hitherto the production of zinc has been recorded in terms of the tonnage of ore shipped and metal contents thereof. The establishment of an electrolytic refinery at Trail has placed the metallurgy of this metal in Canada on a similar basis to that of lead and copper, and it will be in order to record the production accordingly.

In 1915 the shipments of zinc ores to the United States smelters for reduction were 14,895 tons valued at $554,938, and containing 12,231,439 pounds of zinc. Assuming a probable recovery of 80% of the metal, the production of zinc may be recorded as 9,785,151 pounds which, at the average price of zinc for the year, 13·230 cents per pound in New York, would be worth $1,294,575.

In 1916 the total zinc ore shipments from mines, including the zinc-lead ores from the Sullivan mine, and ores exported were about 82,077 tons, containing 48,498,078 pounds of zinc (partially estimated in the absence of complete returns). A portion of the ores shipped to Trail were not treated during the year and the percentage of zinc recovered at the Trail refinery in the early stages of operation was probably not as large as will be secured when the primary difficulties have been eliminated. Adding to the actual recovery of refined zinc at Trail the zinc contents of ores sent to the United States smelters after allowing for smelter losses, we have a zinc production of 23,364,760 pounds which, at the average price of zinc for the year, 12·804 cents, would be worth $2,991,623. Of the total production thus recorded 1,663,200 pounds is credited to the Notre-Dame des Anges ores in Quebec, and 21,701,560 pounds to British Columbia.

The greater part of this production is from British Columbia, and the ore shipped contains also a varying silver content, for which payment is made by the smelters, and without which, on account of the import duty to the United States and the long rail haul, it would not, in many cases, pay to ship. The Slocan mining division produced about $\frac{1}{3}$ of the total output, the Fort Steele division, about $\frac{1}{2}$, and the balance came mostly from the Ainsworth and Nelson divisions.

In Quebec, the property at Notre-Dame des Anges, Portneuf, which is being operated by the Weedon Mining Company, shipped several hundred tons of ore, and a small production was made by Mr. P. Tetreault.

The output from Quebec was about 5 per cent of the total production from Canada.

Annual Shipments of Zinc Ores.

Year.	Zinc ore shipped.		Metallic zinc in ore shipped.
	Tons.	Spot value.	Pounds.
1898	1,162	$ 11,000	788,000
1899	865	18,165	814,000
1900	261	4,810	212,000
1901	.....	.....	.....
1902	158	1,659	142,200
1903	1,000	10,500	900,000
1904	597	3,700	477,568
1905	9,413	139,200	*
1906	1,154	23,800	*
1907	1,573	49,100	*
1908	452	3,215	*
1909(a)	18,371	242,699	16,468,204
1910	5,063	120,003	4,361,712
1911	2,590	101,072	2,346,849
1912	6,415	215,149	5,354,700
1913	7,889	186,827	7,069,800
1914	10,893	262,563	9,101,460
1915	14,895	554,938	12,231,439
1916	82,077	1,086,249	48,498,078

*Figures not available.
(a) Includes 7,424 tons shipped late in 1908.

The zinc industry has been the subject of a special report in 1905 by a Commission appointed to investigate the zinc resources of British Columbia, and the conditions affecting their exploitation.

In 1916 a brief report was made by Dr. A. W. G. Wilson on the production of spelter in Canada, and conditions in connexion with the home treatment of British Columbia zinc ore.[1]

During 1913 the new United States customs tariff came into effect considerably reducing the duties payable on Canadian ores, the new items affecting Canadian shipments being:—

Zinc ores containing 25 per cent or more zinc: 10% on zinc contained therein. Lead bearing ore: $\frac{3}{4}$ cent per pound on lead contained therein.

Although not paid for by the United States smelters, the lead in ore is considered as dutiable and as there is often a small lead content in the zinc ore or cencentrates shipped, the lead duty applies. The result of the decreased duties has been a considerable increase in zinc shipments.

There is also a duty of 15 per cent on metallic zinc exported to the United States, and at present an import of $7\frac{1}{2}$ per cent on zinc and other materials imported into Canada from the United States.

Prices.—The price of spelter in New York, which was 16 cents early in January rose sharply to $18\frac{1}{4}$ cents towards the end of the month, to decrease gradually to a minimum of $8\frac{1}{4}$ cents towards the end of August. Early in September a large business was done and the price gradually strengthened to 13 cents in November, but in December the market was weak, and the year finished with spelter quoted at $9\frac{1}{2}$ cents.

[1] Mines Branch No. 12. Report of the Commission on the Investigation of the Zinc Resources of British Columbia, 1905. (Out of print.)
Mines Branch No. 428. Report on the Production of Spelter in Canada, 1916, by Dr. A. W. G. Wilson.

Average Price of Spelter in Cents per Pound at New York.

Month.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	6·101	5·452	6·442	6·931	5·262	6·386	16·915
February	5·569	5·518	6·499	6·239	5·377	8·436	18·420
March	5·637	5·563	6·626	6·078	5·250	8·541	16·846
April	5·439	5·399	6·633	5·641	5·113	10·012	16·695
May	5·191	5·348	6·679	5·406	5·074	14·781	14·276
June	5·128	5·520	6·877	5·124	5·000	21·208	11·752
July	5·152	5·695	7·116	5·278	4·920	19·026	8·925
August	5·279	5·953	7·028	5·658	5·568	12·781	8·730
September	5·514	5·869	7·454	5·694	5·380	13·440	8·990
October	5·628	6·102	7·426	5·340	4·909	12·800	9·829
November	5·976	6·380	7·371	5·229	5·112	15·962	11·592
December	5·624	6·301	7·162	5·154	5·592	15·391	10·669
Year	5·520	5·758	6·943	5·648	5·213	13·230	12·804

*From the Engineering and Mining Journal, N.Y., Jan. 6, 1917.

Average Prices of Spelter, Ordinary Brands, in London.*

(In pounds per ton.)

Month.	1910.			1911.			1912.			1913.			1914.			1915.			1916.		
January	23	4	3	23	16	7	26	9	11	25	19	1	21	6	6	30	16	1	83	12	5
February	23	3	1	23	3	10	26	6	5	25	4	3	21	7	6	39	16	4	93	10	11
March	23	3	7	22	19	2	25	19	11	24	11	4	21	7	7	44	2	7	90	1	9
April	22	9	11	23	13	8	25	8	11	25	2	4	21	10	2	49	17	9	94	1	8
May	22	1	1	24	6	1	25	11	2	24	10	4	21	5	9	67	19	0	89	11	4
June	22	3	2	24	9	7	25	11	11	21	19	10	21	6	0	100	12	3	63	16	4
July	22	5	6	24	13	10	25	13	1	20	11	2	21	6	7	97	5	0	48	7	6
August	22	14	0	26	11	2	26	1	2	20	14	0	29	0	9	67	15	9	47	19	7
September	23	2	7	27	12	7	26	17	0	21	3	10	25	14	0	67	17	9	48	15	8
October	23	16	6	27	4	10	27	5	10	20	13	9	23	13	6	66	10	11	52	4	4
November	24	1	9	26	13	2	26	14	3	20	14	4	24	14	10	85	6	4	55	0	5
December	23	17	7	26	13	7	26	0	4	21	6	8	27	6	10	82	4	1	54	5	9
Year	23	0	0	25	3	2	26	3	3	22	14	3	23	6	8	66	13	8	68	8	11

*From the annual publication of the "Metal Information Bureau," London, E.C.

Imports.—The recorded imports of zinc, which have hitherto been taken as an index of consumption, show a fairly steady increase, and amounted in 1916 to 29,999,838 pounds, valued at $3,642,476, with also manufactures of zinc valued at $48,101.

The imports of brass, which alloy contains about 30 per cent zinc, were valued in 1916, at $3,752,851.

The imports of zinc during 1915 were 28,170,757 pounds, valued at $2,753,647, with also manufactures of zinc valued at $21,711.

The imports of brass were valued at $2,463,532.

The detailed imports for the last three years are given in the following table, with also the estimated zinc contents of zinc products and brass.

Summary of Imports of Zinc and Zinc Products in 1914, 1915, and 1916.

Zinc and Zinc Products.	1914.			1915.			1916.		
	Product in pounds.	Value of products.	Zinc content in pounds.	Product in pounds.	Value of product.	Zinc content in pounds.	Product in pounds.	Value of product.	Zinc content in pounds.
Zinc, in blocks, pigs and sheets	3,160,900	$ 189,785	3,160,900	1,653,700	$ 226,104	1,653,700	1,624,600	$ 267,750	1,624,600
" as spelter	10,845,400	551,031	10,845,400	14,265,700	1,784,471	14,265,700	13,214,800	1,873,605	13,214,800
" seamless tubing				100	27	100			
" white	9,445,397	389,796	(80%) 7,556,318	11,368,569	656,132	(80%) 9,094,855	14,171,673	1,314,629	11,327,338
" dust	362,109	34,295	(90%) 325,898	503,143	70,823	(90%) 452,829	691,704	162,186	622,534
" sulphate and chloride of	352,715	9,390	(44%) 155,195	379,545	16,090	(44%) 167,000	297,061	24,306	130,707
Total	24,166,521	$1,174,297	22,043,711 (11,021·8 tons)	28,170,757	$2,753,647	25,634,184 (12,817·1 tons)	29,999,838	$3,642,476	26,919,979 (13,460 tons)
" as manufacture		$36,355			$21,711			$ 48,101	
Brass in blocks, pigs and ingots	1,010,600	$ 126,357	(30%) 303,180	1,677,800	$226,499	(30%) 503,340	736,000	$ 163,540	220,800
" old and scrap	1,407,900	150,346	" 422,370	311,900	41,971	" 93,570	848,800	183,611	254,640
" tubing	1,590,573	314,675	" 477,172	1,381,482	349,988	" 414,445	993,119	411,539	297,936
" plain wire	370,407	59,984	" 111,122	439,766	95,952	" 131,930	396,757	164,833	119,027
" bars and rods (free)	1,747,700	285,656	" 524,310						
Total	6,127,180	$ 937,018	1,838,154 (919·1 tons)	3,810,948	$ 714,410	1,143,285 (571·6 tons)	2,974,676	$ 923,523	892,403 (446·2 tons)
Brass, bars and rods		$ 94,827			$ 215,782			$ 362,318	
" strips, sheets or plates		110,733			234,590			242,101	
" wire cloth n.o.p.		120,614			147,464			266,202	
" cups for manufacture of shells		124,622			435,161			1,059,678	
" caps for electric-batteries		5,684			5,367			6,985	
" hand-pumps		11,956			10,930			22,795	
" nails, tacks, etc.		6,736			7,562			13,796	
" other manufactues, n.o.p.		1,445,898			1,406,676			1,778,976	
Total		$1,921,070			$2,463,532			$3,752,851	

Imports of Zinc.

Fiscal Year.	In blocks, pigs and sheets.		As spelter.		As manufactures of zinc.	Seamless tubing.	
	Cwt.	Value.	Cwt.	Value.	Value.	Pounds.	Value.
1880	13,805	$ 67,881	1,073	$ 5,301	$ 8,327	.....	.....
1881	20,920	94,015	2,904	12,276	20,178	.....	.....
1882	15,021	76,631	1,654	7,779	15,526	.....	.....
1883	22,765	94,799	1,274	5,196	22,599	.....	.....
1884	18,945	77,373	2,239	10,417	11,952	.....	.....
1885	20,954	70,598	3,325	10,875	9,459	.....	.....
1886	23,146	85,599	5,432	18,238	7,345	.....	.....
1887	26,142	98,557	6,908	25,007	6,561	.....	.....
1888	16,407	65,827	7,772	29,762	7,402	.....	.....
1889	19,782	83,935	8,750	37,403	7,233	.....	.....
1890	18,236	92,530	14,570	71,122	6,472	.....	.....
1891	17,984	105,023	6,249	31,459	7,178	.....	.....
1892	21,881	127,302	13,909	62,550	7,563	.....	.....
1893	26,446	124,360	10,721	49,822	7,464	.....	.....
1894	20,774	90,680	8,423	35,615	6,193	.....	.....
1895	15,061	63,373	9,249	30,245	5,581	.....	.....
1896	20,223	80,784	10,897	40,548	6,290	.....	.....
1897	11,946	57,754	8,342	32,826	5,145	.....	.....
1898	35,148	112,785	2,794	13,561	10,503	.....	.....
1899	18,785	107,477	5,450	29,687	14,661	.....	.....
1900	28,748	156,167	5,836	29,416	11,475	.....	.....
1901	20,527	103,457	14,621	58,283	6,882	.....	.....
1902	34,871	141,560	18,356	80,757	6,683	.....	.....
1903	26,646	142,827	23,159	110,817	9,754	.....	.....
1904	25,553	138,057	33,952	164,751	12,682	.....	.....
1905	25,141	141,514	37,941	206,244	11,912	.....	.....
1906	24,462	158,438	50,137	290,686	12,917	.....	.....
Calendar Year.							
1907	30,130	198,570	58,430	348,810	21,812	670	$53
1908	24,273	130,689	54,780	254,225	14,577	.....	.....
1909	35,283	199,016	120,615	592,148	16,073	.....	.....
1910	31,660	191,051	109,084	561,170	21,829	.....	.....
1911	33,678	206,859	116,996	654,097	30,862	.....	.....
1912	100,095	617,836	117,845	686,585	46,336	.....	.....
1913	47,226	291,368	126,051	661,207	54,898	.....	.....
1914	31,609	189,785	108,454	551,031	36,355	.....	.....
1915	16,537	226,104	142,657	1,784,471	21,711	100	27
1916	16,246	267,750	132,148	1,873,605	48,101	.....	.....

Imports of Zinc White, Zinc Dust, and Zinc Sulphate and Chloride.

Calendar Year.	Zinc white.		Zinc dust.		Zinc, sulphate and chloride of.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1910	8,496,399	$ 312,779	97,461	$ 4,859	237,466	$ 6,470
1911	8,537,498	314,194	86,242	5,718	414,500	15,930
1912	10,505,944	425,714	308,239	18,944	941,780	29,104
1913	12,682,126	525,643	412,294	26,403	634,634	17,424
1914	9,445,397	389,796	362,109	34,295	352,715	9,390
1915	11,368,569	656,132	503,143	70,823	379,545	16,090
1916	14,171,673	1,314,629	691,704	162,186	297,061	24,306

Consumption.—The table of imports shows that in 1916, 13,460 tons of zinc were imported as zinc or zinc products, with also 446 tons of zinc in brass, and approximately 1,000 tons as zinc contents of manufactures of zinc and brass, or a total of 14,906 tons, which added to the zinc refined in Canada, would give a total consumption of about 18,000 tons, as against 14,000 in 1915.

It is probable, however, in the case of zinc, as has been already shown for steel, copper and lead, that there have been other imports besides those recorded under the usual classification, and that the actual consumption in 1916 was greater than the above estimate.

There are now in Canada three companies constructing, or operating electrolytic plants, viz: The Electro Zinc Company, formerly at Welland, Ontario, and now at Shawinigan Falls, Que, which uses the Watt's process; the French Complex Ore Reduction Company at Nelson, B.C., using the French process; and the Consolidated Mining and Smelting Co. of Canada, Ltd., at Trail, B.C., which company has erected a large plant and is increasing its capacity so as to treat, it is reported, about 70 tons per day.

In 1916, the operations with the exception of the Trail plant were still in the experimental stages of development.

The plant of the Electro Zinc Co. was designed to recover refined zinc ores from Notre-Dame des Anges, Quebec.

The French Complex Ore Reduction Co. established a plant at Nelson, after the Provincial Government had guaranteed its bonds to the amount of $40,000, and was reported to be in a position to start operations early in 1917.

The Trail plant of the Consolidated Mining and Smelting Co. started regular commercial operations early in 1916, and in July it was reported to be producing 20 tons per day. Later in the year, the company undertook to increase its capacity to 45 tons, and then to 70 tons.

Early in 1917 it was reported to be producing about 45 tons per day.

Bounties.—An Act to provide for the payment of bounties on zinc produced from zinc ores mined in Canada was passed by the House of Commons of Canada, May 3, 1916, and reads as follows:—

"An Act to provide for the payment of Bounties on Zinc produced from Zinc Ores mined in Canada. His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

"1. This Act may be cited as The Zinc Bounties Act, 1916.

"2. Whenever it appears to the satisfaction of the Minister of Trade and Commerce who is charged with the administration of this Act, that the standard price of zinc or spelter in cakes, stocks or pigs, in London, England, is less than £36 19s 3d sterling, per ton of two thousand two hundred and forty pounds, the Governor in Council may authorize the payment out of the Consolidated Revenue Fund of a bounty on zinc or spelter, containing not more than two per cent of impurities, produced in Canada, at the time the price is as hereinbefore stated, from zinc ores mined in Canada. Such bounty shall be equal to the difference between such standard price per ton, and £36 19s 3d per ton, but shall in no case exceed two cents per

pound, and in no event shall any bounty be paid when the price received for such zinc and spelter by the producer is eight cents or more per pound.

"3. No bounty shall be payable under this Act on zinc or spelter produced during the continuation of the war, and in no event shall bounty be payable on zinc or spelter produced after the thirty-first day of July, one thousand nine hundred and seventeen.

"4. The total amount payable under the provisions of this Act shall not exceed the sum of $400,000.

"5. The Governor in Council may make regulations for carrying out the provisions of this Act."

Production of Zinc in British Columbia by Districts, 1912-1916.*

(Contents of ore shipped in pounds).

——	1912.	1913.	1914.	1915.	1916.
Kootenay, East—					
Fort Steele division	.....	.....	.....	180,000	14,840,000
Other divisions	142,643	.....	.....	311,719	210,000
Kootenay, West—					
Ainsworth division	.....	150,680	280,000	678,940	625,971
Nelson division	.....	.....	332,003	3,127,209	3,470,036
Slocan division	5,215,637	6,608,088	7,254,464	8,684,572	17,854,357
Cariboo—					
Omineca	.....	.....	.....	.....	168,616
	5,358,280	6,758,768	7,866,467	12,982,440	37,168,980

*From the Minister of Mines Reports, British Columbia.

World's Production of Spelter, in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Australia	1,198	.....	560	1,904	2,531	4,105
Austria and Italy	14,063	13,931	14,666	18,602	21,609	23,928
Belgium	181,851	184,194	190,233	215,050	220,678	217,928
France and Spain	61,512	61,859	65,191	79,791	79,543	78,289
Germany	239,062	242,594	251,046	276,008	298,794	312,075
Great Britain	60,029	65,422	69,531	73,803	63,086	65,197
Holland	19,017	21,548	23,121	25,059	26,380	26,811
Poland	9,740	8,758	9,514	10,952	9,659	8,389
United States	210,424	255,760	269,184	286,526	338,806	346,676
Norway	.....	.....	.....	7,363	8,959	10,237
Total	796,896	854,066	893,046	986,058	1,070,045	1,093,635

*Mineral Resources of the United States.

World's Consumption of Spelter, in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Austria-Hungary	35,935	36,155	37,258	47,950	51,588	44,533
Belgium	74,956	71,209	84,326	81,240	85,098	84,216
France	85,869	73,744	62,059	90,389	90,389	89,286
Germany	198,634	207,343	203,374	241,734	248,899	255,734
Great Britain	152,669	171,408	195,989	193,674	204,146	214,508
Holland	4,189	4,409	4,409	4,409	4,409	4,409
Italy	9,259	9,039	8,929	11,133	11,795	12,015
Russia	19,621	20,282	27,447	31,856	30,754	36,707
Spain	5,512	4,960	4,630	5,291	5,181	6,503
United States	214,167	270,730	245,884	280,059	340,372	295,370
Other countries	11,023	9,921	13,669	19,621	21,715	23,038
Total	811,834	879,200	887,974	1,007,356	1,094,346	1,066,319

*Mineral Resources of the United States.

Electrolytic Zinc Plants in Canada.

Company.	Location of plant.	Remarks.
Consolidated Mining and Smelting Co. of Canada, Ltd	Trail, B.C.	Capacity of plant, 45 tons of refined zinc per day being increased to 70 tons per day.
Electro Zinc Company, Ltd.	Shawinigan Falls, Que.	Experimental in 1916. Small plant for recovery of zinc from zinc oxide.
FrenchComplex Ore Reduction Company	Nelson, B.C.	Experimental. Small demonstration plant at Nelson, B.C.

Electrolytic Zinc Plants in the United States.*

Company.	Location of plant.	Daily spelter capacity.	Remarks.
American Smelting and Refining Co.	Omaha, Nebr.	Experimental	Operated in 1915.
" " "	Garfield, Utah	10 tons	Planned.
Anaconda Copper Mg. Co.	Anaconda, Mont.	25 tons	Under construction; 10 tons operated in 1915.
" " "	Great Falls, Mont	100 tons	Under construction.
Bully Hill Copper Co.	Bully Hill, Cal.	Experimental	Operated in 1915.
		10 tons	Under construction.
Daly-Judge Mining Co.	Park City, Utah.	15 tons	" "
Electrolytic Zinc Co.	Baltimore, Md.	10 tons	" " 2½ tons now in operation.
Mammoth Copper Mg. Co.	Kennett, Cal.	Experimental	Operated in 1915.
Northwestern Metals Co.	Helena, Mont.	Ore capacity 100 tons.	Malm process: not operated in 1915.
Reed Zinc Co.	Palo Alto, Cal.	Experimental	Operated in 1914-15.
River Smelting and Refining Co.	Keokuk, Iowa.	"	Operated in 1915.
Western Metals Co.	Georgetown, Colo.	Ore capacity 100 tons.	Malm process; under construction.

*As published by the United States Geological Survey, April 4, 1916.

Active Zinc Smelters in the United States, and Capacity in 1916, by Companies and States.*

Company.	Location.	Acid Plants.	Retorts at close of 1915.	Retorts June 30 1916.	Additional retorts contemplated or under construction.
Fort Smith Spelter Co.	Fort Smith, Ark.			2,560	
Arkansas Zinc Co.	Van Buren, "			2,400	
United States Zinc Co.	Pueblo, Colo.		2,208	1,944	
American Zinc Co. of Illinois	Hillsboro, Ill.	A	4,000	4,864	
Collinsville Zinc Sm. Co.	Collinsville, "		1,792	2,304	
Granby Mg. & Sm. Co.	E. St. Louis, "	A	3,220	3,220	2,400
Hegeler Zinc Co.	Danville, "	A	3,600	5,400	
Illinois Zinc Co.	Peru, "	A	4,640	4,640	800
Matthiesson & Hegeler Zinc Co.	La Salle, "	A	6,168	6,168	
Missouri Zinc Co.	Beckemeyer, "		352	352	
Mineral Pt. Zinc Co.	Depue, "	A	9,068	9,068	
National Zinc Co.	Springfield, "	A	3,200	4,480	
Robt. Lanyon Z. & Acid Co.	Hillsboro, "	A	1,840	3,200	
Sandoval Zinc Co.	Sandoval, "		672	672	
American Spelter Co.	Pittsburg, Kan.		896	992	
American Zinc, Lead & Smelting Co.	Caney, "		6,080	6,080	
" " "	Dearing, "		4,480	4,480	
Chanute Spelter Co.	Chanute, "		1,280	1,280	
Cherokee Smelting Co.	Bruce, "		896	896	
Edgar Zinc Co.	Cherryvale, "		4,800	4,800	
Granby Mg. & Sm. Co.	Neodesha, "		3,760	3,760	
Iola Zinc Co.	Concreto, "		660	1,320	
Joplin Ore & Spelter Corporation	Pittsburg, "		1,444	1,792	
Lanyon Smelting Co.	" "		448	448	
Owen Zinc Co.	Caney, "		1,280	1,280	640
Pittsburg Zinc Co.	Pittsburg, "		910	910	
Prime Western Spelter Company.	Gas, "	A	4,868	4,868	
U.S. Smelting Co.	Altoona, "		3,960	4,600	
" "	Iola, "		3,440	3,440	
" "	La Harpe, "		1,924	1,924	
Weir Smelting Co.	Weir, "				448
Edgar Zinc Co.	St. Louis, Miss.		2,000	2,000	
Miss. Zinc Sm. Co.	Rich Hill, "			448	
Nevada Smelting Co.	Nevada, "		672	672	
Bartlesville Zinc Co.	Bartlesville, Okla.		5,184	6,336	
" " "	Blackwell, "			1,600	4,800
" " "	Collinsville, "		10,752	13,440	
" " " (Lanyon-Starr Plant)	Bartlesville, "		3,456	3,456	
Eagle-Picher Lead Co.	Henryetta, "				4,000
Henryetta Spelter Co.	" "			3,000	
J. B. Kirk Gas & Sm. Co.	Checotah, "			2,560	2,560
Kusa Spelter Co.	Kusa, "		3,720	3,720	
La Harpe Spelter Co.	" "			4,000	
National Zinc Co.	Bartlesville, "		4,970	4,970	
Oklahoma Spelter Co.	Kusa, "			1,600	
Quinton Spelter Co.	Quinton, "				1,340
Tulsa Fuel & Mfg. Co.	Collinsville, "		6,232	6,232	
U.S. Zinc Co.	Sand Springs, "		5,680	8,000	
American Steel & Wire Company	Donora, Penn.	A	3,648	9,120	
American Zinc & Chemical Co.	Langeloth, "	A	3,648	6,384	912
N.J. Zinc Co. (of Pennsylvania)	Palmerton, "		6,720	6,960	
Clarksburg Zinc Co.	Clarksburg, W.Va		3,648	3,648	
Grasselli Chemical Co.	" "	A	5,760	5,760	
" " "	Meadowbrook, "	A	8,592	8,592	
United Zinc Smelting Corporation	Moundsville, "	A			6,912
Total, for all States			156,568	196,640	24,812
	Plants with special retorts:— Michael Hayman & Co., Buffalo, N.Y.		12	12	
	Trenton Sm. & Refining Co., Trenton, N.J.		96	60	
	Wm. Cramp & Sons Ship & Engine Bldg. Co., Philadelphia, Pa.		32	32	

*United States Geological Survey, Press Bulletin No. 285, August, 1916.

NON-METALLIC PRODUCTS.[1]

ABRASIVES.

The abrasives produced in Canada are: corundum, the various sandstone abrasives, as grindstones, pulpstones, scythestones, etc., and tripolite, or infusorial earth.

Corundum.

The 1916 sales of grain corundum were the lowest since 1901 amounting to only 134,811 pounds, valued at $10,307, or an average of 7·65 cents per pound, as against sales in 1915 of 523,305 pounds, valued at $33,138, or an average of 6·33 cents per pound.

Grain corundum to the amount of 134,811 pounds was recovered from 1,864 tons of rock milled, a recovery of 3·6 per cent. The recovery in 1915 was 6·7 per cent, in 1914 was 5·7 per cent, in 1913, 6·2 per cent, and in 1912 it was 4·4 per cent. The recovery of corundum during the earlier years of the industry was about 10 per cent, but during recent years a much lower grade of rock has been milled.

Statistics concerning the annual production are given in the following table:—

Production of Corundum Ore and Corundum.

(IN SHORT TONS)

Calendar Year.	Corundum-bearing rock treated.	Grain corundum graded.	% Recovery	Grain corundum sold in Canada.	Grain corundum exported.	Total of grain corundum.	Value.	Average price, cents per pound
1900	.....	60	.....	3	.....	3	$ 300	5·00
1901	4,134	444	10·7	85	302	387	46,415	5·97
1902	7,996	806	10·1	106	662	768	84,465	5·49
1903	(a)8,877	839	9·5	85	618	703	77,510	5·51
1904	28,187	1,654	5·9	116	877	993	109,545	5·51
1905	23,571	1,681	7·1	140	1,504	1,644	149,153	4·48
1906	45,719	2,914	6·4	162	2,112	2,274	204,973	4·50
1907	60,532	2,682	4·4	164	1,728	1,892	177,922	4·70
1908	2,678	106	4·0	99	990	1,089	100·398	4·60
1909	35,894	1,579	4·4	129	1,362	1,491	162,492	5·45
1910	37,183	1,686	4·5	106	1,764	1,870	198,680	5·31
1911	41,795	1,641	3·9	92	1,380	1,472	161,873	5·50
1912	36,879	1,620	4·4	63	1,897	1,960	239·091	6·10
1913	12,290	763	6·2	23	1,154	1,177	137,036	5·82
1914	12,111	695	5·7	14	534	548	72,176	6·59
1915	1,724	116	6·7	21	240	262	33,138	6·33
1916	1,864	67	3·6	8	59	67	10,307	7·65
Total	.....	.....	.....	.....	.....	18,600	1,965,474	.....

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

Corundum is found in an area embracing several townships in Renfrew and Hastings counties in the Province of Ontario. The industry made its appearance there in 1900, the production reaching a maximum in 1906. From 1907 to 1913 the yearly production was smaller, but fairly uniform.

[1] A recent publication of the Mines Branch of the Department of Mines (No. 305, Non-Metallic Minerals in Canadian Manufacturing, 1914, by H. Frechette) gives a collection of interesting data with regard to the non-metallic minerals used in Canadian manufacturing industries, indicating the sources of these non-metallic minerals, and the various uses to which they are put.

The Manufacturers Corundum Company has been the only operator for the last seven years.

Detailed information concerning the mines and mills of the corundum district will be found in the Annual Reports of the Ontario Bureau of Mines, and in the Geological Survey publications.[1] The treatment of the corundum-bearing rock consists of crushing, concentration, magnetic separation of the iron, air separation of the mica, and sizing.

The magnetic sand recovered as a by-product in the concentration has found a sale for use in the manufacture of school blackboards.

Grindstones, Pulpstones, Etc.

The total production of grindstones, pulpstones, and scythestones for 1916 was 3,478 tons, valued at $52,782, as compared with a production in 1915 of 2,580 tons, valued at $35,768, an increase of 35 per cent in quantity, and 48 per cent in total value.

The production, as usual, was confined to Nova Scotia and New Brunswick. Reports were made by four operating companies, the quarries reporting sales being located at Mic Mac Point and Quarry Island, Pictou county, N.S., at Stonehaven and Clifton, Gloucester county, at Quarryville, Northumberland county, and at Woodpoint, Westmoreland county, N.B.

The grindstones are shipped chiefly in the finished condition and are marketed in Canada, Newfoundland, and the United States, the price realized being around $11 to $16 per ton.

A number of pulpstones are usually made each year, though none were reported for 1916. Scythestones, both finished and in the rough, are also shipped as well as occasionally small quantities of grit for marble polishing.

The pulpstones have come from the Miramichi Quarry Company's property at Quarryville, Northumberland county, N.B., from which an excellent building stone is obtained. These quarries were idle during 1916.

[1] "The Geology of the Haliburton and Bancroft Area," Adams, Geol. Sur. Can., Memoir No. 6. "Corundum, its Occurrence, Distribution, Exploitation and Uses." Barlow, Geol. Surv. Can., Memoir No. 57.

A table showing the production of grindstones by provinces since 1886 follows:—

Annual Production of Grindstones.

Calendar Year.	Nova Scotia.		New Brunswick.		Total.		Average value per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	
1886	1,765	$24,050	2,255	$22,495	4,020	$46,545	$11.58
1887	1,710	25,020	3,582	39,988	5,292	64,008	12·10
1888	1,971	20,400	3,793	30,729	5,764	51,129	8.87
1889	712	7,128	2,692	23,735	3,404	30,863	9.07
1890	850	8,536	4,034	33,804	4,884	42,340	8.67
1891	1,980	19,800	2,499	22,787	4,479	42,587	9.51
1892	2,462	27,610	2,821	23,577	5,283	51,187	9.69
1893	2,112	21,000	2,488	17,379	4,600	38,379	8.34
1894	2,128	16,000	1,629	16,717	3,757	32,717	8.71
1895	1,400	14,000	2,075	17,932	3,475	31,932	9.19
1896	1,450	14,500	2,263	18,810	3,713	33,310	8.97
1897	1,407	17,500	3,165	24,840	4,572	42,340	9.26
1898	1,422	12,350	3,513	32,425	4,935	44,775	9.07
1899	1,378	10,300	3,133	32,965	4,511	43,265	9.59
1900	1,411	12,600	4,128	40,850	5,539	53,450	9.65
1901	358	3,200	4,223	42,490	4,581	45,690	9.97
1902	1,074	8,118	3,559	36,000	4,633	44,118	9.52
1903	1,337	9,562	4,201	38,740	5,538	48,302	8.72
1904	1,029	7,332	3,620	35,450	4,649	42,782	9.20
1905	1,020	10,200	4,520	52,175	5,540	62,375	11.25
1906	1,023	9,680	4,340	50,134	5,363	59,814	11.15
1907	551	4,480	4,863	55,896	5,414	60,376	11.15
1908	473	4,803	3,370	43,325	3,843	48,128	12.52
1909	312	3,204	3,963	51,460	4,275	54,664	12·79
1910	387	3,496	3,586	43,700	3,973	47,196	11.88
1911	380	3,382	4,186	49,560	4,566	52,942	11.59
1912	374	3,760	4,038	48,330	4,412	52,090	11.81
1913	350	4,900	4,487	46,425	4,837	51,325	10.61
1914	350	5,270	3,626	49,234	3,976	54,504	13.71
1915	285	5,300	2,295	30,468	2,580	35,768	13.86
1916	273	5,800	3,205	46,982	3,478	52,782	15.18
Total					139,886	1,461,683	

The value of exports of grindstones finished and in the rough during the calendar year 1916, according to the records of the Department of Customs, was $44,942 (finished, valued at $43,178, and rough, at $1,764), as compared with an export in 1915, valued at $36,234 (finished, valued at $35,334, and rough $900).

The greater proportion of the Canadian production of grindstones is exported. To meet Canadian requirements, in Ontario and Quebec chiefly, there were imported during 1916: grindstones to the value of $122,291; burrstones, 406 valued at $648; emery $50,666; manufactures of emery $317,053; pumice stone $34,554, sandpaper $247,317, iron sand for glass or granite polishing, or for sawing stone $15,641; or a total value, including grindstones, of $788,150.

The imports during 1915 included: grindstones to the value of $79,391, and other abrasives as follows: burrstones, 177, valued at $314; emery, $67,067; manufactures of emery $139,665; pumice stone, $18,814; sandpaper, $133,677; iron sand for glass or granite polishing, or for sawing stone, $3,263; or a total value, including grindstones, of $442,191.

There was also imported in 1916 and not included in the totals above: artificial abrasives, valued at $79,315, as compared with $28,921 in 1915.

Tables, showing values of exports of grindstones and imports of abrasive materials into Canada, follow:—

Exports of Grindstones.*

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1884	$28,186	1895	$16,723	1906	$31,978
1885	22,606	1896	19,139	1907	32,534
1886	24,185	1897	18,807	1908	19,721
1887	28,769	1898	25,588	1909	13,942
1888	28,176	1899	23,288	1910	23,502
1889	29,982	1900	42,128	1911	29,206
1890	18,564	1901	29,130	1912	26,535
1891	28,433	1902	24,489	1913	54,867
1892	23,567	1903	27,659	1914	24,407
1893	21,672	1904	35,612	1915	36,234
1894	12,579	1905	24,868	1916	44,942

*Including stone for the manufacture of grindstones.

Imports of Abrasive Materials.

Fiscal Year.	Grind-stones. Value.	Burrstones (c) Value.	Emery. (a) Value.	Mfs. of emery. (b) Value.	Pumice stone. (d) Value.	Iron-Sand. (e) Value.	Sandpaper. (f) Value.
1880	$11,714	$12,049	.....	.....	.....	.....	.....
1881	16,895	6,337	.....	.....	.....	.....	.....
1882	30,654	15,143	.....	.....	.....	.....	.....
1883	31,456	13,242	.....	.....	.....	.....	.....
1884	30,471	5,365	.....	.....	.....	.....	.....
1885	16,065	4,517	$ 5,066	$ 4,920	$ 9,384	.....	.....
1886	12,803	4,062	11,877	5,832	2,777	.....	.....
1887	14,815	3,545	12,023	4,598	3,594	.....	.....
1888	18,263	4,753	15,674	4,001	2,890	.....	.....
1889	25,564	5,465	13,565	3,948	3,232	.....	.....
1890	20,569	2,506	16,922	5,313	3,003	.....	.....
1891	16,991	2,089	16,179	6,665	3,696	.....	.....
1892	19,761	1,464	17,782	6,492	3,282	.....	.....
1893	20,987	3,552	17,762	5,606	3,798	.....	.....
1894	24,426	3,029	14,433	2,223	4,160	.....	.....
1895	22,834	2,172	14,569	7,775	3,609	.....	.....
1896	26,561	2,049	16,287	11,913	3,721	.....	.....
1897	25,547	1,827	16,318	11,231	2,903	.....	.....
1898	22,217	1,813	17,661	15,478	3,829	.....	.....
1899	27,476	1,759	21,454	22,343	5,973	.....	.....
1900	34,382	1,546	19,312	25,615	5,604	.....	.....
1901	39,068	5,762	16,311	22,190	5,516	.....	.....
1902	40,838	2,559	14,476	23,892	7,254	.....	.....
1903	53,388	586	18,058	22,177	6,152	.....	.....
1904	46,039	35	21,626	29,273	6,557	.....	.....
1905	49,747	2,607	21,980	33,250	8,447	.....	.....
1906	59,627	2,661	21,781	42,080	9,053	.....	.....
1907 (9 mos.)	40,780	245	20,498	41,086	5,745	.....	.....
1908	65,125	3,396	26,159	57,760	8,917	.....	.....
1909	56,692	1,141	25,931	47,700	8,117	.....	.....
Calendar Year.							
1910	71,394	854	40,400	92,890	14,829	$ 6,647	$148,384
1911	123,356	1,642	46,274	104,170	18,779	8,340	164,474
1912	112,020	1,409	46,616	130,571	21,310	13,347	189,782
1913	145,247	1,784	48,995	135,654	17,861	10,168	171,516
1914	98,872	16	29,127	88,881	16,976	13,743	138,415
1915	79,391	314	67,067	139,665	18,814	3,263	133,677
1916	122,291	648	50,666	317,053	34,554	15,641	247,317

(a) Emery in bulk, crushed or ground. Duty free.
(b) Emery and carborundum wheels and manufactures of emery or carborundum.
(c) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binding into millstones.
(d) Pumice and pumice stone, ground or unground. Duty free.
(e) Iron sand or globules for polishing glass or granite, or for sawing stone. Duty free.
(f) Sandpaper, glass, flint, and emery paper or emery cloth.

The following is a list of the operators of grindstone quarries:—

The Mic Mac Grindstone Co., Ltd., New Glasgow, N.S.
Jos. W. Sutherland, West Merigomish, N.S.
The Read Stone Company, Stonehaven, N.B. and Sackville, N.B.
J. L. C. Knowles, Clifton, N.B.
The Miramichi Quarry Co., Ltd., Quarryville, N.B.

Tripolite.

The shipments of tripolite in 1916 were reported as 620 tons, valued at $12,139.

A brief review of the uses of tripolite, together with a list of the principal known Canadian occurrences, was published in the Annual Report on Mineral Production for 1914.

The shipments from year to year have varied very much, and in some seasons the producing companies shipped from stock only.

From 1902 to the present, Nova Scotia has been the only province producing tripolite, and three companies only have appeared on the list of shippers. These are the Premier Tripolite Company with deposits (unworked for several years) at St. Anns in Victoria county, Cape Breton Island; the Fossil Flour Company, formerly operating at Bass River lake, Colchester county, near Castlereagh; and the Oxford Tripoli Company, operating at Silica lake (formerly at Bass River lake), Colchester county, the latter Company having taken over the property of the Fossil Flour Company.

At the plant of the Oxford Tripoli Company, the crude product is dried and treated on the spot in a 10-ton mill. It is exported to the United States.

The following table gives statistics of the Canadian production from 1896 to date, all of which has been exported.

Annual Shipments of Tripolite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1896	644	$9,960	1906	Nil.	Nil.
1897	15	150	1907	30	$ 225
1898	1,017	16,660	1908	30	195
1899	1,000	15,000	1909	Nil.	Nil.
1900	336	1,950	1910	22	134
1901	850	15,300	1911	20	122
1902	1,052	16,470	1912	38	230
1903	835	16,700	1913	620	12,138
1904	320	6,400	1914	650	13,000
1905	300	3,600	1915	317	12,119
			1916	620	12,139

Tripolite: Analyses of Canadian Samples.

Locality.	1	2	3	4	5	6
Sample from.	H.S. Spence.	H.S. Spence.	R. W. Ells.	H.S. Spence.	E.A.D. Morgan.	C. H. Clapp.
Silica	72·10	81·30	80·487	74·98	79·20	75·92
Alumina	——	——	3·146	3·81	3·98	8·23
Ferric oxide	——	——	·951	·72	·57	3·43
Ferrous oxide	·51	·38	——	·64	·51	——
Lime	——	——	·342	·54	·68	1·85
Magnesia	——	——	·283	·36	·33	1·28
Soda	——	——	——	·65	·94	1·39
Potash	——	——	——	·25	·39	·94
Water—below 110 C.	6·10	5·16	13·321	5·74	8·26	——
Water—above 110 C.	10·70	9·34		9·56	3·84	5·40
Organic matter	6·30	·82		2·72	1·80	——
Carbon dioxide	Nil.	Nil.	·011	Nil.	Nil.	1·08
Total	——	——	——	99·97	100·50	99·52

Analyses by Laboratory of Mines Branch, Ottawa.

Key to Localities:—

1. St. Anns, Victoria co., N.S. Operator, Premier Tripolite Co., 159 Maiden Lane, New York.
2. Silica Lake, Colchester co., N.S. Operator, Oxford Tripoli Co., Oxford, N.S.
3. Pollet River lake, Mechanic's Settlement, Kings co., N.B.
4. Fitzgerald lake, St. John co., N.B.
5. Chertsey tp., Range V, Lot 15, Montcalm co., Que.
6. Prospect lake, Lake District, near Victoria, B.C.

Tripolite: Analyses of Representative Samples.

Locality.	Hanover.	Germany.	Scotland.	Auvergne, France.	Maryland, U.S.A.	Virginia, U.S.A.
Silica	86·4	68·01	92·0	87·2	81·53	75·85
Alumina	1·6	7·13	——	2·0	3·43	9·88
Ferric oxide	1·5	6·82	2·5	——	3·33	2·92
Lime	1·3	——	——	——	2·61	·29
Magnesia	——	——	——	——	5·63	1·63†
Water	6·9	8·45	——	10·0	3·47	8·37
Other volatile and organic matter	2·3	8·17	5·5	——	——	——
Total	100·0	98·58	100·0	99·2	100·0	98·95

†Including potash and soda.

Occurrences in British Columbia.

Diatomaceous, or infusorial earth, has been found in British Columbia[1] apparently associated with volcanic ash. Such occurrences have been noted at a point 18 miles from Ashcroft and also from Deadman river north of Savona.

"The diatomaceous earth from the Kamloops district is admixed with rhyolitic dust and other detritus, chiefly clay, which lowers its silica content to 80 per cent. The purer varieties of the earth contain from 90 to 97 per cent silica. The British Columbia earth is a soft, white, chalk-like substance of fine texture which frequently has been mistaken in the field for kaolin."

[1] Drysdale—Geological Surv. Can. Sum. Report, 1916, p. 52, 53.

Volcanic ash, or andesitic pumice occurs in great quantity as the most recent formation in the Bridge River district and may become of economic importance.

Analyses both of the impure diatomaceous earth and of the volcanic ash are given herewith.

	1	2	3	4
SiO_2	63·94	80.40	80·80	76·58
Al_2O_3	16·34	6·30	5·96	16·13
Fe_2O_3	3·57	1·42	1·42	
MgO	1·38	0·46	0·54	0·18
CaO	3·18	0·32	0·36	0·60
Na_2O	8·39 by diff.	not det.	not det.	0·34
K_2O		0·45		0·16
H_2O	2·75	10·00	11·00	5·80
TiO_2	0·45	0·30	0·30	0·25
	100·00	99·65	100·38	100·04

[1] White andesitic pumice, Bridge River map-area, Lillooet, B.C.
[2] Impure diatomaceous earth (locally known as kaolin), 18 miles from Ashcroft, B.C.
[3] Volcanic ash and diatomaceous earth from Deadman river, north of Savona, B.C.
[4] Siliceous earth, from Neuberg, Germany, after some preparatory drying and crushing.

Analyst, M. F. Connor, Mines Branch.

ACTINOLITE.

The production of actinolite in 1916 was reported as 250 tons, valued at $2,750, after having been milled and prepared for market.

Production of actinolite in Canada has been confined to Elzevir and Kaladar townships in Hastings and Addington counties, Province of Ontario, the centre for the industry being the village of Actinolite. The earliest operations date back to about 1883. For a time deposits were worked only at intervals long apart when sufficient rock was broken to meet the demand for several subsequent years.

Actinolite is used as an ingredient for a coal-tar-roofing compound, the grinding of the crude material being done in such a way as not to destroy the fibre.

An interesting review of the industry appeared in the Ontario Bureau of Mines Report, Vol. XXII, Part II, p. 117, and was quoted in the report on the Mineral Production of Canada for 1913.

The only shipper in recent years is the Actinolite Mining Company of Bloomfield, New Jersey, U.S.A., which owns deposits of actinolite in Kaladar and Elzevir townships, and a mill for grinding the same at Actinolite, Ontario.

Statistics of production during recent years are given in the following table:—

Annual Production of Actinolite.

Calendar Year.	Tons.	Value.	Average Price.
1897	205	$1,845	.....
1899	57	4,872	.....
1900	303	.....	.....
1901	521	3,126	.....
1902	550	4,400	.....
1903	550	3,108	.....
1909	Nil.	Nil.	.....
1910	30	330	$11·00
1911	67	736	11·00
1912	92	1,000	10·87
1913	66	720	10·91
1914	119	1,304	10·96
1915	220	2,420	11·00
1916	250	2,750	11·00

ARSENIC.

The total production of white arsenic in 1916 was 2,186 tons, valued at $262,349, as compared with 2,396 tons, in 1915, valued at $147,830, and 1,737 tons in 1914, valued at $104,015.

Canada's production of white arsenic up to 1903 was secured from a plant at Deloro, Ontario, which treated mispickel residues from which the gold content had been extracted by amalgamation, and bromo-cyanide treatment. Since 1903 though, even in spite of a bounty offered in 1907 by the Ontario Government on "white arsenic, otherwise known as arsenious oxide, produced from mispickel ores, and not from ores carrying smaltite, niccolite, or cobaltite," the industry has been dormant.

In 1906 plants treating cobalt ores made provision for the recovery of white arsenic as a by-product, and since then white arsenic has been produced each year, the production for the last five years being fairly constant in quantity. On this white arsenic no bounty is payable.

The plants which have been producing white arsenic from cobalt ores are located at Deloro, Thorold, Orillia, Copper Cliff, and Welland, all in the Province of Ontario. In 1916 only three of these were operating, viz.: the Deloro plant of the Deloro Mining and Reduction Company, the Thorold plant of the Coniagas Reduction Company, and the Welland plant of the Metals Chemical Co., Ltd.

Arsenical ore concentrates were shipped for several years by a gold mining company in Nova Scotia, but the last of these was made in 1910.

The exports of white arsenic in 1916 according to the records of the Department of Customs were 3,950,500 pounds (1,975 tons), valued at $197,458, as compared with 4,636,400 pounds (2,318 tons), in 1915, valued at $174,190.

The imports of white arsenic, or arsenious oxide, in 1916 were 41,090 pounds, valued at $7,086, as compared with 14,222 pounds in 1915, valued at $657.

Imports of sulphide of arsenic in 1916 were 239,991 pounds, valued at $11,839, as compared with imports in 1915 of 171,993 pounds valued at $5,415.

There was also imported during 1916, arseniate, bi-arseniate and stannate of soda to the amount of 15,779 pounds, valued at $1,228, as compared with 9,090 pounds in 1915, valued at $503.

Annual Production of Arsenic.

Calendar Year.	Arsenical Ore.		White Arsenic.	
	Tons.	Value.	Tons.	Value.
1885	.....	.....	440	$ 17,600
1886	.....	.....	120	5,460
1887	.....	.....	30	1,200
1888	.....	.....	30	1,200
1889	.....	.....	Nil.	Nil.
1890	.....	.....	25	1,500
1891	.....	.....	20	1,000
1892–3	.....	.....	Nil.	Nil.
1894	.....	.....	7	420
1895–8	.....	.....	Nil.	Nil.
1899	.....	.....	57	4,872
1900	.....	.....	303	22,725
1901	.....	.....	695	41,676
1902	.....	.....	800	48,000
1903	.....	.....	257	15,420
1904–5	.....	.....	.....	.....
1906	.....	.....	201	14,058
1907	656	$11,094	330	36,209
1908	986	17,506	715½	41,060
1909	224	3,346	1,129	64,100
1910	547	5,716	1,502	75,328
1911	.....	.....	2,097	76,237
1912	.....	.....	2,045	89,262
1913	.....	.....	1,692	101,463
1914	.....	.....	1,737	104,015
1915	.....	.....	2,396	147,830
1916	.....	.....	2,186	262,349

Exports of White Arsenic.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
1902	547,698	$16,192	1909	3,111,249	$ 119,673
1903	395,573	10,583	1910	4,512,673	173,932
1904	146,000	6,900	1911	4,125,558	81,761
1905	108,000	5,400	1912	3,847,906	101,310
1906	271,063	5,981	1913	2,606,767	107,094
1907	613,504	10,850	1914	3,751,900	132,567
1908	1,913,732	43,493	1915	4,636,400	174,190
			1916	3,950,500	197,458

Annual Imports of Arsenic 1880-1906.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	18,197	$ 576	1889	69,269	$ 2,434	1898	291,967	$ 14,270
1881	31,417	1,070	1890	138,509	4,474	1899	582,383	24,203
1882	138,920	3,962	1891	115,248	4,027	1900	130,730	11,035
1883	51,953	1,812	1892	302,958	9,365	1901	159,263	8,361
1884	19,337	773	1893	447,079	12,907	1902	106,857	6,004
1885	49,080	1,566	1894	292,505	10,018	1903	298,375	11,824
1886	30,181	961	1895	1,115,697	31,932	1904	414,065	12,421
1887	32,436	1,116	1896	664,854	27,523	1905	268,274	7,661
1888	27,510	1,016	1897	152,275	8,378	1906 Duty free	446,975	19,169

Imports of Arsenious Oxide and Sulphide of Arsenic.

Calendar Year.	Arsenious oxide.*		Arsenic, sulphide of.*		Total.
	Pounds.	Value.	Pounds.	Value.	
1907	622,888	$ 42,245	64,014	$ 4,249	$46,494
1908	127,942	4,043	302,970	12,754	16,797
1909	23,857	1,285	309,141	12,371	13,656
1910	260,415	6,891	257,451	8,946	15,837
1911	7,338	158	330,170	6,665	6,823
1912	76,528	1,722	451,928	19,431	21,153
1913	18,788	1,061	455,394	17,759	18,820
1914	5,012	249	11,494	756	1,005
1915	14,222	657	171,993	5,415	6,072
1916	41,090	7,086	239,991	11,839	18,925

*Duty free.

Imports of Arseniate, Bi-Arseniate and Stannate of Soda.

Calendar Year.	Pounds.	Value.
1907	307,247	$ 3,919
1908	7,617	468
1909	22,889	975
1910	26,174	549
1911	47,532	1,908
1912	41,977	1,595
1913	22,892	987
1914	14,389	604
1915	9,090	503
1916	15,779	1,228

ASBESTOS.

Asbestos production in Canada has for many years been confined to the Eastern Townships district of the Province of Quebec; Black Lake, Thetford, Robertsonville, Danville, and East Broughton being the shipping points. Other occurrences are known, but hitherto these have not proved of economic interest.

A serpentine area in the Porcupine gold district has been under development from which some trial shipments have recently been made.

The asbestos deposits, and the asbestos industry (up to 1910) have been described fully in a special report of the Mines Branch,[1] and have also been the subject of a Geological Survey Memoir.[2]

The production since 1910 as recorded by this Division, has been classified on the following valuation basis:—

Crude No. 1 Value $200 per ton, and upwards.
Crude No. 2. Value under $200 per ton.
Mill Stock No. 1. Value $30 and upwards per ton.
Mill Stock No. 2. Value $15–$30 per ton.
Mill Stock No. 3. Value under $15 per ton.

"Asbestic" also mentioned in the tables of statistics, is a fine asbestos powder which now enters largely into the construction and inside finish of fireproof buildings. It is manufactured from the sand and tailings from the shaking screens of some of the asbestos mills. For the year 1916, however, there has been such an increase in asbestos values that no attempt has been made to sub-divide the crude and mill fibre.

In 1916 the output of asbestos was 118,247 tons, as compared with 106,559 tons in 1915, and 107,669 tons in 1914. The total sales (not including asbestic), in 1916 were 133,439 tons, valued at $5,199,797, or an average of $38.97 per ton, as compared with sales in 1915 of 111,142 tons, valued at $3,553,166, or an average of $31.97 per ton. Sales of asbestic in 1916 were 20,710 tons, valued at $29,072, or an average of $1.40 per ton, as against 25,700 tons, valued at $21,819, or an average of 85 cents per ton in 1915.

Statistics of asbestos on hand December 31, 1916, were reported as 6,289 tons, valued at $393,335, or an average of $62.54 per ton, as compared with statistics on December 31, 1915, of 24,346 tons valued at $656,832, or an average of $26.98.

The average number of men employed in mines and mills during 1916 was 2,821 at a wage cost of $1,659,913, as compared with 2,394 men in 1915 at a wage cost of $1,091,076.

[1]Chrysotile Asbestos: "Its Occurrence, Exploitation, Milling and Uses," by Fritz Cirkel. Mines Branch, Department of Mines, Ottawa, No. 69.
[2]Preliminary Report on the Serpentine and Associated Rocks of Southern Quebec, by J. A. Dresser, Geol. Surv. Memoir 22, 1913.

The total quantity of asbestos rock sent to mills during 1916 is reported as 1,822,461 tons, which with a mill production of 112,832 tons, shows an average estimated recovery of 6·19 per cent. In 1915 the recovery was 5·71 per cent, and in 1914 it was 6·03 per cent.

Statistics showing the output, sales, and stocks on hand, December 31st, by grades, for the past three years are shown in the following tables:—

Output, Sales, and Stocks of Asbestos in 1916.

	Output.	Sales.			Stock on hand, December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude	5,415	5,886	$1,866,969	$317.19	444	$138,415	$311.75
Mill Stock	112,832	127,553	3,332,828	26.13	5,845	254,920	43.61
Total asbestos	118,247	133,439	5,199,797	38·97	6,289	393,335	62.54
Asbestic	.....	20,710	29,072	1.40	.....	.....	.....

Output, Sales, and Stocks of Asbestos in 1915.

	Output.	Sales.			Stock on hand, December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude, No. 1	2,305·6	2,736·5	$ 754,174	$ 275·60	590·0	$ 176,533	$ 299.21
" No. 2	1,681·6	2,633·5	322,123	122.32	316·6	43,181	136·40
Mill stock, No. 1	21,709	24,471	1,287,502	52·61	2,259	99,002	43·83
" No. 2	41,973	42,031	840,132	19·99	12,837	268,197	20·89
" No. 3	38,890	39,270	349,235	8.89	8,343	69,919	8.39
Total asbestos	106,559.2	111,142	3,553,166	31·97	24,345·6	656,832	26·98
Asbestic	.....	25,700	21,819	0.85	.....	.....	.....

Output, Sales, and Stocks of Asbestos in 1914.

	Output.	Sales.			Stock on hand, Dec. 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude, No. 1	1,450·6	1,335·9	$ 402,417	$ 301.23	984·3	$ 301,237	$ 306.04
" No. 2	2,611	2,812	370,776	131.87	1,411	187,338	132.78
Mill stock, No. 1	16,144	19,388	932,893	48·12	4,616	229,361	49.69
" No. 2	58,362	47,851	963,973	20·15	15·114	305,809	20.23
" No. 3	29,101	25,155	222,207	8.83	9,046	76,522	8.46
Total asbestos	107,668·6	96,541·9	2,892,266	29.96	31,171·3	1,100,267	35.30
Asbestic	.....	21,031	17,540	0·83	.....	.....	.....

Annual Shipments of Asbestos and Asbestic.

Calendar Year.	Asbestos.			Asbestic.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
1880 (a)	380	$ 24,700	$ 65.00			
1881 (a)	540	35,100	65.00			
1882 (a)	810	52,650	65.00			
1883 (a)	955	68,750	71.99			
1884 (a)	1,141	75,097	65.82			
1885 (a)	2,440	142,441	58.38			
1886 (a)	3,458	206,251	59.64			
1887	4,619	226,976	48.92			
1888	4,404	255,007	57.90			
1889	6,113	426,554	69.78			
1890	9,860	1,260,240	127.81			
1891	9,279	999,878	107·76			
1892	6,082	390,462	64·20			
1893	6,331	310,156	86·81			
1894	7,630	420,825	55·15			
1895	8,756	368,175	42.05			
1896	10,892	423,066	38·84	1,358	$ 6,790	$5.00
1897	13,202	399,528	29·99	17,240	45,840	2.66
1898	16,124	475,131	29.47	7,661	16,066	2.10
1899	17,790	468,635	26·34	7,746	17,214	2.22
1900	21,621	729,886	33·76	7,520	18,545	2.47
1901	32,892	1,248,645	37·96	7,325	11,114	1.52
1902	30,219	1,126,688	37.28	10,197	21,631	2.20
1903	31,129	915,888	29.42	10,548	13,869	1.31
1904	35,611	1,213,502	34.08	12,854	12,850	1.00
1905	50,669	1,486,359	29.33	17,594	16,900	0.96
1906	60,761	2,036,428	33.52	21,424	23,715	1.11
1907	62,130	2,484,767	39.99	28,296	20,275	0.72
1908	66,548	2,555,361	38.40	24,225	17,974	0.74
1909	63,349	2,284,587	36.06	23,951	17,188	0.72
1910	77,508	2,555,974	32.98	24,707	17,629	0.71
1911	101,393	2,922,062	28.82	26,021	21,046	0.81
1912	111,561	3,117,572	27.95	24,740	19,707	0.80
1913	136,951	3,830,909	27.97	24,135	19,016	0.79
1914	96,542	2,892,266	29.96	21,031	17,540	0.83
1915	111,142	3,553,166	31.97	25,700	21,819	0.85
1916	133,439	5,199,797	38.97	20,710	29,072	1.40

(a) Exports.

The shipment of crude asbestos and mill stock since 1903 are separately shown in the next table. The 1916 shipments of crude are the largest that have been recorded and the 1916 shipment of mill stocks have been exceeded in tonnage only by the shipments of 1913, though present values are much in excess of those of the former year.

Annual Shipments of Crude and Mill Stock Asbestos.

Calendar Year.	Crude.			Mill Stock.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
1903	3,134	$ 361,867	$ 115.46	27,995	$ 554,021	$ 19.79
1904	4,410	534,874	121.28	31,201	678,628	21.75
1905	3,767	472,859	125.53	46,902	1,013,500	21.61
1906	3,841	635,345	165.41	56,920	1,401,083	24.61
1907	4,327	830,632	191.97	57,803	1,654,135	28.62
1908	3,345·5	669,232	200.04	63,202	1,886,129	29.84
1909	3,074·3	575,510	187.20	60,275	1,709,077	28.35
1910	3,740	664,508	177.66	73,768	1,891,466	25.64
1911	4,864.1	744,962	153.15	96,529	2,177,100	22.55
1912	5,662·9	890,351	157.23	105,898	2,227,221	21.03
1913	5,660·3	989,162	174.75	131,291	2,841,747	21.64
1914	4,147·9	773,193	186.42	92,394	2,119,073	22.94
1915	5,370	1,076,297	200.43	105,772	2,476,869	23.42
1916	5,886	1,866,969	317.19	127,553	3,332,828	26.13

EXPORTS AND IMPORTS.

The exports of asbestos in 1916 are recorded as 96,775 tons, valued at $3,872,463, as compared with exports in 1915 of 84,584 tons, valued at $2,734,695. There were also exports of asbestic sand and waste in 1916 amounting to 33,564 tons, valued at $241,272, as compared with 25,103 tons, valued at $157,410 in 1915.

From 1903 to 1916 inclusive, the exports of asbestos from Canada have been over 85 per cent of the total shipments. The exports to Great Britain, United States, Germany, and to other countries are shown in the following table. Not all the asbestos consumed by each country mentioned is imported directly, a great deal of the European demands being supplied through United States firms, and a great deal of the German and Austrian pre war demands through Belgium, Holland and Italy.

Export of Canadian Asbestos by Countries 1903-1916.

Calendar Year.	To Great Britain.		To United States.		To Germany.		To other Countries.		Total Exports.		Value per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
1903..	2,743	$ 40,120	24,252	$ 714,781	1,429	$ 25,150	3,356	$110,982	31,780	$ 891,033	$28.04
1904..	6,602	210,175	25,957	762,300	2,463	94,141	2,250	94,271	37,272	1,160,887	31.15
1905..	9,731	305,056	29,696	811,080	2,969	100,061	4,635	169,918	47,031	1,386,115	29.47
1906..	9,435	318,313	39,767	1,058,513	3,654	82,117	6,998	230,314	59,854	1,689,257	28.22
1907..	5,432	200,909	44,861	1,312,582	225	8,195	6,235	147,613	56,753	1,669,299	29.41
1908..	5,221	288,290	50,503	1,314,337	341	9,470	5,145	230,666	61,210	1,842,763	30.11
1909..	5,227	204,978	45,675	1,243,795	693	17,706	5,376	263,378	56,971	1,729,857	30.36
1910..	6,700	280,452	57,939	1,505,477	440	15,925	6,406	306,778	71,485	2,108,632	29.50
1911..	7,511	192,993	62,551	1,732,541	361	20,494	4,697	121,231	75,120	2,067,259	27.52
1912..	9,387	208,464	69,222	1,871,770	1,155	43,898	8,244	225,221	88,008	2,349,353	26.69
1913..	7,220	211,861	78,157	2,120,314	840	36,491	17,595	479,381	103,812	2,848,047	27.43
1914..	11,197	382,482	58,302	1,555,339	2,749	94,967	8,833	265,858	81,081	2,298,646	28.35
1915..	21,930	744,006	56,656	1,722,144	.....	.....	5,998	268,545	84,584	2,734,695	32.33
1916..	14,369	615,426	73,197	2,830,044	.....	.....	9,209	426,993	96,775	3,872,463	40.02

Annual Exports of Asbestos, Calendar Years 1892-1916.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
1892.....	5,380	$373,103	$69.35	1904.....	37,272	$1,160,887	$ 31.14
1893.....	5,917	338,707	57.24	1905.....	47,031	1,386,115	29.47
1894.....	7,987	477,837	59.82	1906.....	59,854	1,689,257	28.22
1895.....	7,442	421,690	56.66	1907.....	56,753	1,669,299	29.41
1896.....	11,842	567,967	47.96	1908.....	61,210	1,842,763	30.11
1897.....	15,570	473,274	20.40	1909.....	56,971	1,729,857	30.36
1898.....	15,346	494,012	32.19	1910.....	71,485	2,108,632	29.50
1899.....	17,883	473,148	26.46	1911.....	75,120	2,067,259	27.52
1900.....	16,993	693,105	39.61	1912.....	88,008	2,349,353	26.69
1901.....	32,269	1,069,918	33.16	1913.....	103,812	2,848,047	27.43
1902.....	31,074	995,071	32.02	1914.....	81,081	2,298,646	28.35
1903.....	31,780	891,033	28.04	1915.....	84,584	2,734,695	32.33
				1916.....	96,775	3,872,463	40.02

Canada, though the leading country in the world in the production of asbestos, does not yet manufacture all the asbestos goods needed to supply the domestic market. Consequently, there is a considerable importation annually of asbestos goods under the Customs classification of "Asbestos in any form other than crude, and all manufactures thereof," the duty being 25 per cent. The 1916 imports were valued at $334,670, as against $168,894 in 1915, and $282,053 in 1914.

Annual Imports of Asbestos.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1885.....	$ 674	1896.....	$ 23,900	1907 (9 mos.).....	$127,509
1886.....	6,831	1897.....	19,032	1908.....	190,980
1887.....	7,836	1898.....	26,389	1909.....	180,598
1888.....	8,793	1899.....	32,607	Calendar Year.	
1889.....	9,943	1900.....	43,455	1910.....	230,849
1890.....	13,250	1901.....	50,829	1911.....	319,815
1891.....	13,298	1902.....	52,464	1912.....	461,449
1892.....	14,090	1903.....	75,465	1913.....	520,082
1893.....	19,181	1904.....	83,827	1914.....	282,053
1894.....	20,021	1905.....	116,836	1915.....	168,894
1895.....	26,094	1906.....	137,974	1916*.....	334,670

*Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom are of interest, as indicating the market in that country, and the sources from which it is supplied. From 1907 to 1912 inclusive, the imports ranged between a low limit of 6,477 and a high limit of 8,620 tons. In 1913 there was a sudden increase to 12,995 tons, and in 1916 the imports had reached 29,917 short tons. Except in the years 1909, 1911 and 1912, direct imports from Canada comprised over 50 per cent of the total, and in 1915 they reached the proportion of 68·5 per cent of the total imports. In 1916 British imports from Canada fell off, but larger quantities were obtained from Russia and Portuguese East Africa.

Statistics as to these imports, indicating the sources of supply, appear in the following tables:—

Imports of Raw Asbestos into the United Kingdom.

	1914		1915		1916	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
Russia	1,403	$140,072	230	$ 19,418	2,878	$364,207
Germany	296	44,160	.....	.....	.....	.....
Portuguese East Africa	329	28,446	796	73,910	3,029	375,785
Italy	84	21,131	39	7,694	39	5,772
United States	1,800	80,704	3,701	174,699	3,946	181,288
Other foreign countries	172	13,067	453	7,485	240	25,287
Total foreign	4,084	327,580	5,219	283,206	10,132	952,339
Cape of Good Hope	932	91,868	3,039	375,420	3,656	466,626
Natal	80	9,169	358	40,578	33	8,770
Canada	11,326	448,449	19,592	1,020,306	13,716	897,982
Other British possessions	58	3,849	378	31,624	2,380	290,097
Total British possessions	12,396	553,335	23,367	1,467,928	19,785	1,663,475
Grand total	16,480	880,915	28,586	1,751,134	29,917	2,615,814

*British Trade Report.

Following is a list of the principal firms reporting production of asbestos, during 1916.

Operator and Head Office Address.	Name of Mine.	Location		Mine Office.
		Township	Range and Lot.	
Asbestos Corp. of Canada, Limited, Thetford Mines, Que.	Kings	Thetford	V26; VI 26	Thetford Mines.
	Beaver	Coleraine	C 31, 32	"
	British Canadian	"	Black Lake	Black Lake.
Bell Asbestos Mines, Thetford Mines, Que.	Bell	Thetford	V N-E½ 27	Thetford Mines.
Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria, Toronto.	Union	Coleraine	B 27, 28	Black Lake.
	Imperial			
	Southwark			
Jacobs Asbestos Mining Co. of Thetford, Ltd., 282 St. Catherine W., Montreal.	Jacobs	Thetford	VI 28	Thetford Mines.
Johnson's (Asbestos) Company, Thetford Mines.	Johnson	Thetford	VI 27	Black Lake.
	Johnson	Coleraine	B 27	Thetford Mines.
Manville Asbestos Co., Ltd., Asbestos	Jeffrey	Shipton	III 8, 9, 10	Asbestos.
The Federal Asbestos Company, Robertsonville.	B. and A	Thetford	V 9	Robertsonville.
The Martin-Bennett Asbestos Mines, Ltd., Thetford Mines.	Ward-Ross	Thetford,	V 27	Thetford Mines.
Imperial Chrome, Inverness, Que	Reed	Coleraine	A 27, 28, 29	Black Lake.
Bennett & Martin Chrome Mines, Coleraine, Que.	.....	Ireland	I, II, III.	Coleraine.

The Frontenac Asbestos Co. reported small sales from stocks.

BARYTES.

During recent years the only barytes deposit worked in Canada is one at Lake Ainslie, Inverness county, N.S., (Post Office, Scotsville), owned by Barytes, Limited, of Halifax, N.S. In Ontario a deposit located in Langmuir township, south of Porcupine, Ontario, has been under development during the past two seasons, by the Premier Langmuir Mines, Ltd.

Shipments of ground barytes in 1916 are reported as 1,368 tons, valued at $19,393, as compared with 550 tons, valued at $6,875 in 1914. In addition to the Canadian market, shipments are also reported as having been made to St. Johns, Nfd., Scotland, and New York.

Statistics of annual production and exports of barytes follow:—

Annual Production of Barytes.

Calendar Year.	Tons.	Value.	Value. per ton.	Calendar Year.	Tons.	Value.	Value. per ton.
1885	300	$1,500	$5.00	1901	653	$ 3,842	$ 5.89
1886	3,864	19,270	4.98	1902	1,096	3,957	3.61
1887	400	2,400	6.00	1903	1,163	3,931	3.38
1888	1,100	3,850	3.50	1904	1,382	3,702	2.68
1889	.....	.....	.....	1905	3,360	7,500	2.23
1890	1,842	7,543	4.09	1906	4,000	12,000	3.00
1891	.....	.....	.....	1907	1,344	3,000	2.23
1892	315	1,260	4.00	1908	4,312	19,021	4.41
1893	.....	.....	.....	1909	179	1,120	6.26
1894	1,081	2,830	2.62	1910	.....	.....	.....
1895	.....	.....	.....	1911	50	400	8.00
1896	145	715	4.93	1912	464	5,104	11.00
1897	571	3,060	5.36	1913	641	6,410	11.00
1898	1,125	5,533	4.92	1914	612	6,169	10.08
1899	720	4,402	6.11	1915	550	6,875	12.50
1900	1,337	7,605	5.69	1916	1,368	19,393	14.17

Exports of Barytes.

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
1901	208	$ 3,820	1909	.....	.....
1902	.....	.....	1910	5	$150
1903	406	368	1911	.....	.....
1904	13,080	5,178	1912	68	114
1905	34,488	14,343	1913	.....	.....
1906	1,350	6,750	1914	.....	.....
1907	550	2,750	1915	.....	.....
1908	3,509	13,690	1916	*	.....

*Though not recorded, exports are apparently being made, see text.

Imports of barytes have not been separately shown in the Customs Department classification since 1890, but certain barium compounds are specifically mentioned. Imports of barium peroxide for the manufacture of hydrogen peroxide for the last nine months of 1913 were 26 tons, valued at $3,600; for 1914, 42 tons, valued at $5,722; for 1915, 18 tons, valued at $5,250; and for 1916, 57 tons, valued at $26,172. Imports of blanc fixe (artificial sulphate of barium) and satin white again showed an increase, being 3,747 tons, valued at $86,306, as compared with 2,746 tons, valued at $59,471 in 1915.

Statistics of imports appear in the following tables:—

Imports of Barytes.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880	2,230	$1,525	1886	.....	$ 62
1881	3,740	1,011	1887	379	676
1882	497	303	1888	236	214
1883	.....	185	1889	1,332	987
1884	.....	229	1890	1,322	978
1885	7	14			

Imports of Blanc Fixé and Satin White.

Calendar Year.	Tons.	Value.	Average.
1910	1,016	$22,726	$22.37
1911	1,315	29,796	22.66
1912	1,635	34,794	21.28
1913	1,698	38,043	22.40
1914	1,854	39,849	21.49
1915	2,746	59,471	21.66
1916	3,747	86,306	23.03

CHROMITE.

The production of chromite has been confined to the vicinity of Black Lake and Coleraine, Megantic county, Quebec.

From 1910 to 1914 inclusive, no chromite was mined in Canada, and only a few small shipments were made from stock, but conditions brought about by the war have resulted in the development of a considerable industry and during the past two years shipments have been made much in excess of those of former years.

The total shipments of crude chromite ores in 1916 were 27,517 tons, valued at $311,460. These ores contained a total of approximately 6,759 tons of Cr_2O_3, or an average of about 24·5 per cent. A considerable portion of the low grade ore and sand, however, amounting in all to 14,242 tons was sent to concentrating mills for concentration before being marketed. The concentrates recovered averaged from 42 per cent to over 50 per cent of Cr_2O_3. The final shipments of ore and concentrates would approximate 15,249 tons, valued at $310,902. In 1915 the shipments were 12,341 tons, valued at $179,543, much of which would average less than 35 per cent Cr_2O_3.

Statistics of production since 1886 are shown in the following table:—

Annual Production of Chromite in Canada.

Calendar year.	Short tons.	Value.	Average price.	Calendar year.	Short tons.	Value.	Average price.
1886	60	$ 945	$15.75	1904	6,074	$ 67,146	$11.05
1887	38	570	15.00	1905	8,575	93,301	10.88
1888 to 1893		No output		1906	9,035	91,859	10.17
				1907	7,196	72,901	10.13
1894	1,000	20,000	20,00	1908	7,225	82,008	11.35
1895	3,177	41,300	13.00	1909	2,470	26,604	10.77
1896	2,342	27,004	11.53	1910	299	3,734	12.49
1897	2,637	32,474	12.31	1911	157	2,587	16.48
1898	2,021	24,252	12.00	1912		No output	
1899	2,010	21,842	10.86	1913			
1900	2,335	27,000	11.56	1914	136	1,210	8.90
1901	1,274	16,744	13.14	1915	12,341	179,543	14.55
1902	900	13,000	14.44	1916	27,517	311,460	11.32
1903	3,509	51,129	14.57				

In commenting on the industry during 1915, it was stated in last year's report that "All available sources are being searched for ore, old dumps re-sorted, prospects and mines re-opened, and every little pocket of ore gophered out and sold." These mining conditions have continued during 1916 and the ores mined have included all grades from lake sands and waste containing as low as 10 per cent Cr_2O_3 to small quantities of ores of 52 and 54 per cent grade.

The operation of a Customs Concentration mill by the Mutual Chemical Company of Canada provided a market for the waste sand and low

grade ores averaging from 10·50 to 16·30 per cent Cr_2O_3 which was raised by concentration to an average of over 50 per cent.

The general average of shipping ore was from 33 to 35 per cent Cr_2O_3.

The ruling prices F.O.B. for ores of varying grade were as follows:

Cr_2O_3 contents:	Price.
25–29 per cent.....	$16.00 per ton.
29–35 „	18.00 „
35–38 „	20.00 „
38–50 „	25.65 per ton at 38% with an increase of 65 cents per unit.

Concentration.—The Lakeside mill at Black Lake was leased from the Black Lake Asbestos and Chrome Company, by the Mutual Chemical Company of Canada. The mill has been remodelled and was placed in operation in July, 1916. The mill equipment includes: jaw crusher, 6 5-stamp mills, and 7 Wilfley tables. About 2,000 tons per month have been treated.

This Company also built a new mill near Little St. Francis lake, with a rated daily capacity of 80 tons of ore, which was not placed in operation until December of 1916.

The marketing of chromite has been principally to destinations outside of Canada, all export being made under special license to approved consignees.

The exports of chromite from Canada during 1916 were, according to the records of the Customs Department, 12,633 tons, valued at $152,532, or an average of $12.07 per ton, as against 7,290 tons, valued at $81,838, or an average of $11.23, exported in 1915. On the other hand the imports into the United States from Canada, according to the published record of the Bureau of Foreign and Domestic Commerce of the United States, were in 1916, 12.220 long tons (13,686 short tons), and in 1915, 10,087 long tons (11,297 short tons), valued at $117,302.

A table of imports of Canadian chromite into the United States from 1904-1916, and a table showing the total United States imports of chromium in 1915 and 1916, with sources of the same, follow:—

Imports of Chromite into the United States from Canada.[1]

Twelve months ending June 30.	Short tons.	Value.	Twelve months. ending June 30.	Short tons.	Value.
1904.....	2,790	$ 36,322	1910.....	269	$2,892
1905.....	6,489	70,934	1911.....	17	150
1906.....	9,951	107,580	1912.....	14½	258
1907.....	6,179	66,115	1913.....	Nil.	.....
1908.....	6,505	69,009	1914.....	597	9,283
1909.....	4,455	50,042	1915.....	399	4,202
			1916.....	17,677	194,591

[1]The Foreign Commerce and Navigation of the United States, Washington, long ton in original changed to short ton.

Chromic Iron Ore Imported into the United States during the Calendar Years 1915 and 1916.*

	1915.			1916.		
	Quantity (long tons).	Value.	Price per ton.	Quantity (long tons).	Value.	Price per ton.
Cuba	.....	.....	.....	34	.....	.....
Canada	10,087	$117,302	$ 11.63	12,220	.....	.....
England	2	250	125.00	5	.....	.....
Greece	4,305	52,376	12.17	7,900	.....	.....
British South Africa	22,800	277,388	12.17	23,000	.....	.....
French Oceania	28,031	177,125	6.32	30,950	.....	.....
Portuguese Africa	11,230	155,620	13.86	38,850	.....	.....
Australia	.....	.....	.....	2,986	.....	.....
Total	76,455	780,061	10.20	115,945	$1,548,402	$13·35

* As furnished by the Bureau of Foreign and Domestic Commerce, U.S. Dept. of Commerce, and published in "Mineral Resources of the United States, 1915," Part I, p. 2.

Small quantities of ferro-chrome have been imported into Canada, but there is no separate record of the quantities thereof. The imports of bichromate of soda in 1916 were 1,421,589 pounds, valued at $362,571, as compared with 467,943 pounds, valued at $34,692 in 1915. The imports of bichromate of potash in 1916 were 31,049 pounds, valued at $13,381, as against imports in 1915 of 142,025 pounds, valued at $17,413.

The principal producers of chromite were: Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria St., Toronto; Dominion Mines and Quarries, Ltd., Dominion Bank Bldg., Toronto; Jos. M. Johnson, Black Lake, Que.; W. J. Woolsey, Black Lake, Que.; J. V. Belanger, Black Lake, Que.; Bennett, Martin Chrome Mines, Coleraine, Que.; Fletcher Pulp and Lumber Co., Sherbrooke, Que.; and the Mutual Chemical Company of America, New York.

COAL.

The term "production" in the text and tables of this report is used to represent the tonnage of coal actually sold, or used, by the producer, as distinguished from the term "output" which is applied to the total coal extracted from the mine, and which includes, in some cases, coal lost or unsaleable, or coal carried into stock on hand at the end of the year.

The peculiar situation which exists in respect to Canada's fuel supply, viz.: That notwithstanding the enormous resources which Canada possesses in coal, over 50 per cent of our consumption is imported from the United States, has been pointed out and explained annually in these reports. Our coal-fields are situated in the extreme east and in the western provinces, while our great central Provinces of Ontario and Quebec, the chief centres of population, are more easily and economically supplied with coal from the nearer coal-fields of Pennsylvania and Ohio. Further, we have no anthracite coal in eastern Canada and we have grown dependent upon the anthracite output of Pennsylvania for that most desirable of domestic fuels, which is not only the chief domestic, or house fuel in Manitoba, Ontario, and Quebec, but is imported even into our eastern coal districts.

Such a condition of international trade attracts little attention during normal times, and it is only under conditions such as those that have been brought about by the great war that the seriousness of the situation and its possibilities are realized. In round numbers we produced last year 14·5 million tons of coal of which we exported 2·1 million tons. But to satisfy our requirements we also imported 13 million tons of bituminous coal and 4·5 million tons of anthracite. It is most important indeed for Canada that there should be no sudden cessation of fuel imports.

The production of coal during 1916 was 14,483,395 short tons (12,931,603 long tons), valued at $38,817,481, or an average of $2.68 per ton, as compared with a production in 1915 of 13,267,023 short tons (11,845,556 long tons), valued at $32,111,182, or an average of $2.42 per ton, and a production in 1914 of 13,637,529 short tons (12,176,365 long tons), valued at $33,471,801 or an average of $2.45 per ton. Compared with 1915 the production in 1916 shows an increase of 1,216,372 tons, or about 9·2 per cent.

While exceeding the production of each of the two preceding years, that of 1916 was less than the production attained in 1912 and in 1913.

The average number of men employed during 1916 was 23,611 and total wages paid $20,884,236, as compared with an average of 24,574 men employed in 1915 and $17,385,200 paid in wages, and 27,571 men employed during 1914 and $19,060,011 paid in wages.

The values given are partially estimated or assumed since complete returns have not been received with respect to amounts realized from coal sales. In the case of Nova Scotia an average value of $3 per long ton

is placed upon the total production in 1916 as against a value of $2.50 per long ton during the previous four years, while for British Columbia an average value of $3.50 per long ton is used. The values placed upon the New Brunswick, Saskatchewan, and Alberta production are those furnished by the operating companies.

The total exports of Canadian coal in 1916 were 2,135,359 tons, valued at $7,099,387 as compared with 1,766,543 tons, valued at $5,406,058 in 1915. There is also a small export of coal "Not the produce of Canada" amounting in 1916 to 62,783 tons, valued at $150,799.

The total imports of coal in 1916 were 17,580,603 tons, valued at $38,289,666, as compared with imports in 1915 of 12,465,902 tons, valued at $28,345,605.

The total consumption of coal in 1916 was 29,865,856 tons, as compared with 23,906,692 tons in 1915, and 26,852,323 tons in 1914.

Bituminous coal constitutes by far the largest proportion of the annual production. Lignite only is produced in Saskatchewan, and in Alberta it forms a large proportion of the Province's production. Of anthracite there is a small output, less than 200,000 tons annually, from one mine, at Bankhead, Alberta.

Statistics of the production of coal by provinces in 1916 and 1915 and comparisons of 1916 production with that of 1915, and of the production of 1915 with that of 1914, are given in the tables following:—

Production of Coal by Provinces, 1916.

Province.	Average No. of men employed.	Wages paid.	Production of coal.			Per cent of total quantity.
			Short tons.	Value.	Average per ton.	
Nova Scotia	10,851	$8,161,297	6,912,140	$18,514,662	$2.68	47·73
New Brunswick	327	212,332	143,540	386,016	2.69	0·99
Saskatchewan	409	234,986	281,300	441,836	1.57	1·94
Alberta	7,060	6,813,209	4,559,054	11,386,577	2.50	31·48
British Columbia	4,949	5,454,912	2,584,061	8,075,190	3.12½	17·84
Yukon Territory	15	7,500	3,300	13,200	4.00	0·02
	23,611	20,884,236	14,483,395	38,817,481	2.68	100.00

Production of Coal by Provinces, 1915.

Province.	Average No. of men employed.	Wages paid.	Production of coal.			Per cent of total quantity.
			Short tons.	Value.	Average per ton.	
Nova Scotia	12,557	$8,133,085	7,463,370	$16,659,308	$2.23	56·25
New Brunswick	332	201,373	127,391	309,612	2.43	0·96
Saskatchewan	344	203,657	240,107	365,246	1.52	1,81
Alberta	6,349	4,840,213	3,360,818	8,283,079	2.46	25·33
British Columbia	4,957	3,974,622	2,065,613	6,455,041	3·12½	15·57
Yukon Territory	35	32,250	9,724	38,896	4.00	0·08
	24,574	17,385,200	13,267,023	32,111,182	2.42	100·00

Comparison of Production, 1914 with 1915, and 1915 with 1916.

Province.	(i) Increase or (d) Decrease.			
	Years 1914 and 1915.		Years 1915 and 1916.	
	Short tons.	Per cent.	Short tons.	Per cent.
Nova Scotia	(i) 92,446	1·25	(d) 551,230	7·39
New Brunswick	(i) 29,342	29·92	(i) 16,149	12·68
Saskatchewan	(i) 7,808	3·36	(i) 41,193	17·16
Alberta	(d) 322,197	8·75	(i) 1,198,236	35·65
British Columbia	(d) 174,186	7·78	(i) 518,448	25·10
Yukon Territory	(d) 3,719	27·66	(d) 6,424	66·06
Total for Canada	(d) 370,506	2·72	(i) 1,216,372	9·17

It will be noted that, with the exception of the Yukon, the western provinces and also New Brunswick, have made substantial increases in production in 1916, whereas Nova Scotia has shown a falling off. The proportion of the total production contributed by the different provinces therefore shows some variations from the previous years. Nova Scotia

with a production of 6,912,140 tons, a decrease of over 7 per cent, is still the largest producer, being credited with 47·7 per cent of the total, as against 56·2 per cent in 1915. Alberta, with an increase of 1,198,236 tons over the 1915 production (equivalent to 35·6 per cent) is again the second largest producer with 31·5 per cent of the total. The British Columbia production increased by 518,448 tons, or 25 per cent and amounted to 17·8 per cent of the total. Saskatchewan with an increase of 41,193 tons, or 17·2 per cent contributed only 1·9 per cent of the total, and New Brunswick and the Yukon each less than one per cent.

The relative importance of the different provinces as coal producers for a number of years past is shown in the next table, in which is set forth the proportional contribution of each province to the total tonnage of coal produced in Canada. For the first time the coal-fields on the Atlantic sea-board have produced less than half the total, although from 1910 to 1915 the combined production of the western provinces has been only a little less than 50 per cent of the total.

Percentage of Production Contributed by Provinces.

Province.	1874.	1890.	1900.	1910.	1911.	1913.	1914.	1915.	1916.
	%	%	%	%	%	%	%	%	%
Nova Scotia.....	91	71	62·9	50·25	62·35	53·62	54·77	57·21	48·72
New Brunswick....									
Saskatchewan*.....	.....	.....	0·7	1·40	1·83	1·42	1·70	1·81	1·94
Alberta*.....	.....	4	5·4	22·42	13·34	26·75	27·01	25·33	31·48
British Columbia....	8	25	31·0	25·80	22·45	18·08	16·42	15·57	17·84
Yukon Territory.....	.....	.....	.....	0·13	0·03	0·13	0·10	0·08	0·02

*Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these Provinces.

The production and distribution of coal mined, by provinces, during 1915 and 1916, is shown in the following tables. The total sales for consumption in Canada during 1916 were 10,701,530 tons, an increase of 874,818 tons over 1915. The sales for export to the United States were 1,451,075 tons, an increase of 120,357 tons over 1915, and the sales to other countries were 284,513 tons, a falling off of 12,830 tons from 1915. The total sales of Canadian coal were 12,437,118 tons, as against 11,454,773 tons in 1915. The quantity used by colliery operators in the manufacture of coke, steel or brick, etc., was 804,814 tons, while 1,241,463 tons were used in the operation of collieries and by workmen, both in excess of the quantities similarly used during the previous year. The total stocks reported at the end of December were 78,702 tons, as against stocks at December 31, 1915, of 171,205 tons, and stocks at the end of December, 1913, of 500,477 tons.

The loss due to breakage, washing, unmarketable slack, so far as returns have been furnished, which are believed to be far from complete, were 385,835 tons. The total output including this unmarketable slack, is shown in the tables.

Production and Distribution of Coal Mined, by Provinces, 1916.

(IN SHORT TONS.)

	Nova Scotia.	New Brunswick	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total.
Sold in Canada	5,226,902	135,683	263,781	4,113,403	3,000	958,761	10,701,530
Sold for export to U.S.	446,038	4,723	1,725	60,164	.....	938,425	1,451,075
Sold for export to other countries	277,607	.....	.....	.....	.....	6,906	284,513
Total sales	5,950,547	140,406	265,506	4,173,567	3,000	1,904,092	12,437,118
Used by producers in making coke, steel, brick, etc	285,892	.....	1,750	67,106	.....	450,066	804,814
Used by producers for colliery consumption and by workmen	675,701	3,134	14,044	318,381	300	229,903	1,241,463
Total used	961,593	3,134	15,794	385,487	300	679,969	2,046,277
Production*	6,912,140	143,540	281,300	4,559,054	3,300	2,584,061	14,483,395
Stock on hand Jan. 1	85,750	526	20	9,412	.....	36,521	132,229
Stock on hand Dec. 31	48,477	584	49	13,632	.....	15,960	78,702
Difference	− 37,273	+ 58	+ 29	+ 4,220	.....	− 20,561	− 53,527
Losses due to breakage or other causes	37,128	60	12,935	113,759	.....	221,953	385,835
Total output	6,911,995	143,658	294,264	4,677,033	3,300	2,785,453	14,815,703

*Production is obtained by adding coal sold and coal used.

Production and Distribution of Coal Mined, by Provinces, 1915.

(IN SHORT TONS.)

	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total.
Sold in Canada	5,693,615	119,694	225,497	3,038,761	9,264	739,881	9,826,712
Sold for export to U.S.	596,171	3,343	145	25,050	230	705,779	1,330,718
Sold for export to other countries	271,675	.....	.....	.....	.....	25,668	297,343
Total sales	6,561,461	123,037	225,642	3,063,811	9,494	1,471,328	11,454,773
Used by producers in making coke, steel, brick, etc	257,312	.....	960	38,878	.....	404,825	701,975
Used by producers for colliery consumption and by workmen	644,597	4,354	13,505	258,129	230	189,460	1,110,275
Total used	901,909	4,354	14,465	297,007	230	594,285	1,812,250
Production*	7,463,370	127,391	240,107	3,360,818	9,724	2,065,613	13,267,023
Stock on hand Jan. 1	138,795	1,081	27	82,453	4,623	43,520	270,499
" " Dec. 31	96,468	501	10	35,865	1,000	37,361	171,205
Difference	− 42,327	− 580	− 17	− 46,588	− 3,623	− 6,159	− 99,294
Losses due to breakage or other causes	92,696	112	3,035	76,337	1,386	138,901	312,467
Total output	7,513,739	126,923	243,125	3,390,567	7,487	2,198,355	13,480,196

*Production is obtained by adding coal sold and coal used.

Distribution of Coal Mined during the Years 1911-12-13-14.

(IN SHORT TONS.)

	1911.	1912.	1913.	1914.
Sold in Canada	8,559,952	10,572,365	11,381,960	10,359,390
Sold for export to United States	1,068,572	1,537,585	1,255,401	1,181,536
" other countries	280,235	314,410	263,189	239,927
Total sales	9,908,759	12,424,360	12,900,550	11,780,853
Used by producers for the manufacture of coke	452,354	870,885	914,421	591,331
" by colliery consumption, and workmen	962,275	1,217,584	1,197,207	1,265,345
Production	11,323,388	14,512,829	15,012,178	13,637,529
Stock on hand Jan. 1	265,046	314,742	385,456	325,275
" Dec. 31	307,755	282,069	500,477	242,152
Difference	+ 42,709	− 32,673	+ 115,021	− 83,123
Loss due to washing, breakage, or other causes	182,567	167,291	405,679	434,337
Total output	11,548,664	14,647,447	15,532,878	13,988,743

Statistics of the annual production of coal in Canada from 1785 to date, are given in the following table. The total production has been 254,452,575 tons. Of this amount Nova Scotia has produced 159,673,019 tons or 62·8 per cent; British Columbia 55,462,331 tons or 22 per cent; Alberta 35,398,773 tons or 13·9 per cent; Saskatchewan 2,824,126 tons or 1·11 per cent; New Brunswick 967,033 tons or 0·38 per cent, and the Yukon Territory 127,293 tons or 0·05 per cent.

Annual Production of Coal Showing Increase or Decrease.

Year.	Short tons.	Value.	Average per ton.	Increase (i) or decrease (d).	
				Short tons.	Per cent.
1785 to 1873	*8,592,150	$14,507,000	$1.69	.....	.....
1874	1,063,742	1,763,423	1.66	.....	.....
1875	1,039,974	1,747,016	1.68	(d) 23,768	2·2
1876	994,762	1,729,546	1.74	(d) 45,212	4·3
1877	1,036,670	1,794,415	1·73	(i) 41,908	4·2
1878	1,089,744	1,941,285	1·78	(i) 53,074	5·1
1879	1,126,497	2,050,639	1.82	(i) 36,753	3.4
1880	1,482,714	2,657,194	1.79	(i) 356,217	31·6
1881	1,537,106	2,688,621	1.75	(i) 54,392	3·7
1882	1,848,148	3,248,446	1.76	(i) 311,042	0·2
1883	1,818,684	3,109,635	1.71	(d) 29,464	21·6
1884	1,984,959	3,593,831	1.81	(i) 166,275	9·1
1885	1,920,977	3,417,807	1.78	(d) 63,982	3·2
1886	2,116,653	3,739,840	1.77	(i) 195,676	10·2
1887	2,429,330	4,388,206	1.81	(i) 312,677	14·8
1888	2,602,552	4,674,140	1.80	(i) 173,222	7·1
1889	2,658,303	4,894,287	1.84	(i) 55,751	2·1
1890	3,084,682	5,676,247	1.84	(i) 426,379	16·0
1891	3,577,749	7,019,425	1.96	(i) 493,067	16·0
1892	3,287,745	6,363,757	1.94	(d) 290,004	8·1
1893	3,783,499	7,359,080	1.95	(i) 495,754	15·1
1894	3,847,070	7,429,468	1.93	(i) 63,571	1·7
1895	3,478,344	6,739,153	1.94	(d) 368,726	9·6
1896	3,745,716	7,226,462	1.93	(i) 267,372	7·7
1897	3,786,107	7,303,597	1.93	(i) 40,391	1.1
1898	4,173,108	8,224,288	1.97	(i) 387,001	10·2
1899	4,925,051	10,283,497	2.09	(i) 751,943	18·0
1900	5,777,319	13,742,178	2.38	(i) 852,268	17·3
1901	6,486,325	12,699,243	1.96	(i) 709,006	12·3
1902	7,466,681	15,210,877	2.04	(i) 780,356	15·1
1903	7,960,364	15,942,833	2.00	(i) 493,683	6·6
1904	8,254,595	16,592,231	2.01	(i) 294,231	3.7
1905	8,667,948	17,520,263	2.02	(i) 413,353	5.0
1906	9,762,601	19,732,019	2.02	(i) 1,094,653	12·6
1907	10,511,426	24,381,842	2.32	(i) 748,825	7·7
1908	10,886,311	25,194,573	2.31	(i) 374,885	3·5
1909	10,501,475	24,781,236	2.36	(d) 384,836	3·5
1910	12,909,152	30,909,779	2.39	(i) 2,407,677	22·93
1911	11,323,388	26,467,646	2.34	(d) 1,585,764	12·28
1912	14,512,829	36,019,044	2.48	(i) 3,189,441	28·04
1913	15,012,178	37,334,940	2.49	(i) 499,349	3.44
1914	13,637,529	33,471,801	2.45	(d) 1,374,649	9·16
1915	13,267,023	32,111,182	2.42	(d) 370,506	2.72
1916	14,483,395	38,817,481	2.68	(i) 1,216,372	9·17
Grand total	254,452,575	556,499,473	2.19	.....	.....

*The total production for the years 1785 to 1873 is made up as follows:—

Nova Scotia (1785 to 1873)	8,053,670 net tons	or 7,190,777 gross tons at	$1.75 per gross ton	$12,583,860
British Columbia (1836 to 1873)	538,480 " "	480,785 " "	4.00 " "	1,923,140
	8,592,150	7,671,662		$14,507,000

Export of Canadian Coal.

A record of coal sold for export, as reported by the operators, has already been given.

Statistics of the exports of coal according to the records of the Department of Customs, are given in the following tables. The exports of Canadian coal in 1916 were 2,135,359 tons, valued at $7,099,387, or an average of $3.32 per ton, as compared with exports in 1915 of 1,766,543 tons, valued at $5,406,058, or an average of $3.06 per ton, thus showing an

increase of 20·8 per cent in quantity and of 31·3 per cent in total value. A reference to the table giving the distribution of coal mined shows that nearly 50 per cent of British Columbia coal sales were for export, as against about 14 per cent of the Nova Scotia coal sales, and less than 2 per cent of the Alberta sales.

Besides Canadian coal exported, there is also a small re-export of "Coal not the produce of Canada."

Exports of Coal Produced during 1914-15-16.

Exported to	1914.			1915.			1916.		
	Short tons.	Per cent.	Value.	Short tons.	Per cent.	Value.	Short tons.	Per cent.	Value.
Great Britain	25,576	1·8	$ 86,764	53,882	3·1	$ 185,317	97,562	4·6	$ 424,403
United States	1,088,983	76·5	2,742,425	1,328,803	75·2	3,945,149	1,555,476	72·8	4,770,113
Newfoundland	174,921	12·2	523,728	228,634	12·9	683,732	254,585	11·9	921,244
Other countries	133,646	9·5	527,258	155,224	8·8	591,860	227,736	10·7	983,627
Total Exports	1,423,126	100·0	3,880,175	1,766,543	100·0	5,406,058	2,135,359	100·0	7,099,387

Annual Export of Coal.

(IN SHORT TONS.)

Calendar Year.	Produce of Canada.	Not the produce of Canada.	Calendar Year.	Produce of Canada.	Not the produce of Canada.
1873	420,683	5,403	1895	1,011,235	96,836
1874	310,988	12,859	1896	1,106,661	116,774
1875	250,348	14,026	1897	986,130	101,848
1876	248,638	4,995	1898	1,150,029	99,189
1877	301,317	4,829	1899	1,293,169	101,004
1878	327,959	5,468	1900	1,787,777	62,776
1879	306,648	8,468	1901	1,573,661	53,894
1880	432,188	14,217	1902	2,090,268	23,453
1881	395,382	14,245	1903	1,954,629	27,138
1882	412,682	37,576	1904	1,557,412	27,308
1883	486,811	44,388	1905	1,635,287	86,792
1884	474,405	62,665	1906	1,835,041	44,758
1885	427,937	71,003	1907	1,894,074	101,778
1886	520,703	78,443	1908	1,729,833	102,071
1887	580,965	89,098	1909	1,588,099	161,098
1888	588,627	84,316	1910	2,377,049	159,859
1889	665,315	89,294	1911	1,500,639	133,943
1890	724,486	82,534	1912	2,127,133	46,706
1891	971,259	77,827	1913	1,562,020	69,566
1892	823,733	93,988	1914	1,423,126	83,137
1893	960,312	102,827	1915	1,766,543	59,690
1894	1,103,694	89,786	1916	2,135,359	62,783

The United States took 72·8 per cent of the Canadian exports in 1916; Newfoundland 11·9 per cent; Great Britain 4·6 per cent; and other countries 10·7 per cent. Exports to other countries which totalled 227,736 tons includes 45,343 tons to France, and 23,427 tons to Australia.

Imports of Coal.

The fact that the populous provinces of Quebec and Ontario have no coal-fields and can secure most of their requirements more cheaply from the coal-fields of Pennsylvania, Ohio, and Virginia, than from Canadian coal-fields accounts for Canadian imports exceeding 50 per cent of Canada's annual coal consumption.

The total imports of coal of all classes in 1916 were 17,580,603 tons, valued at $38,289,666, as compared with total imports in 1915 of 12,465,902 tons valued at $28,345,605, imports in 1914 of 14,721,057 tons valued at $39,801,498, and imports in 1913 of 18,201,953 tons valued at $47,949,119.

Imports of coal into Canada are subdivided into three classes as follows: anthracite, including anthracite dust; bituminous, round and run-of-mine; and bituminous slack such as will pass through a $\frac{3}{4}$-inch screen.

The imports of anthracite represent, practically, Canada's consumption of coal of this variety, as less than 200,000 tons is produced yearly by Canada's one anthracite coal mine at Bankhead, Alberta. The 1916 imports were 4,570,815 tons valued at $22,216,363, an average of $4.86 per ton, exceeding by 498,623 tons, or 12·2 per cent, the imports in 1915, which amounted to 4,072,192 tons valued at $18,753,980, or an average of $4.61 per ton. Although exceeding the imports of the two preceding years, the imports of anthracite in 1916 were less than the 1913 imports which amounted to 4,642,057 tons.

The imports of bituminous coal of all classes were 13,009,788 tons, valued at $16,073,303, as against 8,393,710 tons, valued at $9,591,625 in 1915; 10,286,047 tons, valued at $18,559,574 in 1914; and 13,559,896 tons, valued at $25,914,280 in 1913.

The increase in bituminous imports in 1916 over those of 1915 is thus shown to be no less than 4,616,078 tons, or nearly 55 per cent.

As against this record of the Canadian Customs Department, it may be of interest to quote the record of exports of bituminous coal to Canada as published in the Reports of Trade and Navigation at Washington, for purposes of comparison. The United States record shows exports of bituminous coal to Canada during the twelve months ending December, 1916, of 13,260,110 short tons, as against 9,356,889 tons in 1915; 10,271,409 tons in 1914, and 15,115,733 tons in 1913.

The Canadian and United States records appear to correspond fairly closely for the years 1916 and 1914 but differ rather widely for the years 1915 and 1913. Monthly details of both records are shown on a following page.

The bituminous imports in 1916 included bituminous, round and run-of-mine 9,504,552 tons, valued at $12,368,679, or an average of $1.30 per ton, and bituminous slack 3,505,236 tons, valued at $3,704,624, or an average of $1.06 per ton. The 1915 imports included bituminous, round, and

run-of-mine 6,106,794 tons, valued at $7,564,369, or an average of $1.24 per ton, and bituminous slack 2,286,916 tons, valued at $2,027,256, or an average of $0.89 per ton.

A record of the annual imports of each of the three classes of coal since 1880 is shown in the following table:—

Annual Imports of Coal.

Fiscal Year.	Bituminous coal.		Anthracite coal and Anthracite dust.		Bituminous coal dust.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1880	457,049	$ 1,220,761	516,729	$ 1,509,960	3,565	$ 8,877
1881	587,024	1,741,568	572,092	2,325,937	337	666
1882	636,374	1,992,081	638,273	2,666,356	471	900
1883	911,629	2,996,198	754,891	3,344,936	8,154	10,082
1884	1,118,615	3,613,470	868,000	3,831,283	12,782	14,600
1885	1,011,875	3,197,539	910,324	3,909,844	20,185	20,412
1886	930,949	2,591,554	995,425	4,028,050	36,230	36,996
1887	1,149,792	3,126,225	1,100,165	4,423,062	31,401	33,178
1888	1,231,234	3,451,661	†2,138,627	5,291,875	28,808	34,730
1889	1,248,540	3,255,171	1,291,705	5,199,481	39,980	47,139
1890	1,409,282	3,528,959	1,201,335	4,595,727	53,104	29,818
1891	1,598,855	4,060,896	1,399,067	5,224,452	60,127	36,130
1892	1,615,220	4,099,221	1,479,106	5,640,346	82,091	39,840
1893	1,603,154	3,967,764	1,500,550	6,355,285	109,585	44,474
1894	1,359,509	3,315,094	1,530,522	6,354,040	117,573	49,510
1895	1,444,928	3,321,387	1,404,342	5,350,627	181,318	52,221
1896	1,538,489	3,299,025	1,574,355	5,667,096	210,386	53,742
1897	1,543,476	3,254,217	1,457,295	5,695,168	225,562	59,609
1898	1,684,024	3,179,595	1,460,701	5,874,685	229,445	45,556
1899	2,171,358	3,691,946	1,745,460	6,490,509	276,547	44,717
1900	2,439,764	4,310,964	1,654,401	6,602,912	330,174	98,349
1901	2,516,392	4,956,025	1,933,283	7,923,950	414,432	275,559
1902	3,047,392	5,712,058	1,652,451	7,021,939	489,548	264,550
1903	3,511,412	7,776,717	1,456,713	7,028,664	550,883	420,317
1904	4,053,900	9,108,208	2,275,018	10,461,223	608,041	544,128
1905	4,176,274	8,002,896	2,604,137	12,093,371	650,261	343,456
1906	4,495,550	8,360,348	2,200,863	10,304,308	747,251	489,180
Calendar Year.	Bituminous round and run of the mine (*a*)		Anthracite coal and Anthracite dust (*b*).		Bituminous slack such as will pass through ¾″ screen (*c*).	
1907	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,121,949
1908	6,025,574	12,516,748	3,160,110	14,478,536	1,111,811	1,355,677
1909	5,625,063	11,455,818	3,017,844	13,906,152	1,230,017	1,469,889
1910	5,966,466	11,919,341	3,266,235	14,735,062	1,365,281	1,795,598
1911	8,905,815	18,407,603	4,020,577	18,794,192	1,632,500	2,090,796
1912	8,491,840	16,846,727	4,184,017	20,080,388	1,919,953	2,550,922
1913	10,743,473	21,756,658	4,642,057	22,034,839	2,816,423	4,157,622
1914	7,776,415	14,954,321	4,435,010	21,241,924	2,509,632	3,605,253
1915	6,106,794	7,564,369	4,072,192	18,753,980	2,286,916	2,027,256
1916	9,504,552	12,368,679	4,570,815	22,216,363	3,505,236	3,704,624

(*a*). Duty, 53 cents per ton. (*b*). Coal, anthracite, and anthracite coal dust; duty free. (*c*). Duty 14 cents per ton.

† In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 94 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 50 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.

In view of the attention being given at the present time to the importance of imports of coal to Canada, additional tables have been introduced as follows: showing the monthly imports of bituminous and anthracite coal since 1913, such figures as are available for the first few months of 1917 being added to the record.

For purposes of comparison a table has been added compiled from the monthly reports of Commerce and Navigation published at Washington showing the monthly exports of coal during the same period from the United States to Canada.

Since Canadian imports are derived almost entirely from the United States these records might be expected to correspond fairly closely. It will be noted, however, that month by month they show considerable differences which may in part be explained by the warehousing of imported coal and the consequent delay in entering same for consumption. Serious differences are, however, shown in the yearly totals of imports of bituminous coal for the years 1913 and 1915, although the totals for 1914 and 1916 appear to correspond very well.

Monthly Imports of Bituminous Coal into Canada.*

(IN SHORT TONS.)

	1913.	1914.	1915.	1916.	1917.
January	827,428	917,558	547,772	1,124,918	1,031,719
February	861,813	851,591	653,016	942,811	760,545
March	1,026,503	1,140,943	547,756	918,206	1,114,958
April	682,286	713,764	417,133	727,467	1,331,449
May	1,108,935	611,918	481,908	894,505	893,055
June	1,298,167	634,383	661,569	1,239,882	1,260,652
July	1,192,914	639,417	752,229	1,096,718	1,581,361
August	1,358,495	850,340	846,162	1,188,822	
September	1,795,093	1,082,544	680,151	1,287,554	
October	1,178,649	1,166,197	900,450	1,314,286	
November	1,031,846	947,509	967,791	1,156,239	
December	1,197,767	729,883	937,773	1,118,380	
Total	13,559,896	10,286,047	8,393,710	13,009,788	

*Compiled from the Monthly Reports on Trade and Navigation, Department of Customs, Ottawa.

Monthly Imports of Anthracite Coal into Canada.*

(IN SHORT TONS.)

	1913.	1914.	1915.	1916.	1917.
January	367,464	223,102	270,396	295,578	300,836
February	311,288	237,109	213,797	340,347	277,179
March	295,215	257,498	175,813	381,032	436,567
April	212,240	344,202	361,195	194,402	347,390
May	437,534	452,094	477,522	372,264	318,782
June	437,778	526,515	415,344	513,528	551,105
July	471,573	392,753	341,380	513,858	559,994
August	449,733	473,980	346,689	429,699	
September	437,309	535,538	338,272	433,203	
October	424,306	431,797	415,929	385,953	
November	420,998	306,566	370,384	383,103	
December	376,619	253,856	345,471	327,848	
Total	4,642,057	4,435,010	4,072,192	4,570,815	

* Compiled from the Monthly Reports on Trade and Navigation, Department of Customs, Ottawa.

Monthly Exports of Bituminous Coal from United States to Canada.*

(IN SHORT TONS.)

	1913.	1914.	1915.	1916.	1917.
January	633,020	631,510	396,715	600,616	654,350
February	622,933	493,597	338,905	605,684	646,079
March	824,935	694,810	306,203	611,640	884,497
April	892,781	443,102	426,970	740,865	1,022,171
May	1,647,061	790,229	660,253	1,467,229	1,569,297
June	1,588,286	889,119	978,028	1,476,266	2,123,027
July	1,716,094	1,126,562	1,138,383	1,455,895	1,561,008
August	1,765,659	1,694,668	1,060,717	1,708,883	
September	1,827,309	1,347,282	1,058,176	1,519,550	
October	1,543,887	1,097,164	1,224,880	1,196,122	
November	1,217,251	583,136	1,062,855	1,023,853	
December	836,517	480,230,	704,804	852,076	
Total	15,115,733	10,271,409	9,356,889	13,260,110†	

* Compiled from the Monthly Summary of Foreign Commerce of the United States, Washington, D.C.
† Total taken from December Report.

Monthly Exports of Anthracite Coal from the United States to Canada.*

(IN SHORT TONS.)

	1913.	1914.	1915.	1916.	1917.
January	335,974	215,004	211,435	288,521	323,307
February	400,796	227,506,	198,202	324,354	280,860
March	172,001	181,610	140,128	337,814	400,653
April	348,251	439,961	498,532	237,291	647,428
May	555,473	525,774	461,976	495,609	471,378
June	464,689	479,045	394,502	567,764	671,923
July	434,806	367,556	299,837	432,375	**437,493
August	424,135	506,843	328,516	430,379	
September	357,739	435,918	310,400	391,873	
October	471,312	374,540	380,417	374,565	
November	362,404	261,919	312,583	349,053	
December	245,753	204,231	316,281	326,776	
Total	4,573,333	4,219,907	3,852,810	4,556,374†	

* Compiled from the Monthly Summary of Foreign Commerce of the United States, Washington, D.C.
† Total taken from December Report.
** Total exports. Exports to Canada not separately stated.

Consumption of Coal.

The total consumption of coal in Canada estimated on the basis of production, imports and exports, was in 1916, 29,865,856 tons, as compared with 23,906,692 tons in 1915; 26,852,323 tons in 1914; and 31,582,545 tons in 1913.

Consumption of Coal, 1913-14-15-16.

(IN SHORT TONS.)

	1913.	1914.	1915.	1916.
Production	15,012,178	13,637,529	13,267,023	14,483,395
Exports of Canada	1,562,020	1,423,126	1,766,543	2,135,359
Home consumption of Canadian coal	13,450,158	12,214,403	11,500,480	12,348,036
Imports	18,201,953	14,721,057	12,465,902	17,580,603
Exports not produce of Canada	69,566	83,137	59,690	62,783
Canadian consumption of imported coal	18,132,387	14,637,920	12,406,212	17,517,820
Total consumption of coal in Canada	31,582,545	26,852,323	23,906,692	29,865,856

Annual Consumption of Coal.

(IN SHORT TONS.)

Calendar Year.	Canadian.		Imported.		Total.	Per capita.
	Short tons.	%	Short tons.	%		
1886	1,595,950	45·9	1,884,161	54·1	3,480,111	0·758
1887	1,848,365	45·7	2,192,260	54·3	4,040,625	0·871
1888	2,013,925	37·8	3,314,353	62·2	5,328,278	1·137
1889	1,992,988	44·4	2,490,931	55·6	4,483,919	0·946
1890	2,360,196	47·8	2,581,187	52·2	4,941,383	1·031
1891	2,606,490	46·7	2,980,222	53·3	5,586,712	1·153
1892	2,464,012	44.4	3,082,429	55·6	5,546,441	1·133
1893	2,823,187	47·6	3,110,462	52·4	5,933,649	1·198
1894	2,743,376	48·5	2,917,818	51·5	5,661,194	1·130
1895	2,467,109	45·7	2,933,752	54·3	5,400,861	1·066
1896	2,639,055	45·1	3,206,456	54·9	5,845,511	1·140
1897	2,799,977	47·3	3,124,485	52·7	5,924,462	1·143
1898	3,023,079	48·0	3,274,981	52·0	6,298,060	1·200
1899	3,631,882	47·0	4,092,361	53·0	7,724,243	1·454
1900	3,989,542	47·8	4,361,563	52·2	8,351,105	1·561
1901	4,912,664	50·5	4,810,213	49·5	9,722,877	1·810
1902	5,376,413	51·0	5,165,938	49·0	10,542,351	1·927
1903	6,005,735	52·2	5,491,870	47·8	11,507,605	2·055
1904	6,697,183	49·2	6,909,651	50·8	13,606,834	2·346
1905	7,032,661	48·9	7,343,880	51·1	14,376,541	2·362
1906	7,927,560	51·7	7,398,906	48·3	15,326,466	2·425
1907	8,617,352	45·0	10,549,503	55·0	19,166,855	2·947
1908	9,156,478	47·3	10,195,424	52·7	19,351,902	2·820
1909	8,913,376	47·9	9,711,826	52·1	18,625,202	2·682
1910	10,532,103	50·2	10,438,123	49·8	20,970,226	2·960
1911	9,822,749	40·5	14,424,949	59·5	24,247,698	3·384
1912	12,385,696	46·0	14,549,104	54·0	26,934,800	3·596
1913	13,450,158	42·6	18,132,387	57·4	31,582,545	4·071
1914	12,214,403	45·5	14,637,920	54·5	26,852,323	3·325
1915	11,500,480	48·1	12,406,212	51·9	23,906,692	.....
1916	12,348,036	41·3	17,517,820	58·7	29,865,856	.....

In connexion with records of consumption it may be of interest to record the very large percentage of Canadian coal consumption used by railway locomotives. During the twelve months ending June 30, 1916, the tonnage of coal used by locomotives amounted to no less than 8,677,354 tons, only a little less than one third of the total consumption.

The quantity of coal consumed by railway locomotives in recent years, as compiled from "Railway Statistics" published by the Department of Railways and Canals, is as follows:—

Annual Consumption of Coal by Railway Locomotives.

(IN SHORT TONS).

Year ending June 30th.	Anthracite.	Bituminous.	Total.
1911	6,444	6,769,903	6,776,347
1912	5,374	7,732,938	7,738,312
1913	4,662	9,040,963	9,045,625
1914	5,271	8,268,186	8,273,457
1915	3,691	6,673,845	6,677,536
1916	4,899	8,672,455	8,677,354

Nova Scotia.

The production of coal in Nova Scotia in 1916 was 6,912,140 tons as compared with a production in 1915 of 7,463,370 tons, showing a decrease of 551,230 tons, or 7·39 per cent.

The total sales of coal during 1916 were 5,950,547 tons of which 5,226,902 tons were sold for consumption in Canada, 446,038 tons for export to the United States, and 277,607 tons for export to Newfoundland and other countries.

The total quantity used by producers and in connexion with the collieries was 961,593 tons, including 285,892 tons used by producers in making coke and for other commercial purposes, and 675,701 tons used in the operation of the collieries, or by workmen.

A considerable tonnage of coal reported as sold for consumption in Canada is also used in the manufacture of coke, the total coal charged to coke ovens in the Province during the year being 985,063 tons.

The Dominion Coal Company has for many years been the principal operator, the total production of this firm's collieries at Cape Breton and at Springhill being 4,976,137 tons, or about 72 per cent of the Province's production. The Nova Scotia Steel and Coal Company produced 664,192 tons or 9·7 per cent of the total; the Acadia Coal Company 439,177 tons or 6·4 per cent; the Inverness Railway and Coal Company 298,302 tons or 4·3 per cent; the Maritime Coal, Railway and Power Company 232,877 tons, and the Intercolonial Coal Mining Company 167,911 tons. Cape Breton maintained its position as the chief coal producing county with 76·9 per cent of the total coal raised, Cumberland county being second with 9·9 per cent. Pictou county is credited with 8·9 per cent, and Inverness county with 4·3 per cent of the total.

For a number of years Nova Scotia mines, chiefly those of Cape Breton, have been shipping from 2,000,000 to 2,500,000 tons of coal to Montreal and other Quebec markets, via the St. Lawrence. During 1916, however, only 1,114,337 tons of Nova Scotia coal were marketed in Quebec province, as against 2,048,222 tons in 1915. The current year of 1917 will apparently show almost an entire cessation of St. Lawrence shipments owing to the withdrawal of boats for war service, the reduced output of coal, and the increased demand for bunkering purposes and general consumption in the Maritime Provinces.

The quantity of Nova Scotia coal marketed in the Maritime Provinces in 1916 exceeded by about 1,000,000 tons the quantity so marketed in 1915, and amounted to 62 per cent of the total in 1916, as against 48·6 per cent of the total in 1915 (see table "Distribution of Coal Sold.") Sales of "Bunker Coal" also show a very large increase in 1916, having increased from 383,273 tons in 1915 (12 months ending September) to 604,601 tons in 1916.

Coal Production by Companies, in Nova Scotia, 1916.

(IN SHORT TONS.)

	Total sales.	Used.			Production.[2]	Stocks.		Losses.[3]	Output.
		For coke.[1]	Colliery consumption.	Workmen.		Jan. 1.	Dec. 31.		
Inverness Ry. and Coal Co.	254,252	.....	36,801	7,249	298,302	3,495	1,304	.....	296,111
Sydney Coal Co., Ltd.	6,440	.....	146	134	6,720	.....	.....	.....	6,720
Dominion Coal Co., Ltd.	4,202,704	.....	324,028	58,757	4,585,489	58,092	35,667	19,965	4,583,029
Cape Breton Coal, Iron, and Ry. Co.	1,088	.....	.....	.....	1,088	1,588	500	.....	.....
Nova Scotia Steel and Coal Co., Ltd.	338,825	282,508	21,465	21,294	664,192	643	240	.....	678,328
The Bras d'Or Coal Co., Ltd.	43,128	.....	5,744	746	49,618	150	75	.....	49,679
Alex. Sutherland (Wilford colliery)	8,555	.....	1,093	240	9,888	.....	.....	.....	9,888
Greenwood Coal Co., Ltd.	1,829	.....	23	118	1,970	.....	642	.....	2,612
Acadia Coal Co., Ltd.	387,182	.....	39,288	12,707	439,177	3,041	2,977	.....	439,113
Intercolonial Coal Mining Co.	127,630	3,284	26,240	5,757	162,911	2,813	900	.....	160,998
Maritime Coal, Ry. and Power Co.	203,368	.....	25,233	4,276	232,877	12,159	.....	.....	220,718
Jones & McKinnon	4,934	.....	246	123	5,303	.....	.....	.....	5,303
Dominion Coal Co., Ltd. (Springhill)	315,252	.....	63,476	11,920	390,648	3,669	6,172	321	393,472
Minudie Coal Co., Ltd.	50,122	.....	6,903	1,494	58,519	.....	.....	2,167	60,686
Strathcona Coal Co., Ltd.	2,566	.....	.....	.....	2,566	.....	.....	.....	2,566
Atlantic Grindstone, Coal and Ry. Co.	672	.....	.....	.....	672	.....	.....	.....	672
Royal Coal Co., Ltd.	2,000	.....	200	.....	2,200	100	.....	.....	2,100
	5,950,547	285,892	550,886	124,815	6,912,140	85,750	48,477	37,128	6,911,995

[1] Includes also coal used by producers for steel making and other purposes.
[2] Production is obtained by adding sales and coal used.
[3] Complete records of losses are not furnished by all producers.

Coal Production by Companies, in Nova Scotia, 1915.

(IN SHORT TONS.)

	Total sales.	Used.			Production.[2]	Stocks.		Losses.[3]	Output.
		For coke.[1]	Colliery consumption.	Workmen.		Jan. 1.	Dec. 31.		
Inverness Ry. and Coal Co	203,669	.....	31,183	6,675	241,527	2,604	3,495	32,631	275,049
Sydney Coal Co., Ltd	6,496	.....	90	134	6,720	13	.....	.....	6,707
Dominion Coal Co., Ltd	4,776,447	.....	317,923	57,034	5,151,404	89,971	58,092	42,531	5,162,056
Cape Breton Coal, Iron. and Ry. Co	5,907	.....	373	39	6,319	10,421	6,892	.....	2,790
Nova Scotia Steel and Coal Co., Ltd	384,759	253,422	31,931	15,044	685,156	10,892	643	10,446	685,353
The Colonial Coal Co., Ltd	59,261	.....	4,097	638	63,996	382	150	.....	63,764
Acadia Coal Co., Ltd	336,748	.....	33,512	10,128	380,388	1,537	3,041	.....	381,892
Intercolonial Coal Mining Co	167,507	3,890	28,964	6,957	207,318	11,831	2,813	1,034	199,334
Maritime Coal, Ry. and Power Co	172,402	.....	10,275	3,379	186,056	.....	9,303	.....	195,359
Dominion Coal Co., Ltd. (Springhill)	378,821	.....	63,409	11,489	453,719	8,777	3,669	275	448,886
Minudie Coal Co., Ltd	66,380	.....	9,061	2,094	77,535	2,367	8,370	5,779	89,317
J. L. Rector, Fundy mine	824	.....	.....	.....	824	.....	.....	.....	824
Royal Coal Co., Ltd	2,240	.....	112	56	2,408	.....	.....	.....	2,408
	6,561,461	257,312	530,930	113,567	7,463,370	138 795	96,468	92,696	7,513,739

[1] Includes also coal used by producers for steel making and other purposes.
[2] Production is obtained by adding sales and coal used.
[3] Complete records of losses are not furnished by all producers.

Output, Sales, Colliery Consumption, and Production of Coal in Nova Scotia.

Calendar Year.	Output.	Sold or used.	Colliery consumption	Production.*	Output.	Sold or used.	Colliery consumption	Production.*	Price per ton of 2,240 lbs.	Value of production.
	Tons of 2,240 pounds.				Tons of 2,000 pounds.					
1785 to 1873 (See p. 187)...	.....	.....	.....	7,190,777	.....	.....	.....	8,053,670	$1.75	$12,583,860
1874.....	872,720	749,127	119,582	868,709	977,446	839,022	133,932	972,954	1.75	1,520,240
1875.....	781,165	706,795	124,110	830,905	874,905	791,610	139,003	930,613	1.75	1,454,084
1876.....	709,646	634,207	113,788	747,995	794,804	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	1,259,183	1,159,216	120,834	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.....	1,422,553	1,297,523	111,949	1,409,472	1,503,259	1,453,226	125,383	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	156,550	1,858,596	1.75	2,904,057
1888.....	1,776,128	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,231	1.75	3,034,735
1889.....	1,756,279	1,555,107	158,131	1,713,238	1,967,032	1,741,720	177,107	1,918,827	1.75	2,998,167
1890.....	1,984,001	1,786,111	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	1,752,934	175,092	1,928,026	2,175,913	1,963,286	196,103	2,159,389	1.75	3,374,046
1893.....	2,223,042	1,977,543	205,425	2,182,968	2,489,807	2,214,848	230,076	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	219,751	2,527,982	1.75	3,949,970
1895.....	1,999,756	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	192,975	2,239,808	2,537,706	2,202,447	216,132	2,508,579	1.75	3,919,655
1897.....	2,340,031	2,044,672	181,716	2,226,388	2,020,835	2,290,032	203,522	2,493,554	1.75	3,896,179
1898.....	2,262,656	2,121,126	187,428	1,288,554	2,584,175	2,375,661	187,519	2,563,180	1.75	4,004,970
1899.....	2,865,443	2,633,989	177,460	2,811,449	3,209,296	2,950,067	198,755	3,148,822	2.00	5,622,898
1900.....	3,298,791	2,998,737	236,563	3,235,300	3,694,646	3,358,585	264,051	3,623,536	2.50	8,088,250
1901.....	3,821,033	3,411,127	301,434	3,712,561	4,279,557	3,820,462	337,606	4,158,068	1.75	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
1903.....	5,215,562	4,565,720	481,903	5,047,623	5,841,429	5,113,607	539,731	5,653,338	2.00	10,095,246
1904.....	5,131,985	4,551,740	144,904	4,996,644	5,747,823	5,097,949	498,292	5,596,241	2.00	9,993,288

Output, Sales, Colliery Consumption, and Prodution of Coal in Nova Scotia.

Calendar Year.	Output.	Sold or used.	Colliery consumption	Production.*	Output.	Sold or used.	Colliery consumption	Production.*	Price per ton of 2,240 lbs.	Value of production.
	Tons of 2,240 pounds.				Tons of 2,000 pounds.					
1905	5,197,877	4,613,818	427,774	5,041,592	5,821,622	5,167,476	479,107	5,646,583	$2.00	$10,083,184
1906	5,844,813	5,093,131	460,891	5,554,022	6,546,191	5,704,307	516,198	6,220,505	2.00	11,108,044
1907	5,775,503	5,236,077	437,256	5,673,333	6,468,563	5,864,406	489,727	6,354,133	2.25	12,764,999
1908	6,076,330	5,224,787	576,509	5,939,767	6,805,489	5,851,761	645,690	6,652,539	2.25	13,364,476
1909	5,106,135	4,524,029	522,479	5,046,508	5,718,871	5,066,912	585,177	5,652,089	2.25	11,354,643
1910	5,817,109	5,199,715	542,376	5,742,091	6,515,162	5,823,681	607,461	6,431,142	2.25	12,919,705
1911	6,362,099	5,676,857	577,089	6,253,946	7,125,551	6,358,080	646,340	7,004,420	2.25	14,071,379
1912	6,995,289	6,296,940	652,960	6,949,900	7,834,724	7,052,573	731,315	7,783,888	2.50	17,374,750
1913	7,263,485	6,479,469	645,596	7,125,065	8,135,104	7,257,006	723,067	7,980,073	2.50	17,812,663
1914	6,650,038	5,925,991	655,191	6,581,182	7,448,042	6,637,110	733,814	7,370,924	2.50	16,452,955
1915	6,708,695	6,088,190	575,533	6,663,723	7,513,739	6,818,773	644,597	7,463,370	2.50	16,659,308
1916	6,171,424	5,568,249	603,305	6,171,554	6,911,995	6,236,439	675,701	6,912,140	3.00	18,514,667
Total	.....	.....	.....	142,565,196	.....	.....	.....	159,673,019	.....	301,462,656

*This production is obtained by adding sales and colliery consumption.

Coal Trade by Counties in Nova Scotia, Calendar Years since 1906.

(IN SHORT TONS.)

Calendar Year.	Cumberland.		Pictou.		Cape Breton.		Other counties.		Total.	
	Raised.	Sold.*	Raised.	Sold.*	Raised.	Sold.*	Raised.	Sold.*	Raised.	Sold.*
1906	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396	6,546,191	5,704,307
1907	534,047	445,288	840,533	729,043	4,698,147	4,346,180	395,836	343,895	6,468,563	5,864,406
1908	662,157	530,648	849,802	678,025	4,840,653	4,267,346	452,877	375,742	6,805,489	5,851,761
1909	494,919	403,371	748,860	599,743	4,081,333	3,723,135	398,759	340,663	5,718,871	5,066,912
1910	350,363	288,706	714,846	588,678	5,035,800	4,571,347	414,153	374,950	6,515,162	5,823,681
1911	538,296	436,125	833,956	691,852	5,405,355	4,917,902	347,944	312,201	7,125,551	6,358,080
1912	716,914	595,138	765,678	641,890	6,039,296	5,530,765	312,836	284,780	7,834,724	7,052,573
1913	675,544	553,845	817,177	694,659	6,313,275	5,709,995	329,108	298,507	8,135,104	7,257,006
1914	702,496	572,765	681,356	571,063	5,767,566	5,266,733	296,624	226,549	7,448,042	6,637,110
1915	736,794	620,667	581,226	508,145	5,920,670	5,486,292	275,049	203,669	7,513,739	6,818,773
1916	685,517	578,914	612,611	528,480	5,317,756	4,874,793	296,111	254,252	6,911,995	6,236,439

*Sales include coal used for making coke and steel.

The coal statistics prepared and published by the Nova Scotia Department of Mines cover the fiscal years ending September 30, and the long ton of 2,240 pounds is used exclusively in these reports. A number of tables appearing in the Provincial report for the fiscal year 1916 are reproduced below, the figures having been re-calculated in tons of 2,000 pounds.

For the Provincial, or fiscal year ending September, 1916, the total coal output was slightly greater than during the corresponding year ending September, 1915. It is apparent, therefore, in view of the falling off in the calendar year that the coal production during October, November, and December of 1916 was much less than during the same months of 1915.

Output of Coal in Nova Scotia by Collieries.

(IN SHORT TONS.)

Colliery.	Fiscal Year ending September 30.			
	1913.	1914.	1915.	1916.
Cape Breton County.				
Dominion Coal Company	5,285,968	5,097,589	4,840,133	4,893,981
Nova Scotia Steel and Coal Co	908,806	890,262	645,547	673,923
Cape Breton Coal, Iron and Railway Co	.....	42,269	20,280	.....
Sydney Coal Company	6,089	5,825	6,020	5,566
Bras d'Or Coal Co., Ltd	64,632	63,587	64,073	56,829
Cumberland County.				
Cumberland Railway and Coal Co	438,964	448,824	455,630	415,370
Maritime Coal, Railway and Power Co., Chignecto	183,558	160,376	179,740	226,145
" " " Joggins	.....	.....	.....	.....
Minudie Coal Co	70,926	69,582	91,903	69,976
Atlantic Grindstone and Coal Co	3,040	962	501	1,841
Royal (Eastern) Coal Co., Lawson mine	.....	.....	1,646	2,619
Provincial Mining Co	.....	.....	2,264	3,549
Pictou County.				
Acadia Coal Co	570,501	511,269	363,416	453,570
Intercolonial Coal Co	217,512	247,441	212,596	155,350
Milford Colliery	.....	.....	.....	5,050
Inverness County.				
Inverness Coal and Railway Co	318,387	308,134	261,250	312,280

Production and Sales of Coal by Companies, in Nova Scotia, Year ending September 30, 1916.

(IN SHORT TONS).

Name of Company.	Output.	Sales.	Colliery consumption.	Supplied workmen.	On bank at close of year.	Difference on bank compared with 1915.	
						Increase.	Decrease.
Dominion Coal Co., Ltd.	4,893,981	4,544,078	328,634	58,176	11,854	.....	64,814
N. S. Steel & Coal Co., Ltd.	673,923	619,916	31,287	24,009	3,462	.....	1,289
Cumberland Ry. & Coal Co., Ltd.	415,370	337,877	65,281	11,966	3,052	.....	36
Acadia Coal Co., Ltd.	453,570	401,172	38,185	12,512	3,652	1,701	.....
Maritime Coal, Ry. & Power Co.	226,145	218,272	11,701	3,970	4,960	.....	7,799
Inverness Ry. & Coal Co.	312,280	270,353	35,627	7,117	1,830	.....	818
Intercolonial Coal Co.	155,350	130,610	25,312	5,327	1,462	.....	6,421
Sydney Coal Co.	5,566	5,526	140	171	.....	.....	270
Bras d'Or Coal Co., Ltd.	56,829	50,330	5,554	744	11	.....	88
Minudie Coal Co.	69,976	55,160	7,647	1,870	2,873	2,873	.....
Eastern Coal Co., Ltd. (Lawson mine)	2,619	2,619	.....	.....	.....	.....	.....
Provincial Mining Co., Ltd.	3,549	3,381	168	.....	.....	.....	.....
Atlantic Coal Co., Ltd.	1,841	1,841	.....	.....	.....	.....	.....
Milford Colliery	5,050	4,621	429	.....	.....	.....	.....
Total	7,276,049	6,645,756	549,965	125,862	33,156	4,574	81,535

Distribution of Coal Sold by Nova Scotia Producers.

Markets.	Fiscal years ending September 30.									
	1912.		1913.		1914.		1915.		1916.	
	Short tons.	Per cent.	Short tons.	Per cent.	Short tons.	Per cent.	Short tons.	Per cent.	Short tons.	Per cent.
Nova Scotia—										
Transported by land	2,197,213	31·76	2,530,566	34·88	2,099,186	30·40	1,976,943	30·65	2,673,866	40·23
" sea	373,594	5·40	380,363	5·24	368,551	5·34	392,340	6·08	491,591	7·40
Total Nova Scotia	2,570,807	37·16	2,910,929	40·12	2,467,737	35·74	2,369,283	36·73	3,165,457	47·63
New Brunswick	732,411	10·59	724,239	9·98	762,150	11·04	675,693	10·48	865,238	13·02
Prince Edward Island	103,378	1·49	107,612	1·48	107,275	1·55	93,171	1·45	92,876	1·40
Quebec	2,418,086	34·95	2,456,416	33·85	2,667,372	38·63	2,048,222	31·76	1,114,337	16·77
Newfoundland	224,719	3·25	235,810	3·25	252,660	3·66	233,735	3·63	281,259	4·23
United States	462,035	6·68	524,262	7·23	336,741	4·88	596,606	9·25	509,773	7·67
St. Pierre	10,535	0·15	7,449	0·10	9,673	0·14	11,729	0·18	6,485	0·10
Bunker coal	265,142	3·83	262,278	3·62	278,645	4·04	383,273	5·94	604,601	9·10
For time chartered boats	28,972	0·42	23,958	0·33	20,787	0·30	18,968	0·29	.....	.....
Loss at sea	.....	.....	.....	.....	.....	.....	9,427	0·15	392	.....
Other countries	102,844	1·48	3,202	0·04	1,312	0·02	8,749	0·14	5,338	0·08
Total	6,918,929	100·00	7,256,155	100·00	6,904,352	100·00	6,448,856	100·00	6,645,756	100·00

Number and Class of Workmen employed in the Coal Mines of Nova Scotia, Year ending September 30, 1916.

Company.	Average day's work a month	Average Daily Force.						Horses.
		Surface.	Underground labour.	Cutting coal.	Transportation, upkeep, repairs, commercial.	Total workmen.	Total days.	
Dominion Coal Co.	24·8	843	3,812	929	1,734	7,318	2,177,837	600
Nova Scotia Steel and Coal Co.	25	333	971	605	197	2,106	614,400	51
Cumberland Ry. and Coal Co.	23·7	193	357	294	20	864	245,728	61
Acadia Coal Co.	20·7	229	375	474	65	1,143	284,054	52
Intercolonial Coal Co.	22	104	105	113	30	352	92,928	26
Maritime Coal, Ry. and Power Co.	25	71	159	187	4	421	126,300	6
Inverness Ry. & Coal Co.	25·1	96	192	225	124	637	191,864	30
Sydney Coal Co.	22·6	4	5	6	2	17	4,610	3
Minudie Coal Co.	19·6	63	57	80	15	215	42,173	6
Eastern Coal Co.	23	2	1	10	1	14	3,864	.....
Atlantic Grindstone and Coal Co. (9 mos.)	16½	2	2	5	1	10	1,485	.....
Provincial Co. (9 mos.)	18	2	.....	4	1	7	1,134	.....
Milford Colliery (9 mos.)	16½	2	2	14	2	20	2,970	.....
	.....	1,944	6,038	2,946	2,196	13,124	3,789,339	835

New Brunswick.

The production of coal in New Brunswick in 1916 was, 143,540 tons as against 127,391 tons in 1915, showing an increase of 16,149 tons or over 12·5 per cent. This is the largest production of coal that has been recorded for this province. Three operators have neglected to comply with the request of this Department for detailed returns of their production but close estimates have been made based on statistics furnished by the Provincial Department of Lands and Mines. The total shipments from New Brunswick collieries, as reported by the Deputy Minister of Lands and Mines, were 134,063 short tons.

We are, through the courtesy of the operators, permitted to publish a record of the production from individual properties, as shown in the accompanying table.

Production of Coal in New Brunswick, 1916.

(IN SHORT TONS.)

	Days in operation.	Total sales.	Total for colliery use.*	Total production.
The Minto Coal Co., Ltd., Minto	301	91,177	1,511	92,688
Rothwell Coal Co. Ltd., Rothwell	294	5,529	672	6,201
J. Coakley, Minto	100	808	.....	808
Grand Lake Coal Co. Ltd., Minto	158	4,000	.....	4,000
Northfield Coal Co. Ltd., Minto	.....	5,021	297	5,318
G. H. King, Chipman	300	10,980	150	11,130
Dean Coal Co., Adamsville	.....	2,892	204	3,096
All others (3)	.....	19,999	300	20,299
Total New Brunswick	.....	140,406	3,134	143,540

* Includes consumption under boilers, etc., and coal used by workmen.

In 1915 the Minto Coal Company, the chief operator, produced 86,592 tons; the Rothwell Coal Company 5,932 tons; the Northfield Coal Company 3,994 tons; and the Dean Coal Company 4,984 tons.

Annual Production of Coal in New Brunswick.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1887	10,040	$ 23,607	$2.35	1902	18,795	$ 39,680	$2.11
1888	5,730	11,050	1.93	1903	16,000	40,000	2.50
1889	5,673	11,733	2.07	1904	9,112	18,224	2.00
1890	7,110	13,850	1.95	1905	29,400	58,800	2.00
1891	5,422	11,030	2.03	1906	34,076	68,152	2.00
1892	6,768	9,375	1.39	1907	34,584	77,814	2.25
1893	6,200	9,837	1.59	1908	60,000	135,000	2.25
1894	6,469	10,264	1.59	1909	49,029	98,496	2.25
1895	9,500	14,250	1.50	1910	55,455	110,910	2.00
1896	7,500	11,250	1.50	1911	55,781	111,562	2.00
1897	6,000	9,000	1.50	1912	44,780	89,560	2.00
1898	6,160	9,240	1.50	1913	70,311	166,637	2.37
1899	10,528	15,792	1.50	1914	98,049	241,075	2.46
1900	10,000	15,000	1.50	1915	127,391	309,612	2.43
1901	17,630	51,857	2.94	1916	143,540	386,016	2.69
				Total	967,033	2,178,673	

The coal producing areas include the Grand Lake coal-fields in Queens and Sunbury counties, and the Beersville area in Kent county. In the Grand Lake area the coal seam, which varies in thickness from 20 to 32 inches, is found at a depth of from 30 to 60 feet below the surface.

The Minister of Lands and Mines, in his annual report for the year ended 31st October, 1916, states: "While there was a small quantity of coal mined at Beersville, Kent county, the bulk of the mining has been in the Grand Lake region. The Minto Coal Company are the largest operators, and have much the best equipment for mining among the operators in this district. They, with all other coal mining companies, have been seriously hampered throughout this third year of the war for the want of labor. There has been a demand for coal much greater than could be satisfied and prices never were so good, but the large number of enlistments among mine laborers has limited the output."

Saskatchewan.

The coal deposits of Saskatchewan furnish coal of the lignite variety only. As some of the physical characteristics of this lignite in its raw state tend to prevent its successful and economical use, the yearly production of recent years shows only a slight increase in no way comparable with the increase in population of the Province, and the consequent increased demand for fuel for heating, and the generation of power. The importance of devising better methods for utilizing this lignite, of which vast quantities exist in the adjacent Province of Alberta, as well as in the Province of Saskatchewan, has prompted both the Government of the Province of Saskatchewan, and the Fuel Testing Division of the Mines Branch, Ottawa, to undertake investigations of western lignites, the first results of which have already been published.[1]

The production of lignite in 1916 from 33 collieries was 281,300 tons, valued at $441,836, as compared with 240,107 tons, valued at $365,246 in 1915, an increase of 41,193 tons, or 17 per cent.

The 1916 production included 265,506 tons of coal sold and 15,794 tons used by producers for colliery consumption by workmen or in brick-making.

The output of coal comes chiefly from the vicinity of Estevan, located on the Souris river, near the southeastern corner of the Province. Coal deposits exist for 75 or 100 miles in a northwest-southeast direction along the Souris river, on Big Muddy creek draining Willowbunch lake (only lately reached by a branch line of railway) and on the south branch of the Saskatchewan river, about 100 miles southwest of Saskatoon.

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[1] "The Carbonizing and Briquetting of Lignite," by S. M. Darling, 1915. Investigation for the Government of the Province of Saskatchewan.

Results of the Investigation of Six Lignite Samples obtained from the Province of Alberta, by Haanel and Blizard, 1915. Mines Branch publication No. 331.

The production by the principal operators in 1916 and 1915 is shown in the following tables:—

Production of Coal in Saskatchewan in 1916, by Principal Operators.

(IN SHORT TONS.)

Name of Company.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Western Dom. Collieries, Ltd., Taylorton	186	86,000	5,200	91,200
Manitoba & Saskatchewan Coal Co. Ltd., Bienfait	197	67,057	4,771	71,828
The Bienfait Mine, Bienfait	211	55,132	2,174	57,306
Saskatchewan Coal, Brick & Power Co. Ltd., Shand	210	25,156	1,400	26,556
Geo. Parkinson, Estevan	All year	7,241	.....	7,241
Estevan Coal & Brick Co., Ltd., Estevan	51	2,500	2,000	4,500
McNeil & Rooks, Estevan	265	3,360	.....	3,360
Eidsness Bros., Gladmar	281	3,237	.....	3,237
Alex. Wilson, Taylorton	123	2,826	20	2,846
H. Nicholson, Estevan	130	1,859	45	1,904
A. G. Clark, Roche Percee	126	1,500	100	1,600
Jos. Bastien, Estevan	148	1,153	.....	1,153
Henry V. Heuvel, Hart	110	1,030	.....	1,030
All other operators	.....	7,455	84	7,539
Total production, Saskatchewan	.....	265,506	15,794	281,300

* Includes consumption under boilers, etc., and coal used by workmen.

Production of Coal in Saskatchewan in 1915, by Principal Operators.

(IN SHORT TONS.)

Name of Company.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Western Dominion Collieries, Ltd., Taylorton	188	83,300	5,200	88,500
Manitoba and Saskatchewan Coal Co., Ltd., Bienfait	176	58,600	4,984	63,584
Bienfait Commercial Co., Ltd., Bienfait	202	39,385	1,655	41,040
Maple Leaf Mines, Ltd., Shand	239	24,286	2,295	26,581
Geo. Parkinson, Estevan	305	5,448	.....	5,448
McNeil & Rooks, Estevan	300	3,000	200	3,200
Great West Brick and Coal Co., Estevan	150	2,000	.....	2,000
Eidsness Bros., Gladmar	266	1,645	.....	1,645
H. Nicholson, Estevan	.....	1,317	.....	1,317
J. F. Bulmer, Roche Percee	69½	980	38	1,018
All other operators	.....	5,681	93	5,774
Total production, Saskatchewan	.....	225,642	14,465	240,107

*Includes consumption under boilers, etc., and coal used by workmen.

Annual Production of Coal in Saskatchewan.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1887	(a) 400	$ 800	$ 2.00	1904	124,885	$ 187,021	$ 1.50
1890	200	200	1.00	1905	107,596	152,334	1.42
1891				1906	108,398	164,146	1.51
1892	5,400	9,325	1.73	1907	151,232	252,437	1.67
1893	8,325	12,485	1.50	1908	150,556	253,790	1.69
1894	(b) 15,051	15,153	1.01	1909	192,125	296,339	1.54
1895	15,769	31,538	2.00	1910	181,156	293,923	1.62
1896	16,706	25,059	1.50	1911	206,779	347,248	1.68
1897	25,000	37,500	1.50	1912	225,342	368,135	1.63
1898	25,000	37,500	1.50	1913	212,897	358,192	1.68
1899	25,000	37,500	1.50	1914	232,299	374,245	1.61
1900	40,500	60,750	1.50	1915	240,107	365,246	1.52
1901	45,000	72,000	1.60	1916	281,300	441,836	1.57
1902	70,400	112,640	1.52				
1903	116,703	169,618	1.45	Total	2,824,126	4,476,960	

(a) From Turtle Mountain district, Manitoba.
(b) Including a small quantity from the Turtle Mountain district, Manitoba.

Alberta.

Lignite, bituminous, and anthracite coals are all produced in Alberta. Bituminous coal comprises about 50 per cent of the production, lignite over 45 per cent, and anthracite less than 5 per cent.

As mentioned in the notes on the Saskatchewan production, the vast tonnage of lignites available in the western provinces has prompted investigations with a view to the better utilization of these lignites.

The production of coal in Alberta in 1916 was the highest recorded for the Province and amounted to 4,559,054 tons valued at $11,386,577, or an average of $2.50 per ton, as compared with a production in 1915 of 3,360,818 tons, valued at $8,283,079, or an average of $2.46 per ton, showing an increase in 1916 of 1,198,236 tons, or 35·7 per cent. The highest production previously recorded was that of 1913 compared with which 1916 shows an increase of over half a million tons.

There are many small operators in the Province—in fact so many new operators are producing coal each year that it is difficult to keep lists of them complete. The production of each of the larger collieries is shown in the following table. In 1916 there were 42 companies reporting a production in excess of 10,000 tons, the aggregate production by these firms being 95·5 per cent of the total of the Province. Eleven of these companies reported a production exceeding 100,000 tons each, the largest operators being the Canadian Pacific Railway with a total of 588,877 tons from Bankhead and Lethbridge; West Canadian Collieries, Ltd., with 530,201 tons from Bellevue and Greenhill; and North American Collieries, Ltd., with 372,656 tons from Lovettville, Coalhurst, and Evansburgh.

Of the total production 4,173,567 tons were reported as sales, including 4,113,403 tons sold for consumption in Canada and 60,164 tons sold for

export to the United States; 385,487 tons were used by the producers including 67,106 tons in coke ovens and 318,381 tons used for colliery operation and by workmen.

Production of Coal in Alberta in 1916, by Principal Collieries.

(IN SHORT TONS.)

Name of company, and mine address.	Days in operation.	Total sales.	Total colliery* consumption.	Total production.
Alberta Block Coal Co., Ltd., Drumheller	155	39,990	1,095	41,085
The Alberta Coal Mg. Co., Ltd., Cardiff	164	40,744	4,000	44,744
Big Valley Collieries, Big Valley	175	11,504	250	11,754
Blain & Gilliland-Banner mine, Cardiff	254	30,000	3,400	33,400
Blue Diamond Coal Co., Ltd., Brule Mines	293	56,938	328	57,266
Brazeau Collieries, Ltd., Nordegg	248	274,605	7,125	281,730
Bush Mine Coal Co., Beverly	285	29,162	470	29,632
Canada West Coal Co., Ltd., Taber	194	81,532	16,562	98,094
Can. Pac. Ry., Bankhead	150	(a) 152,601	(b) 27,667	180,268
Can. Pac. Ry., Galt No. 3, Lethbridge	241	122,004	17,362	139,366
Can. Pac. Ry., Galt No. 6, Lethbridge	242	236,443	32,810	269,253
Canmore Coal Co., Ltd., Canmore	295	219,004	19,197	238,201
Cardiff Collieries, Ltd., Cardiff	222	124,065	7,791	131,856
Chinook Coal Co., Ltd., Commerce	253	68,039	12,611	80,650
Clover Bar Coal Co., Ltd., Clover Bar	227	16,018	3,030	19,048
The Dawson Coal Co., Ltd., Edmonton	252	16,252	7,200	23,452
The Dobell Coal Co., Ltd., Tofield	287	22,007	1,872	23,879
The Drumheller Land Co., Ltd., Drumheller	214	31,358	2,655	34,013
Ellis Coal Co., Ltd., Three Mills	288	10,727	1,045	11,772
Franco-Canadian Collieries, Ltd., Frank	261	176,265	16,004	192,269
Georgetown Collieries, Canmore	†(8¾ mos)	33,234	2,575	35,809
The Great West Coal Co., Ltd., Clover Bar	277	67,799	2,676	70,475
Hillcrest Collieries, Ltd., Hillcrest	267	240,603	10,964	251,567
Humberstone Coal Co., Beverly	306	42,928	4,422	47,350
International Coal & Coke Co., Ltd., Coleman	293	126,346	(c) 85,501	211,847
Jasper Park Collieries—Pocahontas Miette	277	90,868	4,402	95,270
McGillivray Ck. Coal and Coke Co., Ltd., Coleman	257	206,406	7,492	213,898
Midland Collieries, Ltd., Drumheller	260	50,545	3,050	53,595
Mountain Park Coal Co., Ltd., Mountain Park	303	134,863	4,673	139,536
Newcastle Coal Co., Ltd., Drumheller	188	34,350	1,017	35,367
North American Collieries, Ltd.				
Pacific Pass Coll., Lovettville	275	61,188	5,877	67,065
Pembina " Evansburgh	285	64,069	6,876	70,945
Lethbridge " Coalhurst (Kipp)	264	205,317	19,381	224,698
St. Albert " St. Albert	**135	6,556	3,392	9,948
Ottewell Coal Co., Clover Bar	.....	12,000	75	12,075
Premier Coal Co., Ltd., Drumheller	203	30,250	400	30,650
Red Deer Valley Coal Co., Ltd., Drumheller	230	19,350	1,960	21,310
Rock Springs Coal & Brick Co., Ltd., Elcan	185	17,472	2,025	19,497
Rosedale Coal & Clay Products Co., Ltd., Rosedale	221	14,750	466	15,216
Rose Deer Coal Mg. Co., Ltd., Wayne	269	40,000	2,550	42,550
Round Hill Collieries, Ltd., Roundhill	269	27,231	450	27,681
The Spicer Coal Co., Ltd., Dinant	295	12,668	600	13,268
Star Coal Mines, Ltd., Aerial	237	56,387	1,166	57,553
Sterling Coal Co., Ltd., Drumheller	244	13,163	2,120	15,283
Tofield Coal Co., Ltd., Tofield	207	35,937	1,484	37,421
Twin City Coal Co., Ltd., Edmonton S	245	59,203	3,357	62,560
West Can. Collieries, Bellevue	228	323,132	14,902	338,034
" " " Greenhill	274	188,189	3,978	192,167
	.....	3,974,062	380,305	4,354,367
All other operators	.....	199,505	5,182	204,687
Total Alberta	.....	4,173,567	385,487	4,559,054

*Includes consumption under boilers, etc., and coal used by workmen.

(a) Briquettes 106,814; (b) Briquettes 1,144; (c) For manufacture of coke 67,106.

† Company now out of business.

** Now abandoned.

Production of Coal in Alberta in 1915, by Principal Collieries.

(IN SHORT TONS.)

Name of company, and mine address.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Alberta Coal Mining Co., Ltd., Cardiff	167	45,750	3,000	48,750
Battle River Collieries, Ltd., Rosenroll	152	9,776	1,540	11,316
Brazeau Collieries, Ltd., Nordegg	237	254,934	6,222	261,156
Brule Lake Coal Mine Entrance	312	14,726	.....	14,726
Bush Mine Coal Co., Beverly	284	14,395	475	14,870
Byers Bros., Clover Bar	197	10,000	.....	10,000
Canada West Coal Co., Ltd., Taber	102	37,073	12,792	49,865
Canmore Coal Co., Ltd., Canmore	169	140,544	13,310	153,854
Canadian Pacific Ry., Bankhead	144	(a) 130,250	(b) 21,877	152,127
" " Lethbridge, Galt No. 3	167	125,993	24,000	149,993
" " " " " 6	164	210,447	29,000	239,447
Cardiff Collieries, Ltd., Cardiff	162	91,932	6,645	98,577
Chinook Coal Co., Commerce	220	50,801	8,602	59,403
City of Lethbridge Coal Mine, Lethbridge	261	11,830	.....	11,830
Consumers Co-operative Co., Ltd., Big Valley	234	12,253	500	12,753
Dawson Coal Co., Edmonton	239	15,832	550	16,382
Dobell Coal Co., Ltd., Tofield	236	15,968	1,894	17,862
Drumheller Land Co., Ltd., Drumheller	129	13,317	1,025	14,342
Franco-Canadian Collieries, Ltd., Frank	227	67,849	12,918	80,767
Georgetown Collieries, Ltd., Canmore	228	42,021	2,727	44,748
Great West Coal Co., Edmonton	247	49,654	3,179	52,833
Hillcrest Collieries, Ltd., Hillcrest	202	214,021	10,730	224,751
Humberstone Coal Co., Beverly	288	41,868	2,885	44,753
International Coal and Coke Co., Ltd., Coleman	151	52,700	(c) 51,937	104,637
Jasper Park Collieries, Ltd., Pocahontas	210	67,394	4,377	71,771
McGillivray Creek Coal & Coke Co., Ltd., Coleman	194	148,681	5,090	153,771
Midland Collieries, Ltd., Drumheller	248	40,000	3,200	43,200
Mountain Park Coal Co., Ltd., Mountain Park	195	77,129	4,508	81.637
Newcastle Coal Co., Ltd., and Alberta Block Coal Co., Ltd. — Drumheller	280	62,206	1,050	63,256
North American Collieries, Ltd. — Pacific Pass	189	69,208	4,636	73,844
North American Collieries, Ltd. — Lethbridge	185	138,021	11,108	149,129
North American Collieries, Ltd. — St. Albert	247	6,290	4,624	10,914
North American Collieries, Ltd. — Evansburgh	160	28,869	3,665	32,534
Rock Springs Coal & Brick Co., Elcan	113	19,200	2,000	21,200
Round Hill Collieries, Ltd., Roundhill	241	23,840	189	24,029
Rosedale Coal & Clay Products Co., Rosedale	269	18,194	481	18,675
Rose Deer Coal Mining Co., Wayne	220	17,450	2,575	20,025
Star Coal Mines, Rosedale	216	26,098	750	26,848
Tofield Coal Co., Tofield	.....	26,440	1,350	27,790
Twin City Coal Co., Edmonton South	262	60,810	5,820	66,630
West Canadian Collieries, Ltd., Bellevue	179	291,050	10,964	302,014
" " " Blairmore	175	39,364	2,479	41,843
		2,834,178	284,674	3,118,852
All other companies		229,633	12,333	241,966
Total Alberta		3,063,811	297,007	3,360,818

*Includes consumption under boilers, etc., and coal used by workmen.
(a) 82,249 briquettes; (b) 1,007 briquettes; (c) 38,878 for manufacture of coke.

Annual Production of Coal in Alberta.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1886	43,220	$ 81,112	$ 1.88	1902	402,819	$ 960,601	$2.38
1887	74,152	157,577	2.13	1903	495,893	1,117,541	2.25
1888	115,124	183,354	1.59	1904	661,732	1,404,524	2.12
1889	97,364	179,640	1.85	1905	931,917	1,993,915	2.14
1890	128,753	198,298	1.54	1906	1,246,360	2,614,762	2.10
1891	174,131	437,243	2.51	1907	1,591,579	3,836,286	2.41
1892	178,970	460,605	2·57	1908	1,685,661	4,127,311	2.45
1893	230,070	586,260	2.55	1909	1,994,741	4,838,109	2.43
1894	184,940	473,827	2.56	1910	2,894,469	7,065,736	2.44
1895	169,885	382,526	2.25	1911	1,511,036	3,979,264	2.63
1896	209,162	581,832	2.78	1912	3,240,577	8,113,525	2.50
1897	242,163	630,408	2.60	1913	4,014,755	10,418,941	2.59
1898	315,088	787,720	2.50	1914	3,683,015	9,350,392	2.54
1899	309,600	774,000	2.50	1915	3,360,818	8,283,079	2.46
1900	311,450	778,625	2.50	1916	4,559,054	11,386,577	2.50
1901	340,275	850,687	2.50				
				Total	35,398,773	87,034,277	

Statistics collected and published[1] by the Chief Inspector of Coal Mines for Alberta, covering coal mining operations in 1916 are quoted in the following tables.

The total output as given by Mr. Stirling for 1916, was 4,648,604 tons, or, after deducting 124,003 tons of slack put on the waste heap 4,524,601 tons of marketable coal. These records differ but slightly from those collected by this Department. The total sales, according to the provincial record were, including briquettes 4,227,164 tons of which 2,956,205 tons were sold for consumption in Alberta; 89,582 tons for consumption in British Columbia; 1,021,656 tons for consumption in Saskatchewan; 98,629 tons for consumption in Manitoba; and 61,092 tons for export to the United States. It is stated with respect to the 2,956,205 tons sold for consumption in Alberta that this includes coal sold to railway companies for the use of locomotives, a considerable percentage of which was probably used in other provinces.

It will be noted that a considerable proportion of Alberta's output is marketed in Saskatchewan, and a small quantity in Manitoba and British Columbia.

The imports of coal into Canada from the United States through ports lying between Port Arthur and the western boundary of Alberta during the calendar year 1916, are reported by the Customs Department as 2,910,576 tons, including 2,376,934 tons of bituminous coal and 533,642 tons of anthracite.

The Chief Inspector in reporting on the coal mining industry during the year, makes the following amongst other comments:—

"Several small mines have been opened in the Peace River district and although these mines are operated on a small scale at present, it is probable that with the increased settlement that is taking place in the district north of Edmonton, these mines should be fairly large producers in the near future.

"It will be noted from the following tables that the output of coal for the year 1916 exceeded that for the year 1915 by 1,213,713 tons, thus establishing a record output for the province. Notwithstanding the increased output, however, it will also be noted that 2,910,576 tons of coal were imported during the year 1916 into the territory lying between Port Arthur and the western boundary of Alberta. As I have already stated in previous reports this imported coal is being consumed in territory which, in my opinion, should be supplied by the production from the mines situated in the Provinces of Alberta and Saskatchewan. Although a larger amount of coal was shipped last year to Saskatchewan and Manitoba than in previous years, I am of the opinion that even with the present freight rates a much larger market could be obtained in these provinces than we have at present.

[1] Annual Report of the Department of Public Works, Province of Alberta, Edmonton.

"The principal development in the province during the last year has been in the Drumheller district, where a considerable amount of underground development has been done and a number of new plants erected."

Output of Coal by Districts, Alberta, 1915 and 1916.

(IN SHORT TONS.)

District.	1915.			1916.		
	Lignite.	Bituminous.	Anthracite.	Lignite.	Bituminous.	Anthracite.
Crowsnest Pass	.....	916,051	.....	.....	1,402,636	.....
Pincher Creek	.....	3,332	.....	3,867	.....	.....
Lethbridge	613,293	.....	.....	740,022	.....	.....
Magrath	1,423	.....	.....	1,247	.....	.....
Milk River	4,016	.....	.....	5,577	.....	.....
Taber	89,698	.....	.....	139,318	.....	.....
Bow Island	5,762	.....	.....	4,132	.....	.....
Medicine Hat	5,536	.....	.....	12,173	.....	.....
Aldersyde	.....	7,946	.....	7,087	.....	.....
High River	.....	3,810	.....	1,526	.....	.....
Canmore	.....	208,875	.....	.....	281,387	.....
Banff	.....	.....	125,732	.....	.....	140,544
Drumheller	247,805	.....	.....	377,618	.....	.....
Big Valley	15,756	.....	.....	16,478	.....	.....
Brazeau	.....	232,728	.....	.....	289,768	.....
Brooks	12,147	.....	.....	10,917	.....	.....
Hanna	28,556	.....	.....	25,048	.....	.....
Lacombe	27,498	.....	.....	18,803	.....	.....
Trochu	10,886	.....	.....	12,898	.....	.....
Three Hills	15,306	.....	.....	15,120	.....	.....
Carbon	6,852	.....	.....	5,091	.....	.....
Battle River	9,406	.....	.....	10,352	.....	.....
Camrose	56,731	.....	.....	52,588	.....	.....
Tofield	54,320	.....	.....	67,063	.....	.....
Clover Bar	155,613	.....	.....	204,546	.....	.....
Edmonton	100,981	.....	.....	111,907	.....	.....
Namao	8,423	.....	.....	12,379	.....	.....
Cardiff	177,617	.....	.....	236,433	.....	.....
Wabamun	2,409	.....	.....	7,475	.....	.....
Pembina	32,888	.....	.....	72,746	.....	.....
Jasper Park	.....	86,496	.....	.....	152,504	.....
Yellowhead Pass	.....	83,414	.....	.....	69,426	.....
Mountain Park	.....	83,585	.....	.....	139,538	.....
Peace River	.....	.....	.....	390	.....	.....
Total	1,682,922	1,626,237	125,732	2,172,801	2,335,259	140,544

Output and Distribution of Coal, Briquettes, and Coke, in Alberta, 1916.

	Sold for Consumption in						Used.			Lifted from stock.	Slack put on waste heap.	Total output for year (including slack).
	Alberta.	British Columbia.	Saskatchewan.	Manitoba.	United States.	Total sales.	Making briquettes.	Making coke.	Under coll. boilers.			
Lignite	959,526	21,143	853,046	79,252	2,324	1,915,291	.....	.....	152,475	.....	105,035	2,172,801
Bituminous	1,883,549	57,894	140,413	17,719	58,187	2,157,762	.....	67,105	103,192	1,179	8,379	2,335,259
Anthracite	23,595	7,376	14,306	294	581	46,152	57,765	.....	26,038	.....	10,589	140,544
Total	2,866,670	86,413	1,007,765	97,265	61,092	4,119,205	57,765	67,105	281,705	1,179	124,003	4,648,604
Briquettes	89,535	3,169	13,891	1,364	.....	107,959	.....	.....	.....	.....	.....	107,959
Coke	52	41,888	.....	.....	.....	41,940	.....	.....	10	.....	.....	41,950

The bituminous coal shown in these tables as being sold for consumption in Alberta includes coal sold to railway companies for the use of locomotives, a considerable percentage of which was probably used in other provinces.

The anthracite and briquettes in the above table were all produced at Banff, and the coke in the Crowsnest district.

Output and Distribution of Lignite in Alberta, by Districts, 1916.

Name of District.	Sold for Consumption in					Total sales.	Used under coll. boilers.	Slack put on waste heap.	Total output for year (including slack)
	Alberta.	British Columbia.	Saskatchewan.	Manitoba.	United States.				
Pincher Creek	3,603	.....	.....	.....	.....	3,603	.....	264	3,867
Lethbridge	219,311	16,191	362,396	56,798	1,978	656,674	74,851	8,497	740,022
Magrath	1,242	.....	.....	.....	.....	1,242	.....	5	1,247
Milk River	4,806	.....	.....	.....	.....	4,806	.....	771	5,577
Taber	18,266	2,783	81,784	7,713	346	110,892	18,890	9,536	139,318
Bow Island	3,661	.....	.....	.....	.....	3,661	.....	471	4,132
Medicine Hat	4,706	.....	6,701	320	.....	11,727	34	412	12,173
Aldersyde	6,652	.....	.....	.....	.....	6,652	.....	435	7,087
High River	1,525	.....	.....	.....	.....	1,525	.....	1	1,526
Drumheller	104,481	648	226,135	7,984	.....	339,248	15,669	22,701	377,618
Big Valley	12,983	.....	1,950	.....	.....	14,933	255	1,290	16,478
Brooks	10,888	.....	.....	.....	.....	10,888	.....	29	10,917
Hanna	24,135	.....	.....	.....	.....	24,135	141	772	25,048
Lacombe	18,269	.....	80	.....	.....	18,349	.....	454	18,803
Trochu	11,479	.....	.....	.....	.....	11,479	50	1,369	12,898
Three Hills	11,561	.....	1,029	.....	.....	12,590	1,438	1,092	15,120
Carbon	4,902	.....	.....	.....	.....	4,902	112	77	5,091
Battle River	9,851	.....	.....	.....	.....	9,851	.....	501	10,352
Camrose	26,315	.....	21,777	.....	.....	48,092	925	3,571	52,588
Tofield	47,193	.....	12,937	601	.....	60,731	2,749	3,583	67,063
Clover Bar	157,320	.....	26,230	1,310	.....	184,860	10,038	9,648	204,546
Edmonton	72,215	.....	22,320	344	.....	94,879	8,518	8,510	111,907
Namao	8,543	.....	1,943	30	.....	10,516	331	1,532	12,379
Cardiff	126,004	1,169	66,905	3,531	.....	197,609	11,784	27,040	236,433
Wabamun	3,580	.....	2,285	60	.....	5,925	.....	1,550	7,475
Pembina	45,650	352	18,574	561	.....	65,137	6,690	919	72,746
Peace River	385	.....	.....	.....	.....	385	.....	5	390
Total	959,526	211,143	853,046	79,252	2,324	1,915,291	152,475	105,035	2,172,801

Output and Distribution of Bituminous Coal in Alberta by Districts, 1916.

(IN SHORT TONS).

Name of District.	Sold for Consumption.						Used.			Lifted from stock.	Slack put on waste heap.	Total output for year (including slack).
	Alberta.	British Columbia.	Saskatchewan.	Manitoba.	United States.	Total sales.	Making coke.	Under coll. boilers.	Put to stock.			
Crowsnest Pass	1,050,054	36,901	123,852	6,022	57,981	1,274,810	67,105	62,020	.....	1,299	.....	1,402,636
Canmore	213,545	14,618	13,411	11,697	206	253,477	.....	20,282	.....	.....	7,628	281,387
Brazeau	280,261	.....	2,646	.....	.....	282,907	.....	6,861	.....	.....	.....	289,768
Jasper Park	148,082	35	56	.....	.....	148,173	.....	4,331	.....	.....	.....	152,504
Yellowhead Pass	56,047	6,304	403	.....	.....	62,754	.....	5,801	120	.....	751	69,426
Mountain Park	135,560	36	45	.....	.....	135,641	.....	3,897	.....	.....	.....	139,538
Total	1,883,549	57,894	140,413	17,719	58,187	2,157,762	67,105	103,192	120	1,299	8,379	2,335,259

Classification of Persons employed in the Lignite, Bituminous, and Anthracite Coal-fields, Alberta, in 1916.

	Underground.						Above Ground.							Total underground and above ground.
	Supervision.	Miners and helpers.	Haulage employees	Mechanics and skilled labour.	Others.	Total.	Supervision.	Mechanics and skilled labour.	Clerical assistance.	Others.	Coke ovens.	Briquette plants.	Total.	
Lignite.....	183	2,157	451	142	204	3,137	82	245	77	591	.....	.....	995	4,132
Bituminous.....	109	1,228	425	105	391	2,258	43	194	57	564	26	.....	884	3,142
Anthracite.....	7	92	8	1	33	141	5	44	8	87	.....	11	155	296
Total.....	299	3,477	884	248	628	5,536	130	483	142	1,242	26	11	2,034	7,570

British Columbia.

The production of coal in British Columbia in 1916 was 2,584,061 tons as compared with 2,065,613 tons in 1915, an increase of 518,448 tons, or 25 per cent.

Of the total production in 1916, 1,904,092 tons were reported as sales including 958,761 tons sold for consumption in Canada; 938,425 tons sold for export to the United States, and 6,906 tons sold for export to other countries; 679,969 tons were used by producers including 450,066 tons for making coke and 229,903 tons for the operation of collieries and for workmen.

The production of collieries on Vancouver Island was 1,472,970 tons, of which 770,869 tons were sold for consumption in Canada; 498,672 tons for export to the United States, and 6,906 tons for export to other countries, 55,436 tons were used in the coke ovens at Comox, and 141,087 tons were used in the operation of collieries and by workmen. Vancouver Island collieries produced 57 per cent of the production of the Province, while compared with the previous year there was an increase of 464,502 tons or about 46 per cent.

The production in the Crowsnest district was 988,188 tons of which 84,357 tons were sold for consumption in Canada, and 433,387 tons for export to the United States; 394,230 tons were used for making coke, and 76,214 tons were used in the operation of collieries and by workmen. This district contributed 38·2 per cent of the total in 1916, and the production exceeded that of 1915 by 36,899 tons.

The production of Nicola and Princeton, etc., was 122,903 tons, of which 103,535 tons were sold for consumption in Canada, and 6,366 tons for export to the United States; and 12,602 tons were used in the operation of collieries and by workmen. These areas contributed about 5 per cent of the total, and the production showed an increase of 17,047 tons, as compared with 1915.

The three largest operators were the Crow's Nest Pass Coal Company with 910,886 tons, the Canadian Collieries (Dunsmuir), Limited, with 616,112 tons, and the Western Fuel Company with 625,562 tons. These three companies contributed over 83 per cent of the Province's production.

Coal Production by Districts in British Columbia, 1916.

(IN SHORT TONS.)

Coal.	Vancouver Island.	Nicola and Princeton.	Crowsnest and East Kootenay.	Total.
Sold for consumption in Canada	770,869	103,535	84,357	958,761
Sold for export to United States	498,672	6,366	433,387	938,425
Sold for export to other countries	6,906	.....	.....	6,906
Total sales	1,276,447	109,901	517,744	1,904,092
Used for making coke or brick	55,436	400	394,230	450,066
Used for colliery consumption, etc.	141,087	12,602	76,214	229,903
Production	1,472,970	122,903	988,188	2,584,061

Coal Production by Districts in British Columbia, 1915.

(IN SHORT TONS.)

Coal.	Vancouver Island.	Nicola and Princeton.	Crowsnest and East Kootenay.	Total.
Sold for consumption in Canada	559,587	88,427	91,867	739,881
Sold for export to United States	292,669	5,293	407,817	705,779
Sold for export to other countries	25,668	.....	.....	25,668
Total sales	877,924	93,720	499,684	1,471,328
Used for making coke or brick	20,115	.....	384,710	404,825
Used for colliery consumption, etc	110,429	12,136	66,895	189,460
Production	1,008,468	105,856	951,289	2,065,613

Coal Production by Collieries in British Columbia, 1916.

(IN SHORT TONS.)

Colliery.	Sold.				Used.		Production.	Lost in washing, etc.	Stocks.		Output.
	In Canada.	To United States.	To other countries.	Total.	Making coke.	Under colliery boilers, etc.			First of year.	Last of year.	
1. No. 1 Mine	208,238	265,676	6,714	480,628	.....	50,120	530,748	.....	12,043	5,237	523,942
Reserve	25,241	45,211	192	70,644	.....	24,170	94,814	.....	820	3,228	97,222
2. East Wellington No. 1	74,985	1,048	.....	76,033	.....	8,804	84,837	5,531	3,023	512	87,857
3. Wellington Extension Mine, Ladysmith	147,407	68,489	.....	215,896	.....	20,805	236,701	60,256	10,429	1,259	287,787
Comox Mines, Cumberland	240,942	71,927	.....	312,869	55,436	11,106	379,411	126,836	7,325	3,975	502,897
4. South Wellington Mines	74,056	46,321	.....	120,377	.....	26,082	146,459	26,029	2,153	1,151	171,486
5. Michel	15,223	60,918	.....	76,141	176,216	21,073	273,430	.....	52	35	273,413
Coal Creek	62,992	306,593	.....	369,585	218,014	49,857	637,456	.....	59	30	637,427
6. Corbin	6,142	65,876	.....	72,018	.....	5,284	77,302	.....	.....	.....	77,302
7. Middlesboro	50,232	.....	.....	50,252	.....	5,229	55,461	.....	303	327	55,485
8. Inland	33,437	.....	.....	33,437	400	2,457	36,294	1,100	280	190	37,304
9. Princeton	19,768	6,366	.....	26,134	.....	4,676	30,810	2,201	34	16	32,993
10. Miscellaneous	98	.....	.....	98	.....	240	338	.....	.....	.....	338
	958,761	938,425	6,906	1,904,092	450,066	229,903	2,584,061	221,953	36,521	15,960	2,785,453

1. Western Fuel Company.
2. Vancouver-Nanaimo Coal Mining Co.
3. Canadian Collieries (Dunsmuir), Ltd.
4. Pacific Coast Coal Mines, Ltd.
5. Crow's Nest Pass Coal Co., Ltd.
6. Corbin Coal and Coke Co., Ltd.
7. Middlesboro Collieries, Ltd.
8. Inland Coal and Coke Co., Ltd.
9. Princeton Coal and Land Co., Ltd.
10. Pacific Coast Colliery of B.C.

Coal Production by Collieries in British Columbia, 1915.

(IN SHORT TONS.)

Colliery.	Sold.				Used.		Production.	Lost in washing, etc.	Stocks.		Output.
	In Canada.	To United States.	To other countries.	Total.	Making coke.	Under colliery boilers, etc.			First of year.	Last of year.	
1. No. 1 Mine	157,125	230,665	2,463	390,253	.....	38,852	429,105	.....	7,699	12,043	433,449
Reserve	8,459	6,571	59	15,089	.....	16,295	31,384	.....	44	820	32,160
2. East Wellington No. 1	46,695	1,806	.....	48,501	.....	7,309	55,810	.....	5,100	3,023	53,733
3. Wellington Extension Mine, Ladysmith	97,057	27,598	12,551	137,206	.....	14,688	151,894	29,197	4,737	10,653	187,007
Comox Mines, Cumberland	172,225	2,971	10,595	185,791	20,115	12,491	218,397	84,706	19,180	8,220	292,143
4. South Wellington Mines	78,026	23,058	.....	101,084	.....	20,794	121,878	23,363	2,434	2,154	144,961
5. Michel	41,028	105,312	.....	146,340	145,939	20,479	312,758	.....	1,312	52	311,498
Coal Creek	47,154	247,465	.....	294,619	238,771	42,597	575,987	.....	2,714	59	573,332
6. Corbin	3,685	55,040	.....	58,725	.....	3,819	62,544	.....	.....	.....	62,544
7. Middlesboro	48,720	.....	.....	48,720	.....	5,264	53,984	.....	300	303	53,987
8. Inland	32,530	.....	.....	32,530	.....	2,474	35,004	.....	.....	.....	35,004
9. Princeton	6,054	5,293	.....	11,347	.....	4,398	15,745	1,635	.....	34	17,414
10. Miscellaneous	1,123	.....	.....	1,123	.....	.....	1,123	.....	.....	.....	1,123
	739,881	705,779	25,668	1,471,328	404,825	189,460	2,065,613	138,901	43,520	37,361	2,198,355

1. Western Fuel Company.
2. Vancouver-Nanaimo Coal Mining Co.
3. Canadian Collieries (Dunsmuir), Ltd.
4. Pacific Coast Coal Mines, Ltd.
5. Crow's Nest Pass Coal Co., Ltd.
6. Corbin Coal and Coke Co., Ltd.
7. Middlesboro Collieries, Ltd.
8. Inland Coal and Coke Co., Ltd.
9. Princeton Coal and Land Co., Ltd.
10. Pacific Coast Colliery of B.C.

Annual Production of Coal in British Columbia.

Calendar Year.	Output.	Home consumption.	Sold for export.	Production*.		Price per long ton.	Value.
	Long tons.				Short tons.		
1836 to1873	480,785	.....	.....	.....	538,480	$4.00	$ 1,923,140
1874.....	81,547	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.....	365,596	95,227	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.....	413,360	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.....	802,296	290,310	619,860	910,170	1,019,390	3.00	2,730,510
1898.....	1,136,485	375,423	752,863	1,128,286	1,263,680	3.00	3,384,858
1899.....	1,306,324	526,058	751,711	1,277,769	1,431,101	3.00	3,833,307
1900.....	1,590,178	685,667	914,184	1,599,851	1,791,833	3.00	4,799,553
1901.....	1,691,557	799,666	914,163	1,713,829	1,919,488	3·00	5,141,487
1902.....	1,641,626	837,871	776,809	1,614,680	1,808,441	3.00	4,844,040
1903.....	1,450,663	947,499	549,449	1,496,948	1,676,581	3.00	4,490,844
1904.....	1,685,698	1,129,465	533,593	1,663,058	1,862,625	3.00	4,989,174
1905.....	1,736,696	1,089,667	647,343	1,737,010	1,945,452	3.00	5,211,030
1906.....	1,899,076	1,236,476	679,829	1,916,305	2,146,262	3.00	5,748,915
1907.....	2,219,602	1,438,402	673,114	2,111,516	2,364,898	3.50	7,390,306
1908.....	2,111,931	1,486,511	597,157	2,083,668	2,333,708	3.50	7,292,838
1909.....	2,388,196	1,585,232	741,667	2,326,899	2,606,127	3.50	8,144,147
1910.....	3,152,207	1,798,873	1,175,007	2,973,880	3,330,745	3.50	10,408,580
1911.....	2,304,794	1,657,422	612,696	2,270,118	2,542,532	3.50	7,945,413
1912.....	2,857,345	1,898,213	966,963	2,865,176	3,208,997	3.50	10,028,116
1913.....	2,587,357	1,799,643	623,946	2,423,589	2,714,420	3.50	8,482,562
1914.....	2,182,164	1,397,036	602,785	1,999,821	2,239,799	3.50	6,999,374
1915.....	1,962,817	1,191,219	653,078	1,844,297	2,065,613	3.50	6,455,041
1916.....	2,487,012	1,463,152	844,045	2,307,197	2,584,061	3.50	8,075,190
Total....	.....	.....	.....	49,519,938	55,462,331	.....	160,643,689

*This production is obtained by adding "Home Consumption" and "Sold for Export."

†52,935 tons of this amount were exported as sales without the division into "Home Consumption" and "Sold for Export."

Yukon.

Coal production in the Yukon in 1916 was reported as 3,300 tons, all the product of the Tantalus mine of the Five Fingers Coal Company, near White Horse.

The colliery of the Northen Light, Power and Coal Company on Coal Creek was idle throughout the year.

Annual Production of Coal in Yukon Territory.

Calendar Year.	Short tons.	Value.	Average per ton.
1901	*5,864	$ 86,230	$ 14.70
1902	4,910	37,280	7.59
1903	1,849	29,584	16.00
1904	.....	.....	.....
1905	7,000	21,000	3.00
1906	7,000	28,000	4.00
1907	15,000	60,000	4.00
1908	3,847	21,158	5.50
1909	7,364	49,502	6.72
1910	16,185	110,925	6.85
1911	2,840	12,780	4.50
1912	9,245	44,958	4.86
1913	19,722	95,945	4.86
1914	13,443	53,760	4.00
1915	9,724	38,896	4.00
1916	3,300	13,200	4.00
Total	127,293	703,218	

*Part of this production was mined in 1900.

COKE.

The accompanying statistics cover only the production of coke in by-product and Beehive coke oven plants and do not include retort coke recovered by gas companies.

Both domestic and imported coal are used in the manufacture of coke in Canadian coke oven plants.

In 1916, 1,501,835 tons of domestic, and 633,076 tons of imported coal were charged to coke ovens from which was obtained an output of 1,448,782 tons of coke, thus averaging 0·679 tons of coke per ton of coal charged. Coke from by-product ovens comprised 69 per cent of the total.

In 1915, 1,425,172 tons of domestic and 431,221 tons of imported coal were charged to coke ovens from which was obtained an output of 1,200,766 tons of coke, thus averaging 0·647 tons of coke per ton of coal charged. Coke from by-product ovens comprised 66 per cent of the total.

In 1914, 1,038,235 tons of domestic, and 503,312 tons of imported coal were used to produce an output of 1,015,253 tons of coke, showing a return of 0·658 tons of coke per ton of coal charged. Coke from by-product ovens comprised 67 per cent of the total.

The amount of coke sold or used by coke producers in 1916 was 1,469,741 tons as compared with 1,170,473 tons in 1915, an increase of 299,268 tons or over 25 per cent.

In addition to the tonnage sold or used by producers there was imported during 1916, 757,116 tons of coke, while the exports totalled 48,539 tons. The Canadian consumption for 1916 was therefore 2,178,318 tons, an increase of 405,857 tons or nearly 23 per cent over the consumption in 1915. The consumption of oven coke during recent years has been as follows: 1,285,228 tons in 1908; 1,449,369 tons in 1909; 1,581,832 tons in 1910; 1,677,188 tons in 1911; 1,981,832 tons in 1912; 2,186,170 tons in 1913; 1,509,068 tons in 1914, and 1,772,461 tons in 1915.

Coke Production, 1916.

(IN SHORT TONS.)

Province.	Coal charged to ovens.	Coke output.	Stock on hand.		Coke sold or used.	Per cent. of total production.	Value of coke sold or used.
			Jan. 1.	Dec. 31.			
Nova Scotia	985,063	653,836	1,711	1,114	654,433	44·53	$2,617,732
Ontario	(a) 633,076	452,502	33,913	13,908	472,507	32·15	2,008,155
Alberta	67,106	42,548	361	959	41,950	2·85	167,800
British Columbia	449,666	299,896	2,949	1,994	300,851	20,47	1,255,725
Total	2,134,911	1,448,782	38,934	17,975	1,469,741	100·00	$6,049,412

(a) All imported coal.

Coke Production, 1915.

(IN SHORT TONS.)

Province.	Coal charged to ovens.	Coke output.	Stock on hand.		Coke sold or used.	Per cent of total production.	Value. of coke sold or used.
			Jan. 1.	Dec. 31.			
Nova Scotia	981,369	584,993	2,621	1,741	585,873	50·05	$1,905,766
Ontario	(a) 431,221	316,211	2,953	33,913	285,251	24·37	1,141,004
Alberta	38,878	24,187	.....	361	23,826	2·04	95,304
British Columbia	404,925	275,375	3,097	2,949	275,523	23·54	1,116,506
Total	1,856,393	1,200,766	8,671	38,964	1,170,473	100·00	$4,258,580

(a) All imported coal.

Distribution of Coke Production, 1916.

(IN SHORT TONS.)

——	Nova Scotia.	Ontario.	Alberta.	British Columbia.	Total.
Sold in Canada	1,821	51,075	41,940	262,299	$ 357,135
Sold for export	.....	.....	.....	38,503	38,503
Total sales	1,821	51,075	41,940	300,802	395,638
Used by maker in blast furnace or otherwise	652,612	421,432	10	49	1,074,103
Total sold or used	654,433	472,507	41,950	300,851	1,469,741
Number of ovens in operation December 31	697	104	120	986	1,907
Number of ovens idle December 31	109	.....	247	294	650

Annual Production of Coke.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1886	35,396	$ 101,940	$ 2.88	1901	365,531	$1,228,225	$ 3.36
1887	40,428	135,951	3.36	1902	502,043	1,519,185	3.03
1888	45,373	134,181	2.96	1903	561,318	1,734,404	3.09
1889	54,539	155,043	2.84	1904	554,083	2,032,048	3.66
1890	56,450	166,298	2.95	1905	700,488	2,436,211	3.48
1891	57,084	175,592	3.08	1906	782,055	2,863,503	3.66
1892	56,135	160,249	2·85	1907	842,003	3,583,468	4.26
1893	61,078	161,790	2.65	1908	858,257	3,449,361	4.02
1894	58,044	148,551	2.56	1909	862,011	3,484,393	4.04
1895	53,356	143,047	2.68	1910	902,715	3,462,872	3.84
1896	49,619	110,257	2.22	1911	935,651	3,630,410	3.88
1897	60,686	176,457	2.91	1912	1,411,229	5,164,331	3.66
1898	87,600	286,000	3.26	1913	1,530,499	5,919,596	3.87
1899	100,820	350,022	3.47	1914	1,023,860	3,658,514	3.55
1900	157,134	649,140	4.13	1915	1,170,473	4,258,580	3.64
				1916	1,469,741	6,049,412	4.12

Annual Production of Coke by Provinces.

Calendar Year.	Nova Scotia.		Ontario.		Alberta.		British Columbia.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short 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
1903	371,745	888,094	.....	.....	.....	.....	189,753	846,310
1904	275,927	808,022	.....	.....	20,984	$ 78,936	257,172	1,148,090
1905	386,366	1,054,712	.....	.....	44,866	179,464	269,256	1,202,035
1906	476,364	1,540,976	.....	.....	69,486	268,042	236,205	1,054,485
1907	524,110	1,688,070	.....	.....	76,321	297,595	241,572	1,049,432
1908	505,929	1,658,151	.....	.....	75,645	309,019	276,683	1,482,191
1909	492,992	1,608,092	.....	.....	87,233	366,734	281,786	1,509,567
1910	508,058	1,655,775	24,685	$ 148,110	121,578	486,312	248,394	1,172,675
1911	557,554	1,814,977	259,554	1,318,303	36,216	146,251	82,327	350,879
1912	625,918	1,840,129	379,854	1,709,343	105,684	424,027	299,773	1,190,832
1913	722,038	2,352,153	419,287	1,991,613	67,403	269,612	321,771	1,306,218
1914	343,289	1,118,614	386,314	1,352,099	29,059	116,236	265,198	1,071,565
1915	585,873	1,905,766	285,251	1,141,004	23,826	95,304	275,523	1,116,562
1916	654,433	2,617,732	472,507	2,008,155	41,950	167,800	300,851	1,255,750

Annual Exports of Coke.

Calendar Year.	Short tons.	Value.	Calendar Year.	Short tons.	Value.
1897	2,987	$ 6,078	1907	70,617	$ 320,357
1898	3,774	8,394	1908	58,708	248,759
1899	5,557	18,726	1909	74,067	329,051
1900	41,529	131,278	1910	57,971	250,715
1901	57,505	176,990	1911	9,852	39,823
1902	62,568	180,920	1912	57,744	252,763
1903	32,608	135,957	1913	68,235	308,410
1904	102,463	345,031	1914	67,838	306,117
1905	116,071	509,908	1915	35,869	160,053
1906	37,003	168,571	1916	48,539	221,334

Annual Imports of Oven Coke.

Fiscal Year.	Short tons.	Value.	Fiscal Year.	Short tons.	Value.
1880	3,837	$ 19,353	1899	141,284	$ 362,826
1881	5,492	26,123	1900	178,878	506,839
1882	8,157	36,670	1901	308,786	680,138
1883	8,943	38,588	1902	267,142	842,815
1884	11,207	44,518	1903	256,723	1,222,756
1885	11,564	41,391	1904	221,050	765,123
1886	11,858	39,756	1905	371,593	807,842
1887	15,110	56,222	1906	480,222	1,311,375
1888	25,487	102,334	Calendar Year.		
1889	29,557	91,902	1907	624,649	2,206,084
1890	36,564	133,344	1908	426,971	1,135,125
1891	38,533	177,605	1909	661,425	1,508,627
1892	43,499	194,429	1910	737,088	1,908,725
1893	41,821	156,277	1911	751,389	1,843,248
1894	42,864	176,996	1912	628,174	1,702,856
1895	43,235	149,434	1913	723,906	2,180,830
1896	61,612	203,826	1914	553,046	1,585,259
1897	83,330	267,540	1915†	637,857	1,608,464
1898	135,060	347,040	1916	757,116	2,229,078

†Duty free.

In Nova Scotia coke was made at Sydney, and Sydney Mines, the ovens at Westville being idle throughout the year.

In Ontario the production came from the Algoma Steel Corporation's plant at Sault Ste. Marie.

In Alberta the plants at Lille and Passburg were idle, while one plant at Coleman was in operation part of the year.

In British Columbia coke was made by the Crow's Nest Pass Coal Company at Fernie and Michel, and by the Canadian Collieries (Dunsmuir) Limited, at Union Bay.

The coke production of the eastern provinces is used almost entirely in the iron and steel industry, while that of the western provinces is used chiefly by the copper and lead smelters, finding a market in the United States as well as in Canada.

In Nova Scotia at the close of 1916 there were 697 ovens in operation, and 109 idle. The ovens formerly operated at Stellarton (45) and Londonderry (97) are not included amongst those idle, being regarded as abandoned. The Dominion Iron and Steel Company had 547 of its 620 ovens in operation. All these ovens are of the Otto-Hoffman by-product type, from which are recovered tar, sulphate of ammonia, and gas. The gas is used in the company's steel plant operations, and the sulphate of ammonia in the crystallized state is disposed of to the trade. The crude tar is sold to the Dominion Tar and Chemical Company, who have a plant close at hand for the separation of a variety of coal-tar products. All the ovens of the Nova Scotia Steel and Coal Company were in operation at the close of the year. The surplus gas from the Bauer ovens is used for the production of steam for the power generating plant.

In Ontario the Algoma Steel Company's Koppers Regenerative By-Product ovens, at Sault Ste. Marie reported now as numbering 104 in place of 110, as formerly, were in operation most of the year, none being idle on December 31. At the Sault Ste. Marie plant, crude tar, crystallized sulphate of ammonia, and gas are recovered. Benzol, toluol, and other hydro-carbons were recovered by the Toronto Chemical Company, a branch of the Dominion Tar and Chemical Co. The latter company also takes the tar, which is treated for the separation of coal-tar products.

In Alberta, all of the Western Canadian Collieries' 50 Bernard ovens at Lille, all of the Leitch Collieries' 101 Mitchell rectangular ovens at Passburg, and some of the International Coal and Coke Company's 216 Beehive ovens at Coleman, were idle throughout the year. The latter company had 120 ovens in operation on December 31.

In British Columbia at the end of the year the Crow's Nest Pass Coal Company had only 24 of its 454 Beehive ovens, at Fernie, idle, and 30 of its 486 at Michel, idle; its 240 Beehive ovens at Carbonade have been idle for some years and are now regarded as permanently abandoned. The 240 Beehive ovens at Hosmer were idle throughout the year. On

Vancouver island the Canadian Collieries (Dunsmuir), Limited, in 1915 rebuilt and placed in operation 100 ovens at Union Bay, and all were in operation at the end of 1916.

The exports of coke in 1915, as per Customs record, were 48,539 tons, principally from British Columbia, as against exports in 1915 of 35,869 tons.

Coke Oven By-Products.

Coke oven by-products were recovered at Sydney, N.S., and Sault Ste. Marie, Ont. The 1916 recoveries included 9,012,202 gallons of tar; 11,040 tons of sulphate of ammonia, together with important quantities of benzol, toluol, and solvent naphthas. In 1915 the recoveries were 7,365,931 gallons of tar, and 10,448 tons of sulphate of ammonia.

Annual Production of Coke Oven By-Products.

Year.	Tar.	Sulphate of ammonia.	Year.	Tar.	Sulphate of ammonia.
	Gallons.	Short tons.		Gallons.	Short tons.
1901	2,662,612	1,614	1909	4,016,824	3,416
1902	4,094,135	2,393	1910	3,963,591	3,491
1903	3,281,249	3,207	1911	6,464,155	7,124
1904	1,649,197	1,773	1912	8,428,896	11,289
1905	3,407,784	2,500	1913	8,371,600	10,608
1906	3,725,723	2,364	1914	5,714,172	8,572
1907	4,424,615	1,738	1915	7,365,931	10,448
1908	4,450,166	3,342	1916	9,012,202	11,040

The imports of sulphate of ammonia in 1916 are reported as 293,096 pounds valued at $9,672, as against imports in 1915 of 503,158 pounds valued at $14,637, and in 1914, of 763,597 pounds valued at $21,335.

Exports of sulphate of ammonia are not separately recorded.

FELDSPAR.

The production of feldspar in 1916 was 19,488 tons, valued at $71,407, or an average of $3.66 per ton, as compared with a production in 1915 of 14,559 tons, valued at $57,801, or an average of $3.92 per ton.

The greater part of the feldspar shipped from Canadian mines is marketed with the pottery manufacturers in the United States. A small quantity of feldspar was sold in 1916 for experimental work in the recovery of potash.

The exports during 1915 and 1916 have not been separately recorded, having been grouped in the Customs classification with talc.

Statistics of production and exports of feldspar are given in the following table:—

Production and Exports of Feldspar.

Calendar Year.	Production			Exports.		
	Tons.	Value.	Average.	Tons.	Value.	Average.
1890	700	$3,500	5·00	.....	.....	.....
1891	685	3,425	5·00	.....	.....	.....
1892	175	525	3·00	.....	.....	.....
1893	575	4,525	7·87	50	$ 500	10·00
1894	Nil.	Nil.	.....	Nil.	Nil.	.....
1895	.....	*2,545	.....	.....	2,545	.....
1896	972	*2,583	2·66	972	2,583	2·66
1897	1,400	3,290	2·35	3,078	5,637	1·83
1898	2,500	6,250	2·50	1,542	4,396	2·85
1899	3,000	6,000	2·00	1,757	5,126	2·92
1900	318	1,112	3·50	379	1,116	2·94
1901	5,350	10,700	2·00	4,367	10,973	2·51
1902	7,576	15,152	2·00	7,374	13,708	1·86
1903	13,928	18,966	1·36	13,760	23,319	1·69
1904	11,083	22,166	2·00	13,960	29,263	2·10
1905	11,700	23,400	2·00	9,161	27,660	3·02
1906	16,948	40,890	2·41	18,183	60,312	3·32
1907	12,584	29,819	2·37	12,068	37,932	3·14
1908	7,877	21,099	2·68	9,524	34,045	3·57
1909	12,783	40,383	3·16	10,834	35,234	3·25
1910	15,809	47·667	3·02	15,601	47,962	3·07
1911	17,723	51,939	2·93	16,150	56,085	3·47
1912	13,733	30,916	2·25	12,779	44,114	3·45
1913	16,790	60,795	3·62	15,966	62,767	3·93
1914	18,060	70,824	3·92	18,072	74,100	4·10
1915	14,559	57,801	3·97	**	.....	.....
1916	19,488	71,407	3·66	**	.....	.....

*Exports.
**Not separately stated.

The Canadian production of feldspar comes chiefly from the counties of Frontenac and Lanark in Ontario, and the counties of Ottawa and Labelle in Quebec. The principal shippers are: Feldspars Limited, Hartington, Ont.; Feldspar Quarries Company, Verona, Ont.; S. H. Orser and Company of Perth, Ont.; the International Feldspar Co., Ltd., Verona and Ottawa, Ont., and the Eureka Flint and Spar Company, East Templeton, Que. For several years there have been small shipments by Messrs. O'Brien & Fowler, Ottawa, from the Villeneuve mine, Township of

Villeneuve, Labelle county, Quebec, where an exceptionally pure white feldspar, suitable for the manufacture of artificial teeth, has been mined.

The feldspar deposits and industry have been the subject of a special report published by the Mines Branch entitled "Feldspar in Canada."[1]

The accompanying table of imports of potash salts into Canada has been compiled from the Customs Reports with a view to indicating the present Canadian market for such products. Canadian potash feldspar deposits may become an important source of potash if any of the attempts now being made to utilize potash silicate rocks as a source of potash should meet with commercial success.

Imports of Potash Manufactures, 1915 and 1916.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Potash, caustic, in packages of *not* less than 25 lbs. each (free)	192,817	$27,041	29,783	$17,471
Potash, caustic, in packages *less* than 25 lbs. each (dutiable)	6,866	727	14,607	1,386
Potash and pearl ash, in packages of *not less* than 25 lbs. each (free)	140,518	21,512	13,720	4,592
Potash and pearl ash, in packages *less* than 25 lbs. each (dutiable)	6,073	417	17,312	1,882
Potash, or potassa bicarbonate of	3,276	429	2,031	472
" bichromate	142,025	17,413	31,049	13,381
" chlorate of, not further prepared than ground	123,007	20,983	63,056	15,017
" muriate and sulphate of, crude	1,710,633	57,866	464,606	53,102
" red and yellow prussiate of	188,372	60,187	55,352	43,432
	2,513,587	206,575	691,516	150,735
Kainite, and other crude German potash salts for fertilizers	17,750	146	198,377	5,016
	2,531,337	206,721	889,893	155,751

[1] "Feldspar in Canada," by Hugh S. de Schmid, Mines Branch, Department of Mines, Ottawa, 1916—Report No. 401.

FLUORSPAR.

Shipments of fluorspar during 1916 have been reported, amounting to 1,284 tons, valued at $10,238, this being the first production since 1912. The fluorspar was obtained from three properties in the county of Hastings, near Madoc, Ont., viz.: Messrs. Wellington and Munro, operating on lot 13, concession XII, of Huntingdon tp.; Messrs. Cross and Wellington, operating the Perry mine, on lot 11, concession XIII, of Huntingdon tp.; and C. R. Ross, operating The McIlroy property on lot 2, concession IV, of Madoc tp. Of the total shipments, 525 tons were marketed in the United States and the balance in Canada, principally with the steel companies. Prices obtained until December were about $6 per ton F.O.B., but during the last month of the year a rapid increase to $15 per ton took place.

Several occurrences of fluorspar are known near Madoc, in Huntingdon and Madoc townships, in Hastings county, Ontario. In 1905 Mr. Stephen Wellington opened a deposit on lot I, con. IV, Madoc township, and made a shipment of 12 tons to Port Hope, Ontario. In 1910 Messrs. Gillespie and Wellington mined from a deposit on lot 10, con. XIV, of the Township of Huntingdon, about 200 tons of material from which 2 tons of fluorspar valued at $15 were shipped. Additional work in succeeding years resulted in shipments in 1911 of 34 tons, valued at $238, to the smelter at Deloro, and to steel foundries at Welland, and in 1912 of 40 tons, valued at $240, to the Copper Cliff smelter. This property, known as the Rogers Fluorspar mine, is now owned by Messrs. Cross and Wellington, Madoc, who have, however, abandoned operations thereon, to re-open the Perry mine on lot 11, con. XIII. Other occurrences of fluorspar have been noted on lot 12, con. XIII of Huntingdon township, and on lot 2, con. III, Madoc township.

Imports of fluorspar are not shown separately in the Reports of the Customs Department. The consumption in steel works though is considerable and reports from steel companies covering their operations show the consumption from 1910 to 1916 inclusive, to have been respectively: 7,461 tons, 8,067 tons, 9,709 tons, 10,687 tons, 7,842 tons, 13,520 tons, and 13,213 tons.

Imports of hydrofluosilicic acid since 1910 have been as follows:—

Imports of Hydrofluosilicic Acid.

Calendar year.	Pounds.	$
1910	187,785	10,813
1911	223,706	9,173
1912	302,918	24,891
1913	1,182,293	46,517
1914	1,384,087	41,576
1915	1,117,874	36,085
1916	896,426	28,611

The Consolidated Mining and Smelting Company, operators of the Trail smelter, who have been probably the largest consumers of hydrofluosilicic acid, which is used in the electrolytic refinery of lead, have recently added to their equipment a plant for the manufacture of this acid and it is reported that the fluorspar required will be imported from United States sources.

The production of fluorspar in the United States in 1916, as reported in "Mineral Resources" of the U.S. Geological Survey, was 155,735 tons, valued at $922,654.

GRAPHITE.

The total shipments of milled or refined graphite in 1916 by Canadian producers was 3,955 tons, valued at $325,362, or an average of $82.28 per ton, as compared with shipments in 1915 of 2,635 tons, valued at $124,223, or an average of $47.14 per ton.

This production is the largest that has been recorded in Canada, and is an evidence of the extent to which the Canadian graphite industry has responded to the demand for this product created by the war.

Shipments include various grades of product with quite a wide range in price. For No. 1 flake, operators report as high as 16 cents per pound, equivalent to $320 per ton.

The following table gives statistics of annual production since 1886.

Annual Production of Graphite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886	500	$4,000	1901	2,210	$ 38,780
1887	300	2,400	1902	1,005	28,300
1888	150	1,200	1903	728	23,745
1889	242	3,160	1904	452	11,760
1890	175	5,200	1905	541	16,735
1891	260	1,560	1906	387	18,300
1892	167	3,763	1907	579	16,000
1893	Nil.	Nil.	1908	251¼	5,565
1894*	3	223	1909	864	47,800
1895	220	6,150	1910	1,392	74,087
1896	139	9,455	1911	1,269	69,576
1897	436	16,240	1912	2,060	117,122
1898	.....	13,698	1913	2,162	90,282
1899	1,130	24,179	1914	1,647	107,203
1900	1,922	31,040	1915	2,635	124,223
			1916	3,955	325,362

*Exports.

In 1916, mills at Buckingham and St. Remi d'Amherst, Quebec, shipped 479¾ tons, valued at $75,776, and mills at Harcourt, Port Elmsley, and Calabogie, Ontario, made shipments aggregating 3,476 tons, valued at $249,586. In 1915, the Quebec shipments were 75½ tons, valued at $5,431, and the Ontario shipments 2,559½ tons, valued at $118,792.

The exports of graphite in 1916, according to Customs records, included 311 tons of crude ore and concentrates, valued at $13,114, an average of $42.17 per ton, together with manufactures of graphite valued at $304,919, or a total valuation of $318,033. The exports in 1915 included crude ore and concentrates 263 tons, valued at $12,009, an average of $45.62 per ton, together with manufactures of graphite, valued at $84,316, or a total value of $96,325.

Exports of Graphite.

Year.	Crude ore and concentrates.		Manufactures.	Total value.
	Tons.	Value.	Value.	
1886	.....	.....	.....	$ 3,586
1887	.....	.....	.....	3,017
1888	.....	.....	.....	1,080
1889	.....	.....	.....	538
1890	.....	.....	.....	1,529
1891	.....	.....	.....	72
1892	.....	.....	.....	3,952
1893	1	$ 38	$ 10	48
1894	3	223	.....	223
1895	544	4,803	30	4,833
1896	136	9,126	354	9,480
1897	205	2,988	1,337	4,325
1898	591	11,527	1,571	13,098
1899	1,237	19,326	3,164	22,490
1900	1,550	40,132	6,065	46,197
1901	1,194	30,535	4,567	35,102
1902	886	23,097	1,742	24,839
1903	412	26,230	17,412	43,642
1904	177	9,609	6,958	16,567
1905	254	7,596	518	8,114
1906	106	2,468	5,274	7,742
1907	121	3,036	2,847	5,883
1908	385	10,158	876	11,034
1909	1,004	52,438	864	53,302
1910	788	53,008	66,658	119,666
1911	813	43,249	33,956	77,205
1912	1,654	70,763	58,920	129,683
1913	1,642	85,368	24,284	109,652
1914	919	50,528	72,718	123,246
1915	263	12,009	84,316	96,325
1916	311	13,114	304,919	318,033

Exports of Graphite by Countries.

Calendar Year.	Crude ore and concentrates.						Manufactures of plumbago.		
	Great Britain.		United States.		Other Countries.		Great Britain.	United States.	Other Countries.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Value.	Value.	Value.
1909	83	$ 9,035	905	$41,558	16	$1,845	.....	.....	.....
1910	223	16,453	556	35,555	9	1,000	$ 3,051	$63,466	$ 141
1911	30	3,631	752	36,295	31	3,323	2,289	30,062	1,605
1912	59	4,984	1,550	62,680	45	3,099	3,932	46,796	8,192
1913	19	1,700	1,618	82,758	5	910	3,278	20,279	727
1914	77	6,730	814	41,168	28	2,630	12,051	58,816	1,851
1915	.....	.....	263	12,009	.....	.....	2,381	81,467	468
1916	.....	.....	311	13,114	.....	.....	5,450	299,256	213

Statistics of imports of graphite are given in the next table. The imports during 1916 were valued at $623,491 and comprised: plumbago, not ground, $3,231; black-lead, $5,241; plumbago, ground and manufactures of, $94,678; and crucibles of clay or plumbago, $520,341. The imports during 1915 were valued at $151,878, and comprised: plumbago, not ground, $3,436; black-lead, $6,084; plumbago, ground and manufactures of, $35,579; and crucibles of clay or plumbago $106,761.

Imports of Raw and Manufactured Graphite.

Fiscal Year.	Plumbago not ground.	Black lead.	Ground and manufactures.	Crucibles, clay or plumbago.	Total.
1880	$ 1,677	$18,055	$2,738	.....	$22,470
1881	2,479	26,544	1,202	.....	30,225
1882	1,028	25,132	2,181	.....	28,341
1883	3,147	21,151	2,141	.....	26,439
1884	2,891	24,002	2,152	.....	29,045
1885	3,729	24,487	2,805	.....	31,021
1886	5,522	23,211	1,408	.....	30,141
1887	4,020	25,766	2,830	.....	32,616
1888	3,802	7,824	22,604	.....	34,230
1889	3,546	11,852	21,789	.....	37,187
1890	3,441	10,276	26,605	.....	40,322
1891	7,217	7,292	26,201	.....	41,710
1892	2,988	13,560	23,085	.....	39,633
1893	3,293	16,595	23,051	.....	42,939
1894	2,177	17,614	15,196	$ 1,490	36,477
1895	2,586	13,922	16,361	5,627	38,496
1896	2,865	18,434	12,090	7,407	40,796
1897	1,406	17,863	14,768	5,906	39,943
1898	1,862	19,638	20,120	12,533	54,153
1899	4,979	21,334	22,140	14,350	62,803
1900	4,437	22,078	17,869	20,571	64,955
1901	2,357	25,646	11,016	38,874	77,893
1902	3,649	20,467	15,021	28,635	67,772
1903	2,870	22,559	12,493	34,624	72,546
1904	1,802	26,053	12,737	28,773	69,365
1905	2,499	30,743	13,192	31,353	77,787
1906	2,791	33,907	19,058	32,950	88,706
1907 (9 mos.)	3,176	16,646	13,740	27,271	60,833
1908	3,030	9,042	31,428	40,092	83,592
1909	1,408	11,009	26,918	37,213	76,548
Calendar Year.					
1910	4,867	10,048	45,042	52,896	112,853
1911	4,940	14,172	37,020	56,814	112,946
1912	7,249	9,587	56,324	82,324	155,484
1913	9,375	8,633	64,254	73,971	156,233
1914	801	6,798	42,680	49,913	100,192
1915	3,436	6,084	35,597	106,761	151,878
1916	3,231	5,241	94,678	520,341	623,491

The market for graphite in Great Britain and the United States is to some extent indicated by the imports into those countries, the most recent available records of which are as follows:—

Imports of Plumbago into Great Britain, 1915 and 1916.[1]

	1915.			1916.		
	Tons (short).	Value.	Per ton.	Tons (short).	Value.	Per ton.
France	1,342	$ 156,712	$116.77	2,787	$ 462,168	$165.83
Madagascar	5,134	460,465	89.69	10,427	1,596,724	153.13
Italy	2,434	48,311	19.85	2,528	74,990	29.66
Japan	4,267	107,422	25.18	6,087	205,130	33.70
United States	867	92,038	106.16	1,845	192,900	104.55
Other foreign countries	4	146	36.50	148	7,777	52.53
British India	94	17,389	194.99	.....	88	.....
Ceylon and dependencies	6,352	775,547	122.10	5,846	1,765,778	302.05
Other British possessions	110	10,390	94.46	51	10,731	210.41
Total	20,604	1,668,420	80.98	29,719	4,316,286	145.24

[1]British Trade Report.

Graphite Imported into the United States.*

	1914.		1915.		1916.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
Ceylon	8,374	$920,147	(a) 12,275	$1,564,917	.....	.....
Mexico	4,259	190,075	1,680	75,000	.....	.....
Canada	1,806	92,536	2,995	116,407	.....	.....
Japan (Chosen via Japan)	6,327	96,433	2,373	35,292	.....	.....
Austria-Hungary	78	1,258	.....	.....	.....	.....
Italy	254	3,203	27	994	.....	.....
Germany	.....	.....	.....	.....	.....	.....
England	381	42,446	(b) 2,216	261,321	.....	.....
France	194	20,278	(c) 1,432	181,236	.....	.....
Br. India	127	9,815	.....	.....	.....	.....
Madagascar	155	18,426	36	2,831	.....	.....
Netherlands	.....	.....	36	2,811	.....	.....
Other countries	47	3,644	5	354	.....	.....
	22,002	1,398,261	23,075	2,241,163	42,930	$7,279,884

a Entered in reports of Department of Commerce as "Other British East Indies."
b Probably Ceylon graphite re-shipped from England.
c Probably Madagascar graphite re-shipped from France.
* Bureau of Foreign and Domestic Commerce of the Department of Commerce, Washington, published in "Mineral Resources of the United States, 1915," Geological Survey.

The following is a list of the principal firms operating graphite properties in recent years:—

Operator and address.	Location.			Mine office.
	County.	Township.	Range or concession and lot.	
Quebec.				
The Canadian Graphite Co., Ltd., Montreal, 34 Coristine Building.	Argenteuil...	Wentworth..	III 1A, 1B.....	Lachute
*Graphite Limited, Montreal, 206 Milton St.	Labelle.....	Amherst.....	VIII 15, 16.....	St. Remi d'Amherst.
*The New Quebec Graphite Co., Ltd., Buckingham.	„	Buckingham.	IV 1, 2, 3, ¼4, ¼5...	Buckingham.
	„	Lochaber....	IV 28.....	
Buckingham Graphite Co., Ltd., Buckingham.	„	Buckingham.	IV 28.....	Buckingham.
The Bell Graphite Co., Ltd., Friars House, London, Eng.	„	„	V 1, 2, 3.....	Buckingham.
*Plumbago Syndicate Mine, Buckingham	„	„	V 20.....	
Peerless Graphite Co., 32 Thorndale Terrace, Rochester, N.Y.	„	„	IX, X 12, 13.....	Buckingham.
Ontario.				
*Black Donald Graphite Co., Calabogie...	Renfrew.....	Brougham...	III, IV, near Whitefish Lake.	Calabogie.
*The Globe Graphite Mining and Refining Co., Port Elmsley.	Lanark.....	Elmsley N...	VI 23.....	Port Elmsley.
	„	Burgess N...	V21; VI22.....	„
Tonkin-Dupont Graphite Co., Ltd, Wilberforce.	Hastings....	Monteagle...	XIII 23.....	Maynooth.
	Haliburton	Monmouth...	XVI S ½ 35.....	Wilberforce.
*National Graphite Ltd., 18 Toronto St., Toronto.	Hastings....	Monteagle...	XIII 24.....	Maynooth.
New York Graphite Co., Harcourt.....	Haliburton...	Cardiff.....	XXI.....	Harcourt.

*Reported shipments in 1916.

Artificial Graphite.

Artificial graphite has been manufactured in electric furnaces at Niagara Falls, Ontario, for several years by the International Acheson Graphite Company. The annual production has been as follows:—

Annual Production of Artificial Graphite.

Calendar Year.	Pounds.	Calendar Year.	Pounds.
1906	445,047	1912	2,302,625
1907	407,779	1913	2,184,472
1908	428,540	1914	1,234,239
1909	513,436	1915	497,271
1910	2,442,166	1916	525,048
1911	2,172,098		

GYPSUM.

In 1916, the total quantity of crude gypsum mined was 424,431 tons, as compared with 505,989 tons in 1915, and 579,841 tons in 1914. The quantity calcined in 1916 was reported as 94,414 tons, as compared with 84,763 tons in 1915, and 138,212 tons in 1914. The total shipments in 1916 were: 342,915 tons, valued at $738,593 and included 249,893 tons of "lump," valued at $263,050, or an average of $1.05 per ton; 15,680 tons of "crushed" valued at $28,111, or an average value of $1.79 per ton; 6,096 tons of "fine ground," valued at $19,673, or an average of $3.23 per ton, and 71,246 tons of "calcined," valued at $427,759, or an average of $6 per ton.

The total shipments in 1915 were 474,815 tons, valued at $854,929, and included 346,947 tons of "lump," valued at $375,815, or an average of $1.08 per ton; 48,735 tons of "crushed," valued at $67,007, or an average of $1.37 per ton; 6,455 tons of "fine ground," valued at $22,767, or an average of $3.53 per ton; and 72,678 tons, of "calcined," valued at $389,340, or an average of $5.36 per ton.

A report[1] on the gypsum industry in Canada has lately been issued by the Mines Branch of the Department of Mines, Ottawa. This describes in detail the operated deposits in the different provinces, and the method of treatment followed in preparing gypsum for the market.

The total quantity of gypsum mined and the total quantity calcined during the past ten years is shown in the following table:—

Gypsum Mined and Gypsum Calcined.

(SHORT TONS.)

Year.	Total gypsum mined.	Gypsum calcined.	Year.	Total gypsum mined.	Gypsum calcined.
1905	443,569	26,855	1911	515,979	76,718
1906	492,759	28,831	1912	549,856	133,392
1907	489,962	34,752	1913	684,726	147,532
1908	375,444	48,727	1914	579,841	138,212
1909	493,068	63,670	1915	505,989	84,763
1910	548,019	69,889	1916	424,431	94,414

About 59 per cent of the gypsum mined in 1916 was shipped in lump form as quarried and of this a very large portion went to calcining mills in the United States. Almost all of the shipments of crude lump are made from the Maritime provinces from which cheap transportation by water is easily secured. There was calcined 94,414 tons, or 2·2 per cent

[1]Gypsum in Canada: Its Occurrence, Exploitation and Technology. L. H. Cole, Mines Branch, Dept. of Mines, Ottawa, Canada, 1915, No. 245.

of the tonnage mined. There was shipped as crushed and fine ground 21,776 tons, or 5·1 per cent of the tonnage mined.

Statistics of the shipments of crude and calcined gypsum since 1905, and of the annual production of gypsum products since 1886, are shown in the tables following:—

Shipments of Crude and Calcined Gypsum, 1914, 1915 and 1916.

Grade.	1914.			1915.			1916.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Lump..	351,729	$400,521	$1.14	346,947	$375,815	$1.08	249,893	$263,050	$1.05
Crushed	49,441	61,686	1.25	48,735	67,007	1.37	15,680	28,111	1.79
Fine ground	6,097	14,496	2.38	6,455	22,767	3.53	6,096	19,673	3.23
Calcined	109,613	679,504	6.20	72,678	389,340	5.36	71,246	427,759	6.00
Total..	516,880	1,156,207	2.24	474,815	854,929	1.80	342,915	738,593	2.15

Shipments of Crude and Calcined Gypsum, 1905-1913.

Calendar Year.	Crude (Lump).			Crude (Ground).			Calcined.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
1905....	412,155	$409,146	$0.99	3,255	$8,779	$2.70	26,748	$168,243	$6.29
1906....	442,132	473,960	1.07	3,195	9,823	3.07	23,695	159,511	6.73
1907....	454,668	473,831	1.04	6,732	16,268	2.42	24,521	156,815	6.40
1908....	298,188	307,532	1.03	9,504	25,468	2.68	33,272	242,701	7.29
1909....	423,474	457,038	1.08	8,814	26,159	2.97	40,841	326,435	7.99
1910....	469,573	508,686	1.08	6,121	17,390	2.84	49,552	408,370	8.24
1911....	449,823	481,077	1.07	7,149	23,125	3.23	61,411	489,192	7.97
1912....	453,577	525,345	1.16	15,487	29,244	1.89	109,394	770,031	7.04
1913....	499,460	615,493	1.23	10,281	20,576	2.00	126,629	811,670	6.41

Annual Production of Gypsum.

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year.	Tons.	Value.	Per ton
1886.....	162,000	$178,742	$1.10	1901.....	293,799	$340,148	$1.16
1887.....	154,008	157,277	1.02	1902.....	333,599	379,479	1.14
1888.....	175,887	179,393	1.01	1903.....	314,489	388,459	1.24
1889.....	213,273	205,108	0.96	1904.....	345,961	373,474	1.08
1890.....	226,509	194,033	0.86	1905.....	442,158	586,168	1.32
1891.....	203,605	206,251	1.01	1906.....	469,022	643,294	1.37
1892.....	241,048	241,127	1.00	1907.....	485,921	646,914	1.33
1893.....	192,568	196,150	1.02	1908.....	340,964	575,701	1.69
1894.....	223,631	202,031	0.90	1909.....	473,129	809,632	1.71
1895.....	226,178	202,608	0.89	1910.....	525,246	934,446	1.78
1896.....	207,032	178,061	0.86	1911.....	518,383	993,394	1.92
1897.....	239,691	244,531	1.02	1912.....	578,458	1,324,620	2.29
1898.....	219,256	232,515	1.06	1913.....	636,370	1,447,739	2.27
1899.....	244,566	257,329	1.05	1914.....	516,880	1,156,207	2.24
1900.....	252,101	259,009	1.02	1915.....	474,815	854,929	1.80
				1916.....	342,915	738,593	2.15

Annual Production of Gypsum by Provinces.

Calendar Year.	Nova Scotia.		New Brunswick.		Ontario.		Manitoba.		British Columbia.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1887.....	116,346	$116,346	29,102	$ 29,216	8,560	$ 11,715	.....	.....	.....	.....
1888.....	124,818	120,429	44,369	48,764	6,700	10,200	.....	.....	.....	.....
1889.....	165,025	142,850	40,866	49,130	7,382	13,128	.....	.....	.....	.....
1890.....	181,285	154,972	39,024	30,986	6,200	8,075	.....	.....	.....	.....
1891.....	161,934	153,955	36,011	33,996	5,660	18,300	.....	.....	.....	.....
1892.....	197,019	170,021	39,709	65,707	4,320	5,399	.....	.....	.....	.....
1893.....	152,754	144,111	36,916	41,846	2,898	10,193	.....	.....	.....	.....
1894.....	168,300	147,644	52,962	48,200	2,369	6,187	.....	.....	.....	.....
1895.....	156,809	133,929	66,949	63,839	2,420	4,840	.....	.....	.....	.....
1896.....	136,590	111,251	67,137	59,024	3,305	7,786	.....	.....	.....	.....
1897.....	155,572	121,754	82,658	118,116	1,461	4,661	.....	.....	.....	.....
1898.....	132,086	106,610	86,083	121,704	1,087	4,201	.....	.....	.....	.....
1899.....	126,754	102,055	116,792	151,296	1,020	3,978	.....	.....	.....	.....
1900.....	138,712	108,828	112,294	145,850	1,095	4,331	.....	.....	.....	.....
1901.....	170,100	136,947	121,595	189,709	1,504	5,692	600	$ 7,800	.....	.....
1902.....	206,087	181,425	124,041	170,153	1,917	7,699	1,554	20,202	.....	.....
1903.....	189,427	173,881	119,182	172,080	2,720	21,988	3,160	20,510	.....	.....
1904.....	218,580	153,600	190,991	187,524	2,390	18,350	4,000	14,000	.....	.....
1905.....	272,252	298,248	163,553	232,586	1,853	23,834	4,500	31,500	.....	.....
1906.....	333,312	345,414	131,246	250,960	2,965	24,420	3,200	22,500	.....	.....
1907.....	357,411	380,859	118,106	213,638	10,404	52,417	.....	.....	.....	.....
1908.....	234,455	230,433	81,620	191,312	10,389	42,456	14,500	111,500	.....	.....
1909.....	345,682	364,379	98,716	226,975	11,731	48,278	17,000	170,000	.....	.....
1910.....	400,455	458,638	90,236	213,579	15,055	67,229	19,500	195,000	.....	.....
1911.....	353,999	406,457	93,205	115,044	27,399	98,018	43,000	372,000	780	$1,875
1912.....	376,082	481,493	82,757	185,821	53,119	176,056	66,500	481,250	.....	.....
1913.....	404,801	479,515	103,954	279,395	62,315	208,029	65,100	479,500	200	1,300
1914.....	303,155	368,931	79,083	200,680	81,219	204,033	53,423	382,563	.....	.....
1915.....	298,864	339,857	74,501	184,929	81,172	190,422	20,278	139,721	.....	.....
1916.....	238,212	278,160	39,546	153,064	36,668	116,086	28,489	191,283	.....	.....

EXPORTS AND IMPORTS.

Statistics of exports and imports of gypsum, as compiled from the Reports of Trade and Navigation, are shown in the accompanying tables. The exports of crude gypsum during the calendar year 1916 were 221,156 tons, valued at $252,476, or an average of $1.14 per ton, as compared with exports in 1915 of 292,234 tons, valued at $336,380, or an average of $1.15 per ton.

There were also exports of ground gypsum in 1916, valued at $154,630, as compared with exports in 1915, valued at $80,933. The total value of exports of gypsum, both crude and ground, was $407,106, as compared with exports in 1915, valued at $417,313.

The imports of gypsum of all grades during the calendar year 1916, reached a value of $43,291, and included: crude gypsum 3,022 tons valued at $14,358, or an average of $4.75 per ton; ground gypsum 282 tons, valued at $3,404, or an average of $12.07 per ton; and Plaster of Paris 3,786 tons, valued at $25,529, or an average of $6.74 per ton.

The imports, in 1915, were valued at $25,819, and included: crude gypsum 1,799 tons, valued at $7,734 or an average of $4.30 per ton; ground gypsum 134 tons, valued at $2,253, or an average of $16.79 per ton (this record appears open to question); and plaster of Paris 2,441 tons, valued at $15,832, or an average of $6.48 per ton.

Exports of Crude Gypsum.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1874	67,830	$68,164	1889	178,182	$194,404	1904	298,211	$316,436
1875	91,485	91,613	1890	175,691	192,254	1905	359,246	388,474
1876	92,765	94,386	1891	171,311	181,795	1906	404,464	462,814
1877	111,980	98,897	1892	189,860	201,086	1907	375,026	424,794
1878	105,455	93,805	1893	162,192	159,262	1908	280,091	324,574
1879	104,993	80,864	1894	160,412	158,124	1909	315,201	372,286
1880	136,935	124,060	1895	189,486	193,244	1910	346,081	416,725
1881	121,270	116,349	1896	181,277	186,589	1911	362,102	425,161
1882	150,272	147,597	1897	189,206	197,150	1912	364,643	423,208
1883	166,152	169,228	1898	169,614	174,907	1913	417,302	504,383
1884	130,141	134,451	1899	201,626	208,090	1914	345,830	404,234
1885	97,552	106,415	1900	188,262	201,912	1915	292,234	336,380
1886	142,833	155,213	1901	236,247	231,594	1916	221,156	252,476
1887	132,724	146,542	1902	289,600	295,215			
1888	125,508	121,389	1903	287,496	311,580			

Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1890	$ 105	1899	$ 8,123	1908	$ 9,765
1891	558	1900	19,834	1909	2,787
1892	20,255	1901	15,337	1910	12,306
1893	22,132	1902	5,101	1911	4,429
1894	20,054	1903	12,457	1912	6,495
1895	22,233	1904	2,333	1913	5,795
1896	21,267	1905	2,673	1914	35,490
1897	6,763	1906	2,934	1915	80,933
1898	6,448	1907	557	1916	154,630

Imports of Gypsum.

Fiscal Year.	Crude Gypsum.		Ground Gypsum.		Plaster of Paris.	
	Tons.	Value.	Lbs.	Value.	Lbs.	Value.
1880	1,854	$ 3,203	1,606,578	$ 5,948	667,676	$ 2,376
1881	1,731	3,442	1,544,714	4,676	574,006	2,864
1882	2,132	3,761	759,460	2,576	751,147	4,184
1883	1,384	3,001	1,017,905	2,579	1,448,650	7,867
1884	.....	3,416	687,432	1,936	782,920	5,226
1885	1,353	2,354	461,400	1,177	689,521	4,809
1886	1,870	2,429	224,119	675	820,273	5,463
1887	1,557	2,492	13,266	73	594,146	4,342
1888	1,236	2,193	106,068	558	942,338	6,662
1889	1,360	2,472	74,390	372	1,173,996	8,513
1890	1,050	1,928	434,400	2,136	693,435	6,004
1891	376	640	36,500	215	1,035,605	8,412
1892	626	1,182	310,250	2,149	1,166,200	5,595
1893	496	1,014	140,830	442	552,130	3,143
1894	.....	1,660	23,270	198	422,700	2,386
1895	603	960	20,700	88	259,200	1,619
1896	1,045	848	64,500	198	297,000	2,000
1897	.....	772	45,000	123	969,900	4,489
1898	1,147	1,742	35,700	293	329,600	2,025
1899	325	692	33,900	338	496,300	3,120
1900	77	958	6,300	69	849,100	6,492
1901	286	1,125	65,400	1,097	502,200	3,978
1902	541	1,697	56,700	249	475,300	2,641
1903	1,076	2,187	68,700	228	630,800	3,599
1904	249	663	106,800	559	625,100	2,885
1905	2,344	7,386	2,255,700	2,681	7,924,100	37,643
1906	6,332	22,008	1,968,600	1,799	12,866,500	43,742
1907 (9 mos.)	9,189	23,410	609,600	1,619	19,849,400	58,364
1908	9,393	36,510	382,500	1,781	15,020,000	51,328
1909	10,317	35,268	6,286,200	5,765	17,009,000	64,849
Calendar Year.						
1910	12,271	21,073	13,380,600	13,242	38,090,300	135,483
1911	2,035	11,792	3,362,400	3,619	57,035,700	190,371
1912	3,503	16,254	14,144,000	19,651	64,991,600	232,198
1913	4,522	21,763	.....	11,770	40,226,400	154,719
1914	3,572	16,448	1,072,600	4,301	15,477,500	54,282
1915	1,799	7,734	268,500	2,253	4,882,900	15,832
1916	3,022	14,358	564,700	3,404	7,571,700	25,529

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c per 100 lbs.

The Nova Scotia production, and the larger part of the New Brunswick production as well, is almost all disposed of in the United States market. The large deposits and the excellent facilities for water transportation are responsible for the gypsum being shipped as quarried to grinding and calcining plants outside these provinces.

Returns from Nova Scotia operators show the tonnage of gypsum mined during recent years to have been as follows: 298,035 tons in 1916; 317,076 tons in 1915; 339,747 tons in 1914; and 423,977 tons in 1913. Of the total tonnage mined in 1916, about 93·5 per cent was extracted from quarries in Hants county, near Windsor, Walton, and Cheverie, and the rest came from quarries at Quarry St. Anns and Iona, Victoria county.

In New Brunswick four properties were operating, three near Hillsborough in Albert county and the Old Stewart property (Arbuckle quarry) at Plaster Rock. The tonnage of gypsum mined in 1916 was 53,003 tons, as compared with 78,640 tons in 1915, 86,912 tons in 1914, and 112,739 tons in 1913. About 44·1 per cent of the output was shipped in crude form, either lump or ground, and the balance was calcined. Shipments were made to the United States, Australia and New Zealand as well as to the Canadian market.

In Ontario, there was a large falling off in the quantity of gypsum mined, the figures for recent years being as follows: 39,393 tons in 1916, 85,444 tons in 1915 and 89,159 tons in 1914. The total sales in 1916 including crushed, fine ground, and calcined (both that sold as such, and as an ingredient of wall plaster), amounted to 36,668 tons, valued at $116,086. The total sales of crude, ground and calcined gypsum in 1915 were 81,172 tons, valued at $190,422.

Manitoba's shipments of gypsum are almost entirely in the calcined form. The total quantity of crude gypsum mined in 1916, was 34,000 tons, as compared with 24,859 tons in 1915; 64,023 tons in 1914; 76,500 tons in 1913; and 80,000 tons in 1912. The shipments were 28,489 tons, chiefly calcined, valued at $91,283, as compared with shipments of 20,278 tons, valued at $139,721 in 1915, 53,423 tons, valued at $382,563 in 1914, and 65,100 tons in 1913, valued at $479,500.

The following is a list of the principal operators:—

Location.		Operator and Address.
County.	Post Office.	
NOVA SCOTIA.		
Cumberland	Nappan	Maritime Gypsum Co., Ltd., 381 Fourth Ave., New York.
Hants	Minasville	Geo. Hamilton, Minasville, N.S.
	Newport Landing*	Newport Plaster Mining & Manufacturing Co., Ltd., Windsor, N.S. Box 225.
	Walton* Cheverie	Rock Plaster Manufacturing Company, 381 Fourth Ave., New York.
	Kempt*	Capt. H. B. Patterson, Cheverie, N.S.
	Noel	Noel Plaster Company, Noel, N.S.
	Three Mile Plains	Nova Scotia Gypsum Co., Three Mile Plains, N.S.
	Wentworth*	Wentworth Gypsum Company, Ltd., Windsor, N.S.
	Newport Station*	Windsor Gypsum Company, Newburgh, N.Y.
	Brooklyn* West Gore	Windsor Plaster Company, Ltd., Windsor, N.S. Box 94.
Inverness	Eastern Harbour	Cheticamp Gypsum and Plaster Co., (St. Lawrence Gypsum Co., Ltd., St. John, N.B.)
Victoria	Iona*	Iona Gypsum Company, Ltd., Sydney, N.S., Box 362.
	Port Hastings	Nova Scotia Cement and Plaster Company, 9 Toronto St., Toronto, Ont.
	McKinnon's Harbour*	Newark Plaster Company, 30 Church , New York, N.Y.
	Quarry St. Anns*	Victoria Gypsum Mg. & Manufacturing Co., Chester, Pa.
	Island Point	Plaster Quarry Co., Ltd., c/o 30B, Board of Trade Bldg., Montreal.
NEW BRUNSWICK.		
Albert	Hillsborough*	Albert Manufacturing Company, Hillsborough, N.B.
	Demoiselle Creek*	Hillsboro Plaster Company, Hillsborough, N.B.
	Edgetts Landing*	Hillsboro Plaster, Quarrying & Mfg. Co., Ltd., Hillsborough, N.B.
Victoria	Plaster Rock	John E. Stewart, Andover, N.B.
Westmorland	Cape Maringouin* (Near Rockport).	New Brunswick Gypsum Company, Ltd., Hillsborough, N.B.
ONTARIO.		
Haldimand	Caledonia*	The Alabastine Company, Ltd., Paris, Ont.
	Lythmore*	The Crown Gypsum Company, Lythmore, Ont.
	Nelles Corners	Grand Gypsum Limited, 32 Stinson St., Hamilton, Ont.
MANITOBA.		
Tp. 32. Range 9	Gypsumville*	Manitoba Gypsum Company, Ltd., Winnipeg, Man.
Tp. 33. Ranges 8 and 9.	"	Dominion Gypsum Company, P.O. Box 537, Winnipeg, Man.
BRITISH COLUMBIA.		
	Grand Prairie	B.C. Gypsum Company, Yorkshire Bldg., Vancouver, B.C.
	Merritt	Dr. Geo. Schumacher.

*Reporting sales and output, 1916.

MAGNESITE.

The shipments of magnesite during 1916 were 55,413 tons, valued at $563,829, and with the exception of a small experimental shipment from Atlin, B.C., were derived from the magnesite deposits in Argenteuil county, Quebec.

The 1915 shipments were 14,779 tons, valued at $126,584 and those of 1914, 358 tons, valued at $2,240, thus indicating the rapidity with which the mining of magnesite has been developed in this district.

The Argenteuil deposits have been worked in a small way since 1908, and a record of annual shipments as well as of imports of magnesia are shown in the accompanying table. There is no separate record of the imports of magnesite.

Annual Production of Magnesite and Imports of Magnesia.

Calendar Year.	Sales of Magnesite.		Imports of Magnesia.	
	Tons.	Value.	Tons.	Value.
1908	120	$ 840	.....	.....
1909	330	2,508	.....	.....
1910	323	2,160	233	$10,847
1911	991	5,531	253	11,012
1912	1,714	9,645	379	29,641
1913	515	3,335	145	12,226
1914	358	2,240	127	16,429
1915	14,779	126,584	91	9,695
1916	55,413	563,829	195	20,651

There were two principal operators in the Quebec field; the North American Magnesite Co., shipping calcined as well as crude magnesite and the Scottish Canadian Magnesite Company shipping crude mineral only. In addition to these, Fitzsimons and Boshart were carrying on development operations. Shipments have been hauled 12 and 14 miles from the quarries to Calumet Station on the C.P.R. During the latter part of 1916, however, the Scottish Canadian Magnesite Company completed a narrow gauge railway from the C.P.R. tracks, Grenville to the mine.

The hydromagnesite deposits occurring in the vicinity of Atlin, B.C., have been exploited during the past two years by Messrs. Armstrong and Morrison of Vancouver, B.C., who shipped 635 tons to Eastern United States and to Great Britain, for testing and experimental purposes.

This occurrence of magnesite was described by Dr. G. A. Young, in the Summary Report of the Geological Survey for 1915, pp. 50-61.

Magnesium Sulphate.

Sulphate of magnesium, epsomite, or epsom salts, has been found in southern British Columbia in the Osoyoos District, from which a few hundred tons have been shipped during 1915 and 1916.

The Provincial Mineralogist of British Columbia makes the following references[1] to this deposit.

"A deposit of magnesium sulphate near Kruger mountain, Osoyoos Division, B.C., occurs in a flat depression known as Spotted lake, which is a partially dried-up lake containing alternate circles of water and dry places. The magnesium sulphate occurs as a layer all over the lake-bottom, covering a considerable area and said to be of exceptional purity; the thickness of the deposit has not been definitely ascertained. Three hundred tons was extracted and shipped to New York in 1915, where a market at a good price was obtained. The material is used in the drug trade. The nearest town to the deposit is Oroville, Washington, U.S.A., which is distant about six miles."

"During the first three months of 1916 the Stewart-Calvert Company, of Seattle, Wash., shipped 250 tons of magnesium sulphate from Spotted lake. No accurate survey of the deposits available has been made so far. The company gave up operations owing to the excessive amount of water, and also owing to the difficulty of transportation to the railroad. It has also claims on the American side that are easier of access."

Metallic Magnesium.

The manufacture in Canada of metallic magnesium has been undertaken by the Shawinigan Electro Metals Company, Ltd., at Shawinigan Falls, Que. The metal is made from magnesium chloride salts which have been imported. It is proposed, however, to undertake the manufacture of these salts in Canada from Canadian magnesite.

[1]Annual Report, Minister of Mines, B.C., 1916—pp. 27 and 260.

MANGANESE.

The exports of manganese ore in 1916 are reported as 957 tons, valued at $89,544 and in the absence of complete returns from operators this figure may be taken to represent production.

Shipments include some bog manganese from Adamsville on the Intercolonial railway, Kent county, New Brunswick, as well as high grade ore from New Ross, Nova Scotia and a few tons from Cape Breton.

Annual Production of Manganese Ore.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
1886	1,789	$41,499	$23.20	1901*	440	$ 4,820	$ 10.95
1887	1,245	43,658	35.07	1902*	172	4,062	23.62
1888	1,801	47,944	26.62	1903	91	2,775	30.49
1889	1,455	32,737	22.50	1904	66	2,740	41.51
1890	1,328	32,550	24.51	1905*	22	1,720	78.18
1891	255	6,694	26.25	1906*	93	925	9.95
1892	115	10,250	89.13	1907*	1	22	22.00
1893	213	14,578	68.44	1908	Nil.	.....	.....
1894	74	4,180	56.49	1909	Nil.	.....	.....
1895	125	8,464	67.71	1910	Nil.	.....	.....
1896*	123½	3,975	32.19	1911	5½	300	54.55
1897*	15¼	1,166	76.46	1912	75	1,875	25.00
1898	50	1,600	32.00	1913	Nil.	Nil.	.....
1899	1,581	20,004	12.65	1914	28	1,120	40.00
1900	30	1,800	60.00	1915	201	9,360	46.57
				1916*	957	89,544	92.41

*Exports.

The manganese ores which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These were mostly ores with a high manganese content, and fairly free from deleterious constituents. The largest part of the production was consequently put to those uses, where a high grade raw material is desired, *e.g.*, as an oxidizing agent in the manufacture of chlorine, bromine, manganates, and permanganates, as a decolorizer of glass, porcelain, and enamels, as a colouring material in dyeing and pottery and paint manufacture, as a drier in paints and varnishes, in the manufacture of dry and Leclanche cells, etc.

The mining of manganese ores in Canada reached considerable proportions between 1880 and 1890 when the annual production ranged from 1,200 to 1,800 tons, valued at from $30,000 to $50,000. In 1891 the production fell away, and only once since (in 1899) did it exceed 500 tons. In 1907, 1908, 1909, and 1910, there was no production. In 1910 the Nova Scotia Manganese Company started operations on a property at New Ross, Lunenburg county, N.S., and made small shipments in 1911, 1912, and 1914.

The property was taken over in September, 1915, by the Metals Development Company, Ltd., of 80 Granville St., Halifax, and since

October of 1916 has been operated by the Rossville Manganese Co., Ltd., at the same address. The ore is reported to be a mixture of psilomelane and manganite. The operators are equipped to crush and screen the ore to any size desired. According to the Provincial Mines Report production during the fiscal year ending September 1916 was 544·3 long tons of high grade manganese ore. The ore is hauled 26 miles to Chester Basin and thence by rail to Yarmouth, and then by water to New York.

At the property of the New Ross Manganese Company, situated about two miles south of the above, about 18 tons of manganese ore were recovered in working over the old dumps. The mine, however, was not operated, and has been shut down since 1903.

In the same district operations were begun in December on another property by the International Manganese and Chemical Co., of Boston. A mining camp and equipment were installed and a shaft sunk, but no ore shipped.

W. N. McDonald of Sydney, C.B., did some further work on the "Glenmore" and "Isabella" manganese properties at Enon, near Loch Lomond, Cape Breton county.

Some shipments were made of bog manganese from deposits in the vicinity of Adamsville Station on the Intercolonial railway, Kent county, New Brunswick, on which operations had been begun during the previous year by The New Brunswick and Nova Scotia Mining & Development Co. of New York. All work, however, appears to have been discontinued early in the year.

Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1873.....	1,031	$20,192	1888.....	1,181	$21,832	1903.....	135	$1,889
1874.....	782	16,973	1889.....	1,436	29,350	1904.....	123	2,706
1875.....	203	5,514	1890.....	1,906	36,831	1905.....	22	1,720
1876.....	412	8,039	1891.....	255	6,694	1906.....	93	925
1877.....	891	15,909	1892.....	143	8,205	1907.....	1	22
1878.....	626	10,860	1893.....	133	12,521	1908.....	.....	.....
1879.....	1,886	27,436	1894.....	56	3,120	1909.....	3	434
1880.....	2,179	34,797	1895.....	108·3	6,351	1910.....	4	160
1881.....	1,704	40,554	1896.....	123·5	3,975	1911.....	4	225
1882.....	894	25,747	1897.....	15·3	1,166	1912.....	10	300
1883.....	1,326	25,343	1898.....	11	325	1913.....	8	303
1884.....	603	20,089	1899.....	70	2,410	1914.....	30	750
1885.....	1,684	34,649	1900.....	34	1,720	1915.....	255	6,855
1886.....	(a) 1,818	58,338	1901.....	440	4,820	1916.....	957	89,544
1887.....	1,415	34,802	1902.....	172	4,062			

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

No separate record of imports of manganese ores is kept in the classification of the Customs Department, but statistics for imports of "oxide of manganese" are listed. In 1916 these imports were 1,170 tons, valued at $63,786, or an average of $54.52 per ton, as compared with 1,238 tons, valued at $46,678, or an average of $37.70 per ton in 1915, and 1,702 tons,

valued at $42,287, or an average of $24.85 per ton in 1914. Imports of ferro-silicon, spiegeleisen, and ferro-manganese for 1916 were 14,777 tons, valued at $1,879,508; 13,758 tons, valued at $807,312 in 1915; and 22,147 tons valued at $549,485 in 1914.

Statistics of imports of oxide of manganese follow:—

Imports of Oxide of Manganese.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1884	3,989	$ 258	1901	272,134	$ 8,176
1885	36,778	1,794	1902	476,331	5,360
1886	44,967	1,753	1903	279,611	8,051
1887	59,655	2,933	1904	275,696	7,051
1888	65,014	3,022	1905	235,289	6,832
1889	52,241	2,182	1906	244,620	5,508
1890	67,452	3,192	1907 (9 mos.)	386,404	11,087
1891	92,087	3,743	1908	732,242	17,863
1892	76,097	3,530	1909	382,137	6,561
1893	94,116	3,696	Calendar Year.		
1894	101,863	4,522	1910	1,297,020	17,133
1895	64,151	2,781	1911	1,924,520	22,612
1896	108,590	4,075	1912	2,512,610	27,707
1897	70,663	2,741	1913	5,175,195	46,990
1898	130,456	5,047	1914	3,404,863	42,287
1899	141,356	5,539	1915	2,476,328	46,678
1900	126,725	4,155	1916	2,339,809	63,786

By far the greater part of the world's production of manganese enters the market as spiegeleisen, and ferro-manganese. These are used principally in the steel industry where they are added to both Bessemer and open-hearth steels, the manganese acting as a deoxidizer, recarbonizer, and neutralizer of sulphur.

Before the war over 50 per cent of the world's production of manganese ore had been coming from Russian territory in the vicinity of the Black Sea, and a large share from British India. During the past three years, however, these sources of supply have been largely supplemented in the United States market by imports from Brazil. The demand for manganese ore and for ferro-manganese has been such as to result in much higher prices for both the ore and the ferro-alloy than those ruling before the war.

The manganese ore market is discussed in a recent issue of the Engineering and Mining Journal, from which the following extract[1] is taken:

"The price schedules have been altered continuously, and high grade ore running 49% and over, which was quoted around 40 cents in the early part of the war, is now offered at $1.10 per unit f.o.b. buyers' works. Formerly, ore under 38% could hardly be sold—now buyers are prepared to take material from 33% upward. Again, ore containing over 8% of silica was subject to a penalty, and the maximum silica allowed, before the ore was rejected, was 12%. Today some of the buyers are ready to accept manganese ore, even if it contains up to 20% of silica. Excess

[1]The Manganese Ore Market, Engineering & Mining Journal, Aug. 4, 1917, p. 203.

of silica over 8%, however, is penalized at the rate of 50 cents per ton for each unit of silica.

"The United States Steel Corporation is still accepting manganese ore with a penalty of only 15 cents for the excess of silica over 8%. Other buyers deduct 1% of manganese for each 1% of silica in excess of 10. Phosphorus, also, is penalized, and a penalty of 15 cents a ton for each point over 0·1% is charged. The maximum allowance for phosphorus is 0·2%. Though these limits have been set, it is possible by actual negotiations to get an otherwise unacceptable ore taken by the buyers, and it is best for the mine to ship a trial car or cargo, since according to the general and physical character of the ore, a price can often be fixed which is in excess of the actual schedules submitted."

The imports of manganese ore into the United States during 1916 were 552,003 short tons, as against 313,985 tons in 1915, and 283,294 tons in 1914.

MICA.

According to returns received from producers, shipments of mica in 1916 totalled 1,208 tons, valued at $255,239, or an average of $211.29 per ton, as compared with shipments in 1915 of 417 tons valued at $91,905, or an average of $220.40 per ton. By provinces, the production was: Quebec 844 tons, valued at $192,343, or an average of $227.89 per ton, and Ontario 364 tons, valued at $62,896, or an average of $172.79 per ton.

The statistics as to value of production should be considered with discretion and with due regard to the conditions under which the industry is conducted. The condition in which mica is shipped from the mines varies greatly; one operator ships his output cleaned and trimmed, while the output of another is in a rough cobbed state, with consequent noteworthy differences in prices realized. And further, companies operating trimming shops as well as mines may place only a nominal value on shipments from mines to trimming shops.

Tables showing the total value and the production by provinces from 1909 to 1916 and the total value of the annual production from 1886 to 1908 follow:—

Annual Production of Mica by Provinces.

Calendar Year.	Quebec.			Ontario.			Total.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
1909...	128	$93,298	$728.89	241	$ 54,484	$226.07	369	$147,782	$400.49
1910...	316	87,295	276.25	442	103,090	233.24	758	190,385	251.17
1911...	217	69,465	320.12	373	59,212	158.75	590	128,677	218.10
1912...	196	81,044	413.48	384	62,932	163.89	580	143,976	248.23
1913...	626	125,488	200.46	478	68,816	143.97	1,104	194,304	176.00
1914...	246	62,794	255.26	349	46,267	132.57	595	109,061	183.30
1915...	217	50,390	232.21	200	41,515	207.58	417	91,905	220.40
1916...	844	192,343	227.89	364	62,896	172.79	1,208	255,239	211.29

Annual Production of Mica 1886-1908.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1886.....	$ 29,008	1894.....	$ 45,581	1902.....	$135,904
1887.....	29,816	1895.....	65,000	1903.....	177,857
1888.....	30,207	1896.....	60,000	1904.....	160,777
1889.....	28,718	1897.....	76,000	1905.....	178,235
1890.....	68,074	1898.....	118,375	1906.....	303,913
1891.....	71,510	1899.....	163,000	1907.....	312,599
1892.....	104,745	1900.....	166,000	1908.....	139,871
1893.....	75,719	1901.....	160,000		

Most of the various minerals of the mica group have been found in Canada. Lepidolite occurrences have been noted in British Columbia, Nova Scotia and Quebec; biotite occurrences in Ontario and Quebec;

muscovite occurrences in British Columbia, Manitoba, Nova Scotia, Ontario and Quebec; and phlogopite occurrences in Baffinland, Ontario, and Quebec. Only the phlogopite (or amber mica) occurrences of Ontario and Quebec have been proven to be of economic interest. These have been the subject of special investigation by the Mines Branch, Ottawa.[1] The muscovite occurrences at Tete Jaune Cache, and Big Bend in British Columbia have also been specially investigated by the Mines Branch,[2] but as yet they have made no production.

Canada's production of mica has come exclusively from two fields: one, in the Province of Quebec, a short distance to the north of the city of Ottawa, and the other embracing parts of the counties of Lanark, Leeds, and Frontenac, in the Province of Ontario. The city of Ottawa (and the adjacent city of Hull) lying between these two fields is the centre to which almost all the production of the various mines and numerous small prospects is shipped for trimming, grading and marketing. In preparation for the market a considerable proportion of the tonnage received is cobbed out and the mica split, trimmed and otherwise manufactured, with the result that the exports, though of smaller tonnage than the shipments from the mines, usually exceed them in total value.

According to Customs records the exports of mica in 1916 were 654 tons, valued at $379,720 of which 119 tons, valued at $81,913 were exported to Great Britain; 533 tons, valued at $296,221 to the United States; and 2 tons, valued at $1,586 to other countries. In 1915, the total exports were 440 tons, valued at $236,124, of which 67 tons, valued at $34,065 were exported to Great Britain; 372 tons, valued at $201,659 to the United States; and 1 ton, valued at $400 to other countries.

Tables showing the annual exports and the distribution of the exports by countries during recent years follow:—

Annual Exports of Mica.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
1887	$ 3,480	1897	$ 69,101	1906	912	$581,919
1888	23,563	1898	110,507	1907	558	422,172
1889	30,597	1899	158,002	1908	290	198,839
1890	22,468	1900	146,750	1909	359	256,834
1891	37,590	1901	152,553	1910	469	330,903
1892	86,562	1902	391,812	1911	347	242,548
1893	70,081	1903	196,020	1912	448	334,054
1894	38,971	1904	198,482	1913	409	240,775
1895	48,525	1905	179,049	1914	335	178,940
1896	47,756			1915	440	236,124
				1916	654	379,720

[1]"Mica: Its Occurrence, Exploitation and Uses." H. S. deSchmid, Mines Branch, Department of Mines, Ottawa, No. 118.

[2]Mines Branch, Department of Mines, Ottawa, Summary Report, 1913, p. 42.

Exports of Mica by Countries, 1914, 1915, and 1916.

	1914.		1915.		1916.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
To Great Britain	70	$37,969	67	$ 34,065	119	$ 81,913
To United States	242	126,220	372	201,659	533	296,221
To other countries	23	14,751	1	400	2	1,586
Total	335	178,940	440	236,124	654	379,720

Statistics of the imports of mica into the United States, and Great Britain, showing the relative importance of Canada as a source of supply for each, are given in the following tables:—

Imports of Mica into the United States.[1]

Year ending June 30.	Imports from Canada.		Total imports from all countries.	
	Short tons.	Value.	Short tons.	Value.
1895	273	$39,637	410	$ 127,515
1896	310	57,908	632	214,997
1897	208	54,630	441	187,845
1898	233	53,854	313	94,294
1899	512	131,310	808	259,228
1900	549	136,981	1,019	314,882
1901	484	161,741	1,011	369,644
1902	427	184,287	903	384,818
1903	417	196,470	973	414,953
1904	287	137,191	693	306,937
1905	253	121,560	594	296,362
1906	539	328,991	1,206	731,484
1907	767	596,321	1,724	1,295,606
1908	172	140,166	655	567,550
1909	167	132,941	403	313,525
1910	434	333,196	1,008	682,539
1911	316	239,964	872	612,936
1912	362	213,750	742	513,792
1913	639	218,365	1,634	1,003,158
1914	340	124,785	806	524,454
1915	254	69,481	382	221,704
1916	355	79,834	500	299,353

[1]The Foreign Commerce and Navigation of the United States.

Imports of Mica into Great Britain.*

	1914.		1915.		1916.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Germany	69,552	$14,220	.....	.....	.....	.....
United States	206,640	12,395	487,760	$ 17,885	182,336	$ 11,150
Other foreign countries	54,768	30,947	113,568	37,872	62,496	26,845
British India	2,745,008	460,392	3,307,808	448,313	4,864,384	963,454
Canada	137,200	37,040	208,768	29,497	98,448	36,957
Other British possessions	38,080	5,787	82,656	11,636	16,352	2,866
Total	3,251,248	560,781	4,200,560	545,203	5,224,016	1,041,272

*British Trade Report.

The following is a list of the operators of mica mines who have sent in returns to the Statistical Division of the Mines Branch in 1915 and 1916.

Operator and Address.	Location of Mine.	
	County.	Township and Lot.
Ontario.		
Fahey & Sullivan, Elgin, Ont	Leeds	S. Crosby, VII 14.
Grierson & Gallagher, Perth, Ont	Lanark	N. Burgess, V 3.
Sam. Cordick, Perth, Ont	"	" V 4.
S. H. Orser Co., Perth, Ont	"	" 6, 8.
Jno. Mahon (N. Lewell), Rideau Ferry, Ont	"	" V 10.
Rinaldo McConnell, Toronto, Kent Bldg	"	" VIII 1.
W. L. McLaren, Perth, Nevis Cottage	"	" VIII 4, 5, 6.
The Loughborough Mg. Co., Ltd., Sydenham, Ont	Frontenac	Loughboro VII W½ 11.
The Sydenham M. & Ph. Mg. Co., Ltd., Sydenham, Ont.	"	" VIII 7.
Frontenac Mica Co., Ltd., c/o S. A. Hookey, Shumacher, Ont	"	" VIII N½ 10
Anglin Mica Mg. Co., Kingston, Ont	"	" X 10.
Jas. Wilson & Sons, Hartington, Ont	"	Bedford, VI 4.
Kent Bros. & J. M. Stoness, Kingston, Ont	"	" VI 30; XIII 4.
Varney, Smith & Wm. Green, Perth Road, Ont	"	" VIII 4.
Quebec.		
J. B. Gorman, Buckingham, Que	Labelle	Buckingham XII 14.
W. L. Parker, Buckingham, Que	"	Bigelow.
Detroit Mica Mg. Co., Ltd., Windsor, Ont	"	Derry, VI (part of)
O'Brien & Fowler, Ottawa, Beech St	Ottawa	Portland E, IX 30, 31, 32.
" " "	"	" E., VII 18.
" " "	"	" W., X 2.
" " "	Labelle	Villeneuve, I 30, 31.
J. B. Gauthier, Buckingham, Que	"	" II 2.
William Cleland, Bouchette, Que	Ottawa	Cameron II 10.
Brown Bros., Cantley, Que	"	Hull, XII 11a.
Vavasour Mining Association, Ottawa, Ont	"	" XII 10.
R. McConnell, Toronto, Kent Bldg	"	" XIV N½ 10B.
S. H. Cross, Farm Point, Que	"	" XV, 16, 17.
Watts & Noble, Perkins, Que	"	Templeton. X 15, 16.
Wallingford Mica & Mg. Co., Ltd., Perkins, Que	"	" VIII 16.
Wallingford Bros. Ltd., Perkins, Que	"	" N. VIII E½ 15.
Blackburn Bros., Ottawa, Ont	"	" Gore, lot 18.
Chabot & Co., Ottawa, 124 Rideau	"	" " lot 38.
The Capital Mica Co., Ltd., Ottawa, Ont	"	Wakefield, II 23a.
H. F. Flynn, Hull, Que	"	" B 19.
" " "	"	Wright, D15.
Calumet Mica Co., Ottawa, 316 Rideau	Pontiac	Huddersfield IV 20, 22; V 22.
Cross & Wilson, Cascades, Que	"	Thorne.

MINERAL PIGMENTS.

Iron Oxides—Ochres.

For many years there has been an annual production in the Province of Quebec of iron oxides from deposits situated between Champlain and Three Rivers, a short distance from the St. Lawrence river.

These oxides are marketed after calcining as paint materials and are also sold crude for use in the purification of illuminating gas. The mineral paint is calcined, washed, and fine ground before shipment.

The total production in 1916 was 8,811 tons, valued at $58,711 as compared with 6,248 tons, valued at $48,353 in 1915, and 5,890 tons, valued at $51,725 in 1914.

Statistics of production since 1886 are shown in the following table:—

Annual Production of Iron Oxides.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886	350	$ 2,350	1902	4,955	$30,495
1887	485	3,733	1903	6,266	32,760
1888	397	7,900	1904	3,925	24,995
1889	794	15,280	1905	5,105	34,675
1890	275	5,125	1906	6,758	36,125
1891	900	17,750	1907	5,828	35,570
1892	390	5,800	1908	4,746	30,440
1893	1,070	17,710	1909	3,940	28,093
1894	611	8,690	1910	4,813	35,185
1895	1,339	14,600	1911	3,622	28,333
1896	2,362	16,045	1912	7,654	32,410
1897	3,905	23,560	1913	5,987	41,774
1898	2,226	17,450	1914	5,890	51,725
1899	3,919	20,000	1915	6,248	48,353
1900	1,966	15,398	1916	8,811	58,711
1901	2,233	16,735			

There is included in the above table a small production from an ochre deposit at Campbellville, Halton county, Ont., which has been inactive since 1911.

The active operators in the iron oxide industry in 1916 were the following:—

The Canada Paint Company, Limited, Montreal, Que.
The Champlain Oxide Company, Three Rivers, Que.
Thos. H. Argall, Three Rivers, Que.

In previous years production was reported by:—

Francois Ouellette, St. Joseph de Nicolet, Que.
Ontario Mineral Paint Company, Campbellville, Ont.

The exports of mineral pigments, iron oxides, ochres, etc., in 1916 are reported as 1,696 tons, valued at $25,312, as compared with exports in

1915 of 1,196 tons, valued at $17,263. Statistics of annual exports since 1897 follow:—

Exports of Mineral Pigments, Iron Oxides and Ochres.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1897	512	$ 7,706	1907	191	$10,043
1898	283	4,227	1908	125	4,850
1899	308	5,408	1909	658	7,956
1900	651	7,154	1910	1,746	29,839
1901	401	8,233	1911	2,000	27,070
1902	352	6,182	1912	3,016	34,513
1903	676	12,770	1913	1,956	18,931
1904	416	7,260	1914	1,777	22,311
1905	353	7,704	1915	1,196	17,263
1906	139	2,379	1916	1,696	25,312

Imports of mineral pigments are included under two classifications (1) ochres and ochrey earths, siennas and umbers, duty 20 per cent, and (2) oxides rough stuffs, fillers, fireproofs and colours, dry, n.e.s., duty 25 per cent.

During 1916, imports under the first classification were 2,082 tons, valued at $51,771 and under the second 2,917 tons, valued at $357,487 or total of 4,999 tons, valued at $409,258. In 1915, imports under the first classification were 1,240 tons, valued at $23,763, and under the second, 2,452 tons, valued at $260,986, or total of 3,692 tons, valued at $284,749.

Statistics of imports appear in the following tables:—

Imports of Ochres and Pigments, 1915 and 1916.

	Duty.	1915.		1916.	
		Pounds.	Value.	Pounds.	Value.
Ochres, ochrey earths, siennas, and umbers	20%	2,479,853	$23,763	4,163,762	$51,771
Oxides, fillers, fireproofs, rough stuffs, and colours, dry, n.e.f.	25%	4,904,725	260,986	5,883,871	357,487
Total		7,384,578	284,749	9,997,633	409,258

Annual Imports of Ochres and Pigments.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	571,454	$ 6,544	1899	2,444,698	$ 31,092
1881	677,115	8,972	1900	2,474,537	32,017
1882	731,526	8,202	1901	2,092,067	27,267
1883	898,376	10,375	1902	2,530,743	33,909
1884	533,416	6,398	1903	3,215,346	42,243
1885	1,119,177	12,782	1904	2,767,580	36,636
1886	1,100,243	12,267	1905	3,122,690	35,887
1887	1,460,128	17,067	1906	4,321,530	57,397
1888	1,725,460	17,664	1907 (9 mos.)	2,926,528	39,675
1889	1,342,783	12,994	1908	3,749,132	39,923
1890	1,394,811	14,066	1909	2,122,781	27,540
1891	1,528,696	20,550	Calendar Year.		
1892	1,708,645	22,908	1910	4,227,660	55,393
1893	1,968,645	23,134	1911	4,397,514	53,092
1894	1,358,326	18,951	1912	4,998,089	69,621
1895	793,258	12,048	1913	12,100,014	283,554
1896	1,159,494	16,954	1914	11,110,497	278,064
1897	1,504,044	18,504	1915	7,384,578	287,749
1898	2,126,592	26,307	1916	9,997,633	409,258

MINERAL WATER.

The statistics of production, given herewith represent, as usual, as closely as can be secured, the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate of the value of mineral water used at springs for drinking or bathing purposes; nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The value of the production in 1916 was $127,806 as compared with $115,274 in 1915; $134,111 in 1914, and $173,677 in 1913.

The imports of mineral and ærated waters during the calendar year 1916 were valued at $130,933; during 1915 at $126,569; during 1914 at $199,327 and during 1913, $257,153.

The exports of mineral water during 1916 were valued at $1,598; as compared with $3,578 in 1915 and $2,367 in 1914.

Statistics of production, imports and exports, are given in the following tables:—

Annual Production of Mineral Water.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
1888.....	124,850	$ 11,456	1898....	555,000	$100,000	1908.....	.....	$151,953
1889.....	424,600	37,360	1899.....	.....	100,000	1909.....	.....	175,173
1890.....	561,165	66,031	1900.....	.....	75,000	1910.....	.....	199,563
1891.....	427,485	54,268	1901.....	.....	100,000	1911.....	.....	223,758
1892.....	640,380	75,348	1902.....	.....	100,000	1912.....	.....	172,465
1893.....	725,096	108,347	1903.....	.....	100,000	1913.....	.....	173,677
1894.....	767,460	110,040	1904.....	.....	100,000	1914.....	.....	134,111
1895.....	739,382	126,048	1905.....	.....	100,000	1915.....	.....	115,274
1896.....	706,372	111,736	1906.....	.....	100,000	1916.....	.....	127,806
1897.....	749,691	141,477	1907.....	.....	136,020			

Annual Imports of Mineral Water.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	$41,797	1893.....	$ 27,909	1906.....	$ 178,643
1881.....	55,763	1894.....	28,130	1907 (9 months).....	143,416
1882.....	57,953	1895.....	27,879	1908.....	153,831
1883.....	49,546	1896.....	32,674	1909.....	159,221
1884.....	48,613	1897.....	22,142	Calendar Year.	
1885.....	55,864	1898.....	33,314	1910.....	202,306
1886.....	47,006	1899.....	38,046	1911.....	229,367
1887.....	52,989	1900.....	30,343	1912.....	273,698
1888.....	54,891	1901.....	40,802	1913.....	257,153
1889.....	66,331	1902.....	91,871	1914.....	199,327
1890.....	71,521	1903.....	108,130	1915.....	126,569
1891.....	15,721	1904.....	137,304	1916.....	130,933
1892.....	17,913	1905.....	161,799		

Annual Exports of Mineral Water.

Calendar Year.	Gallons.	Value.	In bottles. Value.	Total.
1910	16,136	$ 7,169	.....	$ 7,169
1911	26,495	12,952	.....	12,952
1912	9,690	4,710	.....	4,710
1913	3,640	526	$ 970	1,496
1914	2,287	599	1,768	2,367
1915	198	53	3,525	3,578
1916	229	22	1,576	1,598

The following is a list of the principal producers of mineral water:—

Operator.	Address.	Location of Spring.		Brand of Water.
		County.	P.O.	
N. Brunswick.				
Havelock Mineral Springs Company, Ltd.	Moncton, N.B.	Kings	Havelock	Havelock.
Quebec.				
T. R. Ridgeway	Montreal, 14 St. John.	Chambly	Chambly	Richelieu.
Radnor Water Company, Ltd.	Montreal, 500 McGill Bldg.	Champlain	Radnor Forges.	Radnor.
Cyprien Roy	St. Germain, Que.	Kamouraska	L'Islet-Plate	St. Germain.
*St. Leon Waters, Limited	Toronto, 1 Toronto St.	Maskinonge	St. Leon	Mirack.
Ratté et Frère	Quebec, 22 Bigouette	"	Nancy	St. Leon.
M. Timmons & Son	Quebec, Que.	Quebec	Quebec	Claire Fontaine.
*Chas. Gurd & Co., Ltd.	Montreal, 76 Bleury	Vercheres	Varennes	Varennes.
The Abenakis Springs Co., Ltd.	Abenakis Springs	Yamaska	Abenakis Springs.	Abekanis.
Alf. Ferland	Montreal, 1661 Bordeaux.	Two Mountains	St. Benoit	St. Benoit.
Ontario.				
Saugeen Mineral Water Company.	Southampton, Ont.	Bruce	Southampton	Saugeen.
The Carlsbad, Ltd.	Carlsbad Springs, Ont.	Carleton	C. Springs	Carlsbad.
Borthwick Mineral Water Co.	Ottawa	"	.....	Borthwick.
Goderich Mineral Water Co.	Goderich, Ont.	Huron	.....	Minisitung.
Dom. Springs Mineral Water.	Pakenham, Ont. R. R. No. 4.	Lanark,	.....	Dominion.
Sanitaris Limited	Arnprior, Ont.	N. "	Pakenham	Sanitaris.
Arthur Bélanger	Papineauville, Que.	Prescott	N. Plantagenet Tp.	St. George.
Allan's Limited	Montreal, 86 Dorchester W.	"	Caledonia Springs	Caledonia.
Chas. Gurd & Co., Ltd.	Montreal, 76 Bleury	"	"	Gurd's Caledonia.
Lyall, Trenholme & Macdonnell	Montreal West	"	"	Beaver.
A. Sabourin	Hawkesbury	"	"	Maple Leaf.
The Caledonia Springs Co., Ltd.	Montreal, 360 Craig E.	"	"	Magi.
		Russell	Bourget	Adanac.
F. Deneault	Bourget, Que.	"	"	Brook.
The Can. Mineral Waters, Ltd.	Toronto, 65 Bellwood	"	"	Russell Lithia.
*Stanley Mineral Springs Co., Ltd.	Winnipeg	Thunder Bay Dist.,	Stanley	Stanley.
Saskatchewan.				
Manitou Mineral Water Co., Ltd.	Watrous	.....	Manitou Lake	Manitou.
British Columbia.				
*Halcyon Bottling Co.	Halcyon, B.C.	W. Kootenay Dist.	Halcyon	Halcyon Lithia.
M. Grady	St. Leon Hot Springs, B.C.	" "	St. Leon, Hot Springs.	St. Leon.
*F. F. Siemens	Rush Lake, Sask.	" "	Renata, B.C.	.....

*Idle.

NATURAL GAS.

The total production of natural gas in Canada in 1916 was 25,467,458 thousand cubic feet, valued at $3,958,029, to which Ontario contributed 17,953,109 thousand cubic feet, valued at $2,765,105; Alberta 6,904,231 thousand cubic feet, valued at $1,113,296, and New Brunswick 610,118 thousand cubic feet, valued at $79,628.

The total production in 1915 was 20,124,162 thousand cubic feet, valued at $3,706,035, to which Ontario contributed 15,211,523 thousand cubic feet valued at $2,622,838 (as reported to the Ontario Bureau of Mines; direct returns by operators to the Mines Branch were not complete); Alberta 4,481,947 thousand cubic feet, valued at $1,022,814; and New Brunswick, 430,692 thousand cubic feet, valued at $60,383.

The value of the gas, as reported by producers, varies from 5 cents to 30 cents per thousand feet, but these prices do not represent what the customer has to pay. In some cases the producer also owns the distribution pipe line and receives the full price paid by the consumer. In other cases the producer may sell to a pipe line company who either sells directly to consumers, or may in turn resell to other pipe line companies for retail distribution; in such cases as these the producer receives only a fraction of the amount paid by the consumer, but he is saved the expense of distribution. The statistics given herewith represent, as far as possible, the value received by the producer, or owner, of the gas wells, whether such producer be the owner of the distribution line or not.

The petroleum and natural gas resources of Canada have been the subject of special investigation by the Mines Branch, Ottawa, and two volumes comprising the results of this investigation have recently been issued.[1]

Statistics of the production of natural gas in 1914, 1915 and 1916, and of the value of the annual production since 1892 follow:—

Natural Gas Production, 1916.

Province.	No. men.	Wages	Wells, 1916.						Production.		
			(a)	(b)	(c)	(d)	(e)	(f)	M. cu. ft.	Value.	Average.
Quebec	—	—	1	1	—	—	2	—	—	—	—
New Brunswick	12	$13,193	22	—	—	—	22	1	610,118	$ 79,628	0·131
Ontario	581	299,379	1480	139	44	74	1889	21	17,953,109	2,765,105	0·157
Saskatchewan	—	—	—	—	1	—	—	1	—	—	—
Alberta	157	220,341	56	—	—	—	56	5	6,904,231	1,113,296	0·161
Total	750	532,913	1559	140	45	74	1969	28	25,467,458	3,958,029	0·155

(a) Total number of productive wells at beginning of year.
(b) Number of productive wells drilled during year.
(c) " " dry wells drilled during year.
(d) " " wells abandoned during year.
(e) " " productive wells at end of year.
(f) " " wells on which drilling was in progress at end of year.

[1] "Petroleum and Natural Gas Resources of Canada," F. G. Clapp, Mines Branch, Dept. of Mines, Can., No. 291, Vol. I and Vol. II.

Natural Gas Production, 1915.

Province.	No. men.	Wages.	No. Wells, 1915.				Production.		
			(a)	(b)	(c)	(d)	M. cu. ft.	Value.	Average.
New Brunswick	8	8,413	22	0	0	0	430,692	$ 60,383	$0.13½
Ontario††	.....	.....	.....	.....	.....	.....	15,211,523	2,622,838	0·17
Saskatchewan	.....	.....	0	0	0	1	.....	.....	.....
Alberta	177	242,173	63	1	1	1	4,481,947	1,022,814	0.23
Total	.....	.....	.....	.....	.....	.....	20,124,162	3,706,035	0.18

(a) Total number of producing wells at end of year.
(b) Number of producing wells drilled during the year.
(c) Number of non-producing wells drilled during the year.
(d) Number of incomplete wells at the end of the year.
††Figures from Ontario Bureau of Mines.

Natural Gas Production, 1914.

Province.	No. men.	Wages.	No. Wells, 1914.				Production.		
			(a)	(b)	(c)	(d)	M. cu. ft.	Value.	Average.
Quebec	.....	.....	2	1	0	0	.....	.....	.....
New Brunswick	5	5,825	23	2	3	0	425,826	$ 54,249	$ 0.13
Ontario	392	224,492	1,665	120	28	2	14,094,521	2,215,808	0.15½
Saskatchewan	.....	.....	0	1	1	3	.....	.....	.....
Alberta	164	243,976	64	10	1	4	7,172,157	1,214,670	0.17
British Columbia	.....	.....	0	0	0	1	.....	.....	.....
Total	561	474,293	1,754	134	33	10	21,692,504	3,484,727	0.16

(a) Total number of producing wells at end of year.
(b) Number of producing wells drilled during the year.
(c) Number of non-producing wells drilled during the year.
(d) Number of incomplete wells at end of the year.

Annual Production of Natural Gas.

Calendar Year.	Value.	Calendar Year.	Value.
1892	$150,000	1904	$ 328,376
1893	376,233	1905	379,561
1894	313,754	1906	583,523
1895	423,032	1907	815,032
1896	276,301	1908	1,012,660
1897	325,873	1909	1,207,029
1898	322,123	1910	1,346,471
1899	387,271	1911	1,907,678
1900	417,094	1912	2,362,700
1901	339,476	1913	2,309,381
1902	195,992	1914	3,484,727
1903	202,210	1915	3,706,035
		1916	3,958,029

PEAT.

The total shipments of peat during 1916 were 300 tons, valued at $1,500, all from a bog in Middlesex county, Ontario, operated by The Dorchester Peat Fuel Co., Ltd.

In 1915 shipments were made from the Alfred bog, Prescott county, amounting to 300 tons, valued at $1,050.

Statistics of the annual production of peat since 1900 are given in the following table:—

Annual Production of Peat.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1900	400	$1,200	1908	60	$ 180
1901	220	600	1909	60	240
1902	475	1,663	1910	841	2,604
1903	1,100	3,300	1911	1,463	3,817
1904	800	2,400	1912	700	2,900
1905	80	260	1913	2,600	10,100
1906	474	1,422	1914	685	2,470
1907	50	200	1915	300	1,050
			1916	300	1,500

Following is a list of publications on peat issued by the Mines Branch, Ottawa.

Report No. 19. "Peat and Lignite, their Manufacture and Uses in Europe," by Erick Nystrom, M.E. 1908 (Out of print).

Report No. 30. "Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908." Bulletin No. 1, by Erick Nystrom and A. Anrep.

Report No. 71. Investigation of the peat bogs, and peat industry of Canada, 1909-10; to which is appended Mr. Alf. Larson's paper on Dr. M. Ekenberg's wet-carbonizing process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. Anrep,; also a translation of Lieut. Ekelund's pamphlet entitled "A solution of the peat problem," 1909, describing the Ekelund process for the manufacture of peat powder, by Harold A. Leverin, Ch. E. Bulletin No. 4—by A. Anrep. (Second edition, enlarged.) (Out of print.)

Report No. 90. Reprint of Presidential Address delivered before the American Peat Society at Ottawa, July 25, 1910, by Eugene Haanel, Ph.D.

Report No. 151. Investigation of the Peat Bogs and the Peat Industry of Canada, 1910-1911. Bulletin No. 8, by A. Anrep.

Report No. 154. The Utilization of Peat Fuel for the Production of Power, being a record of experiments conducted at the Fuel Testing Station, Ottawa, 1910-1911. Report on—by B. F. Haanel, B.Sc.

Report No. 266. Investigation of the Peat Bogs and the Peat Industry, 1911-1912. Bulletin No. 9, by A. Anrep, Peat Expert.

Report No. 299. Peat, Lignite and Coal. Their value as Fuels for the Production of Gas and Power in the By-Product Recovery Producer. Report by B. F. Haanel, B.Sc.

Report No. 351. "Investigation of the peat bogs and the peat industry of Canada, 1913-1914." Bulletin No. 11. A. Anrep.

Report No. 447 "The value of Peat Fuel for the Generation of Steam." Bulletin No. 17, by John Blizzard, B. Sc.

PETROLEUM.

The petroleum situation in Canada is worthy of a brief introductory summary. The production in 1916 of crude petroleum was 6,934,288 imperial gallons, whereas the imports of crude and refined oils amounted to 292,426,121 gallons and the exports in comparison were quite small. There was thus an oil consumption of almost 300,000,000 gallons of which less than 2½ per cent was from Canadian oil fields.

About 85 per cent of the total imports is in the form of crude oil of which a little over one-half is imported for the use of Canadian oil refineries.

A complete record of the production of oil refineries has not been obtained, but sufficient information has been obtained to indicate that probably at least 70 per cent of the Canadian consumption of refined illuminating oils, lubricating oils, gasoline, etc., is now produced in Canadian refineries.

The production of crude petroleum in 1916 was 198,123 barrels (of 35 Imperial gallons) valued at $392,284, as compared with a production in 1915 of 215,464 barrels, valued at $300,572; in 1914 of 214,805 barrels, valued at $343,124 and in 1913 of 228,080 barrels, valued at $406,439. The average price per barrel realized in recent years has been as follows: $1.98 in 1916; $1.395 in 1915; $1.597 in 1914; and $1.782 in 1913

The production of crude petroleum has come almost solely from Ontario. New Brunswick has been a producer for about nine years to the extent of less than 3,000 barrels, annually. There has been a small production in Alberta during each of the past three years, but the record is not complete.

The New Brunswick production has been as follows: 95 barrels in 1909; 1,485 barrels in 1910; 2,461 barrels in 1911; 2,679 barrels in 1912; 2,111 barrels in 1913; 1,725 barrels in 1914; 1,020 barrels in 1915, and 1,345 barrels in 1916. The 1916 production in Ontario was 196,778 barrels, valued at $389,621 as against a production in 1915 of 214,444 barrels valued at $299,149.

In Ontario, although a slight increase in value is shown in 1916, the production of crude oil has been steadily, but surely declining in spite of attempts being made by drilling to enlarge the areas of producing fields, or to find new ones. In the newer producing fields, as Dutton, Onondaga, and Tilbury, the decline has been relatively more rapid than in the older fields of Lambton and Bothwell.

During 1916 some drilling has been undertaken in the township of Brooke, Lambton district, and also at Thamesville in the Bothwell section.

New Brunswick petroleum production has been confined to Albert county where at present The New Brunswick Gas and Oil-Fields, Limited, are the only operators. The properties of this Company, formerly the

Maritime Oil-Fields, Limited, having developed a very considerable flow of gas, the operators have been concentrating their energies on gas development. New Brunswick possesses large deposits of bituminous shales richer in oil than the Scottish shales which have been exploited for many years at a profit.

Of the many wells drilled in Alberta during the past four years, there are said to be nine in which oil has been found. Two companies have undertaken refining operations on a limited scale, viz.: The Calgary Petroleum Products, Ltd., with wells and refinery situated on Sec. 6, Tp. 20, R. 2, West of the 5th Mer.; and the Southern Alberta Oil Company, Ltd., on Sec. 18 of the same tp. These operations are still in the development stage with wells being deepened to seek a greater supply of oil.

The Calgary Petroleum Products, Ltd., had recovered, to the end of 1916, about 41,000 gallons of crude oil which is of paraffin base and from 52° to 62° Baume gravity. Gasoline and other high grade distillates are obtained by natural distillation under pressure in oil traps. The two wells of this Company have a capacity of about 4,500,000 cubic feet of gas per day. This is a "wet gas" capable of giving up casing head gasoline under treatment. In experimental work from $\frac{1}{2}$ to 1 gallon of gasoline per 1,000 cubic feet has been recovered and preparations are being made for the installation of a commercial plant.

During the twelve months ending March 31, 1917, 45,162 gallons of refined petroleum and naphtha were shipped from these two Alberta refineries, according to inspection returns.

The statistics of production of petroleum during recent years are compiled from the records of the Department of Trade and Commerce as being the most accurate basis available. These figures are secured in connexion with the payment of a bounty of $1\frac{1}{2}$ cents per gallon by the Dominion Government on all crude oil produced from wells, or oil shales, in Canada, the claim for bounties having to be substantiated as to quantity by the certificate of the receiving stations, tank companies, refiners, or other purchasers, as well as by the supervising officers on bounties.

Statistics of production of crude oil from 1881, in barrels of 35 gallons each, with the total value, and average price per barrel, are given in the following table:—

Annual Production of Crude Petroleum.

Year.	Barrels of 35 gallons.	Value.	Average.	Year.	Barrels of 35 gallons.	Value.	Average
1881	368,987	.....	.....	1899	808,570	$1,202,020	$ 1.48⅞
1882	389,573	.....	.....	1900	710,498	1,151,007	1.620
1883	472,866	.....	.....	1901	622,392	1,008,275	1.620
1884	571,000	.....	.....	1902	530,624	951,190	1.792
1885	587,563	.....	.....	1903	486,637	1,048,874	2.155
1886	584,061	$ 525,655	$0.90	1904	503,474	935,895	1.858
1887	713,728	556,708	0.78	1905	634,095	856,028	1.350
1888	695,203	713,695	1.02⅔	1906	569,753	761,760	1.337
1889	704,690	653,600	0.92¾	1907	788,872	1,057,088	1.340
1890	795,030	902,734	1.18	1908	527,987	747,102	1.415
1891	755,298	1,010,211	1.33¾	1909	420,755	559,604	1.330
1892	779,753	984,438	1.26¼	1910	315,895	388,550	1.230
1893	798,406	874,255	1.09½	1911	291,092	357,073	1.225
1894	829,104	835,322	1.00¾	1912	243,336	345,050	1.418
1895	726,138	1,086,738	1.49⅔	1913	228,080	406,439	1.782
1896	726,822	1,155,647	1.59	1914	214,805	343,124	1.597
1897	709,857	1,011,546	1.42½	1915	215,464	300,572	1.395
1898	758,391	1,061,747	1.400	1916	198,123	392,284	1.98

The following table gives statistics of the bounties paid to date by the Dominion Government on production of crude oil in Canada, from wells or oil shales, the bounty being 1½ cents per gallon.

Record of Bounty Paid by Dominion Government on Production of Crude Petroleum.

Calendar Year.	Bounty Paid.	Calendar Year.	Bounty Paid.
1905	$332,900	1911	$152,823
1906	299,120	1912	127,751
1907	414,158	1913	119,742
1908	277,193	1914	112,569
1909	220,897	1915	112,577
1910	165,845	1916	104,014

The production of crude oil in the Province of Ontario, by districts since 1916, is shown in the following tables. The record has been furnished by the Supervisor of Petroleum Bounties at Petrolia and agrees very closely, although not identically, with the statistics of the Department of Trade and Commerce used in compiling the record of production for the whole of Canada.

Production of Crude Petroleum in Ontario, Monthly, by Districts, 1916.

Months.	District of						Totals.
	Lambton.	Bothwell.	Dutton.	Tilbury.	Onondaga.	Belle River.	
	Gals.	Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
January	311,575	97,617	3,804	33,296	.....	.....	446,292
February	360,875	91,274	8,230	18,440	2,084	.....	480,903
March	377,387	93,513	.....	117,934	.....	.....	588,834
April	372,244	79,652	3,630	49,937	.....	.....	505,463
May	490,414	109,934	7,661	21,726	.....	.....	629,735
June	510,693	112,374	14,604	85,959	.....	.....	723,630
July	393,679	90,235	9,244	36,510	5,499	.....	535,167
August	501,404	108,476	8,686	65,623	26,339	.....	710,528
September	390,499	88,027	3,501	38,480	1,024	.....	521,531
October	422,168	88,232	12,554	8,730	17,198	.....	548,882
November	373,561	109,152	7,969	61,762	.....	.....	552,444
December	472,787	116,482	19,931	31,994	4,468	1,610	647,272
Totals 1916	4,977,286	1,184,968	99,814	570,391	56,612	1,610	6,890,681
Totals 1915	5,647,894	1,168,829	189,046	445,957	52,160	1,592	7,505,478
Totals 1914	5,396,513	1,188,635	76,645	648,567	85,310	41,686	7,437,356
Totals 1913	5,451,136	1,202,201	161,342	938,842	146,037	16,237	7,915,795

Production of Crude Petroleum in Ontario by Districts, 1906-1916.

Field.	1906.	1907.	1908.	1909.	1910.
	Bls.	Bls.	Bls.	Bls.	Bls.
Lambton	377,286	304,212	265,368	243,123	205,456
Tilbury and Romney	106,992	411,588	201,286	124,003	63,058
Bothwell	44,827	42,727	39,228	38,092	36,998
Leamington	39,655	6,135	9,334	5,929	141
Dutton	19,376	14,977	13,743	9,513	7,752
Thamesville	175	237	.....	.....	.....
Comber	651	.....	.....	.....	.....
Onondaga (Brant county)	.....	.....	.....	.....	1,005
Total	588,962	779,876	528,959	420,660	314,410

Field.	1911.	1912.	1913.	1914.	1915.	1916.
	Bls.	Bls.	Bls.	Bls.	Bls.	Bls.
Lambton	184,450	150,272	155,747	154,186	161,368	142,208
Tilbury and Romney	48,707	44,727	26,824	18,530	12,742	16,297
Bothwell	35,244	34,486	34,348	33,961	33,395	33,856
Leamington	.....	.....	.....	.....	.....	.....
Dutton	6,732	4,335	4,610	2,190	5,401	2,852
Onondaga (Brant county)	13,501	7,115	4,172	2,437	1,490	1,617
Belle River	.....	.....	464	1,191	46	47
Total	288,634	240,935	226,165	212,495	214,442	196,877

In the above record the District of Thamesville is credited with a small production in the years 1906 and 1907. Subsequent production in this district has been included with that of Bothwell. Recent drilling operations have, in this district, been undertaken by the Vacuum Gas and Oil Company who report that from the end of October to the end of December about 2,250 barrels of oil were shipped.

Inspection of Petroleum.

During 1916, there were nine oil refineries in Canada; one each at Sarnia, Ont., Regina, Sask., and Ioco, B.C., owned by the Imperial Oil Company of Sarnia; one at Petrolia, Ontario, owned by the Canadian Oil Companies, Ltd., Toronto; one at Wallaceburg, owned by the Empire Refining Company; one at Petrolia, owned by the Canadian Oil Producing and Refining Company; one at Toronto, owned by the British American Oil Company, Ltd.; two south of Calgary, Alberta, operated by The Calgary Petroleum Products, Ltd., and the Southern Alberta Oil Co., Ltd.

In addition to the above, new refineries are being built at Dartmouth, N.S., and Montreal, Que., by the Imperial Oil Company, and one near Vancouver by the Shell Company of California. These refineries with the exception of those in Alberta are using large quantities of imported crude oil.

All refined illuminating oils and naphtha manufactured and shipped from Canadian refineries are inspected by the Department of Inland Revenue. The total quantity inspected for the fiscal year ending March 31, 1917, was 76,818,608·29 gallons as compared with 64,014,398·79 gallons during the fiscal year 1916, and 46,382,785·09 gallons during the fiscal year 1915.

The following tables, showing the quantities of refined illuminating oils and naphtha inspected in the several districts, are quoted from the annual report of the Department of Inland Revenue.

Return of Inspected Petroleum and Naphtha Shipped from Refineries During the Fiscal Year Ending March 31, 1916.

Divisions.	Petroleum.	Naphtha.	Total.
	Gals.	Gals.	Gals.
London, Ont.	27,679,747·15	24,569,570·99	52,249,318·14
Toronto, Ont.	2,272,670·00	2,697,022·00	4,969,692·00
Moosejaw, Sask.	1,911,064·50	2,395,926·20	4,306,990·70
Calgary, Alta.	2,447·00	42,715·25	45,162·25
Vancouver, B.C.	3,970,409·70	11,277,035·50	15,247,445·20
Total.	35,836,338·35	40,982,269·94	76,818,608·29

Comparative Statement of Inspected Petroleum and Naphtha Shipped from Canadian Refineries During the Fiscal Years Ending March 31, 1910-1917.

Fiscal Year.	Petroleum.	Naphtha.	Total.
	Gals.	Gals.	Gals.
1910	19,100,424·16	4,113,149·46	*23,213,573·62
1911	21,017,628·45	6,517,655·41	*27,535,283·86
1912	20,886,072·43	5,577,591·62	*26,463,664·05
1913	22,485,437·34	6,880,761·85	*29,366,199·19
1914	22,986,328·66	10,615,688·61	*33,602,017·27
1915	31,117,405·08	15,265,380·01	46,382,785·09
1916	34,775,554·81	29,238,843·98	64,014,398·79
1917	35,836,338·35	40,982,269·94	76,818,608·29

*All from Ontario Refineries.

Exports of Petroleum.

The exports of crude oil from Canada are comparatively small, the available statistics being shown in the next table following. During 1916 the exports as published by the Customs Department included: oil, mineral, coal and kerosene, crude, 137,647 gallons valued at $11,439, and refined, 446,595 gallons valued at $48,137; gasoline and naphtha 54,806 gallons, valued at $14,194. There was also an export of "other oils n.e.s." amounting to 3,391,857 gallons, valued at $1,038,025 which possibly included products of petroleum.

In 1915 the exports included: crude oil 35,977 gallons, valued at $1,789, refined oils 103,488 gallons, valued at $14,107, naphtha and gasoline 16,644 gallons, valued at $4,540, or a total of 156,109 gallons, valued at $20,436. There was also an export of 1,247,376 gallons, valued at $290,943, of "other oils n.e.s.," which probably included products of petroleum.

Exports of Crude and Refined Petroleum.

Calendar Year.	Crude oil.		Refined oil.		Total.	
	Gals.	Value.	Gals.	Value.	Gals.	Value.
1881	.....	.....	.....	.....	501	$ 99
1882	.....	.....	.....	.....	1,119	286
1883	.....	.....	.....	.....	13,283	710
1884	.....	.....	.....	.....	1,098,090	30,168
1885	.....	.....	.....	.....	337,967	10,562
1886	.....	.....	.....	.....	241,716	9,855
1887	.....	.....	.....	.....	473,559	13,831
1888	.....	.....	.....	.....	196,602	74,542
1889	.....	.....	.....	.....	235,855	10,777
1890	.....	.....	.....	.....	420,492	18,154
1891	446,770	$18,471	585	$ 104	447,355	18,575
1892	310,387	12,945	1,146	100	311,533	13,045
1893	107,719	3,696	2,196	394	109,915	4,090
1894	53,985	2,773	5,297	513	59,282	3,286
1895	22,831	1,044	10,237	2,023	33,068	3,067
1896	601	101	7,489	999	8,090	1,100
1897	.....	.....	342	49	342	49
1898	96	4	12,735	3,001	12,831	3,005
1899	.....	.....	3,425	859	3,425	859
1900	40	2	8,559	2,394	8,599	2,396
1901	14,168	691	375	66	14,543	757
1902	400	40	626	146	1,026	186
1903	350	15	1,013	190	1,363	205
1904	4,207	213	2,126	470	6,333	683
1905	35	2	7,228	2,078	7,263	2,080
1906	900	141	8,938	1,401	9,838	1,542
1907	1,125	102	3,132	575	4,257	677
1908	.....	.....	296	71	296	71
1909	.....	.....	7,768	934	7,768	934
1910	.....	.....	2,818	462	2,818	462
1911	.....	.....	24,448	4,500	24,448	4,500
1912	18,500	3,964	62,736	10,408	81,236	14,372
1913	3,650	379	*42,148	7,472	45,798	7,851
1914	3,996	362	*46,945	12,433	50,941	12,795
1915	35,977	1,789	*120,132	18,647	156,109	20,436
1916	137,647	11,439	*501,401	62,331	639,048	73,770

*Includes naphtha and gasoline.

The total value of the imports of petroleum and petroleum products in 1916 was $14,705,323, as against a value of $8,047,781 in 1915.

The total imports of petroleum oils, crude and refined in 1916 were 292,426,121 gallons, valued at $14,604,476. These oil imports included: crude fuel and gas oils 253,093,270 gallons, valued at $8,469,822; coal and kerosene and illuminating oils 8,080,107 gallons, valued at $542,893; lubricating oils 5,466,076 gallons, valued at $973,253; gasoline 18,321,891 gallons, valued at $3,624,931; and other oils, products of petroleum 7,464,777 gallons, valued at $1,003,577.

The total imports of petroleum oils, crude and refined, in 1915 were 236,923,765 gals., valued at $7,979,264. The oil imports included, crude oil 192,588,487 gals., valued at $3,678,021, refined and illuminating oils, 6,792,873 gals., valued at $405,019; gasoline 28,030,972 gals., valued at $2,693,717, lubricating oils 4,547,179 gals., valued at $755,535, and other oils, products of petroleum 4,954,254 gals., valued at $446,972.

The imports of petroleum products in 1916 included 1,281,376 pounds of paraffin and paraffin wax candles, valued at $100,847, as compared with imports in 1915 of 980,662 pounds, valued at $68,517.

Details of imports of petroleum and petroleum products during the calendar years 1915 and 1916 are given in the following table:—

Imports of Petroleum and Petroleum Products During the Calendar Years 1915 and 1916.

Products.	1915.		1916.	
	Gals.	Value.	Gals.	Value.
(*a*) Petroleum crude, fuel and gas oils (0·8235 specific gravity or heavier)	192,548,743	$3,675,253	252,981,211	$8,452,580
(*b*) Crude petroleum, gas oils (other than benzene, naphtha and gasoline)	39,744	2,768	112,059	7,242
(*c*) Coal and kerosene, distilled, purified, or refined	6,658,460	348,444	7,912,419	474,442
(*d*) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon	134,413	56,575	167,688	68,451
(*e*) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon	3,678,253	488,215	4,239,675	597,733
(*f*) Products of petroleum, n.o.p.	4,954,254	446,972	7,464,777	1,003,577
(*g*) Lubricating oils, n.o.p.	868,926	267,320	1,226,401	375,520
(*h*) Gasoline	28,030,972	2,693,717	18,321,891	3,624,931
Total	236,913,765	7,979,264	292,426,121	14,604,476
	Pounds.		Pounds.	
Paraffin wax	756,234	40,965	1,061,112	70,308
Paraffin wax candles	224,428	27,552	220,264	30,539
Total	.....	8,047,781	.....	14,705,323

(*a*) Subdivided on Feb. 16, 1916, into two parts:—

1. Crude petroleum in its natural state, ·7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refineries to be refined in their own factories.

2. Petroleum, (not including crude petroleum imported to be refined, or illuminating or lubricating oils) ·8235 specific gravity or heavier at 60 degrees temperature.

The total annual imports of petroleum and petroleum products are shown in the three tables following. The first table gives imports of petroleum, crude and refined; the second imports of paraffin wax; and the third imports of paraffin wax candles.

Imports of Crude and Refined Petroleum.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
1880	678,641	$131,359	1899	10,394,208	$ 763,303
1881	1,437,475	262,168	1900	9,633,647	864,833
1882	3,007,702	398,031	1901	11,082,822	982,640
1883	3,086,316	358,546	1902	13,220,005	1,107,207
1884	3,160,282	380,082	1903	18,799,312	1,643,371
1885	3,767,441	415,195	1904	24,521,115	2,152,623
1886	3,819,146	421,836	1905	35,296,332	2,151,514
1887	4,290,003	467,003	1906	32,624,410	1,908,177
1888	4,523,056	408,025	1907 (9 mos.)	23,645,861	1,480,261
1889	4,650,274	484,462	1908	40,213,542	2,577,059
1890	5,075,650	515,852	1909	51,700,476	3,219,243
1891	5,071,386	498,330	Calendar Year.		
1892	5,649,145	475,732	1910	84,629,334	4,826,763
1893	6,002,141	446,389	1911	116,892,689	6,009,730
1894	6,597,108	439,988	1912	186,787,484	11,858,533
1895	7,577,674	525,372	1913	222,779,028	13,238,429
1896	8,005,891	735,913	1914	244,487,973	11,072,362
1897	8,415,302	697,169	1915	236,913,765	7,979,264
1898	9,074,311	724,519	1916	292,426,121	14,604,476

Annual Import of Crude Petroleum, Gasoline, Illuminating Oils, Lubricating Oils, Etc.

	Crude Petroleum.		Gasoline.		Coal-kerosene and other Illuminating Oils.	
	Gallons.	Value.	Gallons.	Value.	Gallons.	Value.
1910	53,604,053	$1,639,358	16,679,691	$1,693,296	7,656,727	$ 502,364
1911	71,653,251	2,188,870	23,338,773	1,976,032	13,690,962	722,403
1912	120,082,405	3,996,842	40,904,598	5,347,767	14,748,218	1,012,735
1913	162,061,926	5,250,835	29,525,180	4,822,941	19,393,627	1,394,440
1914	195,207,210	5,750,971	24,396,401	2,747,360	12,833,065	970,481
1915	192,588,487	3,678,021	28,030,972	2,693,717	6,792,873	405,019
1916	253,093,270	8,469,822	18,321,891	3,624,931	8,080,107	542,893
	Lubricating Oils.		Other Oils Products of Petroleum.			
1910	4,081,257	718,381	2,607,606	273,364	.....	.....
1911	5,308,917	806,452	2,900,786	315,973	.....	.....
1912	6,763,800	1,077,712	4,288,463	423,477	.....	.....
1913	6,789,451	1,172,986	5,008,844	597,227	.....	.....
1914	5,767,676	940,143	6,283,621	663,407	.....	.....
1915	4,547,179	755,535	4,954,254	446,972	.....	.....
1916	5,466,076	973,253	7,464,777	1,003,577	.....	.....

Imports of Paraffin Wax.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1883	43,716	$ 5,166	1900	47,400	$ 3,529
1884	39,010	6,079	1901	118,848	9,639
1885	59,967	8,123	1902	225,885	12,750
1886	62,035	7,953	1903	592,642	28,674
1887	61,132	6,796	1904	418,967	18,440
1888	53,862	4,930	1905	81,992	7,795
1889	63,229	5,250	1906	112,612	9,721
1890	239,229	15,844	1907 (9 mos.)	55,021	5,922
1891	753,854	50,275	1908	62,308	8,041
1892	733,873	48,776	1909	129,631	12,795
1893	452,916	38,935	Calendar Year.		
1894	208,099	15,704	1910	1,192,616	58,673
1895	163,817	11,579	1911	1,688,216	75,661
1896	150,287	10,042	1912	1,901,586	85,491
1897	138,703	7,945	1913	1,291,615	72,351
1898	103,570	5,987	1914	1,218,969	57,527
1899	92,242	4,025	1915	756,234	40,965
			1916	1,061,112	70,308

Imports of Paraffin Wax Candles.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	10,445	$ 12,269	1898	60,802	$4,427
1881	7,494	1,683	1899	62,331	5,856
1882	5,818	1,428	1900	27,663	3,671
1883	7,149	1,734	1901	44,562	3,588
1884	8,755	2,229	1902	51,120	5,752
1885	9,247	2,449	1903	83,377	9,025
1886	12,242	2,587	1904	83,471	9,078
1887	21,364	3,611	1905	137,353	15,293
1888	22,054	2,829	1906	148,808	15,804
1889	8,038	1,337	1907 (9 mos.)	38,900	5,088
1890	7,233	1,186	1908	156,934	20,035
1891	10,598	2,116	1909	110,858	14,806
1892	9,259	1,952	Calendar Year.		
1893	8,351	1,735	1910	169,619	21,433
1894	10,818	1,685	1911	271,571	30,763
1895	19,448	2,541	1912	242,420	34,029
1896	25,787	4,072	1913	337,222	37,546
1897	25,114	2,929	1914	375,267	44,874
			1915	224,428	27,552
			1916	220,264	30,539

PHOSPHATE.

The small production of phosphate or apatite, which has been obtained in Canada since 1896, has been produced almost altogether as a by-product in connexion with the mining of mica. Shipments during 1916 totalled 203 tons, valued at $2,514, as compared with 217 tons, valued at $2,502 in 1915, and 954 tons, valued at $7,275 in 1914.

Phosphate is used at Buckingham, Que., in the manufacture of fertilizers, phosphorus, and ferro-phosphorus, and the main supply is now imported from Florida.

For a number of years previous to 1892, there was a considerable production of apatite from the district north of Buckingham, the annual output varying from 20,000 tons to 30,000 tons. The introduction of the cheaply-mined phosphates of the southern States, however, resulted in the collapse of the Canadian industry, though it was claimed at the time of closing down that there was no diminution in the available supply of mineral.

Thin beds of phosphate rock have been found[1] in western Alberta, at Banff in the Rocky mountains, which in character closely resembles the phosphate beds of Montana to the south. Owing to the thinness of the beds, seldom over 12 inches in thickness, and the low grade character of the rock, 20 to 27 per cent phosphoric acid, the Banff deposits do not appear to be considered of present economic importance.

Statistics of production and exports are shown in tables following:—

Annual Production of Phosphate.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
1886.....	20,495	$304,338	$14.85	1901.....	1,033	$6,280	$6.07
1887.....	23,690	319,815	13.50	1902.....	856	4,953	5.79
1888.....	22,485	242,285	10.77	1903.....	1,329	8,214	6.18
1889.....	30,988	316,662	10.21	1904.....	817	4,590	5.62
1890.....	31,753	361,045	11.37	1905.....	1,300	8,425	6.48
1891.....	23,588	241,603	10.24	1906.....	850	6,375	7.50
1892.....	11,932	157,424	13.20	1907.....	824	6,018	7.30
1893.....	8,198	70,942	8.65	1908.....	1,596	14,794	9.26
1894.....	6,861	41,166	6.00	1909.....	998	8,054	8.07
1895.....	1,822	9,565	5.25	1910.....	1,478	12,578	8.51
1896.....	570	3,420	6.00	1911.....	621	5,206	8.38
1897.....	908	3,984	4.39	1912.....	164	1,640	10.00
1898.....	733	3,665	5.00	1913.....	385	3,643	9.46
1899.....	3,000	18,000	6.00	1914.....	954	7,275	7.63
1900.....	1,415	7,105	5.02	1915.....	217	2,502	11.53
				1916.....	203	2,514	12.38

Exports of phosphate in 1916 are reported by the Department of Customs as 103 tons, valued at $1,543, and in 1915 as 179 tons, valued at $1,860.

[1] Discovery of Phosphate of Lime in the Rocky Mountains, by F. D. Adams, and W. J. Dick, Conservation Commission, Ottawa, 1915.
Investigation of a reported discovery of Phosphate in Alberta, by Hugh S. deSchmid, Mines Branch, Department of Mines, Ottawa, 1916.
Transactions Canadian Mining Institute, Vol. XIX, 1916, pages 321-348.

The imports of phosphate rock (fertilizer) during 1916 were valued at $16,182; acid phosphate (not medicinal), 2,751,941 pounds, valued at $146,910; and phosphorus 95,543 pounds, valued at $42,738.

The imports of phosphate rock (fertilizer) for 1915 were valued at $14,148; acid phosphate (not medicinal), 1,964,131 pounds, valued at $105,035, and phosphorus 75,900 pounds, valued at $29,572.

Phosphorus is manufactured at Buckingham by the Electric Reduction Company.

Exports of Phosphate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1878	10,743	$208,109	1892	11,482	$153,765	1906	.....	.....
1879	8,446	122,035	1893	7,738	67,952	1907	.....	.....
1880	13,060	190,086	1894	5,450	40,170	1908	1	$ 30
1881	11,968	218,456	1895	250	2,500	1909	895	15,735
1882	17,153	308,357	1896	300	2,995	1910	.....	.....
1883	19,716	427,668	1897	235	850	1911	3	100
1884	21,709	424,240	1898	723	8,240	1912	.....	.....
1885	28,969	496,293	1899	308	3,575	1913	.....	.....
1886	20,440	343,007	1900	Nil.	Nil.	1914	247	677
1887	23,152	433,217	1901	6	120	1915	179	1,860
1888	18,776	298,609	1902	70	1,380	1916	103	1,543
1889	29,987	394,768	1903	1	20	.....	.....	.....
1890	28,457	499,369	1904	191	5,348	.....	.....	.....
1891	17,271	384,661	1905	40	1,253	.....	.....	.....

Imports of Acid Phosphate and Phosphorus.

Calendar Year.	Phosphate rock (fertilizer)	Acid phosphate.		Phosphorus.	
		Pounds.	Value.	Pounds.	Value.
1910	$72,950	1,379,173	$55,999	6,752	$2,065
1911	46,217	1,334,643	60,882	14,818	4,384
1912	24,586	1,379,173	55,999	13,807	4,012
1913	16,070	1,987,775	89,543	17,600	5,856
1914	20,220	1,874,486	97,862	20,994	6,760
1915	14,148	1,964,131	105,035	75,900	29,572
1916	16,182	2,751,941	146,910	95,543	42,738

PYRITES.

The total shipments of pyrites ores in 1916 were 309,251 tons, valued at $1,084,095, and included 130,639 tons valued at $523,272 from Quebec, 177,552 tons valued at $555,523 from Ontario, and a small tonnage from British Columbia.

The total shipments in 1915 were 286,038 tons, valued at $985,190, and included 142,735 tons, valued at $570,940 from Quebec, and 143,303 tons, valued at $414,250 from Ontario mines.

In the Province of Quebec, shipments were made from the Eustis mine, Eustis; the Weedon mine and the Stratford mine in Stratford township. The pyrites ores of the Eastern Townships of Quebec are cupriferous, the copper content of the shipping ores averaging about 2·75 per cent; they also carry small quantities of gold and silver.

The shipping mines in Ontario were those at Sulphide and Queensboro in Hastings county; the Caldwell property in Lanark county; the Helen and Goudreau properties in Algoma district, and the Northpines mine, Vermillion lake, Kenora district.

In British Columbia shipments were made from the Sullivan mine at Kimberley to Trail, where a sulphuric acid plant has been installed by the Consolidated Mining & Smelting Co. Ltd.

The exports of pyrites from Canada in 1916, as reported by the Customs Department were 156,722 tons, valued at $557,024, as compared with 137,598 tons valued at $527,318 exported in 1915, and 89,999 tons valued at $377,985 exported in 1914. Direct returns from operators, however, appear to indicate larger exports than is shown by this record and it is possible that some of the ore may be exported as "copper ore" and not as pyrites.

The imports of brimstone and crude sulphur during the calendar year 1916, were 73,467 tons valued at $1,186,618, as against 30,182 tons valued at $480,317 in 1915, and 41,954 tons valued at $870,868 in 1914.

Annual Production of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.....	42,906	$193,077	1897.....	38,910	$116,730	1908.....	47,336	$ 224,824
1887.....	38,043	171,194	1898.....	32,218	128,872	1909.....	64,644	222,814
1888.....	63,479	285,656	1899.....	27,687	110,748	1910.....	53,870	187,062
1889.....	72,225	307,292	1900.....	40,031	155,164	1911.....	82,666	365,820
1890.....	49,227	123,067	1901.....	35,261	130,544	1912.....	81,526	314,081
1891.....	67,731	203,193	1902.....	35,616	138,939	1913.....	158,566	521,181
1892.....	59,770	179,310	1903.....	33,982	127,713	1914.....	228,314	744,508
1893.....	58,542	175,626	1904.....	37,180	134,033	1915.....	286,038	985,190
1894.....	40,527	121,581	1905.....	33,339	125,486	1916.....	309,251	1,084,095
1895.....	34,198	102,594	1906.....	42,743	169,990			
1896.....	33,715	101,155	1907.....	46,243	212,491			

Imports: Brimstone* and Crude Sulphur.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	1,775,489	$27,401	1899	24,517,026	$ 265,799
1881	2,118,720	36,956	1900	21,128,656	215,433
1882	2,375,821	40,329	1901	23,856,651	270,608
1883	2,336,085	36,737	1902	24,640,735	325,307
1884	2,195,735	37,463	1903	24,412,737	259,123
1885	2,248,986	35,043	1904	19,364,730	204,663
1886	2,922,043	43,651	1905	23,435,140	242,251
1887	3,103,644	38,750	1906	43,047,672	436,156
1888	2,048,812	25,318	1907 (9 mos.)	25,854,615	277,439
1889	2,427,510	34,006	1908	51,806,739	517,249
1890	4,440,799	44,276	1909	44,049,172	426,569
1891	3,601,748	46,351	Calendar Year.		
1892	4,769,759	67,095	1910	45,669,739	474,619
1893	6,381,203	77,216	1911	43,862,954	446,491
1894	5,845,463	61,558	1912	77,294,039	806,690
1895	4,900,225	56,965	1913	60,865,975	633,114
1896	6,934,190	63,973	1914	83,907,805	870,868
1897	8,672,751	87,719	1915	60,364,184	480,317
1898	38,026,798	373,786	1916	146,934,925	1,186,618

*Brimstone, crude or in roll or flour, or sulphur in roll or flour.

Exports of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1894	8,532	$33,205	1905	19,755	$ 55,767
1895	7,705	38,298	1906	26,050	65,349
1896	15,002	33,837	1907	25,056	80,139
1897	15,096	30,812	1908	17,283	96,600
1898	9,804	26,387	1909	35,798	156,644
1899	15,599	34,084	1910	30,434	110,071
1900	17,620	41,182	1911	32,102	120,585
1901	24,971	57,263	1912	5,938	11,935
1902	18,584	50,178	1913	46,066	211,640
1903	21,067	59,604	1914	89,999	377,985
1904	18,279	49,911	1915	137,598	527,318
			1916	156,722	557,024

The following is a list of companies operating pyrites mines in Canada:—

The Eustis Mining Company, Eustis, Que.

The Weedon Mining Company, Limited, Weedon, Que.

La Mine de Cuivre et Or, Stratford, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont., and 25 Broad St., New York.

The Canadian Sulphur Ore Co., Ltd., Queensboro, Ont.

The Northern Pyrites Company, Northpines, Ont., and 25 Broad St., New York.

Algoma Steel Corporation, Limited, Sault Ste. Marie, Ont.

The Madoc Mining Co., Goudreau, Ont., and 25 Broad St., New York.

T. B. Caldwell, Flower Sta., Ont.

The Rand Consolidated Mines, Ltd., Goudreau, Ont., and 853 Ellicott Sq., Buffalo, N.Y.

The Consolidated Mining & Smelting Co. of Canada, Trail, B.C. (Sullivan property at Kimberley, B.C.).

Sulphuric Acid.

Complete statistics of the production of sulphuric acid in Canada have been collected by this Department in 1917, and a record has been obtained covering the annual production during the years 1912 to 1916 inclusive, with production during the first six months of 1917.

The first collection of statistics of production of sulphuric acid in Canada, undertaken by this Division, was for the years 1887, 1888, and 1889, but for some reason the collection of the record was discontinued. The only other records available were those of the Census office for decennial periods.

Sulphuric acid is manufactured in different grades or strengths, the strength being measured according to the percentage of sulphur trioxide (SO_3) or pure sulphuric acid (H_2SO_4) contained. The scale of measurement generally employed in Canada and the United States is that known as the Baumé Hydrometer scale and the principal grades of acid manufactured are generally referred or reduced to the following standards: 50° Baumé acid, also known as Chamber acid, containing an average of 62·18 per cent of H_2SO_4; 60° Baumé acid containing an average of 77·67 per cent H_2SO_4; 66° Baumé acid or oil of vitriol, containing 93·19 per cent H_2SO_4. Acids stronger than 66° Bé. should have their percentage compositions determined by chemical analyses.[1] These stronger acids appear under various names including pyrosulphuric acid, fuming or Nordhausen acid, Oleum, etc.

Production records have been obtained in terms of the standard grades 50° Bé., 60° Bé., 66° Bé., and stronger acids. The quantities of the first two grades have, however, in the following statistics been reduced to their equivalent in 66° Bé. acid.

The total production of sulphuric acid in Canada during the twelve months ending December 31, 1916, derived from 8 operating plants, was 124,920 short tons of acid of 66° Bé. equivalent including a small quantity of stronger acid, as compared with a production in 1915 of 75,838 tons. During the first six months of 1917 the production in terms of 66° Bé. equivalent was 65,258 tons or at the rate of over 130,000 tons per annum. The requirements of the munitions and steel making industries have greatly increased the consumption of sulphuric acid.

The ores used in the manufacture of sulphuric acid in 1916 included 20,566 tons of imported sulphur or brimstone and 62,681 tons of pyrites, most of which was from Canadian mines. Crediting the pyrites ore with 23,192 tons of sulphur, an average of 37 per cent, we may assume that, of the total production of sulphuric acid, 58,712 tons were derived from imported sulphur and 66,208 tons from pyrites ores.

[1] Sulphuric Acid, Manufacturing Chemists Association of the United States.

Annual Production of Sulphuric Acid in Canada, 1912-1916.

Calendar Year.	Sulphuric acid made, in terms of 66°Bé. acid.[1]	Ores used in the production of acid.	
		Sulphur.	Pyrites.
	Short tons.	Short tons.	Short tons.
1912	44,651	4,773	27,680
1913	47,227	4,281	31,774
1914	41,919	2,227	33,331
1915	75,838	4,716	55,586
1916	124,920	20,566	62,681
1917 (1st six months)	65,258	11,086	31,614

[1]Record includes a small production of Oleum and other grades, the strength of which is not specified. An approximate estimate of production in terms of 50° acid will be obtained by increasing these figures by 50 per cent.

A portion of the Canadian production has been exported and during 1913, 1914, and 1915 the exports considerably exceeded the imports, whereas in 1916 the imports were in excess. The total exports of sulphuric acid in 1916 were 1,576 tons valued at $74,527, as against exports in 1915 of 9,635 tons valued at $243,457. The imports of sulphuric acid during the calendar year 1916 were 2,400 tons valued at $115,173, as compared with imports in 1915 of 141 tons valued at $4,872, and imports in 1914 of 166 tons valued at $7,149.

Annual Exports of Sulphuric Acid.

Calendar Year.	Short tons.	Value.	Average value per ton.
1913	1,247	$15,295	$12.27
1914	3,743	45,612	12.19
1915	9,635	243,457	25.27
1916	1,576	74,527	47.29

Imports of Sulphuric Acid.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1885	774,764	$10,791	1902	420,731	$ 4,626
1886	507,927	7,930	1903	102,314	2,332
1887	678,603	8,468	1904	113,407	2,563
1888	2,494,648	35,415	1905	920,804	8,227
1889	181,652	2,606	1906	822,585	8,558
1890	211,871	2,927	1907	733,151	6,901
1891	177,627	2,466	1908	650,095	7,582
1892	222,628	2,837	1909	241,388	3,298
1893	172,422	2,367	Calendar Year.		
1894	107,520	1,648	1910	2,474,802	21,702
1895	174,605	2,481	1911	1,031,803	9,281
1896	114,137	1,430	1912	4,971,446	35,325
1897	977,446	8,033	1913	145,074	4,054
1898	665,344	5,536	1914	332,274	7,149
1899	165,637	2,427	1915	281,413	4,872
1900	740,858	7,066	1916	4,806,304	115,173
1901	448,608	5,272			

Following is a list of manufacturers of sulphuric acid in Canada:—

Dominion Iron and Steel Co., Ltd., Sydney, C.B.
Consolidated Mining and Smelting Co., Trail, B.C.
Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont.
Grasselli Chemical Co., Ltd., Hamilton, Ont.
Nichols Chemical Co. of Canada, Ltd., Montreal, Que.
Acid plants at: Capelton, Que.
Sulphide, Ont.
Barnet, B.C.
Victoria Chemical Co., Ltd., Victoria, B.C.
British Chemical Co., Trenton, Ont.
Aetna Chemical Co. of Canada, Ltd., Drummondville, Que.

QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel and of copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used for the manufacture of sanitary and enamelled ware.

The total shipments in 1916 are reported as 136,745 tons valued at $251,226, as compared with shipments of 127,108 tons, valued at $205,153 in 1915, and shipments of 54,148 tons, valued at $84,583 in 1914.

There is included with the statistics of quartz a small production of grinding pebbles obtained from near Jackfish, Ontario, on the north shore of Lake Superior, by the Canada Pebble Company, Ltd.

Imports of silex of crystallized quartz in 1916 were 1,677 tons, valued at $18,297 and the imports of flint were 5,348 tons, valued at $71,983.

Imports of silex or crystallized quartz in 1915 were 402 tons, valued at $5,527, and the imports of flint were 4,327 tons, valued at $48,966.

Statistics of the annual production of quartz, so far as these have been obtained, are shown in the next table:—

Annual Production of Quartz.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1890	200	$1,000	1907	56,585	$124,148
1891-2	.....	.....	1908	44,741	52,830
1893	100	500	1909	56,924	71,285
1894-5-6	10	50	1910	88,205	91,951
1897	.....	.....	1911	60,526	83,865
1898	284	570	1912	100,242	195,216
1899	600	1,260	1913	78,261	169,842
1900-1905	.....	.....	1914	54,148	84,583
1906	48,376	65,765	1915	127,108	205,153
			1916	136,745	251,226

Imports of Silex: Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880	5,252	$2,290	1899	3,951	$ 2,595
1881	3,251	1,659	1900	4,021	2,876
1882	3,283	1,678	1901	3,562	2,106
1883	3,543	2,058	1902	4,388	3,858
1884	3,259	1,709	1903	3,514	2,762
1885	3,527	1,443	1904	5,547	4,409
1886	2,520	1,313	1905	8,931	4,475
1887	14,533	5,073	1906	7,465	8,347
1888	4,808	2,385	1907 (9 mos.)	11,964	12,969
1889	5,130	1,211	1908	24,938	19,166
1890	1,768	2,617	1909	6,206	6,909
1891	3,674	1,929	Calendar Year.		
1892	1,429	1,244	1910	12,577	11,996
1893	2,447	1,301	1911	7,877	7,518
1894	2,451	1,521	1912	12,571	10,680
1895	2,882	1,881	1913	13,797	13,811
1896	3,289	2,174	1914	17,407	15,502
1897	2,564	3,415	1915	8,036	5,527
1898	3,104	2,773	1916 (Duty free)	33,540	18,297

Grinding Pebbles.

There has been, as already mentioned, a small annual production of grinding pebbles from near Jackfish, Ontario. These pebbles have been used chiefly in the cement industry.

Another possible source of grinding pebbles has been found in southern Saskatchewan. Mr. N. B. Davis of the Mines Branch who has been investigating the clay resources of this region reports upon the pebble deposits as follows:[1]

"Considerable deposits of rounded quartzite pebbles, suitable for grinding purposes, were found in the southwestern part of the Province."

"The Cypress Hills are capped by a gravel bed varying in thickness up to fifty feet. South of Maple Creek, on the north side of the hills, the slopes are covered with these pebbles, and at the top of the escarpment they are to be found in place. They are particularly well exposed in the road cuttings through the hills near Coulee post office and in the escarpment south of Elkwater lake in Alberta."

"The C.P.R. Weyburn-Stirling line is ballasted for a considerable distance east and west of Gouverneur with quartzite gravel taken from a glacial deposit on 29, 9, 12, 3rd, near that station. This is south of the Cypress Hills and the gravel was probably, in large part, derived from the tops of the hills by glacial ice and streams. This deposit is of particular importance because of its proximity to the railroad."

"The pebbles vary in size from one inch up to six inches in diameter, the greater proportion being about three inches."

"Small sample lots were shipped to two cement plants in Alberta for testing, but to date no information is available. However, there is no doubt of the quality of these pebbles for cement grinding, and for such work they are an important resource to the cement industries of Manitoba, Saskatchewan and Alberta."

[1] Mines Branch, Dept. of Mines, Canada, Summary Report for 1916—p. 122.

SALT.

The production of salt in Canada has been almost altogether obtained from salt fields in southwestern Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of salt in 1916 (including the salt equivalent of brine used in the chemical industries) were 132,903 tons, valued at $717,653, exclusive of packages. The average number of men employed during the year was 262, and the amount of wages paid $219,595. The value of the packages used during the year was $309,603, and stock of salt in manufacturers' hands at the close of the year was reported as 1,970 tons. The 1916 production included table and dairy salt 35,045 tons, valued at $247,456, or an average of $7·06 per ton; common fine 54,596 tons, valued at $262,660, or an average of $4.81 per ton; common coarse 41,259 tons, valued at $200,479, or an average of $4.86 per ton, and land salt 2,003 tons, valued at $7,058, or an average of $3.52 per ton.

The total sales of salt in 1915 were 119,900 tons, valued at $600,226, exclusive of packages. The value of the packages used was returned as $280,747. The average number of men employed during the year was 254, and the amount paid in wages $186,059. Stocks of salt in manufacturers' hands at the close of the year were reported as 3,613 tons.

Detailed statistics of the production during the past six years, showing the total sales of salt, the value of the sales, exclusive of packages, the value of the packages used, stock in manufacturers' hands at the end of the year, number of men employed, wages paid, and the total annual production since 1886, are given in the following tables.

Detailed Statistics of Salt Production 1911-1916.

—	1911.	1912.	1913.	1914.	1915.	1916.
Sales of salt..... Tons.	91,582	95,053	100,791	107,038	119,900	132,903
Value of salt (exclusive of packages)..... $	443,004	459,582	491,280	493,648	600,226	717,653
Value of packages..... $	198,789	224,696	262,479	278,879	280,747	309,603
Stock in manufacturers' hands at end of year.....Tons.	1,422	3,256	4,066	4,519	3,613	1,970
Men employed.....No.	225	231	251	253	254	262
Wages paid..... $	123,040	155,648	178,386	178,277	186,059	219,595

Annual Production of Salt.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886	62,359	$227,195	1901	59,428	$262,328
1887	60,173	166,394	1902	64,456	292,581
1888	59,070	185,460	1903	62,452	297,517
1889	32,832	129,547	1904	69,477	321,778
1890	43,754	198,857	1905	67,340	320,858
1891	45,021	161,179	1906	76,720	329,130
1892	45,486	162,041	1907	72,697	342,315
1893	62,324	195,926	1908	79,975	378,798
1894	57,199	170,687	1909	84,037	415,219
1895	52,376	160,455	1910	84,092	409,624
1896	43,960	169,693	1911	91,582	443,004
1897	51,348	225,730	1912	95,053	459,582
1898	57,142	248,639	1913	100,791	491,280
1899	59,339	254,390	1914	107,038	493,648
1900	62,055	279,458	1915	119,900	600,226
			1916	132,903	717,653

Comparatively small quantities of salt are now exported from Canada, the exports in 1916 being 305,900 pounds, valued at $2,223 as compared with exports of 889,300 pounds, valued at $5,836 in 1915, and exports of 952,700 pounds, valued at $5,229, in 1914.

The imports of salt on the other hand are quite considerable and in total value greatly exceed the domestic production.

During the calendar year 1916 the imports of salt subject to duty included: salt in bulk 34,035 tons, valued at $111,130, and salt in bags, barrels, or other packages 7,679 tons, valued at $59,980. Salt imported from the United Kingdom or any British possession, or imported for the use of sea or gulf fisheries, duty free, was imported to the extent of 109,493 tons, valued at $523,725, giving total imports of 151,207 tons, valued at $694,835.

During the calendar year 1915 the imports of salt subject to duty included: salt in bulk 27,613 tons, valued at $84,449, and salt in bags, barrels or other packages 6,867 tons, valued at $50,997. Salt imported from the United Kingdom or any British possession or imported for the use of sea or gulf fisheries, duty free, was imported to the extent of 103,006 tons, valued at $382,080, giving total imports of 137,486 tons, valued at $517,526.

The total consumption of salt, domestic and imported, was in 1916, approximately 283,958 tons valued at $1,410,265, as compared with a consumption in 1915 of 256,942 tons valued at $1,111,916, and a consumption in 1914 of 249,208 tons, valued at $1,029,300.

The statistics of exports of salt since 1880, are shown in tables following:—

Exports of Salt.

Calendar Year.	Bushels.	Value.	Calendar Year.	Bushels.	Value.
1880	467,641	$46,211	1899	11,205	$2,773
1881	343,208	44,627	1900	37,653	8,997
1882	181,758	18,350	1901	39,224	6,510
1883	199,733	19,492	1902	9,331	3,798
1884	167,029	15,291			
1885	246,794	18,756		Pounds.	
1886	224,943	16,886	1903	1,915,648	5,927
1887	154,045	11,526	1904	1,006,036	4,186
1888	15,251	3,987	1905	1,447,728	6,112
1889	8,557	2,390	1906	618,707	3,437
1890	6,605	1,166	1907	2,222,542	7,709
1891	5,290	1,277	1908	529,229	3,840
1892	2,000	504	1909	276,765	2,488
1893	4,940	1,267	1910	275,200	2,618
1894	4,639	1,120	1911	454,600	5,055
1895	4,865	959	1912	289,150	3,723
1896	3,842	899	1913	460,900	3,047
1897	5,383	1,193	1914	952,700	5,229
1898	5,202	1,252	1915	889,300	5,836
			1916	305,900	2,223

Imports: Salt Paying Duty.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	726,640	$ 3,916	1899	11,781,453	$ 32,839
1881	2,588,465	6,355	1900	11,028,337	30,180
1882	3,679,415	12,318	1901	11,625,688	34,087
1883	12,136,968	36,223	1902	13,892,849	39,605
1884	12,770,950	38,949	1903	14,554,693	41,785
1885	10,397,761	31,726	1904	29,779,183	73,826
1886	12,266,021	39,181	1905	18,473,868	58,056
1887	10,413,258	35,670	1906	21,366,064	59,805
1888	10,509,799	32,136	1907 (9 mos.)	21,834,435	58,553
1889	11,190,088	38,968	1908	31,019,400	79,341
1890	15,135,109	57,549	1909	31,653,900	83,660
1891	15,140,827	59,311	Calendar Year.		
1892	18,648,191	65,963	1910	40,347,500	97,326
1893	21,377,339	79,838	1911	46,351,900	109,793
1894	15,867,825	53,336	1912	60,134,500	133,869
1895	8,498,404	29,881	1913	63,015,000	147,775
1896	7,665,257	24,550	1914	67,786,600	151,108
1897	11,911,766	33,470	1915	68,961,200	135,446
1898	11,068,785	32,792	1916	83,429,100	171,110

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Salt, fine, in bulk, n.e.s. (a)	55,226,400	$ 84,449	68,070,200	$ 111,130
Salt, n.e.s., in bags, barrels or other packages (b)	13,734,800	50,997	15,358,900	59,980
Total	68,961,200	135,446	83,429,100	171,110

(a) Duty 5c per 100 lbs. (b) Duty 7½c per 100 lbs.

Imports: Salt Not Paying Duty.*

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	212,714,747	$400,167	1899	183,046,365	$267,520
1881	231,640,610	488,278	1900	193,554,550	295,253
1882	166,183,962	311,489	1901	216,271,603	339,387
1883	246,747,113	386,144	1902	238,648,737	385,629
1884	225,390,121	321,243	1903	232,708,675	361,185
1885	171,571,209	255,719	1904	198,634,047	338,082
1886	180,205,949	255,359	1905	196,907,500	340,954
1887	203,042,332	285,455	1906	203,080,000	352,214
1888	184,166,986	220,975	1907 (9 mos.)	139,459,900	240,841
1889	180,847,800	253,009	1908	200,944,800	350,878
1890	158,490,075	252,291	1909	232,237,700	376,961
1891	195,491,410	321,239	Calendar Year.		
1892	201,831,217	314,995	1910	217,587,000	364,735
1893	191,595,530	281,462	1911	202,347,100	326,325
1894	196,668,730	328,300	1912	219,278,900	352,081
1895	201,691,248	332,711	1913	225,877,200	417,508
1896	205,005,100	338,888	1914	217,505,500	389,773
1897	215,844,484	312,117	1915	206,011,600	382,080
1898	202,634,927	293,410	1916	218,986,700	523,725

*Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

Consumption of Salt in Canada in 1915 and 1916.

	1915.		1916.	
	Pounds.	Value.	Pounds.	Value.
Canadian salt production	239,800,000	$ 600,226	265,806,000	$ 717,653
Less exports	889,300	5,836	305,900	2,223
	238,910,700	594,390	265,500,100	715,430
Imports of salt paying duty	68,961,200	135,446	83,429,100	171,110
Imports of salt free of duty	206,011,600	382,080	218,986,700	523,725
Total	513,883,500	1,111,916	567,915,900	1,410,265

In 1911 the Canadian Salt Company, at their Sandwich plant, commenced the manufacture of caustic soda by the electrolytic method, the liberated chlorine being utilized for the manufacture of bleaching powder.

The annual imports of caustic soda and chloride of lime since 1910 are shown in the accompanying table.

Imports of Caustic Soda and Chloride of Lime.

	Caustic Soda.		Chloride of Lime.	
	Pounds.	Value.	Pounds.	Value.
1910	13,974,444	$267,338	10,386,519	$116,923
1911	13,812,053	259,982	11,725,167	118,501
1912	14,544,545	278,579	12,183,765	113,346
1913	15,983,298	291,008	12,761,153	115,614
1914	18,436,827	314,278	15,147,645	138,619
1915	7,737,149	184,468	12,015,999	112,142
1916	12,502,758	508,860	7,892,923	158,546

The following is a list of operators:—

Operator.	Address.	Location.	No. of Wells.	Depth. (Ft.)
†New Brunswick Salt Works...	Plumweseep, N. B.	Plumweseep.....	1	370
The Canadian Salt Co., Ltd...	Windsor, Ont.....	Windsor.....	6	1,200 to 1,700
		Sandwich.....	2	1,200 to 1,700
The Western Salt Co., Ltd....	Courtright, Ont.....	Courtright.....	1	1,800
		*Mooretown.....	1	1,700
North American Chemical Co., Ltd.	Toronto, 364 Richmond W.	Clinton.....	1	1,200
		Goderich.....	1	1,200
*Jas. H. Kittermaster.....	Sarnia, 191 Front N.....	*Mooretown.....	1	.....
The Dominion Salt Co., Ltd..	„	Sarnia.....	4	1,700 to 2,100
*The Sarnia Salt Co., Ltd.....	Windsor, 34 Elliott.....	„	1	1,750
The Elarton Salt Works Co., Ltd.	Hyde Park Corner, Ont.	Warwick (III 6).....	1	1,397
Exeter Salt Works Co., Ltd...	Exeter, Ont.....	Exeter.....	1	1,225
*Hensall Salt Works..... (George MacEwan Estate)	Goderich, Ont.....	Hensall.....	1	1,200
Western Canada Flour Mills Co., Ltd.	„ Ont.....	Goderich.....	1	1,100
*Goderich Salt Works (P. MacEwan Estate.)	„	„	2	1,050 to 1,175
Ontario Peoples Salt & Soda Mfg. Co., Ltd.	Kincardine, Ont.....	Kincardine.....	1	935
Wingham Salt Works.....	Wingham, Ont.....	Wingham.....	1	1,135
*Prairie Lime & Salt Co., Ltd..	Edmonton, Alta.....	Mafeking, Man.....	.....	.....
*B. C. Salt Works, Ltd.....	Prince Rupert, B.C.....	Kwinitsa.....	1	300

*Not in operation.
†Development work suspended.

TALC.

The production of talc in the Province of Ontario, was supplemented in 1916 by a small shipment from a British Columbia deposit northeast of Vancouver.

The total shipments by mine operators during the year were 13,104 tons, valued at $49,423, as compared with shipments in 1915 of 11,885 tons, valued at $40,554, and 10,808 tons, valued at $40,418 in 1914.

The operators were:—

Messrs. Cross & Wellington, Madoc, operating the Henderson mine on lot 14, concession XIV, Huntingdon township, Hastings Co., Ont.

Anglo-American Talc Corporation, Ltd., Madoc, operating the Connolly mine on W. half of lot 15, concession XIV, Huntingdon township, Hastings Co., Ont.

Eldorite Limited, Eldorado, operating a mine and small mill near Eldorado, N.W. lot 20, concession V, Madoc township, Hastings Co., Ont.

W. J. Dickinson, operating a deposit at D'Arcy Station on the Pacific Great Eastern Railway, 60 miles from Squamish, B.C.

The Henderson mine has been operated for some years, the greater part of the output being sold to Geo. H. Gillespie & Co., who operate a grinding mill at Madoc, the balance being exported to the United States.

In 1916, 1,755 tons were shipped crude to the United States, the balance being sent to Canadian grinding mills. In 1915, 1,720 tons, in 1914, 1,269 tons, and in 1913, 2,750 tons were shipped crude to the United States. The crude talc is valued at from $2.50 to $3.00 per ton at the mine, and the ground or refined talc during 1916 at an average of about $14.00 per ton.

Imports of talc are not now separately recorded by the Customs Department, but the imports in 1915 were 154 tons, valued at $1,866, as against imports in 1914 of 584 tons, valued at $8,983 and imports in 1913 of 402 tons, valued at $10,706.

Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value
1886	50	$ 400	1901	259	$ 842
1887	100	800	1902	689	1,804
1888	140	280	1903	990	2,739
1889	195	1,170	1904	840	1,875
1890	917	1,239	1905	500	1,800
1891	Nil.	Nil.	1906	1,234	3,030
1892	1,374	6,240	1907	1,534	4,602
1893	717	1,920	1908	1,016	3,048
1894	916	1,640	1909	4,350	10,300
1895	475	2,138	1910	7,112	22,308
1896	410	1,230	1911	7,300	22,100
1897	157	350	1912	8,270	23,132
1898	405	1,000	1913	12,250	45,980
1899	450	1,960	1914	10,808	40,418
1900	1,420	6,365	1915	11,885	40,554
			1916	13,104	49,423

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

INTRODUCTORY.

The subjects included under this heading comprise, in the order treated: cement, clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc., lime, sand-lime brick, sand and gravel, slate, and stone for building and other purposes, including granite, marble, limestone, sandstone, etc. Previous to 1912 no attempt was made to collect a record of the production of sands and gravels in Canada, and the only statistics available were those of exports and imports. In 1912, however, a beginning was made in the collection of these statistics; but owing to the incompleteness of the available lists of producers and the failure of many to answer correspondence, only a very partial record was obtained. In 1913 the scope of the collection was extended to cover sands and gravels used by railways for ballasting, etc. The statistics of stone production do not include the stone used in making cement or lime, but are as complete as possible for all other established stone quarries; nevertheless there is undoubtedly a large production of stone for foundation work, road-making, and railway construction, of which no record is available.

The total value of the production of structural products in 1916 was $17,467,186, as compared with $17,920,759 in 1915, and $26,009,227 in 1914, the decrease in 1916 being $453,573, or 2·5 per cent, as compared with the previous year.

The total value of the imports of the same class of products in 1916 was $5,562,220, as against $3,912,946 in 1915, and $6,528,838 in 1914.

The total exports were valued at $681,239 in 1916, as against $519,676 in 1915, and $941,661 in 1914.

The apparent total consumption of these structural products based upon the record of production, imports and exports, was in 1916 valued at $22,348,167, as compared with $21,314,029 in 1915; and $31,596,404 in 1914, the increase in consumption in 1916 being $1,034,138, or 4·9 per cent, while compared with $39,916,642 in 1913—the year of maximum consumption—the falling off was $17,568,475 or about 44 per cent.

A summary of the production, imports, exports, and consumption of structural materials and clay products in 1916 and in 1915, and the annual production from 1910 to 1914 are shown in tables herewith:—

Structural Materials, Calendar Year 1916.

	Production.	Imports.	Exports.	Consumption.
Cement, portland	$6,547,728	$ 43,747	$ 2,424	$6,589·051
Clay products	4,120,805	4,554,167	80,112	8,594,860
Lime	1,091,463	96,332	66,406	1,121,389
Sand-lime brick	126,235	.....	.....	126,235
Sand and gravel	1,838,320	183,894	388,309	1,633,905
Slate	6,223	96,776	.....	102,999
Stone	3,736,412	587,304	143,988	4,179,728
	17,467,186	5,562,220	681,239	22,348,167

Structural Materials, Calendar Year 1915.

	Production.	Imports.	Exports.	Consumption.
Cement, portland	$6,977,024	$ 47,836	$ 5,161	$ 7,019,699
Clay products	3,914,488	2,998,465	45,572	6,867,381
Lime	1,015,702	98,040	15,617	1,098,125
Sand-lime brick	141,742	.....	.....	141,742
Sand and gravel	1,624,767	120,756	380,549	1,364,974
Slate	2,039	108,676	.....	110,715
Stone	4,244,997	539,173	72,777	4,711,393
	17,920,759	3,912,946	519,676	21,314,029

Production of Structural Materials, 1910-1914.

	1910.	1911.	1912.	1913.	1914.
Cement	$ 6,412,215	$ 7,644,537	$ 9,016,556	$ 11,019,418	$ 9,187,924
Clay products	7,629,956	8,359,933	10,575,869	9,504,314	6,871,957
Lime	1,137,079	1,517,599	1,844,849	1,609,398	1,360,628
Sand-lime brick	371,857	442,427	1,020,386	906,665	609,515
Sand and gravel	(a) 407,974	(a) 408,110	1,512,099	2,258,874	2,505,310
Slate	18,492	8,248	8,939	6,444	4,837
Stone	3,650,019	4,328,757	4,726,171	5,504,639	5,469,056
Total	19,627,592	22,709,611	28,794,869	30,809,752	26,009,227

(a) Exports only.

The statistical situation with respect to the production of cement, clay and stone quarry products is closely reflected in the following annual records of building operations covering the same period. These figures as published in the "Labour Gazette" show a gradual increase in value of building permits reaching maximum in 1912, and since then showing rapid decreases until 1916 when a slight increase occurred. This same authority in its issue of March 1916 clearly indicated the strong demand for structural material during the five years immediately preceding 1913, more noticeable throughout the west. This section was also the first to feel the setback.

For the year 1916, the total value of building permits in selected localities was $39,740,692, as compared with $33,566,749 in the previous year showing an increase of $6,173,943, or 18·4 per cent. Of the totals, eastern Canada contributed $32,160,844 or 81 per cent in 1916, and $28,748,103

or about 86 per cent in 1915. The figures for eastern Canada in 1916 also show a decrease of over 63 per cent as compared with 1913, while a decrease of over 93 per cent is shown in western Canada when compared with 1912.

Building Permits Issued in Canada, 1915 and 1916.*

	1915.	1916.	Increase (+) or Decrease (−)	
				%
Nova Scotia (2)	$ 1,262,087	$ 1,348,534	$ + 86,447	6·8
New Brunswick (2)	864,339	675,980	− 188,359	21·8
Quebec (6)	12,267,849	9,891,630	−2,376,219	19·3
Ontario (15)	14,353,828	20,244,700	+5,890,872	41·0
Total East (25)	28,748,103	32,160,844	+3,412,741	11·9
Manitoba (2)	1,862,455	2,752,173	+ 889,718	47·7
Saskatchewan (3)	574,987	687,170	+ 112,183	19·6
Alberta (2)	460,375	895,040	+ 434,665	94·4
B. Columbia (3)	1,920,829	3,245,465	+1,324,636	68·9
Total West (10)	4,818,646	7,579,848	+2,761,202	57·3
Total 35 cities	33,566,749	39,740,692	+6,173,943	18·4

*"Labour Gazette," February, 1917.

Building Permits Issued in Canada, 1910-1914.

	1910.	1911.	1912.	1913.	1914.
Nova Scotia (2)	$ 831,594	$ 1,005,287	$ 1,209,781	$ 1,158,954	$ 990,293
New Brunswick (2)	637,390	655,655	689,795	2,822,780	852,655
Quebec (6)	21,378,827	20,998,391	26,688,493	34,893,249	24,527,591
Ontario (15)	33,964,103	39,824,589	50,024,770	49,486,583	38,558,430
Manitoba (2)	16,340,835	19,255,429	21,761,954	19,231,259	13,240,385
Saskatchewan (3)	6,350,749	12,534,901	20,947,160	13,070,665	2,783,235
Alberta (2)	7,750,950	16,579,898	34,840,639	17,862,103	8,938,627
B. Columbia (3)	15,523,410	22,862,605	29,090,352	17,962,307	6,889,765
Total 35 cities	102,777,858	133,716,766	185,252,934	154,487,900	96,780,981

CEMENT.

The total quantity of cement made in 1916, according to returns received from the manufacturers, was 4,753,033 barrels of 350 pounds net each (831,781 tons), as compared with 5,153,763 barrels (901,909 tons), made in 1915, a decrease of 400,730 barrels (70,128 tons), or nearly 7·8 per cent.

The total quantity of Canadian portland cement sold in 1916 was 5,369,560 barrels (939,671 tons), as compared with 5,681,032 barrels (994,181 tons), made in 1915, a decrease of 311,472 barrels (54,508 tons), or 5·5 per cent.

The total consumption of cement in 1916, including Canadian and imported cement was 5,390,156 barrels, of 350 pounds each (943,252 tons), as compared with 5,709,222 barrels (999,114 tons), in 1915, a decrease of 319,066 barrels (55,837 tons), or 5·6 per cent.

The production of cement in Canada during the past few years, though all classed as portland, has included an output of puzzolan cement, made from blast furnace slag at Sydney, N.S., and a small production of "natural portland," made at Babcock, Manitoba. The slag cement plant at Sydney has, however, been idle during the past two years.

The average number of men employed in Canadian cement plants during 1916 was 1,695, and the total wages paid $1,307,224. In 1915 the average number of men employed was 1,686, and wages paid $1,184,459.

Statistics of the total annual sales of natural rock and portland cement since 1887, are shown in the following table:—

Annual Production* of Cement.

Calendar Year.	Natural rock cement.			Portland cement.			Total.	
	Barrels.	Value.	Average value.	Barrels.	Value.	Average value.	Barrels.	Value.
1887	.....	.....	.....	.....	.....	.....	69,843	$ 81,909
1888	.....	.....	.....	.....	.....	.....	50,668	35,593
1889	90,474	$ 69,790	$0.77	Nil.	Nil.	.....	90,474	69,790
1890	87,521	74,822	0·85	14,695	$ 17,583	$1.20	102,216	92,405
1891	90,846	103,479	1·14	2,633	5,082	1·93	93,479	108,561
1892	88,187	94,912	1·08	29,221	52,751	1·81	117,408	147,663
1893	126,673	130,167	1·03	31,924	63,848	2·00	158,597	194,015
1894	72,965	74,842	1·03	35,177	69,795	1·98	108,142	144,637
1895	66,219	60,795	0·92	62,075	112,880	1·82	128,294	173,675
1896	70,705	60,500	0·86	78,385	141,151	1.80	149,090	201,651
1897	85,450	65,893	0·77	119,763	209,380	1.75	205,213	275,273
1898	87,125	73,412	0.84	163,084	324,168	1.99	250,209	397,580
1899	147,387	119,308	0·81	255,366	513,983	2·01	396,753	633,291
1900	125,428	99,994	0.80	292,124	562,916	1.93	417,552	662,910
1901	133,328	94,415	0.71	317,066	565,615	1.78	450,394	660,030
1902	127,931	98,932	0·77	594,594	1,028,618	1.73	722,525	1,127,550
1903	92,252	74,665	0.81	627,741	1,150,592	1.83	719,993	1,225,247
1904	56,814	50,247	0.88	910,358	1,287,992	1.41	967,172	1,338,239
1905	14,184	10,274	0.72	1,346,548	1,913,740	1.42	1,360,732	1,924,014
1906	8,610	6,052	0.70	2,119,764	3,164,807	1.49	2,128,374	3,170,859
1907	5,775	4,043	0·70	2,436,903	3,777,328	1.55	2,441,868	3,781,371
1908	1,044	815	0.78	2,665,289	3,709,139	1.39	2,666,333	3,709,954
1909	0	0	.....	4,067,709	5,345,802	1.31	4,067,709	5,345,802
1910	0	0	.....	4,753,975	6,412,215	1.35	4,753,975	6,412,215
1911	0	0	.....	5,692,915	7,644,537	1.34	5,692,915	7,644,537
1912	0	0	.....	7,132,732	9,106,556	1.28	7,132,732	9,106,556
1913	0	0	.....	8,658,805	11,019,418	1.27	8,658,805	11,019,418
1914	0	0	.....	7,172,480	9,187,924	1.28	7,172,480	9,187,924
1915	0	0	.....	5,681,032	6,977,024	1.23	5,681,032	6,977,024
1916	.....	.....	.....	5,369,560	6,547,728	1.22	5,369,560	6,547,728

*Quantities sold or used.

The production of cement in 1916 was derived from 15 plants. Fourteen other plants were idle throughout the year, one of these making shipments from stocks. The total daily capacity of the 29 completed plants is 53,415 barrels, as shown in the following table:—

Daily Capacity of Completed Plants, 1916.

	Active.		Idle.		Total.	
	No.	Capacity	No.	Capacity	No.	Capacity
Nova Scotia	.....	.....	1	140	1	140
Quebec	2	14,800	1	1,800	3	16,600
Ontario	7	10,950	9	8,900	16	19,850
Manitoba	2	3,725	.....	.....	2	3,725
Alberta	2	4,000	2	3,500	4	7,500
B. Columbia	2	5,000	1	600	3	5,600
	15	38,475	14	14,940	29	53,415

The completed plants are distributed as follows: one in Nova Scotia, using blast furnace slag; three in Quebec, using limestone and clay; sixteen in Ontario, of which ten use marl, and six, limestone; two rock plants in Manitoba, one of which makes a "natural portland;" four in Alberta including one marl plant at Marlboro, and three limestone plants. During the year the plant at Marlboro was remodelled to use limestone, but was not expected to be in operation until 1917. In British Columbia there are three rock plants.

A comparison of the principal statistics of 1916 and 1915 showing the increase or decrease, as the case may be, is given in the next table.

In 1916 the sales exceeded the output, and quantity held in stock at the end of the year showed a decrease of 618,086 barrels, as compared with 1915. The average price per barrel at the mills for all plants, with the exception of those in Manitoba, has been steadily falling, being $1.22 in 1916, as against $1.23 in 1915; $1.28 in 1914; $1.27 in 1913; $1.27¾ in 1912; and $1.34 in 1911. The average price at the mills in the several provinces was: Quebec, $1.17 in 1916; and $1.18 in 1915; Ontario, $1.04 in 1916, and $1.08 in 1915; Manitoba, $1.86 in 1916, and $1.84 in 1915; Alberta, $1.73 in 1916, and $1.78 in 1915; British Columbia, $1.53 in 1916, and $1.70 in 1915.

The imports of cement in 1916 showed a decrease in quantity of about 27 per cent. from the imports in 1915, while the average price fluctuated from $1.61 in 1913 to $1.50 in 1914; $1.43 in 1915, and $1.54 in 1916.

Comparison of Production, Sales, and Imports of Portland Cement in 1915 and 1916.

	1915.	1916.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.....Bls.	5,681,032	5,369,560	....	....	311,472	5·5
Cement manufactured..... „	5,153,763	4,753,033	....	....	400,730	7·8
Stock on hand Jan. 1..... „	2,620,022	2,072,266	....	....	547,756	20·9
Stock on hand Dec. 31..... „	2,062,961	1,444,875	....	....	618,086	29·9
Value of cement sold or used.... $	6,977,024	6,547,728	....	....	429,296	6·2
Average price per barrel..... „	1·23	1·22	....	....	0·01	0·8
Wages paid..... „	1,184,459	1,307,224	122,765	10·4	....	....
Men employed.....No.	1,686	1,695	9	0·5	....	....
Imports of portland cement.....Bls.	28,190	20,596	....	....	7,594	26·9
Value of cement..... $	40,426	31,621	....	....	8,805	21·8
Average price per barrel..... „	1·43	1·54	0·11	7·7	.....	....
Total consumption of cement in Canada.....Bls	5,709,222	5,390,156	....	....	319,066	5·6

Of the total cement made in 1916, 164,436 barrels were made from marl and 4,588,597 barrels from limestone, whereas in 1915 the quantity made from marl was 429,268 barrels, and 4,724,495 barrels from limestone. In 1914, 641,869 barrels were made from marl and 8,085,400 barrels from limestone and slag. Practically all of the newer plants erected during the past few years are limestone plants.

The proportion of cement made from marl and limestone since 1911 is shown in the following table:—

Year.	Cement from Marl.		Cement from Limestone.	
	Quantity.	%	Quantity.	%
1911	1,626,857	28·0	4,050,682*	72·0
1912	1,420,155	20·0	5,720,849*	80·0
1913	1,491,131	16·8	7,395,202*	83·2
1914	641,869	7·3	8,085,400*	92·7
1915	429,268	8·3	4,724,495	91·7
1916	164,436	3·4	4,588,597	96·6

*Includes slag cement.

Statistics of the annual production of portland cement since 1897, showing the quantity made, quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

Annual Production of Portland Cement.

(BARRELS.)

Year.	Number of operating plants.	Quantity made.	Quantity sold.	On hand Dec. 31.	Value of sales.	Average per barrel.	Daily capacity operating plants.
1897	.....	.....	119,763	.....	$ 209,380	$1.75	.....
1898	.....	.....	163,084	.....	324,168	1.99	.....
1899	.....	.....	225,366	.....	513,983	2·01	.....
1900	.....	.....	292,124	.....	562,916	1·91	.....
1901	4	360,160	317,066	58,094	565,615	1·78	.....
1902	8	562,335	594,594	33,446	1,028,618	1·73	3,900
1903	9	714,136	627,741	128,386	1,150,592	1·83	4,850
1904	10	908,990	910,358	112,051	1,287,992	1·41	.....
1905	13	1,541,568	1,346,548	306,466	1,913,740	1.42	8,000
1906	15	2,152,562	2,119,764	302,356	3,164,807	1.49	10,500
1907	17	2,491,513	2,436,093	354,435	3,777,328	1·55	14,400
1908	23	3,495,961	2,665,289	1,214,021	3,709,139	1.39	27,500
1909	22	4,146,708	4,067,709	1,777,238	5,345,802	1.31	23,050
1910	22	4,396,282	4,753,975	832,038	6,412,215	1·35	25,835
1911	24	5,677,539	5,692,915	903,589	7,644,537	1.34	28,810
1912	24	7,141,004	7,132,732	903,094	9,106,556	1.28	36,515
1913	27	8,886,333	8,658,805	1,089,595	11,019,418	1.27	50,540
1914	24	8,727,269	7,172,480	2,628,117	9,187,924	1.28	48,815
1915	17	5,153,763	5,681,032	2,062,961	6,977,024	1.23	41,850
1916	15	4,753,033	5,369,560	1,444,875	6,547,728	1.22	38,475

Imports and Exports.—The quantity of cement exported is not recorded but the value in 1916 is reported as $2,424, as against a value of exports in 1915 of $5,161, and $2,223 in 1914.

The imports of cement previous to 1901 were larger than the Canadian production, but gave way steadily to the increasing domestic output until 1909, during which year the imports amounted to 142,194 barrels, or about 3 per cent of the Canadian consumption. From 1910 to 1912 inclusive, there was a steady increase in the importation of cement, the imports in 1912 being 1,434,413 barrels. During four and one-half months of 1912 the duty was, on account of the scarcity in western Canada, reduced by one-half, and on May 31, 1913, a permanent reduction was made in the general tariff from 12½ cents to 10 cents per hundred pounds. The imports, however, have fallen to 254,093 barrels in 1913, 98,022 barrels in 1914, 28,190 barrels in 1915, and 20,596 barrels in 1916.

The United States has been the principal source of imports during the past few years supplying all imports in 1916 and over 96 per cent of the 1915 imports. During the latter year about 4 per cent was derived from Great Britain. In 1914 about 71 per cent and in 1913, 68 per cent of the imports were from the United States.

The imports of cement during 1915 and 1916 by countries are shown in the next table:—

Imports of Cement 1915 and 1916.

	1915.				1916.			
	Cwt.	Per cent.	Value.	Average value.	Cwt.	Per cent.	Value.	Average value.
Great Britain	3,726	3·8	$ 1,480	$0·40	4	....	$ 5	$1.25
United States	94,938	96·2	38,946	0.41	72·083	100·0	31·616	0.44
Total	98,664	100·0	40,426	0.41	72·087	100·0	31.621	0.44
Equivalent in barrels of 350 lbs	28,190	.....	.....	.....	20,596	.....	.....	.....

A permanent revision of the cement duties was made in the early part of 1913, and from May 13, 1913, the cement duties have been as follows:—

	British Preferential tariff.	Intermediate tariff.	General tariff.
Cement, portland, and hydraulic or water lime, in barrels, bags, or casks, the weight of the package to be included in the weight for duty per hundred pounds	7 cents.....	10 cents.....	10 cents.
Bags in which cement or lime mentioned in the next preceding item is imported	15 per cent....	20 per cent....	20 per cent.

This is equivalent to a duty under the general and intermediate tariffs of 35 cents per barrel on cement, and 8 cents on the bags, or a total of 43 cents per barrel.

Statistics of the exports of cement since 1891, and of imports since 1880, are given in the next two tables:—

Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1891	$2,881	1900	$ 3,296	1909	$113,362
1892	938	1901	1,514	1910	12,914
1893	1,172	1902	2,267	1911	4,067
1894	482	1903	2,851	1912	2,436
1895	937	1904	5,494	1913	1,736
1896	1,328	1905	3,143	1914	2,223
1897	644	1906	7,551	1915	5,161
1898	2,117	1907	9,618	1916	2,424
1899	2,733	1908	34,591		

Imports of Cement.

Fiscal Year.	Cement and Mfrs. of N.E.S.*	Hydraulic cement.†			Portland cement.		
		Quantity.	Value.	Average value.	Quantity.	Value.	Average value.
		Barrels.			Barrels.		
1880	$ 28	10,034	$10,306	$1.03	.....	$ 55,774	.....
1881	298	7,812	7,821	1.00	.....	45,646	.....
1882	86	11,945	13,410	1.12	.....	66,579	.....
1883	548	11,659	13,755	1.18	.....	102,537	.....
1884	1,236	8,606	9,514	1.11	.....	102,857	.....
1885	1,315	5,613	5,396	0.96	.....	111,521	.....
1886	1,851	6,164	6,028	0·98	.....	120,398	.....
1887	1,419	6,160	8,784	1.43	102,750	148,054	$1.44
1888	5,787	5,636	7,522	1.33	122,402	177,158	1.45
1889	10,668	5,835	7,467	1.28	122,273	179,406	1.47
1890	5,443	5,440	9,048	1.66	192,322	313,572	1.63
1891	2,890	3,515	6,152	1.75	183,728	304,648	1.66
1892	3,394	2,214	2,782	1.26	187,233	281,553	1.50
1893	2,909	4,896	8,060	1.65	229,492	316,179	1.38
1894	2,618	1,054	985	0.93	224,150	280,841	1.25
1895	2,112	5,333	7,001	1.31	196,281	242,813	1.24
1896	3,672	5,688	8,948	1.57	204,407	242,409	1.19
1897	4,318	2,494	3,937	1.58	210,871	252,587	1.20
		Cwt.			Cwt.		
1898	3,263	16,033	7,097	0.44	1,073,058	355,264	0.33
1899	8,929	1,678	694	0.41	1,300,424	467,994	0.36
1900	10,452	10,418	4,711	0.45	1,301,361	498,607	0.38
1901	4,890	17,784	6,865	0.39	1,612,432	654,595	0.41
1902	12,234	29,585	17,755	0.60	1,971,616	833,657	0·42
1903	16,281	13,690	6,333	0.46	2,316,853	868,131	0.37
1904	14,305	12,088	5,391	0.45	2,476,388	995,017	0.40
1905	18,489	16,961	10,690	0.63	4,228,394	1,234,649	0.29
1906	27,858	10,794	4,034	0.37	2,848,582	963,839	0.34
Calendar Year.							
1907	13,748	16,788	6,339	0.38	2,354,204	837,520	0.36
1908	5,843	2,752	921	0.33	1,641,672	531,045	0.32
1909	6,374	682	614	0.90	497,678	166,669	0.33
1910	7,718	365	349	0.96	1,222,586	468,046	0.38
1911	7,430	26,655	6,107	0.23	2,316,707	834,879	0.36
1912	9,698	†	.....	.....	5,020,446	1,969,529	0.39
1913	17,729	†	.....	.....	889,324	409,303	0.46
1914	12,533	†	.....	.....	343,076	147,158	0.43
1915	7,410	†	.....	.....	98,664	40,426	0.41
1916	12,126	†	.....	.....	72,087	31,621	0.44

* Cement not elsewhere specified and manufactures of cement.
† From 1912 included in portland cement.

Consumption of Cement.—The consumption of cement is represented practically by the domestic production, together with the imports, the exports being so comparatively small as to be negligible. The total consumption of cement in Canada in 1916 was 5,390,156 barrels (943,277 tons), made up of 5,369,560 barrels (939,673 tons), of Canadian cement, and 20,596 barrels (3,604 tons) of imported cement, the Canadian cement representing 99·6 per cent, and the imported cement 0·4 per cent of the total.

In 1915 the total consumption of cement was 5,709,222 barrels (999,114 tons), made up of 5,681,032 barrels (994,181 tons), of Canadian cement and 28,190 barrels (4,933 tons) of imported cement, the Canadian cement representing 99·5 per cent, and the imported cement, 0·5 per cent of the total.

In 1914 the total consumption of cement was 7,270,502 barrels (1,272,-338 tons), made up of 7,172,480 barrels (1,255,184 tons) of Canadian cement, and 98,022 barrels (17,154 tons) of imported cement, the Canadian cement representing 98·7 per cent, and the imported cement 1·3 per cent of the total.

Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	Per cent.	Barrels.	Per cent.	Barrels.
1901	317,066	36	555,900	64	872,966
1902	594,594	52	544,954	48	1,139,548
1903	627,741	45	773,678	55	1,401,419
1904	910,358	54	784,630	46	1,694,988
1905	1,346,548	59	918,701	41	2,265,249
1906	2,119,764	76	665,845	24	2,785,609
1907	2,436,093	78	672,630	22	3,108,723
1908	2,665,289	85	469,049	15	3,134,338
1909	4,067,709	97	142,194	3	4,209,903
1910	4,753,975	93	349,310	7	5,103,285
1911	5,692,915	90	661,916	10	6,354,831
1912	7,132,732	83.3	1,434,413	16.7	8,567,145
1913	8,658,805	97.1	254,093	2·9	8,912,898
1914	7,172,480	98·7	98,022	1·3	7,270,502
1915	5,681,032	99·5	28,190	0·5	5,709,222
1916	5,369,560	99·6	20,596	0·4	5,390,156

Nova Scotia.—There is but one cement plant in Nova Scotia, located at Sydney and operated by the Sydney Cement Company, Limited. Puzzolan cement is made from blast furnace slag and lime. This plant has not been operated for two years.

Quebec.—This Province has three completed cement mills, all operated by the Canada Cement Company, Limited; two situated near Montreal, one at Longue Pointe, which has been idle throughout the year, and one at Montreal East, and the third at Hull. The Montreal mills have now a combined daily capacity of 13,800 barrels and the Hull mill 2,800 barrels. The total quantity of cement sold or used by producers during 1916 in this Province was 2,150,475 barrels, valued at $2,525,863, as compared with 2,390,724 barrels, valued at $2,812,797 in 1915.

Ontario.—Ontario continues as the most important cement-producing province in Canada, having sixteen completed plants with a total daily capacity of 19,850 barrels at the end of 1916. Of these four limestone and three marl plants were operated during the year. The nine idle mills included one limestone and eight marl plants. The names of the operating companies and location of plants are shown in an accompanying list of producers.

The total sales of cement in Ontario during 1916 were 2,230,386 barrels valued at $2,312,677, as compared with 2,407,670 barrels valued at $2,597,807 in 1915. There was thus a decrease in sales of 177,284 barrels, or over 7 per cent.

The detailed statistics of production during 1916 and 1915 are shown in the next table.

Cement Production in Ontario, 1915 and 1916.

	1915.	1916.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.....Bls.	2,407,670	2,230,386	.....	.....	177,284	7·4
Cement manufactured..... "	2,325,912	1,858,693	.....	.....	467,219	20·1
Stock on hand Jan. 1..... "	842,957	753,301	.....	.....	89,656	10·6
Stock on hand Dec. 31..... "	761,199	381,608	.....	.....	379,591	49·9
Value of cement sold..... $	2,597,807	2,312,677	.....	.....	285,130	11·0
Wages paid..... "	482,606	490,126	7,520	1·6	.....	.....
Men employed.....No.	801	722	.....	.....	79	9·9
Total daily capacity of operating plants.....Bls.	12,550	10,950	.....	.....	1,600	12·7

Manitoba.—The Commercial Cement Company of Winnipeg, is operating a natural portland cement plant at Babcock, 75 miles southwest of Winnipeg, on the Canadian Northern Railway. The capacity of the plant is reported as about 225 barrels per day. The mill of the Canada Cement Company near Winnipeg has a daily capacity of 3,500 barrels. Limestone is obtained from a property in township 28, range 10, west of the first meridian, about 130 miles north of Winnipeg, on the Oak Point branch of the Canadian Northern railway.

Alberta.—This Province possesses four completed cement plants with a total daily capacity of about 7,500 barrels, located respectively at Exshaw, Calgary, Blairmore, and Marlboro. The first three are limestone plants, and the last was remodelled during the year and changed from marl to rock.

In addition to the completed plants, there are two other rock plants on which construction work has been suspended, viz: One at Blairmore owned by the Keystone Portland Cement Company, and one at Dauntless, near Medicine Hat, owned by the Canada Cement Company; the latter plant is being planned for a capacity of 1,000,000 barrels per annum.

The total quantity of cement marketed by producers in 1916 was 275,727 barrels, valued at $477,832, as against 233,648 barrels valued at $415,009 in 1915.

British Columbia.—The two plants on Vancouver Island were in operation during 1916, one for a short period only. The Vancouver Portland Cement Company's mill at Tod Inlet has a daily capacity of 3,000 barrels. The mill of the Associated Cement Company (Canada), Ltd., successors to the Portland Cement Construction Company, Ltd., at Bamberton, has a daily capacity of about 2,000 barrels. In both cases the limestone, shale, and clay are obtained in the vicinity of the works.

The plant at Princeton constructed by the British Columbia Portland Cement Co., Ltd., capacity averaging 600 barrels daily, remained idle throughout the year.

The total sales of cement from British Columbia mills in 1916 were 285,679 barrels, valued at $436,459, as compared with 309,436 barrels, valued at $526,042 in 1915.

The production of cement in Ontario has already been shown separately, and the aggregate production in all other provinces during 1915 and 1916 is given in the next table.

Cement Production in Other Provinces, 1915 and 1916.

	1915.	1916.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.....Bls.	3,273,362	3,139,174	.....	.....	134,188	4·1
Cement manufactured..... "	2,827,851	2,894,340	66,489	2·4	.....	.....
Stock on hand Jan .1..... "	1,777,065	1,318,965	.....	.....	458,100	25·8
Stock on hand Dec. 31..... "	1,301,762	1,063,267	.....	.....	238,495	18·3
Value of cement sold..... $	4,379,217	4,235,051	.....	.....	144,166	3·3
Wages paid..... "	701,853	817,098	115,245	16·4	.....	.....
Men employed.....No.	885	973	88	9·9	.....	.....
Total daily capacity of operating plants..... Bls.	29,300	27,525	.....	.....	1,775	6·0

List of Manufacturers of Cement.

Operator and Address.	Location of Plant.	Raw Materials Used.	Kilns. No.	Kilns. Length.	Total Daily Capacity.	Works Superintendent, or Representative.
Nova Scotia.				Feet	Barrels	
Sydney Cement Co., Ltd., Sydney, N.S., Box 509	Sydney *	Blast furnace slag	.....	.....	140(?)	H. C. Burchell.
Quebec.						
Canada Cement Co., Ltd., Montreal, Que., Herald Bldg:—						F. P. Jones, Gen. Mgr. H. L. Doble, Secy.
Montreal Mill No. 1	Montreal East	Limestone	4–4–9	125–110–150	12,000	F. B. Kilbourn, Supt.
Montreal Mill No. 2	Longue Pointe *	"	4	125	1,800	J. S. Downs, Supt.
International Mill	Hull	"	10	60	2,800	Wm. O'Neil, Supt.
La Société des Industries de Chambord	Chambord *	.....	.....	.....	.....	T. L. Bergeron, Sec.
Ontario.						
Canada Cement Co., Ltd., Montreal, Que:—						
Belleville Mill (No. 4)	Belleville (Point Anne) *	Limestone	8	60	1,800	H. L. Shock, Supt.
Belleville Mill (No. 5)	" (Thurlow Tp)	"	6	125	2,700	" "
Lakefield Mill	Lakefield *	Marl	3–6	60–100	1,200	E. W. Bailey, Supt.
Marlbank Mill	Marlbank (Hungerford Tp) *	"	4–5	95– 60	1,200	C. J. Matt, Supt.
Port Colborne Mill	Port Colborne	Limestone	4	150	3,000	S. R. Preston, Supt.
Owen Sound Mill	Shallow Lake *	Marl	5	100	1,200	Alf. Harrington, Supt.
The Maple Leaf Portland Cement Co., Ltd., Listowel, Ont	Atwood *	"	2	100	350	Robt. Oliver.
The Ontario Portland Cement Co., Ltd., Brantford, 51 George	Blue Lake	"	4	70	500	Sam. H. Reid, Mgr.
The National Portland Cement Co., Ltd., Durham, Ont	Durham	"	8	70	1,400	W. Calder.
The Hanover Portland Cement Co., Ltd., Hanover, Ont	Hanover	"	3	100	750	E. D. Gruetzner.
Superior Portland Cement Co., Ltd., Orangeville, Ont. (In liquidation).	Orangeville *	"	4	80	800	.....
The Union Cement Co., Ltd., Owen Sound, Ont	Owen Sound	Limestone	4–1	60–70	800	T. L. Dates.
The Imperial Portland Cement Co., Ltd., Owen Sound, Ont	" *	Marl	3	100	650	D. J. Kennedy, V.P.
Ben Allen Portland Cement Co., Ltd., Owen Sound, R. R. No. 7	.....	(Marl)	.....	.....	.....	J. D. McMillan, Pres.
Kirkfield Portland Cement Co., Ltd., Toronto, c-o 15 Wellington, W., Receiver	Raven Lake *	Marl	1–3	125–60	500	.....
St. Marys Cement Limited, Toronto, 49 Wellington E	St. Marys	Limestone	2	160	1,800	J. G. Lind, Supt.
The Crown Portland Cement Co., Ltd., Toronto, c-o 85 Bay, Liquidator.	Wiarton *	(a)	4	100	1,200	.....
Manitoba.						
The Commercial Cement Co., Ltd., Winnipeg, Man., 307 Quebec Bank	Babcock	Natural, P. C.	6	40 (Vertical)	225	A. W. Gordon.
Canada Cement Co., Ltd., Montreal, Que	Tuxedo, Winnipeg	Limestone	4	150	3,500	A. W. Clark, Supt.

List of Manufacturers of Cement.—*Continued.*

Operator and Address.	Location of Plant.	Raw Materials Used.	Kilns.		Total Daily Capacity.	Works Superintendent, or Representative.
			No.	Length.		
Alberta.						
Canada Cement Co., Ltd., Montreal, Que.:—						
Alberta Mill	Calgary *	Limestone	3	100	1,500	E. French, Supt.
Dauntless Mill	Dauntless ‡					
Exshaw Mill	Exshaw *	Limestone	3-3	80-150	3,000	A. G. Beck, Supt.
The Rocky Mountains Cement Co., Ltd., Calgary, Alberta, Box 1694	Blairmore	„	2	99	1,000	L. G. Eaton, Supt.
The Keystone Portland Cement Co., Ltd., Calgary, Box 1236	„ ‡	„				W. J. Budd, Supt.
The Edmonton Cement Co., Ltd., Edmonton, 707 Tegler Bldg	Marlboro *	„	3	140	2,000	J.R. Patterson, Supt.
British Columbia.						
The Associated Cement Co. (Canada), Ltd., Victoria, B.C., Box 1591	Bamberton, Saanich Inlet	Limestone	2	185	2,000	H. Anderson.
British Columbia Portland Cement Co., Ltd., Vancouver, 615 Hastings, W. (In liquidation)	Princeton *	„	1	125	600	Jno. D. Kearns, Liquidator.
Vancouver Portland Cement Co., Ltd., Victoria. Box 681	Tod Inlet	„	1-1-2	170-125-155	3,000	R. P. Butchart, Man. Dir.

*Idle 1916 ‡ New plant, not yet completed. (a) Plant undergoing change from marl to gravel rock, when company went into liquidation.

CLAY AND CLAY PRODUCTS.[1]

For a number of years a small quantity of fireclay has been produced and sold as such, and during the past five years there has been a small, but increasing production of kaolin, or china-clay from a deposit in the Province of Quebec. With these exceptions, practically all of the clay production in Canada consists almost altogether of the manufactured product.

The clay products made in Canada comprise brick of various kinds, including common and pressed, ornamental and fancy building brick, paving brick, firebrick, porous fireproofing brick and blocks, sewerpipe and drain tile, pottery and sanitary ware, the last two products chiefly from imported clays.

The total value of the clay products sold or marketed in 1916 was $4,120,805, as compared with $3,914,488 in 1915; $6,871,957 in 1914; $9,504,313 in 1913, and $10,575,869 in 1912.

The production in 1916 showed a slight increase over 1915: $206,317, or 5·3 per cent. It was but little over one-third the maximum production reached in 1912.

For a few years previous to 1913 the annual production of clay products increased very rapidly, having more than doubled in that period. In 1913, however, the financial stringency affected building operations to such an extent as to greatly reduce the demand for building brick. There was actually a considerable increase in the quantity of common and pressed building brick manufactured during the year, but a large falling off in sales, so that large stocks of brick must have remained in manufacturers' hands at the close of the year. In 1914 there was a large falling off both in quantities of brick made and in quantities sold, and the stocks of common and pressed brick on hand at the end of the year were reported as 242,106,000,

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[1] Special investigations of the clay resources of Canada have been undertaken by the Department of Mines for a number of years and several special reports have been published thereon. The first work was undertaken by J. Walter Wells in 1905 under the direction of Dr. Haanel. In 1909, Dr. Heinrich Ries, Professor of Economic Geology in Cornell University was engaged by the Geological Survey to carry on a general investigation of Canadian clays. Mr. Joseph Keele of the Geological Survey was associated with Dr. Ries in the work which has been continued during the past five years.

The following reports have been published dealing with clays:—

Mines Branch, Department of Mines:

"Clays and Shales of Manitoba: Their Industrial Value." Report on. By J. Walter Wells, 1905. (Out of print).

"Notes on Clay Deposits near McMurray, Alberta," by Sydney C. Ells B.Sc., (Bulletin No. 10), 1915.

Geological Survey Branch, Department of Mines:

"The Clay and Shale Deposits of Nova Scotia, and Portions of New Brunswick." By H. Ries and J. Keele, 1911.

"Preliminary Report on the Clay and Shale Deposits of the Western Provinces." By H. Ries and J. Keele, 1912.

"The Clay and Shale Deposits of the Western Provinces—Part II." By H. Ries and J. Keele, 1913.

"Clay and Shale Deposits of New Brunswick." By J. Keele, 1914.

"Clay and Shale Deposits of the Western Provinces, Part III." By Heinrich Ries, 1914.

"Preliminary Report on the Clay and Shale Deposits of the Province of Quebec." By J. Keele. 1915—Memoir No. 64.

"Clay and Shale Deposits of the Western Provinces, Part IV." By H. Ries, 1915—Memoir No. 65.

"Clay and Shale Deposits of the Western Provinces, Part V." By J. Keele, 1915—Memoir No. 66.

or about 44 per cent of the number sold during the year. In 1915, there was again a large decrease both in quantity of brick made and in quantities sold. Sales, however, exceeded actual output, stocks having been depleted to a considerable extent to supply demand. Stocks of common and pressed brick on hand at the end of the year were reported as 147,817,000, or about 61 per cent of the stocks reported at the end of 1914. All classes of clay products showed a falling off in production, with the exception of firebrick, pottery and kaolin.

During 1916, however, the total quantity sold was about the same as that manufactured, while stocks of common and pressed brick held on hand at the close of the year, fell to slightly over 100,000,000 and all classes of clay products showed increased sales.

The average number of men employed in 1916 was 4,164 as compared with 4,405 of the previous year, and total wages paid were $1,740,900, as against $1,452,828 in 1915.

Of the total value of the sales in 1916, building and paving brick, including fireproofing, contributed $2,732,000, or about 66·3 per cent, as against $2,571,153, or about 65·6 per cent of the total in 1915. Sewerpipe and tile production in 1916 were valued at $1,075,674, or 26·1 per cent of the total, as against $1,154,742, or 29·5 per cent of the total in 1915. The total value of the production of pottery in 1916 was reported as $391,173, of which $61,069 only is estimated as attributable to Canadian clays and the balance to imported clays. Compared with the previous year the production of building, paving and fireproofing brick shows an increase of 6·3 per cent, and the production of sewerpipe and tiles, a decrease of 6·8 per cent.

The value of the production of fireclays and firebrick from domestic clays was $234,562, as against $110,693 in 1915. The production of kaolin in 1916 was 1,750 tons, valued at $17,500, as against 1,300 tons, valued at $13,000 in 1915.

The average price of common building brick for the whole of Canada in 1916 was $7.71 per M, as compared with $7.48 per M in 1915; $7.99 in 1914; $8.85 in 1913; $9.11 in 1912; $8.37 in 1911; and $8.13 in 1910. The average prices of pressed, or front brick for the same years were respectively: $10.95; $9.89; $11.91; $12.40; $12.86; $12.53, and $11.89, thus showing a general increase in the cost of building brick until 1912, falling off again in 1913, 1914, 1915, with a higher price ruling again in 1916.

Ontario is by far the largest producer of clay products, having contributed in 1916 over 52 per cent of the total values marketed during the year as against nearly 58 per cent of the total values marketed during 1915.

Quebec contributed 24·1 per cent in 1916, as against 23·5 per cent in 1915; Alberta 5·5 per cent in 1916, as compared with 2·9 per cent in 1915; Manitoba 2·5 per cent in 1916, as against 2·4 per cent in 1915; and

British Columbia 7·1 per cent in 1916, as compared with 5·8 per cent in the previous year.

Nova Scotia contributed 5·8 per cent of the total values marketed during 1916, as against 5·7 per cent in 1915.

The following tables of production and of imports of clay products furnish comparisons of particular interest. In the first place an estimate of the value of consumption of clay products is furnished.

The total value of the imports in 1916 was $4,554,167 (not including certain items probably in part covering clay products), and after deducting a small export, a total approximate consumption of clay products valued at $8,594,860 is shown, of which 48 per cent was of domestic production.

In 1915 the approximate consumption was valued at $6,867,381 of which 57 per cent was of domestic production.

In 1914 the approximate consumption was valued at $11,291,024, of which about 61 per cent was of domestic production.

In 1913 the consumption was valued at $16,212,733, of which 58·6 per cent was of domestic production.

In 1912 the consumption was valued at $17,149,659, in 1911, $13,516,477, in 1910, $11,958,591, and in 1909, $9,696,324. In 1909, about 70 per cent of the consumption was of domestic production.

In the case of building brick, the imports are small compared with the home production, amounting to not much more than 5 per cent of the latter. The imports of paving brick in 1916 were more than double, and those of firebrick about twelve times the Canadian production. The imports of drain tile and sewerpipe were about 4 per cent of the Canadian production.

Statistics of production in 1916 and 1915 of the several classes of clay products by provinces are shown in the following tables:—

Production of Clay Products by Provinces, 1916.

Province.	Per cent of total value.	No. of active firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			
					No. manufactured.	No. sold.	Value of sales.	Per M.	No. manufactured.	No. sold.	Value of sales.	Per M.
Nova Scotia	5·79	7	278	$ 98,401	10,995,000	8,015,000	$ 62,103	$ 7.49	220,000	93,000	$ 1,445	$ 15.53
New Brunswick	1·04	8	132	39,543	4,550,000	4,075,074	41,701	10.23	65,000	65,000	1,080	16.62
Quebec	24·11	25	829	380,249	94,673,232	93,668,357	658,909	7.03	5,810,840	3,742,133	64,269	17·17
Ontario	52·06	205	2,226	942,926	108,671,845	103,854,020	817,321	7.87	35,249,733	37,281,665	378,994	10.17
Manitoba	2·53	11	129	24,930	5,353,000	8,911,694	91,464	10·26	.....	110,050	1,984	18·95
Saskatchewan	1·91	11	108	26,065	5,331,000	6,751,145	58,790	8.71	760,000	430,000	6,586	15.32
Alberta	5·46	10	214	94,804	6,520,000	7,114,890	58,360	8.20	1,255,000	3,033,321	34,422	11.35
British Columbia	7·10	13	248	133,982	5,427,100	4,644,495	38,196	8.23	.....	191,920	3,575	18.62
Total	100·00	290	4,164	1,740,900	241,521,177	237,034,675	1,826,844	7.71	43,360,573	44,947,089	492,355	10·95

Province.		Paving brick.		Ornamental.		Refractories.	Fireproofing.	Pottery.	Sewerpipe.	Tiles,drain.	Kaolin.	Total.
		No. sold.	Value.	No. sold.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.
Nova Scotia	.....	.....	.....	.....	.....	$ 43,014	$ 10,000	.....	$121,878	$ 30	.....	$ 238,470
New Brunswick	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	.....	42,881
Quebec	.....	.....	.....	.....	$ 4,000	24,200	55,945	$2,700	157,778	8,363	$17,500	993,664
Ontario	.....	865,900	$ 13,844	593,811	17,102	.....	218,345	35,300	320,453	343,677	.....	2,145,036
Manitoba	.....	.....	.....	.....	.....	.....	10,800	.....	.....	.....	.....	104,248
Saskatchewan	.....	.....	.....	.....	.....	7,000	6,292	.....	.....	.....	.....	78,668
Alberta	.....	.....	.....	.....	.....	.....	53,334	23,069	53,141	2,814	.....	225,140
British Columbia	.....	723,993	16,300	.....	.....	160,348	6,839	.....	63,037	4,403	.....	292,698
Total	.....	1,589,893	30,144	.....	21,102	(b) 234,562	361,555	(a) 61,069	716,287	359,387	17,500	4,120,805

(a) There was also a production of $330,104 from imported clays. (b) There was also a production of $22,484 from imported clays.

Production of Clay Products by Provinces, 1915.

Province.	Per cent of total value.	No. of active firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			
					No. manufactured.	No. sold.	Value of sales.	Per M.	No. manufactured.	No. sold.	Value of sales.	Per M.
Nova Scotia	5·67	11	204	$ 75,219	4,340,000	6,462,000	$ 48,684	$ 7.53	100,000	100,000	$ 1,500	$15.00
New Brunswick	0·92	5	90	27,225	3,150,000	3,675,000	34,150	9.29	50,000	40,000	880	22.00
Quebec	23·46	33	980	308,956	74,834,971	79,744,548	566,085	7.10	3,219,000	3,990,517	62,766	15.73
Ontario	57·60	245	2,613	886,856	104,858,929	123,977,112	910,459	7.34	37,778,496	43,504,736	398,308	9.16
Manitoba	2·39	12	199	16,835	5,076,000	8,630,411	87,194	10.10	.....	.....	.....	.....
Saskatchewan	1·13	13	43	7,332	1,300,000	4,184,185	36,482	8.72	.....	422,860	7,119	16.82
Alberta	2·96	13	137	50,330	2,523,887	3,753,746	32,399	8.63	55,000	1,340,555	13,250	9.88
British Columbia	5·87	17	139	80,075	735,280	4,305,880	39,734	9.23	249,652	418,492	8,951	21.41
Total	100·00	349	4,405	1,452,828	196,819,067	234,732,882	1,755,187	7.48	41,452,148	49,817,160	492,774	9.89

Province.	Paving brick.		Ornamental.		Firebrick and fireclay shapes.	Fireproofing.	Pottery.	Sewerpipe.	Tiles, drain.	Kaolin.	Total.
	No. sold.	Value.	No. sold.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.
Nova Scotia	.....	.....	.....	.....	$ 22,741	$ 3,720	$ 200	$144,836	$ 200	.....	$ 221,881
New Brunswick	.....	.....	.....	.....	.....	.....	.....	.....	750	.....	35,780
Quebec	.....	.....	253,439	$12,140	15,156	41,040	18,638	180,000	9,600	$13,000	918,425
Ontario	863,770	$13,345	755,128	36,957	.....	146,915	46,062	361,350	341,467	.....	2,254,863
Manitoba	.....	.....	.....	.....	.....	6,480	.....	.....	.....	.....	93,674
Saskatchewan	.....	.....	.....	.....	805	.....	.....	.....	.....	.....	44,406
Alberta	.....	.....	.....	.....	.....	30,263	.....	39,460	324	.....	115,696
British Columbia	363,877	7,349	.....	.....	71,991	24,983	.....	73,800	2,955	.....	229,763
Total	1,227,647	20,694	1,008,567	49,097	(b) 110,693	253,401	(a) 64,900	799,446	355,296	13,000	3,914,488

(a) There was also a production of $252,180 from imported clays. (b) There was also a production of $28,807 from imported clays.

Sales of Clay Products by Provinces, 1911-1916.

Province.	1911.	1912.	1913.	1914.	1915.	1916.
Nova Scotia	$ 274,249	$ 272,053	$ 332,272	$ 266,204	$ 221,881	$ 238,470
New Brunswick	38,000	54,910	62,269	66,502	35,780	42,881
Quebec	1,341,467	1,680,460	1,606,816	1,267,700	918,425	993,664
Ontario	3,916,575	4,864,700	5,220,467	3,979,606	2,254,863	2,145,036
Manitoba	834,428	1,018,051	514,358	317,488	93,674	104,248
Saskatchewan	226,958	332,943	189,820	98,349	44,406	78,668
Alberta	1,052,751	1,356,184	893,408	462,199	115,696	225,140
British Columbia	675,505	996,568	684,904	413,909	229,763	292,698
	8,359,933	10,575,869	9,504,314	6,871,957	3,914,488	4,120,805

Annual Value of Production of Clay Products, 1899-1916.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1899	$2,988,099	1905	$4,709,842	1911	$ 8,359,933
1900	3,195,105	1906	5,072,635	1912	10,575,869
1901	3,382,706	1907	5,772,117	1913	9,504,314
1902	3,625,489	1908	4,500,702	1914	6,871,957
1903	4,034,289	1909	6,450,840	1915	3,914,488
1904	3,841,560	1910	7,629,956	1916	4,120,805

Exports and Imports.—The total value of the exports of clay products in 1916 was $80,112, and included 1,746,000 building brick, valued at $13,942; manufactures of clay valued at $58,550, and earthenware valued at $7,620.

In 1915 the total value of the exports of clay products was $45,572, which included 1,115,000 building brick, valued at $9,089; manufactures of clay valued at $25,202, and earthenware valued at $11,281.

Exports of Clay Products.

Calendar Year.	Building brick.		Manufactures.	Earthenware.	Total.
	M.	Value.			
1910	390	$ 2,762	$ 9,061	$ 9,240	$21,063
1911	394	3,977	2,071	6,101	12,149
1912	694	8,493	256	10,001	18,750
1913	977	8,579	27,201	16,553	52,333
1914	1,486	11,871	26,866	9,336	48,073
1915	1,155	9,089	25,202	11,281	45,572
1916	1,746	13,942	58,550	7,620	80,112

The imports of clays and clay products reached a total value during the calendar year 1916 of $4,554,167, which exceeded the domestic production by $433,362. The total imports in 1915 were valued at $2,998,463.

Clay imports are classified by the Department of Customs under three main subdivisions, including: brick and tile, earthenware and china ware, and clays. The imports of clays in 1916 were valued at $325,494, and

included chiefly china-clay and fireclay with a small quantity of pipe-clay, and other clays not classified. The value of china-clay imported was $114,110, and of fireclay $187,124. In 1915 the total value of the imports of clays was $237,096, and included china-clay valued at $124,658, and fireclay at $87,267. The imports of these clays have varied considerably from year to year, the imports of china-clay in 1914 and fireclay in 1916 being the highest recorded.

The imports classified under brick and tile were valued in 1916 at $2,048,259, as compared with a value of $1,301,359 in 1915. A large portion of these imports is made up of firebrick, over 80 per cent in 1916. There is also a considerable import of building and paving brick, of sewer-pipe and drain tile, and of building blocks, and manufactures of clay not specified.

The imports of earthenware and chinaware, of which the most important class is tableware, were valued in 1916 at $2,180,414, as against $1,460,010 in 1915. These imports are chiefly of a class of goods not manufactured in Canada and for which the raw materials are not as yet obtainable from Canadian sources.

The detailed record of imports during the calendar years 1911 to 1916 is shown in the next table.

Imports of Clay Products, Calendar Years, 1911 to 1916.

Imports.	1911.	1912.	1913.	1914.	1915.	1916.
Brick and tile:—						
Bath brick	$ 2,623	$ 1,927	$ 2,690	$ 1,894	$ 630	$ 902
Building brick	475,865	763,470	575,269	353,353	114,958	118,687
Building blocks	(b)	(b)	(a) 356,366	276,817	181,145	69,353
Paving brick	164,292	160,663	176,497	145,063	76,759	70,268
Firebrick, of a class or kind not made in Canada (free)	814,414	953,621	976,097	535,712	577,458	1,162,679
Firebrick n.o.p.	(b)	(b)	(a) 216,760	154,421	235,613	495,113
Drain tile, not glazed	5,640	4,018	12,156	2,941	346	2,072
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed	382,929	507,024	465,997	338,533	41,801	40,233
Manufactures of clay, n.o.p.	523,998	818,467	339,760	178,056	72,649	88,952
Total	2,369,761	3,209,190	3,121,592	1,986,790	1,301,359	2,048,259
Earthenware and chinaware:—						
Brown or coloured earthenware and stoneware, and Rockingham ware	52,100	62,161	70,632	71,083	74,864	145,490
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.	184,291	291,804	264,090	163,431	135,425	176,329
Demijohns, churns, or crocks	4,933	18,404	32,599	25,935	14,752	16,632
Tableware of china, porcelain, white granite or iron-stoneware	1,718,582	2,068,362	2,185,601	1,437,175	1,016,900	1,566,312
China and porcelain ware, n.o.p.	62,025	71,751	43,696	30,006	18,312	17,304
Tiles or blocks of earthenware or stone prepared for mosaic flooring	123,203	160,082	173,445	104,285	40,286	41,189
Earthenware tiles, n.o.p.	154,351	239,391	296,791	186,161	92,700	74,293
Manufactures of earthenware, n.o.p.	217,051	183,001	248,016	174,146	66,771	142,865
Total	2,516,536	3,094,956	3,314,870	2,192,222	1,460,010	2,180,414
Clays:—						
China-clay ground, or unground	125,768	127,402	149,337	150,881	124,658	114,110
Fireclay, ground or unground	125,199	140,500	143,399	90,233	87,267	187,124
Pipeclay, ground or unground	1,786	234	385	829	614	2,440
Clays all other, n.o.p.	17,494	20,258	31,169	46,185	24,557	21,820
Totals	270,247	288,394	324,290	288,128	237,096	325,494
Grand total	5,156,544	6,592,540	6,760,752	4,467,140	2,998,465	4,554,167
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material	285,847	382,920	477,133	359,288	182,757	173,244
Chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground	147,640	167,990	164,879	113,211	100,012	170,498

(a) Nine months. (b) Included in manufactures of clay, n.o.p.

In addition to the imports of clay products, there is also shown in the preceding table a considerable annual importation of "chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground", much of which is, no doubt, used in connexion with the manufacture of clay products. The value of these imports during the calendar year 1916 was $170,498, of which $124,948 was from the United States, and $45,550 from Great Britain. The value of the imports under this item during the calendar year 1915 was $100,012. There is also shown an annual importation of "baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material", the value of such imports during 1916 being $173,244, as compared with $182,757 during the year 1915.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and porcelain ware, white granite or iron-stoneware, etc., are brought from France and Japan. The imports during the fiscal year ending March 31, 1916, showing the country of origin, are shown in the next table. Of the brick and tile imported 88·3 per cent was from the United States and 11·6 per cent from Great Britain; and only $449 worth from all other countries. Of the earthenware and chinaware, 64·4 per cent was imported from Great Britain, 20·1 per cent from the United States; 7·0 per cent from France; and 7·7 per cent from Japan. The crude clays were imported principally from Great Britain and the United States.

Imports of Clay Products during the Twelve Months Ending March 1916, Showing Countries of Origin.

Imports.	Great Britain.	United States.	France.	Japan.	Other countries.	Total.
Brick and tile:—						
Bath brick	$ 881	$ 12	.....	.....	.....	$ 893
Building brick	4,632	105,162	.....	.....	.....	109,794
Building blocks	1,855	136,163	.....	.....	.....	138,018
Paving brick	15,267	62,585	.....	.....	.....	77,852
Firebrick of a class or kind not made in Canada	90,564	626,782	.....	.....	$ 447	717,793
Firebrick, n.o.p	34,502	281,093	.....	.....	.....	315,595
Drain tile, not glazed	53	859	.....	.....	.....	912
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed	12,441	21,930	.....	.....	.....	34,371
Manufactures of clay, n.o.p	9,849	54,196	.....	$ 2	.....	64,047
Total	170,044	1,288,782	.....	2	447	1,459,275
Earthenware and chinaware:—						
Brown or coloured earthenware and stoneware, and Rockingham ware	13,830	79,170	$ 70	124	426	93,620
C.C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p	85,861	35,077	549	4,951	1,256	127,694
Demijohns, churns, or crocks	179	10,693	.....	.....	28	10,900
Tableware of china, porcelain, white granite or iron-stoneware	782,339	37,810	102,889	96,900	8,310	1,028,248
Chinaware, to be silver-mounted, imported by manufacturers of silverware	5,437	239	.....	.....	.....	5,676
China and porcelain ware, n.o.p	6,507	5,980	66	6,441	58	19,052
Tiles or blocks of earthenware or stone prepared for mosaic flooring	7,252	31,579	.....	348	347	39,526
Earthenware tiles, n.o.p	29,696	54,667	.....	.....	99	84,462
Manufactures of earthenware, n.o.p	19,843	42,061	241	5,013	417	67,575
Total	950,944	297,276	103,815	113,777	10,941	1,476,753
Clays:—						
China-clay, ground or unground	50,618	77,972	.....	.....	.....	128,590
Fireclay, ground or unground	24,014	80,801	.....	32	.....	104,847
Pipeclay, ground or unground	7	1,291	.....	.....	.....	1,298
Clays, all other, n.o.p	454	23,499	.....	32	7	23,992
Total	75,093	183,563	.....	64	7	258,727
Grand total	1,196,081	1,769,621	103,815	113,843	11,395	3,194,755
Per cent of total	37·44	55·39	3·25	3·56	0·36	100·00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material	72,299	102,643	158	.....	.....	175,100
Chalk, china or cornwall stone, cliff stone, and feldspar, fluorspar, magnesite, ground or unground	36,006	88,768	.....	.....	.....	124,774

Imports of Clay Products (Total Value) 1900-16.

Fiscal Year.	Brick and tile.**	Earthenware and chinaware.	Clays.	Totals.
1900	$ 145,914	$ 959,526	$122,965	$1,228,405
1901	133,343	1,114,677	141,251	1,389,271
1902	172,281	1,275,093	140,521	1,587,895
1903	157,783	1,406,610	176,416	1,740,809
1904	259,421	1,611,356	144,706	2,015,483
1905	761,756	1,636,214	176,805	2,574,775
1906	1,000,372	1,692,359	220,504	2,913,235
1907*	770,686	1,422,880	178,240	2,371,806
1908	1,079,556	2,190,784	267,720	3,538,060
Calendar Year.				
1909	1,249,450	1,781,759	216,330	3,247,539
1910	1,755,773	2,283,116	292,508	4,331,397
1911	2,369,761	2,516,536	270,247	5,156,544
1912	3,209,190	3,094,956	288,394	6,592,540
1913	3,121,592	3,314,870	324,290	6,760,752
1914	1,986,790	2,192,222	288,128	4,467,140
1915	1,301,359	1,460,010	237,096	2,998,465
1916	2,048,259	2,180,414	325,494	4,554,167

*9 months ending March1907.
**Includes fireclay classified as "for use in process of manufactures."

Canadian Customs Duties affecting clays and clay products in force are shown as follows: Supplemented since April 8, by 1915, a war tax of 5 per cent ad valorem Preferential and 7½ per cent Intermediate and General.

Canadian Customs Duties on Clay Products.

	British Preferential tariff.	Intermediate tariff.	General tariff.
281 Firebrick of a class or kind not made in Canada	Free.	Free.	Free.
282 Building brick, paving brick, and mfgs. of clay or cement (n.o.p.)	12½%	20%	22½%
283 Drain tiles not glazed	15 „	17½ „	20 „
284 Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks glazed or unglazed, earthenware tiles (n.o.p.)	25 „	32½ „	35 „
285 Tiles or blocks of earthenware or of stone prepared for mosaic flooring	20 „	27½ „	30 „
286 Earthenware and stoneware, viz., demijohns, churns, or crocks	20 „	27½ „	30 „
287 Tableware of china, porcelain, white granite or ironstone	15 „	27½ „	27½ „
288 Earthenware and stoneware, brown or coloured and Rockingham ware, "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware (n.o.p.)	20 „	27½ „	30 „
289 Closets, urinals, basins, lavatories, baths, bath-tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material	20 „	30 „	35
295 Clays, including china-clays, fireclays and pipeclay, not further manufactured than ground; ganister and sand; gravels; earths, crude only	Free.	Free.	Free.

CLAY BUILDING BRICK.

The total sales from Canadian plants of clay building brick including common and pressed brick, but excluding ornamental, paving, firebrick, and fireproofing brick, are shown by provinces for the past four years in the tables following.

In 1916 the total sales were 281,981,764, valued at $2,319,199, made up of 237,034,675 common brick, valued at $1,826,844, or an average value of $7.71 per thousand, and 44,947,089 pressed brick, valued at $492,355, or an average value of $10.95 per thousand. In addition to these, there was a production of ornamental brick valued at $21,102, and a production of fireproofing brick, valued at $361,555.

In 1915 the total sales were 284,550,042, valued at $2,247,961 made up of 234,732,882 common brick, valued at $1,755,187 or an average value of $7.48 per thousand, and 49,817,160 pressed brick, valued at $492,774, or an average value of $9.89 per thousand. The production of ornamental brick was valued at $49,097, and fireproofing brick, valued at $253,401.

In 1914 the total sales were 551,148,620, valued at $4,769,417, made up of 457,513,762 common, valued at $3,653,861, or an average value of $7.99 per thousand, and 93,634,858 pressed brick, valued at $1,115,556, or an average value of $11.91 per thousand. There were also 1,554,496 ornamental brick produced, valued at $23,592, and fireproofing brick and architectural terracotta valued at $405,543.

Sales of Clay Building Brick (Common and Pressed) 1915 and 1916.

Province.	1915.			1916.		
	No. sold.	Value.	Per cent of total value.	No. sold.	Value.	Per cent of total value.
Nova Scotia	6,562,000	$ 50,184	2·23	8,108,000	$ 63,548	2·74
New Brunswick	3,715,000	35,030	1·56	4,140,074	42,781	1·85
Quebec	83,735,065	628,851	27·97	97,410,490	723,178	31·18
Ontario	167,481,848	1,308,767	58·22	141,135,685	1,196,315	51·58
Manitoba	8,630,411	87,194	3·88	9,021,744	93,448	4·03
Saskatchewan	4,607,045	43,601	1·94	7,181,145	65,376	2·82
Alberta	5,094,301	45,649	2·03	10,148,211	92,782	4·00
British Columbia	4,724,372	48,685	2·17	4,836,415	41,711	1·80
Total	284,550,042	2,247,961	100·00	281,981,764	2,319,199	100·00

Large stocks of bricks were reported as being in manufacturers' hands at the close of 1915, the total number being 147,817,000 brick, or equivalent to 52 per cent of the year's sales. Stocks at the end of 1916 were reduced to 101,657,000 equivalent to 36 per cent of the year's sales.

The record of stocks on hand by provinces is shown in the following table:—

Common and Pressed Brick Held in Stock by Manufacturers December 31, 1915 and 1916.

Province.	1915.			1916.		
	Common brick. M.	Pressed brick. M.	Total M.	Common brick. M.	Pressed brick. M.	Total M.
Nova Scotia	500	.....	500	1,980	127	2,107
New Brunswick	700	42	742	1,614	20	1,634
Quebec	26,826	2,589	29,415	20,535	3,884	24,419
Ontario	65,202	13,044	78,246	41,368	8,755	50,123
Manitoba	14,800	190	14,990	5,728	289	6,017
Saskatchewan	5,088	540	5,628	3,177	325	3,502
Alberta	8,375	3,750	12,125	5,417	1,502	6,919
British Columbia	6,020	151	6,171	6,060	876	6,936
Total	127,511	20,306	147,817	85,879	15,778	101,657

The exports of building brick since 1891, and the imports since 1880, are shown in the following tables. The exports have never been large, averaging for a number of years, about $6,000 per annum. The exports fell off somewhat from 1909 to 1911, but increased again to a value of $11,871 in 1914, $9,089 in 1915, and $13,942 in 1916.

The annual imports for a number of years previous to 1903 averaged only about $20,000 in value; during the past ten years however, the imports have rapidly increased from $100,000 to over $760,000 in 1912. During the calendar year 1916 the imports were 10,083,000 brick, valued at $118,687, of which 133,000, valued at $2,351, or an average of $17.67 per thousand were imported from Great Britain, and 9,950,000, valued at $116,336, or an average of $11.69 per thousand from the United States. The imports during the calendar year 1915 were 10,168,000 brick, valued at $114,958, of which 375,000, valued at $4,592, or an average value of $12.24 per thousand, were imported from Great Britain, and 9,793,000, valued at $110,366, or an average value of $11.27 per thousand, from the United States.

Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
1891	246	$ 1,163	1900	546	$ 4,528	1909	365	$ 2,255
1892	1,963	12,192	1901	646	5,189	1910	390	2,762
1893	6,073	44,110	1902	2,110	12,786	1911	394	3,977
1894	1,095	7,405	1903	891	5,699	1912	694	8,493
1895	1,655	8,665	1904	696	5,357	1913	977	8,579
1896	983	5,678	1905	754	5,888	1914	1,486	11,871
1897	573	2,679	1906	697	6,541	1915	1,155	9,089
1898	65	442	1907	802	6,193	1916	1,746	13,942
1899	172	1,351	1908	2,344	9,047			

Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
1880	340	$ 2,067	1893	1,489	$ 14,108	1906	21,934	$194,897
1881	415	4,281	1894	2,220	18,320	Calendar Year.		
1882	3,500	24,572	1895	575	4,705	1907	12,961	129,235
1883	1,448	14,234	1896	1,057	23,189	1908	14,931	110,981
1884	3,263	20,258	1897	2,094	10,336	1909	27,972	195,360
1885	3,108	14,632	1898	639	6,652	1910	29,049	274,482
1886	983	5,929	1899	2,611	21,306	1911	51,102	475,865
1887	276	2,440	1900	1,792	19,305	1912	81,425	763,470
1888	2,483	20,720	1901	2,800	20,677	1913	56,846	575,269
1889	2,590	24,585	1902	4,087	33,802	1914	30,022	353,353
1890	1,933	12,500	1903	2,881	28,493	1915	10,168	114,958
1891	589	9,744	1904	13,455	117,468	1916	10,083	118,687
1892	621	5,075	1905	25,515	168,122			

Prices.—The price of brick varies greatly with the quality, locality, market, or demand. The values, as given in the table of production, are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1916, according to these returns was $7.71 as compared with $7.48 in 1915, $7.99 in 1914, $8.85 in 1913, and $9.11 in 1912; and of pressed brick $10.95 in 1916, as compared with $9.89 in 1915, $11.91 in 1914, $12.49 in 1913, and $12.86 in 1912.

In the Maritime Provinces during 1916 the price of common brick varied from $7.50 to $12.00, averaging for Nova Scotia $7.49, and for New Brunswick $10.23. In Quebec, the price of common brick varied between $5.50 and $9.00, averaging $7.03, while the price of pressed brick averaged $17.17. The average price of common brick in Ontario was $7.87, and pressed brick was $10.17. In all the western provinces, common brick ranged from $8.00 to $11.50, averaging $10.26 in Manitoba, $8.71 in Saskatchewan, $8.20 in Alberta, and $8.23 in British Columbia. Pressed brick ranged from $9.62 to $25.00 in individual yards, averaging $18.95 in Manitoba, $15.32 in Saskatchewan, $11.35 in Alberta, and $18.62 in British Columbia.

The following table shows the average values at the kilns, of common and pressed brick, during 1914, 1915, and 1916, as furnished by the producers.

Average Prices per Thousand of Common and Pressed Brick.

	Common brick.			Pressed brick.		
	1914.	1915.	1916.	1914.	1915.	1916.
Nova Scotia	$ 7.75	$ 7.53	$ 7.49	$ 15.32	$ 15.00	$15.53
New Brunswick	10.61	9.29	10.23	22.50	22.00	16.62
Quebec	7.40	7.10	7.03	15.91	15.73	17.17
Ontario	7.86	7.34	7.87	10.77	9.16	10.17
Manitoba	10.79	10.10	10.26	12.59	.....	18.95
Saskatchewan	8.93	8.72	8.71	17.31	16.82	15.32
Alberta	7.92	8.63	8.20	13.52	9.88	11.35
British Columbia	8.56	9.23	8.23	26.50	21.41	18.62
Canada	7.99	7.48	7.71	11.91	9.89	10.95

Production of Brick by Provinces.

Nova Scotia and New Brunswick.—The total sales in Nova Scotia were 8,108,000 brick, valued at $63,548, as compared with sales of 6,562,000 brick, valued at $50,184 in 1915. The chief sources of production were: Pugwash, Elmsdale, New Glasgow, Wallace Bridge, and Plymouth.

The total sales in New Brunswick were 4,140,074 brick, valued at $42,781, as compared with 3,715,000 brick, valued at $35,030 in 1915, the principal points of production being: Fredericton, St. John, Lewisville, St. Leonard, Bathurst, and Grafton.

Quebec.—The total sales of brick in Quebec in 1916 were: 97,410,490, valued at $723,178, comprising 93,668,357 common brick, valued at $658,909, or $7.03 per thousand, and 3,742,133 pressed brick, valued at $64,269, or $17.17 per thousand.

The sales in 1915 were 83,735,065, valued at $628,851, comprising 79,744,548 common brick, valued at $566,085, or $7.10 per thousand, and 3,990,517 pressed brick, valued at $62,766, or $15.73 per thousand.

While brick-making is carried on at many places in the Province, the principal plants are located at Montreal, Laprairie, Sherbrooke, Quebec, Montmorency Falls, and Deschaillons.

Ontario.—This Province is credited in 1916 with over 52 per cent of the brick production of Canada, the total sales as reported by 205 firms, being 141,135,685 brick, valued at $1,196,315, including 103,854,020 common brick, valued at $817,321, or an average of $7.87 per thousand, and 37,281,665 pressed brick, valued at $378,994, or an average of $10.17 per thousand.

The total sales in 1915 were 167,481,848 brick, valued at $1,308,767, and included 123,977,112 common brick, valued at $910,459, or an average of $7.34 per thousand, and 43,504,736 pressed brick, valued at $398,308, or an average of $9.16 per thousand.

The city of Toronto and vicinity, including the counties of York, Peel, and Halton, is the principal brick-making section, and in 1916 produced about 58 per cent of the Ontario production, or about 30 per cent of the total Canadian production of brick. The county of Wentworth, comprising the city of Hamilton and vicinity, produced about 13 per cent of the Ontario production.

The greater part of the pressed brick reported as such was made in the Toronto and Hamilton districts.

The production by principal counties in 1915 and 1916 is shown in the accompanying tables:—

Sales of Common and Pressed Brick in Ontario by Principal Counties, 1916.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
Algoma	1,325,000	$ 12,650	$ 9.55	4,000	$ 60	$15.00	$ 12,710	1·06
Carleton	4,513,088	36,973	8.19	.....	.....	.....	36,973	3·09
Halton & Peel	8,567,000	60,382	7.05	28,340,000	286,266	10.10	346,648	28·97
Kent	6,215,050	48,443	7.79	.....	.....	.....	48,443	4·06
Lincoln	2,157,455	20,173	9.35	.....	.....	.....	20,173	1·69
Middlesex	3,734,160	32,556	8.72	.....	.....	.....	32,556	2·72
Nipissing	1,160,900	10,191	8.78	.....	.....	.....	10,191	0·85
Peterboro	1,465,000	13,918	9.50	.....	.....	.....	13,918	1·16
Renfrew	2,502,330	22,960	9·17	.....	.....	.....	22,960	1·92
Sudbury	1,480,000	14,800	10.00	.....	.....	.....	14,800	1·24
Thunder Bay	1,476,650	12,274	8.31	.....	.....	.....	12,274	1·03
Waterloo	1,892,275	14,700	7.77	.....	.....	.....	14,700	1·23
Wentworth	14,442,815	101·162	7.01	6,329,288	53,543	8.46	154,705	12·93
York	39,095,893	308,798	7.90	2,608,377	39,125	15.00	347,923	29·08
Total, 15 counties	90,007,616	709,980	7.89	37,281,665	378,994	10.17	1,088,974	91·03
Total, other counties	13,846,404	107,341	7.75	.....	.....	.....	107,341	8·97
Total, Ontario	103,854,020	817,321	7.87	37,281,665	378,994	10.17	1,196,315	100·00

Sales of Common and Pressed Brick in Ontario by Principal Counties, 1915.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
York	48,656,434	$336,701	$ 6.92	2,708,600	$ 37,379	$13.80	$ 374,080	28·56
Halton	.....	.....	.....	25,176,560	214,251	8.51	214,251	16.37
Wentworth	15,439,140	92,856	6.01	5,679,873	52,356	9.22	145,212	11·10
Peel	11,296,120	98,393	8.71	5,426,438	48,095	8.86	146,488	11·19
Carleton	6,028,000	47,667	7.91	.....	.....	.....	47,667	3·64
Russell	3,200,000	23,400	7.31	1,000,000	12,000	12.00	35,400	2·70
Kent	3,864,300	27,973	7.24	.....	.....	.....	27,973	2·14
Grey	1,614,000	11,197	6.94	120,000	1,080	9.00	12,277	0·94
Middlesex	4,935,500	38,434	7.79	800,000	8,000	10.00	46,434	3·55
Renfrew	2,516,000	20,853	8.29	.....	.....	.....	20,853	1·59
Essex	2,693,000	19,705	7.32	.....	.....	.....	19,705	1·51
Thunder Bay District	1,010,500	11,925	11.80	.....	.....	.....	11,925	0·91
Total, 12 counties	101,252,994	729,104	7.20	40,911,471	373,161	9.12	1,102,265	84·22
Total, other counties	22,724,118	181,355	7.98	2,593,265	25,147	9.70	206,502	15·78
Total, Ontario	123,977,112	910,459	7.34	43,504,736	398,308	9.16	1,308,767	100·00

The annual production of common and pressed brick, as ascertained by the Ontario Bureau of Mines, is shown in the following table. The figures differ only slightly from those reported directly to the Mines Branch.

Building Brick Made in Ontario since 1898.

(As ascertained by the Ontario Bureau of Mines.)

	Common brick.			Pressed brick.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
1898	170,000	$ 914,000	$5.376	$ 8,970	$100,344	$11.187
1899	233,898	1,313,750	5.617	10,808	105,000	9.715
1900	240,430	1,379,590	5.738	11,562	114,419	9.896
1901	259,265	1,530,460	5.903	12,846	104,394	8.127
1902	220,500	1,411,000	6.399	19,755	144,171	7.298
1903	230,000	1,561,700	6.790	23,703	218,550	9.220
1904	200,000	1,430,000	7.150	26,857	226,750	8.443
1905	250,000	1,937,500	7.750	26,000	234,000	9.000
1906	300,000	2,157,000	7.190	39,860	337,795	8.475
1907	273,882	2,109,978	7.704	69,763	648,683	9.298
1908	222,361	1,575,875	7.087	56,167	485,819	8.649
1909	246,308	1,916,147	7.779	53,167	490,571	9.227
1910	304,988	2,374,287	7.785	44,204	458,596	10.375
1911	354,546	2,801,971	7.903	52,764	564,630	10.701
1912	385,000	3,178,250	8.255	65,598	634,169	9.667
1913	408,808	3,452,352	8.445	81,238	919,741	11.321
1914	294,400	2,336,207	7.935	61,934	656,944	10.607
1915	91,967	763,591	8.30	24,836	217,350	8.751
1916	58,541	498,896	8.52	(a)		

(a) Not separately stated.

In addition to the ordinary clay-building brick, there were produced in this Province, in 1916, ornamental brick, valued at $17,102, and fire-proofing valued at $218,345. In 1915 the production of ornamental brick was valued at $12,140, and of fire-proofing and terra cotta $41,040.

Manitoba.—All the western provinces showed an increase in brick sales. In Manitoba the total sales were 9,021,744 valued at $93,448, as compared with sales in 1915 of 8,630,411, valued at $87,194. Stocks on hand at the end of December 1916 were reported as 6,017,000 brick. The principal brick-making plants are at Winnipeg, St. Boniface, Lac du Bonnet, Portage la Prairie, Sidney, Balmoral, Learys, and Neepawa.

Saskatchewan.—The total sales of clay-building brick in Saskatchewan in 1916 were 7,181,145, valued at $65,376, as against sales in 1915 of 4,607,045, valued at $43,601. Stocks on hand at the end of 1916 were 3,502,000. The principal clay plants operated were at Estevan, Shand, Prince Albert, Arcola, Meota, Clay Bank, Pilot Butte, Verigin, and Broadview.

Alberta.—The total sales of clay-building brick in 1916 were 10,148,211, valued at $98,782, as compared with sales in 1915 of 5,094,301, valued at $45,649, and stocks on hand at the end of 1916 amounted to 6,919,000 brick. In addition to ordinary building-brick, there was a production of fireproofing brick, valued at $53,334, as compared with $30,263 in 1915. The principal centres of production were: Edmonton, Medicine Hat, Redcliff, Lethbridge, and Sandstone.

British Columbia.—The total sales of brick in this Province in 1916 were reported as 4,836,415, valued at $41,771, as against sales in 1915 of 4,724,372, valued at $48,685, while stocks on hand at the end of the year were 6,936,000 brick. There was also a production of fireproofing brick, valued at $6,839, as against a value of $24,983 in 1915. The principal centres of brick manufacture were: Grand Forks, Clayburn, Kilgard, Port Haney and vicinity, Victoria, Sydney, and East Wellington.

CLAY-PAVING BRICK.

The total production of paving bricks and paving blocks in Canada in 1916 was reported as 1,589,893, valued at $30,144, or an average value of $18.96 per thousand, as compared with 1,227,647 valued at $20,694, or an average value of $16.85 per thousand in 1915.

This paving brick is made chiefly at West Toronto, Ontario, from shale obtained from the banks of the Humber river, although during the past three years there has also been a small production reported from Clayburn, British Columbia.

The annual production has, for a number of years, varied from 3,000,000 to over 5,000,000 per season; and the Ontario output finds a market chiefly in Toronto.

Statistics of production since 1897 are shown in the next table.

The imports of paving brick during the past five years have considerably exceeded the domestic production. During the calendar year 1916 the imports were: 5,667,000, valued at $70,268, or an average value of $12.40 per thousand, and included: 4,772,000 valued at $57,524, or an average of $12.05, from the United States, and 895,000, valued at $12,774, or an average of $14.24 from Great Britain.

The total imports during the calendar year 1915 were 5,865,000, valued at $76,759, or an average value of $13.09 per thousand, and included 4,747,000, valued at $61,468, or an average of $12.95 from the United States, and 1,118,000, valued at $15,291, or an average value of $13.68 from Great Britain.

Annual Production of Paving Brick.*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
1897	4,568	$45,670	$10.00	1907	3,618	$72,354	$20.00
1898	.....	.....	.....	1908	3,720	59,456	15.98
1899	5,300	42,550	8.03	1909	3,760	67,408	17.93
1900	2,710	26,950	9.94	1910	4,215	78,980	18.74
1901	3,689	37,000	10.03	1911	5,220	79,444	15.22
1902	4,211	42,000	9.97	1912	4,580	85,989	18.78
1903	3,789	45,288	11.95	1913	4,208	75,669	17.98
1904	4,436	55,450	12.50	1914	2,707	49,627	18.33
1905	4,500	54,000	12.00	1915	1,228	20,694	16.85
1906	3,000	45,000	15.00	1916	1,590	30,144	18.96

*Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
Fiscal Year.				Calendar Year.			
1895	275	$ 5,006	$18.20	1907	5,438	$ 62,570	$11.51
1896	918	10,132	11.04	1908	.....	100,013	.....
1897	52	719	13.83	1909	.....	139,336	.....
1898	367	2,337	6.37	1910	10,503	124,994	11.90
1899	1,583	23,648	14.94	1911	11,450	164,292	14.34
1900	2,175	35,644	16.39	1912	11,793	106,663	13.62
1901	900	10,414	11.57	1913	13,035	176,497	13.54
1902	1,030	16,788	16.30	1914	9,069	145,063	16.00
1903	1,337	18,811	14.07	1915	5,865	76,759	13.09
1904	1,986	29,753	14.98	1916	5,667	70,268	12.40
1905	3,350	32,578	13.86				
1906	4,104	46,008	11.21				

FIRECLAY AND FIRECLAY PRODUCTS.

There are a number of clays from different parts of Canada that have been used in the manufacture of refractory brick, or firebrick, and for furnace linings, etc., which have been usually termed "fireclays." These include clays found with the coal measures at Westville, Sydney Mines, and North Sydney, N.S., and at Comox, V.I., also clays found south of Moosejaw, at Claybank, Sask., at Clayburn, near the city of Vancouver, B.C., and at Kilgard, B.C. Stove linings and other refractory clay products are made at several places in Ontario and Quebec from imported clays.

The total value of the sales of fireclay, firebrick, and fireclay products in 1916 was $234,562, as compared with a valuation of $110,693 in 1915. There was, in addition, in 1916, a production of fireclay products valued at $22,484 reported as being made from imported clays.

The production in 1916 included fireclay, or refractory clay sold as such, 9,206 tons, valued at $30,767; firebrick 5,688,511, valued at $147,757, or an average of $25.97 per thousand; and other fireclay products valued at $56,038.

The production in 1915 included fireclay and refractory clay sold as such 2,328 tons, valued at $12,065; firebrick 2,895,640, valued at $68,700, or an average of $23.73 per thousand; and other fireclay products valued at $29,928.

The imports of firebrick during the calendar year 1916 were valued at $1,657,792, of which $1,495,868 was from the United States, and $161,924 from Great Britain.

The imports of firebrick during the calendar year 1915 were valued at $813,071, of which $718,299 was from the United States, $93,926 from Great Britain, and $846 from other countries.

Fireclay was imported during the calendar year 1916 to the value of $187,124, as compared with a value of $87,267 in 1915; $90,233 in 1914; and $143,399 in 1913.

Statistics of the annual production since 1907 of firebrick, refractory clay or fireclay, sold as such, and of fireclay products; and statistics of the imports of firebrick and fireclay are shown in the following tables:—

Production of Fireclay and Fireclay Products.

Year.	Firebrick.			Fireclay.			Other fireclay products.	Total value.
	No. sold.	Value.	Per M.	Tons.	Value.	Per ton.	Value.	
1907	4,323,179	$113,322	$26.21	.....	.....	.....	$18,000	$131,322
1908	2,415,871	70,429	29.16	1,984	$8,121	$4.09	31,752	110,302
1909	1,059,270	32,742	30.92	4,405	12,390	2.81	33,000	78,132
1910	1,375,400	21,352	21.34	1,425	5,863	4.11	15,000	50,215
1911	2,367,937	44,122	18.63	7,532	24,128	3.20	20,880	89,130
1912	3,429,594	67,192	19.59	6,307	24,343	3.86	34,050	125,585
1913	3,667,276	86,164	23.50	3,345	14,018	4.19	42,556	142,738
1914	2,815,690	72,299	25.67	2,171	12,875	5.93	22,394	107,568
1915	2,895,640	68,700	23.73	2,328	12,065	5.18	29,928	110,693
1916	5,688,511	147,757	25.97	9,206	30,767	3.34	56,038	234,562

Imports of Firebrick and Fireclay.

Fiscal Year.	Fireclay.	Firebrick.	Calendar Year.	Fireclay.	Firebrick.
1900	$ 59,291	$ 39,535	1909	$ 86,161	$ 485,994
1901	79,530	32,831	1910	124,293	811,927
1902	64,541	45,608	1911	125,199	814,414
1903	94,509	34,522	1912	140,500	953,621
1904	52,716	38,335	1913	143,399	1,192,857
1905	73,837	44,746	1914	90,233	690,133
1906	131,130	51,892	1915	87,267	813,071
1907 Calendar Year	152,485	641,811	1916	187,124	1,657,792
1908	86,879	380,905			

SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1916 was $716,287, as compared with a value of $799,446 in 1915, $1,104,499 in 1914, and $1,035,906 in 1913. About 45 per cent of the production in 1916 was made in Ontario.

Following is a list of firms reporting production of sewerpipe in 1916:—

Standard Clay Products, Limited, St. Johns, Que., and New Glasgow, N.S.
Ontario Sewerpipe Company, Mimico, Ont.
Dominion Sewerpipe Company, Swansea, Ont.
Hamilton and Toronto Sewerpipe Company, Hamilton, Ont.
Alberta Clay Products Company, Medicine Hat, Alta.
Kilgard Fireclay Company, Kilgard, B.C.
The Clayburn Company, Limited, Clayburn, B.C.
British Columbia Pottery Company, Victoria, B.C.

The imports of drainpipe and sewerpipe during 1916 were valued at $40,233, of which $30,814 were imported from the United States, and $9,419 from Great Britain.

The total imports during 1915 were valued at $41,801, of which $28,496 were imported from the United States, and $13,305 from Great Britain.

The total sales of drain tile in Canada in 1916 as reported to this Branch were valued at $359,387, as compared with sales of $355,296 in 1915 and $366,340 in 1914. The greater part of this production is in Ontario; the sales in this Province as reported by the producers being 20,205,837, valued at $343,677, as against 18,812,712, valued at $341,467 in 1915.

The Ontario Bureau of Mines reports the total number of drain tile made in that Province during 1916, as 16,562,000, valued at $302,080, or an average of $18.24 per thousand, as compared with 17,837,000, valued at $321,253, or an average of $18.01 per thousand in 1915.

The imports of unglazed tile are comparatively small, the value during the calendar year 1916 being $2,072, as compared with $346, in 1915, and $2,941 in 1914.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe, are shown in the next three tables:—

Production of Sewerpipe.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1888	$266,320	1898	$181,717	1908	$ 514,362
1889	*	1899	161,546	1909	645,722
1890	348,000	1900	231,525	1910	774,110
1891	227,300	1901	248,115	1911	812,716
1892	367,660	1902	301,965	1912	884,641
1893	350,000	1903	317,970	1913	1,035,906
1894	250,325	1904	440,894	1914	1,104,499
1895	257,045	1905	382,000	1915	799,446
1896	153,875	1906	350,045	1916	716,287
1897	164,250	1907	667,100		

*Not available.

Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

Year.	No.	Value.	Year.	No.	Value.	Year.	No.	Value.
1891	7,500,000	$ 90,000	1900	19,544,000	$209,738	1909	27,418,000	$363,555
1892	10,000,000	100,000	1901	21,592,000	231,374	1910	21,028,000	318,460
1893	17,300,000	190,000	1902	17,510,000	199,000	1911	21,630,000	349,558
1894	25,000,000	280,000	1903	18,200,000	227,000	1912	16,463,000	279,579
1895	14,330,000	157,000	1904	16,000,000	210,000	1913	16,935,000	292,767
1896	13,200,000	144,000	1905	15,000,000	220,000	1914	14,710,000	277,530
1897	*	*	1906	17,700,000	252,500	1915	17,837,000	321,253
1898	22,668,000	225,000	1907	15,578,000	250,154	1916	16,562,000	302,080
1899	21,027,400	240,246	1908	24,800,000	338,622			

*Not stated.

Imports of Drain Tile and Sewerpipe.

Fiscal Year.	Drain tile. (a)	Sewerpipe. (b)	Fiscal Year.	Drain tile. (a)	Sewerpipe. (b)
1880	.....	$33,796	1899	$ 1,817	$ 32,071
1881	.....	37,368	1900	1,383	37,766
1882	.....	70,061	1901	1,264	54,819
1883	.....	70,699	1902	269	55,261
1884	$5,585	66,170	1903	252	57,100
1885	2,911	66,678	1904	1,637	53,958
1886	1,905	56,048	1905	1,229	101,166
1887	2,183	69,020	1906	4,727	131,353
1888	4,290	96,967	Calendar Year.		
1889	2,346	80,869	1907	2,011	130,698
1890	3,780	73,654	1908	2,056	108,189
1891	673	86,522	1909	2,785	170,280
1892	473	59,064	1910	4,485	175,599
1893	110	38,891	1911	5,640	382,929
1894	53	24,572	1912	4,018	507,024
1895	695	20,358	1913	12,156	465,997
1896	339	18,957	1914	2,941	338,533
1897	416	33,870	1915	346	41,801
1898	157	29,454	1916	2,072	40,233

(a) Drain tile, not glazed.
(b) Drain pipes, sewerpipe, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

POTTERY AND EARTHENWARE.

The pottery made from Canadian clays has been, hitherto chiefly of the common grades, such as flower pots, jardinières, crocks, jars, churns, etc. A number of potters made a higher grade product of stoneware, but the majority of these used imported clays. Sanitary ware is made at St. Johns, Que., and at other points, but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitary ware in 1916, according to returns received, was $391,173, of which it is estimated that a value of $330,104 is attributable to imported clays. The total value of the production in 1915 was $317,080, of which a value of $252,180 was credited to imported clays.

Annual statistics of production are shown herewith:—

Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1888	$ 27,750	1898	$ 214,675	1908	$200,541
1889	Not available	1899	185,000	1909	285,285
1890	195,242	1900	200,000	1910	250,924
1891	258,844	1901	200,000	1911	102,493
1892	265,811	1902	200,000	1912	43,955
1893	213,186	1903	200,000	1913	53,533
1894	162,144	1904	140,000	1914	35,371
1895	151,588	1905	120,000	1915	64,900
1896	163,427	1906	150,000	1916	61,069
1897	129,629	1907	253,809		

Details of the imports of earthenware and chinaware showing the values imported and the countries of origin, have already been shown in the general table of imports.

The imports in 1916 were valued at $2,180,414, as compared with a value $1,460,010 in 1915; $2,192,222 in 1914; and $3,314,870 in 1913. These imports are subdivided into eight classes, and in 1916 included: Brown or coloured earthenware, etc., $145,490; C.C., or cream-coloured ware, decorated, printed, sponged, etc., $176,329; demijohns, churns, or crocks, $16,632; tableware of china, porcelain, white granite, etc., $1,566,312; china and porcelain ware, n.o.p., $17,304; tiles or blocks of earthenware or stone prepared for mosaic flooring, $41,189; earthenware tiles, n.o.p., $74,293; manufactures of earthenware, n.o.p., $142,865.

The imports in 1915 included: Brown, or coloured earthenware, etc., $74,864; C.C. or cream-coloured ware, decorated, printed, sponged, etc., $135,425; demijohns, churns, or crocks, $14,752; tableware of china, porcelain, white granite, etc., $1,016,900; china and porcelain ware, n.o.p., $18,312; tiles, or blocks of earthenware, or stone prepared for mosaic flooring, $40,286; earthenware tiles, n.o.p., $92,700; manufactures of earthenware, n.o.p., $66,771.

It will be observed that there has been a large decrease in all but two classes of earthenware and chinaware imported in 1916. Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, France, Japan, and other countries.

Imports of Earthenware and Chinaware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880	$322,333	1893	$ 709,737	1906	$1,692,359
1881	439,029	1894	695,514	1907 (9 mos.)	1,422,880
1882	646,734	1895	547,935	1908	2,190,784
1883	657,886	1896	575,493	Calendar Year.	
1884	544,586	1897	595,822	1909	1,781,759
1885	511,853	1898	675,874	1910	2,283,116
1886	599,269	1899	916,727	1911	2,516,536
1887	750,691	1900	959,526	1912	3,094,956
1888	697,082	1901	1,114,677	1913	3,314,870
1889	697,949	1902	1,275,093	1914	2,192,222
1890	695,206	1903	1,406,610	1915	1,460,010
1891	634,907	1904	1,611,356	1916	2,180,414
1892	748,810	1905	1,636,214		

KAOLIN.

The shipments of kaolin in 1916 were 1,750 tons, valued at $17,500, as compared with 1,300 tons, valued at $13,000 in 1915.

The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, operated by the Canadian China Clay Company of Montreal, and since the beginning of operations, has been as follows:—

Annual Production of Kaolin.

Year.	Tons.	Value.	Average.
1912	20	$ 160	$ 8.00
1913	500	5,000	10.00
1914	1,000	10,000	10.00
1915	1,300	13,000	10.00
1916	1,750	17,500	10.00

The plant for refining the clay is situated 2 miles from St. Remi d'Amherst, and 7 miles from Huberdeau, the terminus of the Montfort Branch of the Canadian Northern Quebec railway—46 miles northwest of Montreal.

The imports of china-clay, ground and unground, into Canada during the twelve months ending December 1916, were 19,062 tons, valued at $114,110, or $5.99 per ton, as against imports of 21,940 tons, valued at $124,658, or $5.68 per ton in 1915.

The imports of earthenware and chinaware, as already noted, were valued at $2,180,414 in 1916, $1,460,010 in 1915, $2,192,222 in 1914, and $3,314,870 in 1913, and consist chiefly of tableware of china, porcelain, etc.

Annual Imports of China-Clay.

Calendar Year.	Tons.	Value.	Value per ton.
1907	13,242	$102,209	$7.72
1908	10,781	87,984	8.16
1909	12,791	100,066	7.82
1910	18,216	142,125	7.80
1911	18,819	125,768	6.68
1912	18,332	127,402	6.95
1913	21,164	149,337	7.06
1914	20,437	150,881	7.38
1915	21,940	124,658	5.68
1916	19,062	114,110	5.99

LIME.

The production of lime which in 1916 amounted to 5,493,250 bushels (equivalent to about 192,264 tons), valued at $1,091,463, or an average of 20 cents per bushel, or $5.75 per ton, shows an increase of 446,006 bushels, or 8·8 per cent over the 1915 production, of 5,047,244 bushels (equivalent to about 176,654 tons), valued at $1,015,702, also an average of 20 cents per bushel.

In 1914 the production was 7,028,582 bushels (equivalent to about 246,000 tons), valued at $1,360,628, an average of 19 cents per bushel, or $5.53 per ton.

Returns were received from 76 firms in 1916, as compared with 78 firms in 1915. The average number of men employed in 1916 was 758, and wages paid $381,365, as against 633 men employed and $293,735 paid in wages in 1915. Statistics in respect to labour and wages in lime production, however, should be used with some discrimination, as many firms producing lime are also engaged in the quarrying of stone for purposes other than lime-burning, and are unable to make separate reports as to labour employed. This is particularly evident in the records from Nova Scotia and New Brunswick, since, for the first mentioned, the record includes only the labour employed at the kilns, while, for the latter, quarry costs are also included.

The average price per bushel of lime sold in 1916 varied from a minimum 18 cents in Ontario to a maximum 34 cents in British Columbia.

Over 84 per cent of the total production in 1916 was derived from Ontario, Quebec, and the Maritime Provinces, as against 88 per cent of the total from these provinces in 1915, 85 per cent in 1914, and 72 per cent in 1912.

The production of hydrated lime, amounting to a total of 9,137 tons, was reported by six firms, viz.: The Standard Lime Company, Limited, Joliette, Que.; The Standard White Lime Company, and The Ontario Reformatory at Guelph, The Elora White Lime Company, Limited, Elora, and The Contractors Supply Company, Limited, Orangeville, in Ontario; and the Pacific Lime Company, Limited, Blubber Bay, B.C.

Lime Production by Provinces, 1916.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	Sales.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
P.E. Island	1	2	$ 81	1,734	$ 546	$ 0.315	0·05
Nova Scotia	1	10	8,956	909,800	181,960	0.200	16·67
New Brunswick	5	82	45,272	424,113	104,635	0.247	9·59
Quebec	21	270	101,121	1,498,845	267,119	0.178	24·47
Ontario	37	278	161,312	2,031,396	367,115	0.181	33·64
Manitoba	5	54	30,232	355,301	83,754	0.236	7·67
Alberta	3	18	7,919	78,019	20,033	0.257	1·84
British Columbia	3	44	26,472	194,042	66,301	0.342	6·07
Total	76	758	381,365	5,493,250	1,091,463	0.199	100·00

Lime Production by Provinces, 1915.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	Sales.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
Nova Scotia	1	10	$ 4,802	915,086	$ 183,017	$0.200	18·02
New Brunswick	5	77	39,572	369,117	93,797	0.254	9·23
Quebec	20	209	100,449	1,351,306	274,831	0.203	27·06
Ontario	40	240	97,298	1,903,914	328,515	0.173	32·34
Manitoba	5	55	27,948	281,432	71,372	0.254	7·03
Alberta	4	22	8,288	74,152	14,445	0.195	1·42
British Columbia	3	20	15,378	152,237	49,725	0.327	4·90
Total	78	633	293,735	5,047,244	1,015,702	0.201	100·00

Lime Production by Provinces, 1914.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	Sales.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
P. E. Island	1	2	$ 61	1,693	$ 542	$0.32	0·04
Nova Scotia	1	15	6,900	516,029	103,206	0.20	7·59
New Brunswick	5	89	47,224	391,739	102,980	0.26	7·57
Quebec	18	258	137,640	1,767,935	389,064	0.22	28·59
Ontario	43	429	224,937	3,393,078	556,850	0.16	40·92
Manitoba	7	123	47,331	526,167	92,898	0.18	6·83
Alberta	6	58	25,963	280,252	58,321	0.21	4·29
British Columbia	4	41	28,275	151,689	56,767	0.37	4·17
Total	85	1,015	518,331	7,028,582	1,360,628	0.19	100·00

Annual Production of Lime by Provinces.

Year.	Nova Scotia.			P. E. Island.			New Brunswick.			Quebec.			Ontario.		
	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.
1906	50,000	$ 13,600	$0.27	.....	.....	.....	405,450	$ 94,290	$0.23	923,563	$201,816	$0.22	2,885,000	$496,785	$0.17
1907	30,000	11,100	0.37	15,000	$4,900	$0.33	554,330	124,786	0.23	1,053,856	262,990	0.25	2,333,879	393,474	0.17
1908	37,500	12,000	0.32	13,568	4,102	0.30	155,748	34,262	0.22	857,700	201,357	0.23	2,087,731	358,507	0.17
1909	37,500	11,250	0.30	20,230	5,479	0.27	697,466	154,151	0.22	1,281,827	315,633	0.25	2,619,553	434,147	0.17
1910	40,000	8,800	0.22	15,750	4,690	0.30	470,050	105·593	0.22	1,227,555	299,126	0.23	2,988,020	476,137	0.16
1911	618,950	123,790	0.20	20,250	6,765	0.33	613,728	132,897	0.22	1,428,392	356,453	0.25	3,360,265	538,902	0.16
1912	684,625	136,930	0.20	24,971	8,191	0.33	616,835	133,742	0.22	1,727,614	474,595	0.27	3,376,193	573,269	0.17
1913	851,050	170,210	0.20	3,762	1,129	0.30	392,985	98,841	0.25	1,616,446	418,008	0.26	3,254,482	573,209	0.18
1914	516,029	103,206	0.20	1,693	542	0.32	391,739	102,980	0.26	1,767,935	389,064	0.22	3,393,078	556,850	0.16
1915	915,086	183,017	0.20	.....	.....	.....	369,117	93,797	0.25	1,351,306	274,831	0.20	1,903,914	328,515	0.17
1916	909,800	181,960	0.20	1,734	546	0.31	424,113	104,635	0.25	1,498,845	267,119	0.18	2,031,396	367,115	0.18

	Manitoba.			Saskatchewan.			Alberta.			B. Columbia.			Canada.		
1906	620,201	119,792	0.19	.....	.....	.....	240,000	56,200	0.23	106,192	26,694	0.25	5,230,406	1,009,177	0.19
1907	431,548	84,793	0.20	3,700	1,480	0.40	173,040	41,225	0.24	159,963	49,847	0.31	4,755,316	974,595	0.20
1908	138,786	24,192	0.17	.....	.....	.....	135,000	34,500	0.26	176,435	44,027	0.25	3,601,468	712,947	0.20
1909	423,954	69,670	0.16	.....	.....	.....	281,125	67,350	0.24	231,269	75,076	0.32	5,592,924	1,132,756	0.20
1910	606,679	100,808	0.17	.....	.....	.....	303,214	69,268	0.23	196,878	72,657	0.37	5,848,146	1,137,079	0.19
1911	706,888	140,629	0.20	.....	.....	.....	434,038	100,407	0.23	351,014	117,756	0.34	7,533,525	1,517,599	0.20
1912	818,237	168,257	0.21	4,000	1,440	0.36	704,035	166,520	0.24	517,329	181,905	0.35	8,475,839	1,844,849	0.22
1913	576,938	107,281	0.19	35,000	10,000	0.29	465,250	115,355	0.25	362,571	115,365	0.32	7,558,484	1,609,398	0.21
1914	526,167	92,898	0.18	.....	.....	.....	280,252	58,321	0.21	151,689	56,767	0.37	7,028,582	1,360,628	0.19
1915	281,432	71,372	0.25	.....	.....	.....	74,152	14,445	0.20	152,237	49,725	0.33	5,047,244	1,015,702	0.20
1916	355,301	83,754	0.24	.....	.....	.....	78,019	20,033	0.26	194,042	66,301	0.34	5,493,250	1,091,463	0.20

Exports and Imports.—The value of the lime exported during the calendar year 1916 was $66,406, the destination being mainly the United States. In 1915 the exports were valued at $15,617. The imports of lime during the calendar year 1916 were 211,780 barrels (21,178 tons), valued at $96,332, or an average of 46 cents per barrel, and were derived chiefly from the United States. The imports during 1915 were 189,774 barrels (18,977 tons), valued at $98,040, or an average of 52 cents per barrel.

Annual statistics of exports and imports are given in the next two tables.

Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1891	$119,853	1900	$ 80,852	1909	$48,821
1892	121,535	1901	99,194	1910	44,762
1893	86,623	1902	116,009	1911	39,536
1894	83,670	1903	131,412	1912	35,097
1895	71,697	1904	73,838	1913	29,234
1896	70,820	1905	85,723	1914	16,927
1897	53,177	1906	57,072	1915	15,617
1898	49,594	1907	55,903	1916	66,406
1899	73,565	1908	43,316		

Imports of Lime.

Year.	Barrels.	Value.	Average value.	Year.	Barrels.	Value.	Average value.
Fiscal Year.				Fiscal Year.			
1880	6,100	$6,013	$0.99	1899	15,720	$ 11,124	$ 0.71
1881	5,796	4,177	0.72	1900	12,865	11,211	0.87
1882	5,064	5,365	1.06	1901	19,657	14,534	0.74
1883	7,623	9,224	1.21	1902	24,602	17,584	0.71
1884	10,804	11,200	1.04	1903	31,108	22,470	0.72
1885	12,072	11,503	0.95	1904	54,359	39,639	0.73
1886	11,021	9,347	0.85	1905	98,676	71,588	0.73
1887	10,835	8,524	0.79	1906	134,334	93,630	0.70
1888	10,142	7,537	0.74	Calendar Year.			
1889	13,079	9,363	0.72	1907	126,285	99,179	0.79
1890	8,149	5,360	0.66	1908	143,270	99,196	0.69
1891	6,259	4,273	0.68	1909	168,357	118,239	0.70
1892	6,132	4,241	0.69	1910	212,502	138,847	0.65
1893	6,879	4,917	0.71	1911	228,538	161,985	0.71
1894	6,766	4,907	0.73	1912	329,925	207,481	0.63
1895	12,008	5,743	0.48	1913	386,693	238,271	0.62
1896	10,239	7,331	0.72	1914	340,828	211,123	0.62
1897	16,108	10,529	0.65	1915	189,774	98,040	0.52
1898	12,850	9,002	0.70	1916*	211,780	96,332	0.46

*Duty 20 per cent.

The Province of Ontario is the principal lime producing province, having in recent years contributed from 30 to 42 per cent of the total output. In 1916 the contribution was 37 per cent of the total production.

Statistics of the annual production of lime in Ontario, as published by the Ontario Bureau of Mines since 1896, are shown in the next table. For the years previous to 1910 these returns are slightly higher than those obtained by the Mines Branch.

Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

Calendar Year.	Bushels.	Value.	Average per bushel.	Calendar Year.	Bushels.	Value.	Average per bushel.
1896.....	1,800,000	$222,000	$0.12	1907.....	2,650,000	$418,700	$0.17
1897.....	.....	.....	.....	1908.....	2,442,331	448,596	0.18
1898.....	2,620,000	308,000	0.12	1909.....	2,633,500	470,858	0.18
1899.....	4,342,500	535,000	0.12	1910.....	2,889,235	474,531	0.16
1900.....	3,893,000	544,000	0.14	1911.....	2,469,773	402,340	0.16
1901.....	4,100,000	550,000	0.13	1912.....	2,297,525	381,672	0.17
1902.....	4,300,000	617,000	0.14	1913.....	2,300,991	390,600	0.17
1903.....	3,400,000	520,000	0.15	1914.....	2,075,228	333,407	0.16
1904.....	2,600,000	406,800	0.16	1915.....	1,340,394	244,953	0.18
1905.....	3,100,000	424,700	0.14	1916*.....	1,367,005	243,942	0·18
1906.....	2,885,000	496,785	0.17				

*Preliminary.

SAND-LIME BRICK.

The first record of the production of sand-lime brick in Canada was obtained for the year 1907 when there was a production by ten firms amounting to 16,492,971 brick, valued at $167,795.

In 1916 the sales were reported as 16,540,747 brick, valued at $126,235, or an average of $7.63 per thousand, as against sales in 1915 of 17,960,802 brick, valued at $141,742, or an average of $7.89 per thousand. During 1916 a decrease in sales is shown. Sales were made very largely from stock since the total number of brick made during the year was reported as only 13,884,400, while stocks at the end of the year amounted to 5,178,175 brick.

Annual Production of Sand-Lime Brick.

Calendar Year.	No. of firms reporting sales.	Number sold.	Value.	Per M.
1907	10	16,492,971	$ 167,795	$10.17
1908	9	17,288,260	152,856	8.84
1909	9	27,052,864	201,650	7.45
1910	13	44,593,541	371,857	8.34
1911	16	51,535,243	442,427	8.58
1912	20	96,448,402	1,020,386	10.58
1913	22	92,586,676	906,665	9.79
1914	21	70,650,030	609,515	8.63
1915	18	17,960,802	141,742	7.89
1916	15	16,540,747	126,235	7.63

SAND AND GRAVEL.

The production of sand and gravel in Canada during 1916, according to returns received by this office, amounted to 8,156,207 tons, valued at $1,838,320, showing an increase in quantity of 1,710,490 tons or 26·5 per cent, and an increase in value of $213,553 or 13·1 per cent, as compared with the production reported for 1915.

The 1916 production included: building sand and sand for concrete and road building, etc., 1,379,319 tons, valued at $475,811; gravel and crushed gravel, 553,125 tons, valued at $162,250; sand and gravel, 1,505,775 tons, valued at $605,280; railway ballast, 4,559,686 tons, valued at $521,189; moulding sand, 19,251 tons, valued at $16,726; and other sands (mostly engine sands), 139,051 tons, valued at $57,064.

Previous to 1912, no attempt had been made by this department to obtain statistics of the production of building sand or of gravel in Canada. In 1912, however, a beginning was made, the returns received showing a production of sand and gravel valued at $1,512,099.

For the year 1913 the collection was extended to include a record of the production of sand and gravel for railroad ballasting, but, at the time of closing the statistics, several important returns had not been received. However, the total value of the production as reported was $2,258,874.

The total value of the production in 1914 as reported was $2,505,310, but it is probable that the record was more complete than for the previous years, which doubtless accounts in large measure for the increase in production shown.

Production of Sand and Gravel, 1916.

Province.	Sand.		Sand and Gravel.		Ballast.		All Other.		Total.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
Nova Scotia	32,719	$ 19,620	67,563	$ 45,262	66,000	$ 13,800	9,289	$ 5,949	175,571	$ 84,631
New Brunswick	80	20	55,350	21,075	747,459	99,768	125	125	803,014	120,988
Quebec	368,915	137,905	26,335	9,336	539,365	65,597	131	46	934,746	212,884
Ontario	930,590	293,375	830,329	271,891	1,808,109	189,176	142,203	64,505	3,711,231	818,947
Manitoba	39,745	20,650	456,093	151,635	659,567	70,181	2,200	986	1,157,605	243,542
Saskatchewan	3,882	3,437	161,514	40,476	161,974	15,793	746	373	328,116	60,079
Alberta	575	230	45,723	16,708	420,034	49,620	1,168	584	467,500	67,142
British Columbia	2,813	574	415,993	211,147	157,178	17,254	2,440	1,222	578,424	230,197
Total	1,379,319	475,811	(a)2,058,900	767,530	4,559,686	521,189	(b) 158,302	73,790	8,156,207	1,838,320

(a) Includes 553,125 tons gravel, valued at $162,250. (b) Includes 19,251 tons moulding sand, valued at $16,726.

Production of Sand and Gravel, 1915.

Province.	Sand.		Sand and Gravel.		Ballast.		All Other.		Total.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
Nova Scotia	21,897	$ 17,441	102,582	$ 38,196	236,500	$ 11,825	7,070	$ 4,359	368,049	$ 71,821
New Brunswick	2,450	1,445	4,220	1,631	316,522	15,938	.....	.....	323,192	19,014
Quebec	399,253	204,745	16,245	4,777	450,575	51,461	.....	.....	866,073	260,983
Ontario	675,208	189,538	522,466	195,303	1,684,902	282,015	150,807	60,570	3,033,383	727,426
Manitoba	29,135	10,537	239,987	140,114	214,772	52,745	350	270	484,244	203,666
Saskatchewan	11,944	10,568	24,450	17,893	75,525	9,745	.....	.....	111,919	38,206
Alberta	2,565	459	32,670	25,916	355,024	20,755	358	67	390,617	47,197
British Columbia	27,304	5,886	395,789	167,305	439,477	82,773	5,670	868,240	490	256,454
Total	1,169,756	440,619	1,338,409	591,135	3,773,297	527,257	164,255	65,756	6,445,717	1,624,767

Annual Production of Sand and Gravel, 1912-1914.

Province.	1912.	1913.	1914.
P. E. Island, Nova Scotia, New Brunswick	$ 13,549	$ 101,201	$ 100,016
Quebec	243,126	638,778	370,713
Ontario	363,668	638,771	833,635
Manitoba	101,653	197,719	314,081
Saskatchewan	255,453	236,377	222,019
Alberta	148,704	265,165	273,115
British Columbia	385,946	180,863	391,731
Total	1,512,099	2,258,874	2,505,310

Statistics of the exports and imports of sand and gravel, are published in the annual reports of the Department of Customs, and the following tables are compiled from this source since 1893. During 1916 there were exported from Canada 1,114,913 tons of sand and gravel, valued at $388,309, while the imports were 233,777 tons, valued at $183,894.

Annual Export of Sand and Gravel.

Calendar Year.	Short Tons.	Value.	Average per ton.	Calendar Year.	Short Tons.	Value	Average per ton.
1893	329,116	$121,795	$0.37	1905	306,935	$152,805	$0.50
1894	324,656	86,940	0.27	1906	336,550	139,712	0.41
1895	277,162	118,359	0.43	1907	298,095	119,853	0.40
1896	224,769	80,110	0.36	1908	298,954	161,387	0.54
1897	152,963	76,729	0.50	1909	481,584	256,166	0.53
1898	165,954	90,498	0.55	1910	624,824	407,974	0.65
1899	242,450	101,640	0.42	1911	573,494	408,110	0.71
1900	197,558	101,666	0.51	1912	660,090	459,952	0.70
1901	197,302	117,465	0.60	1913	644,633	440,956	0.68
1902	159,793	119,120	0.75	1914	952,370	802,358	0.84
1903	355,792	124,006	0.35	1915	808,022	380,549	0.47
1904	399,809	129,803	0.32	1916	1,114,913	388,309	0.35

Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Average value.	Fiscal Year.	Tons.	Value.	Average value.
1893	26,065	$ 31,739	$ 1.22	1906	116,500	$173,727	$1.49
1894	41,573	33,506	0.81	Calendar Year.			
1895	19,609	24,779	1.26	1907	265,912	223,968	0.84
1896	18,953	24,604	1.30	1908	133,665	135,348	1.01
1897	21,308	25,222	1.18	1909	151,323	153,778	1.02
1898	32,148	43,287	1.35	1910	195,796	196,766	1.00
1899	30,288	42,209	1.39	1911	241,375	246,613	1.02
1900	35,713	41,280	1.16	1912	532,721	445,781	0.84
1901	35,749	42,891	1.20	1913	439,673	440,343	1.00
1902	47,381	58,668	1.24	1914	273,812	224,759	0.82
1903	91,518	95,647	1.05	1915	199,597	120,756	0.60
1904	110,634	107,547	0.97	1916	233,777	183,894	0.79
1905	85,339	92,722	1.09				

SLATE.

There is a small annual production of slate in Canada, obtained from the New Rockland quarries, Melbourne township, Richmond county, operated by Messrs. Frazer and Davies.

The production in 1916 was 1,262 squares, valued at $6,223, as compared with a production in 1915 of 397 squares, valued at $2,039, and of 1,075 squares, valued at $4,837 in 1914.

Annual Production of Slate.

Calendar Year.	Quantity.	Value.	Calendar Year.	Quantity.	Value.
1886*	5,345	$ 64,675	1902	.....	$19,200
1887	7,357	89,000	1903*	5,510	22,040
1888	5,314	90,689	1904	5,277	23,247
1889	6,935	119,160	1905	.....	21,568
1890	6,368	100,250	1906	.....	24,446
1891	5,000	65,000	1907	4,335	20,056
1892	5,180	69,070	1908	2,950	13,496
1893	7,112	90,825	1909	4,000	19,000
1894	.....	75,550	1910	3,959	18,492
1895	.....	58,900	1911	1,833	8,248
1896	.....	53,370	1912	1,894	8,939
1897	.....	42,800	1913	1,432	6,444
1898	.....	40,791	1914	1,075	4,837
1899	.....	33,406	1915	397	2,039
1900	.....	12,100	1916	1,262	6,223
1901	.....	9,980			

*From 1903, in squares; previously, in tons.

No exports of slate have been reported since 1896 with the exception of the years 1908 and 1909.

The imports of slate during the past twelve years ranged from $90,000 to over $200,000 per annum.

The total value of the imports during the calendar year 1916 was $96,776, and included: roofing slate, 4,412 squares, valued at $21,335; school writing slate, $35,887; slate pencils, $11,309; and other slates and manufactures of, $28,245. The total value of the imports during the calendar year 1915 was $108,676, and included: roofing slate, 7,483 squares valued at $34,528; school writing slate, $38,874; slate pencils, $4,954; and other slates and manufactures of, $30,320.

The imports of roofing slate, school writing slate, and manufactures of slate n.o.p., are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come chiefly from the United States.

Imports of Slate during the Years 1913, 1914, 1915, and 1916.

Slate and manufactures of.	1913.	1914.	1915.	1916.
Roofing slate	$ 97,730	$ 91,977	$ 34,528	$ 21,335
School writing slate	51,953	54,723	38,874	35,887
Slate pencils	9,166	6,514	4,954	11,309
Slate of all kinds and manufactures of	76,625	59,444	30,320	28,245
Mantels	.....	598	.....	.....
	235,474	213,256	108,676	96,776

Exports of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1884	539	$6,845	1893	178	$3,168
1885	346	5,274	1894	187	3,610
1886	34	495	1895	36	574
1887	27	373	1896	301	8,913
1888	22	475	1897 to 1907	Nil.	Nil.
1889	26	3,303	1908	.....	2,539
1890	12	153	1909	134	612
1891	15	195	1910 to 1916	Nil.	Nil.
1892	87	2,038			

Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value	Year.	Value.
1880	$21,431	1893	$51,179	Calendar Year.	
1881	22,184	1894	29,267	1907	$134,063
1882	24,543	1895	19,471	1908	120,282
1883	24,968	1986	24,176	1909	135,221
1884	28,816	1897	21,615	1910	142,285
1885	28,169	1898	24,907	1911	169,685
1886	27,852	1899	33,100	1912	200,643
1887	27,845	1900	53,707	1913	235,474
1888	23,151	1901	72,187	1914	213,256
1889	41,370	1902	72,601	1915	108,676
1890	22,871	1903	84,437	1916	96,776
1891	46,104	1904	86,057		
1892	50,441	1905	93,228		
		1906	112,941		

STONE.[1]

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone and flagstone, rubble, riprap, and crushed stone, limestone for furnace flux, sugar factories, etc., but stone used for burning lime or manufacturing cement is not included.

The kinds of stone quarried have been classed as granite (including trap rock, syenite, and other igneous rocks), limestone, sandstone, and marble.

The records are practically confined to quarry operations, and to the production of sawn or polished stone when these operations are carried on by quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals, such as farmers, and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is also used in railway construction work and in road building, of which the record is probably very incomplete.

The total value of the production of stone in 1916, according to returns received was $3,736,412, as compared with a value of $4,244,997 in 1915, showing a falling off of $508,585, or over 12 per cent.

The number of active firms reporting in 1916 was 198, the total number of men employed 4,020, and the total wages paid $2,115,320. In 1915 the number of active firms reporting was 236, the number of men employed 5,144, and the total wages paid $2,188,302.

Of the total value of the 1916 production, limestone contributed $2,224,091, or 59·5 per cent; granite $1,247,267, or 33·4 per cent; sandstone $146,244, or 3·9 per cent; and marble $118,810, or 3·2 per cent.

Stone was used for building purposes to the value of $1,173,642, or 31·4 per cent of the total; monumental and ornamental to the value of $183,086, or 4·9 per cent; curb, paving, and flagstone $77,339, or 2 per cent; rubble 574,929 tons, valued at $413,600, or 11·1 per cent; crushed stone 1,869,344 tons valued at $1,408,515, or 37·7 per cent; and furnace flux 824,110 tons, valued at $480,230, or 12.9 per cent.

By provinces, Quebec shows again the largest output, having a value of $1,370,465, or 36·7 per cent of the total; being made up of limestone

[1] A special investigation has been undertaken by the Mines Branch on the building and ornamental stones of Canada, by Prof. W. A. Parks, of Toronto University, and four reports of this series have been completed as follows:—

No. 100. "The Building Stones of Canada, Vol. I." "Building and Ornamental Stones of Ontario."

No. 203. "Building Stones of Canada, Vol. II." "Building and Ornamental Stones of the Maritime Provinces."

No. 279. "Building Stones of Canada, Vol. III." "Building and Ornamental Stones of the Province of Quebec."

No. 388. "Building Stones of Canada, Vol. IV." "Building and Ornamental Stones of the Provinces Manitoba, Saskatchewan, and Alberta."

to the value of $799,354, granite valued at $422,297, marble $118,810, and sandstone $30,004. Ontario takes second place with a production of $857,023, or about 23 per cent of the total, of which limestone is credited with $688,114, granite $135,826, and sandstone $33,083. British Columbia ranks third in order of importance with a total of $564,218, including granite $464,949, sandstone $6,500 and limestone $92,769. The Nova Scotia production was valued at $459,298, comprising limestone $263,803, granite $164,870, and sandstone $30,625. In Manitoba the production, all of which was limestone, was valued at $372,894. New Brunswick is credited with $112,257, made up chiefly of granite and sandstone.

Production of Stone by Provinces, 1916.

Province.	Granite.	Limestone.	Marble.	Sandstone.	Total.	%	Labour.	
							No. men employed.	Wages.
Nova Scotia	$ 164,870	$ 263,803	.....	$ 30,625	$ 459,298	12·3	580	$ 319,983
New Brunswick	59,325	6,900	.....	46,032	112,257	3·0	135	52,046
Quebec	422,297	799,354	$118,810	30,004	1,370,465	36·7	1,729	790,512
Ontario	135,826	688,114	.....	33,083	857,023	22·9	864	439,981
Manitoba	.....	372,894	.....	.....	372,894	10·0	288	198,807
Alberta	.....	257	.....	.....	257	.....	.....	.....
British Columbia	464,949	92,769	.....	6,500	564,218	15·1	424	313,991
Total	1,247,267	2,224,091	118,810	146,244	3,736,412	100·0	4,020	2,115,320
Per cent	33·4	59.5	3·2	3·9				

Production of Stone by Provinces, 1915.

Province.	Granite.	Limestone.	Marble.	Sandstone.	Total.	%	Labour.	
							No. men employed.	Wages.
Nova Scotia	$ 79,636	$ 255,024	.....	$ 33,264	$ 367,924	8·7	659	$ 233,396
New Brunswick	8,335	.....	.....	145,177	153,512	3·6	192	74,845
Quebec	594,744	1,189,633	$145,400	36,417	1,966,194	46·3	2,638	1,045,280
Ontario	140,894	634,728	10,927	19,588	806,137	19·0	1,009	371,218
Manitoba	351	153,113	.....	.....	153,464	3·6	148	94,785
Alberta	.....	.....	.....	890	890	.....	8	700
British Columbia	701,593	79,583	1,700	14,000	796,876	18·8	490	368,078
Total	1,525,553	2,312,081	158,027	249,336	4,244,997	.....	5,144	2,188,302
Per cent	35·9	54·5	3·7	5·9	.....	100·0	.....	.....

Production of Stone by Kinds and by Provinces Showing Purposes Used, 1916.

By kinds.	Building.	Ornamental and monumental.	Paving and curbstone.	Rubble.		Crushed.		Furnace Flux		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	
Granite	$ 507,139	$ 75,577	$ 67,476	396,203	$ 299,910	424,873	$ 297,165	.....	.....	$ 1,247,267
Limestone	629,650	3,158	1,673	104,049	60,161	1,387,235	1,049,219	824,110	$ 480,230	2,224,091
Marble	.....	103,400	.....	.....	.....	27,464	15,410	.....	.....	118,810
Sandstone	36,853	951	8,190	74,677	53,529	29,772	46,721	.....	.....	146,244
By Provinces.										
Nova Scotia	107,202	1,586	5,515	76,652	62,342	13,970	22,510	465,831	260,143	459,298
New Brunswick	6,970	55,745	1,230	58,428	41,412	2,300	6,900	.....	.....	112,257
Quebec	445,091	119,239	49,716	48,020	32,393	800,407	724,026	.....	.....	1,370,465
Ontario	70,734	6,416	20,878	60,754	29,480	977,113	602,197	188,820	127,318	857,023
Manitoba	358,112	.....	.....	5,732	4,876	14,020	9,906	.....	.....	372,894
Alberta	.....	.....	.....	.....	.....	643	257	.....	.....	257
British Columbia	185,533	100	.....	325,343	243,097	60,891	42,719	169,459	92,769	564,218
Total	1,173,642	183,086	77,339	574,929	413,600	1,869,344	1,408,515	824,110	480,230	3,736,412
Per cent	31·4	4·9	2·0	.....	11·1	.....	37·7	.....	12·9	.....

Production of Stone by Kinds and by Provinces Showing Purposes Used, 1915.

By kinds.	Building.	Ornamental and monumental.	Paving and curbstone.	Rubble.		Crushed.		Furnace Flux.		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	
Granite	$ 487,599	$ 80,377	$ 88,474	569,410	$ 407,842	541,811	$ 461,261	.....	.....	$ 1,525,553
Limestone	400,017	68,973	27,539	155,961	102,250	1,828,365	1,279,480	814,854	$433,822	2,312,081
Marble	143,321	.....	.....	.....	.....	25,039	14,706	.....	.....	158,027
Sandstone	51,386	680	22,091	191,513	147,032	20,015	28,147	.....	.....	249,336
By Provinces.										
Nova Scotia	16,464	18,700	4,531	43,064	23,846	77,941	52,633	481;346	251,750	367,924
New Brunswick	24,475	8,080	935	144,343	120,022	.....	.....	.....	.....	153,512
Quebec	566,693	116,599	102,635	98,044	75,427	1,272,934	1,104,730	110	110	1,966,194
Ontario	84,580	5,151	29,503	65,782	34,842	937,072	546,193	176,021	105,868	806,137
Manitoba	118,028	.....	.....	19,871	14,592	31,545	20,844	.....	.....	153,464
Alberta	390	.....	500	.....	.....	.....	.....	.....	.....	890
British Columbia	271,693	1,500	.....	545,780	388,395	95,738	59,194	157,377	76,094	796,876
Total	1,082,323	150,030	138,104	916,884	657,124	2,415,230	1,783,594	814,854	433,822	4,244,997
Per cent	25·5	3·5	3·3	.....	15·5	.....	42·0	.....	10·2	100·0

Exports and Imports.—The exports of stone from Canada in 1916 were valued at $143,988, as against $72,777 in 1915, and $72,080 in 1914. The principal item in the export of stone during the past few years was building stone, unwrought, of which the exports in 1916 were 128,453 tons, valued at $103,796. There was also an export of ornamental granite, marble, etc., unwrought, of 15,967 tons, valued at $7,989; crushed stone 26,754 tons, valued at $27,611, and dressed stone of all kinds valued at $4,592.

The exports of the several classes of stone during the past three years as shown by the Customs record, were as follows:—

Exports of Stone during the Calendar Years 1914, 1915, and 1916.

	1914.		1915.		1916.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
Crushed	25,130	$18,153	42,716	$24,453	26,754	$ 27,611
Ornamental, granite, marble, etc., unwrought	231	5,607	29,976	12,764	15,967	7,989
Building, freestone, limestone, etc., unwrought	63,009	46,198	35,804	28,910	128,453	103,796
Stone of all kinds, dressed	.....	2,122..	.....	6,650	.....	4,592
	.....	72,080..	.....	72,777..	.....	143,988

Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
1890	$21,725	$ 43,611	1904	$ 4,760	$ 17,802
1891	13,398	46,162	1905	3,545	13,089
1892	7,698	47,424	1906	23,097	4,675
1893	9,102	12,532	1907	4,233	3,087
1894	22,576	34,130	1908	15,194	36,820
1895	8,587	51,616	1909	33,598	24,087
1896	4,934	32,897	1910	5,352	22,219
1897	9,415	42,034	1911	1,436	26,899
1898	2,526	65,370	1912	2,621	30,621
1899	5,092	101,931	1913	7,381	86,459
1900	5,933	115,711	1914	2,122	69,958
1901	5,917	157,739	1915	6,650	66,127
1902	8,632	124,829	1916	4,592	139,396
1903	7,684	46,295			

The imports of stone are classified as: building stone of all kinds, except marble; refuse stone; manufactures of granite and other stone; and marble and its manufactures. The total value of the imports during the calendar year 1916 was $587,304, as compared with a value of $539,173 in 1915, showing a slight increase. The imports during 1916 comprised: building stone (rough), valued at $68,939; building stone (dressed) $43,410; granite and manufactures of granite $133,229; marble and manufactures of, $171,849; and refuse stone 363,682 tons, valued at $169,877.

The total value of the imports from the United States in 1916 was

$437,310; Great Britain $90,100; Italy $386; and from other countries $59,508.

The imports during 1915 comprised: building stone (rough) valued at $54,249; building stone (dressed) $57,761; granite and manufactures of granite $179,604; paving blocks $584; marble and manufactures of, $152,454 and refuse stone 269,912 tons, valued at $94,521.

The total value of the imports from the United States in 1915 was $401,612; Great Britain $136,153; Italy $483; and from other countries $925.

During both years the imports were derived chiefly from the United States and Great Britain, the United States supplying building stone, paving blocks, marble, and refuse stone principally, and Great Britain mainly manufactures of granite. Marble was obtained also in small quantities from Italy and other countries.

Total Imports of Stone during the Calendar Years 1915 and 1916.

Imports.	1915.		1916.	
	Short Tons.	Value.	Short Tons.	Value.
Building stone, rough[1]	.....	$ 54,249	.....	$ 68,939
Building stone, dressed[2]	.....	57,761	.....	43,410
Refuse stone[3]	269,912	94,521	363,682	169,877
Granite, sawn only	.....	2,350	.....	5,049
Granite, manufactures of	.....	141,831	.....	91,939
Paving blocks	.....	584	.....	.....
Manufactures of stone, n.o.p.	.....	35,423	.....	36,241
Marble and manufactures of—				
Marble, sawn or sand rubbed, not polished	.....	86,640	.....	92,414
Marble, rough, not hammered or chiselled	.....	24,801	.....	35,792
Marble, manufactures of, n.o.p.	.....	41,013	.....	43,643
	.....	539,173	.....	587,304

[1] Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.
[2] Flagstone and all other building stone, sawn, or dressed, or partially dressed.
[3] Stone refuse not sawn, hammered, or chiselled, not fit for flagstone, building stone, or paving.

Imports of Stone, Showing Country of Origin, Calendar Year 1916.

Imports.	Great Britain.		United States.		Italy.	Other countries.
	Short Tons.	Value.	Short Tons.	Value.	Value.	Value.
Building stone, rough[1]	.....	.....	.....	$ 68,939	.....	.....
Building stone, dressed[2]	.....	$ 239	.....	43,171	.....	.....
Refuse stone	20	4	279,884	122,217	.....	$47,656
Granite, sawn only	.....	538	.....	4,511	.....	.....
Granite, manufactures of	.....	83,995	.....	7,944	.....	.....
Paving blocks	.....	.....	.....	.....	.....	.....
Manufactures of stone, n.o.p.	.....	2,118	.....	32,882	.....	1,241
Marble and manufactures of—						
Marble, sawn or sand rubbed, not polished	.....	1,028	.....	88,864	.....	2,522
Marble rough, not hammered or chiselled	.....	.....	.....	35,792	.....	.....
Marble, manufactures of, n.o.p.	.....	2,178	.....	32,990	$386	8,089
Total	.....	90,100	.....	437,310	386	59,508

Annual Imports of Stone.

	Building stone.		Manufactures of granite, etc., paving blocks.	Marble.	Flagstone.*	Total value.
	Rough.	Dressed.				
Fiscal Year.						
1880	$ 32,824	$ 3,146	$ 29,408	$ 63,015	.....	$ 128,393
1881	7,823	50,326	36,877	85,977	$ 241	181,244
1882	32,848	775	37,267	109,505	848	181,243
1883	33,429	1,632	45,636	128,520	99	209,316
1884	46,232	4,856	45,290	108,771	1,158	206,307
1885	28,433	2,058	39,867	102,835	1,756	174,949
1886	36,776	4,899	41,984	117,752	9,443	210,854
1887	47,819	6,549	41,829	104,250	10,966	211,413
1888	84,263	2,110	47,487	94,681	21,077	249,618
1889	89,723	10,591	61,341	118,421	15,451	295,527
1890	126,456	5,699	84,396	99,353	48,995	364,899
1891	151,119	19,771	61,051	107,661	36,348	372,950
1892	85,169	10,381	39,479	106,268	15,048	256,345
1893	47,609	8,901	49,323	96,177	8,500	210,510
1894	48,097	4,811	49,510	94,657	2,429	199,504
1895	37,732	6,550	51,050	83,422	84	178,838
1896	42,737	11,393	51,499	90,065	Nil.	195,694
1897	27,442	11,272	34,026	77,150	227	150,117
1898	25,322	3,173	41,240	95,894	1,540	167,129
1899	43,494	4,546	60,148	104,879	Nil.	210,067
1900	63,376	1,157	57,039	94,017	63	215,652
1901	45,039	1,039	66,639	96,159	116	208,992
1902	69,972	29,102	72,397	130,424	1,231	303,126
1903	71,202	16,664	78,629	153,481	.....	319,976
1904	59,864	33,914	141,165	181,511	.....	416,454
1905	49,004	53,813	150,160	145,466	.....	398,443
1906	66,994	65,134	178,435	189,589	Refuse Stone.†	500,152
Calendar Year.						
1907	73,140	85,683	161,250	254,897	79,371	654,341
1908	64,607	72,575	196,717	245,448	34,746	614,093
1909	102,470	178,087	221,097	182,147	54,428	738,229
1910	125,531	186,064	266,313	267,215	.....	845,123
1911	85,084	307,784	272,512	384,252	91,214	1,140,846
1912	117,037	451,635	309,386	475,926	113,159	1,467,143
1913	105,576	464,540	302,398	577,028	191,307	1,640,849
1914	72,147	252,563	240,015	465,563	222,581	1,252,869
1915	54,249	57,761	180,188	152,454	94,521	539,173
1916	68,939	43,410	133,229	171,849	169,877	587,304

*Included in building stone since 1903.
†Not shown separately previous to Nov. 29, 1906.

GRANITE.

The production of granite, including trap-rock, syenite, etc., in 1916, according to returns received from 62 active firms was valued at $1,247,267, as compared with a production in 1915 by 69 firms, valued at $1,525,553, showing a decreased production in 1916 of $278,286, or over 18 per cent.

The largest production is reported from British Columbia in 1916, the value being $464,949, as against $701,593 in 1915. The value of the production in Quebec was $422,297, as against $594,744 in 1915. Ontario produced granite to the value of $135,826 in 1916, as compared with $140,894 in 1915. Much of the rough stone quarried in New Brunswick, as well as stone imported from Redbeach, Maine, is worked up into finished ornamental and monumental stone in mills at St. George, N.B. The value of

the finished stone produced at this point in 1916 was $113,745, as against value of $95,993 in 1915.

Value of Granite Production by Provinces, 1916.

Province.	Building.	Monumental or ornamental.	Curb, or paving.	Rubble and Riprap.		Crushed.		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	
Nova Scotia.	$ 97,750	$ 785	$ 5,515	62,350	$ 49,470	7,750	$ 11,350	$ 164,870
New Brunswick.	.....	(1) 55,595	1,230	450	2,500	.....	.....	59,325
Quebec.	230,356	15,537	41,226	8,050	4,825	138,305	130,353	422,297
Ontario.	.....	3,560	19,505	10	18	217,927	112,743	135,826
British Columbia.	157,033	100	.....	325,343	243,097	60,891	42,719	464,949
Total.	507,139	75,577	67,476	396,203	299,910	424,873	297,165	1,247,267

(1) Finished stone was produced at St. George to the value of $113,745.

Value of Granite Production by Provinces, 1915.

Province.	Building.	Monumental or ornamental.	Curb, or paving.	Rubble and Riprap.		Crushed.		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	
Nova Scotia.	$ 6,300	$ 18,700	$ 4,531	1,064	$ 746	73,121	$ 49,359	$ 79,636
New Brunswick.	.....	(2) 7,400	935	.....	.....	.....	.....	8,335
Quebec.	223,418	51,599	58,942	17,675	15,586	252,954	245,199	594,744
Ontario.	1,888	1,178	24,066	4,891	3,115	126,780	110,647	140,894
Manitoba.	.....	.....	.....	.....	.....	195	351	351
British Columbia.	255,993	1,500	.....	545,780	388,395	88,761	55,705	701,593
Total.	487,599	80,377	88,474	569,410	407,842	541,811	461,261	1,525,553

(2) Finished stone was produced at St. George to the value of $95,993.

Annual Production of Granite.

Calendar Year.	Short Tons.	Value.	Calendar Year.	Value.
1886	6,062	$ 63,309	1901	$ 155,000
1887	21,217	142,506	1902	210,000
1888	21,352	147,305	1903	200,000
1889	10,197	79,624	1904	150,000
1890	13,307	65,985	1905	226,305
1891	13,637	70,056	1906	278,419
1892	24,302	89,326	1907	194,712
1893	22,521	94,393	1908	282,320
1894	16,392	109,936	1909	454,824
1895	19,238	84,838	1910	739,516
1896	18,717	106,709	1911	1,119,865
1897	19,345	61,934	1912	1,373,119
1898	23,897	81,073	1913	1,653,791
1899	13,418	90,542	1914	2,176,602
1900	.....	80,000	1915	1,525,553
			1916	1,247,267

LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators, nor that of the stone used in the

manufacture of cement, a record of lime and cement production being separately given. With these exceptions, the total value of limestone produced in Canada in 1916 was $2,224,091, as compared with the value of $2,312,081 in 1915, showing a slight decrease.

During 1916 the production of limestone for building purposes was valued at $632,808, as against $468,990 in 1915. The production of curbstone and paving stone was valued at $1,673, as against $27,539 in 1915. The production of rubble and riprap was 104,049 tons, valued at $60,161, as against 155,961 tons, valued at $102,250 in 1915. The production of crushed stone was 1,387,235 tons, valued at $1,049,219, as against 1,828,365 tons, valued at $1,279,480 in 1915. The production of furnace flux was 824,110 tons, valued at $480,230, as against 814,854 tons, valued at $433,822, in 1915.

Limestone Production by Provinces, 1916.

Province.	Building and ornamental.	Curbstone and paving stone.	Rubble and riprap.		Crushed.		Furnace flux.		Total value.
			Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	
Nova Scotia	.....	.....	.....	.....	1,220	$ 3,660	465,831	$260,143	$ 263,803
New Brunswick	.....	.....	.....	.....	2,300	6,900	.....	.....	6,900
Quebec	$215,037	$ 300	39,970	$ 27,568	621,987	556,449	.....	.....	799,354
Ontario	59,659	1,373	58,347	27,717	747,065	472,047	188,820	127,318	688,114
Manitoba	358,112	.....	5,732	4,876	14,020	9,906	169,459	.....	372,894
Alberta	.....	.....	.....	.....	643	257	.....	.....	257
British Columbia	.....	.....	.....	.....	.....	.....	.....	92,769	92,769
Total	632,808	1,673	104,049	60,161	1,387235	1,049,219	824,110	480,230	2,224,091

Limestone Production by Provinces, 1915.

Province.	Building and ornamental.	Curbstone and paving stone.	Rubble and riprap.		Crushed.		Furnace flux.		Total value.
			Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	
Nova Scotia	.....	.....	.....	.....	4,820	$ 3,274	481,346	$251,750	$ 255,024
Quebec	$277,581	$25,693	80,369	$ 59,841	981,535	826,408	110	110	1,189,633
Ontario	73,381	1,846	55,721	27,817	803,683	425,816	176,021	105,868	634,728
Manitoba	118,028	.....	19,871	14,592	31,350	20,493	.....	.....	153,113
British Columbia	.....	.....	.....	.....	6,977	3,489	157,377	76,094	79,583
Total	468,990	27,539	155,961	102,250	1,828,365	1,279,480	814,854	433,822	2,312,081

Production of Limestone by Provinces, 1909-1914.

Province.	1909.	1910.	1911.	1912.	1913.	1914.
Nova Scotia	$ 161,922	$ 192,919	$ 245,216	$ 275,944	$ 258,719	$ 94,239
New Brunswick	30	315	110	.....	.....	.....
Quebec	972,253	962,429	1,296,577	1,187,751	1,307,428	1,326,943
Ontario	639,674	722,763	680,461	862,052	1,196,130	853,906
Manitoba	328,554	328,029	315,782	381,572	382,984	346,258
Alberta	.....	.....	.....	.....	20,000	.....
British Columbia	37,258	43,121	56,780	55,617	38,830	51,435
Total	2,139,681	2,249,576	2,594,926	2,762,936	3,204,091	2,672,781

MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only $45,837 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production, but the opening up of the quarries at Philipsburg, and South Stukely, Que., together with the development of quarries in Ontario, and British Columbia, has resulted in a considerable production of marble during the past nine years. The total value of the production in 1916 was returned as $118,810 comprising: ornamental marble 1,034 tons, valued at $103,400; and crushed 27,464 tons, valued at $15,410; as compared with a total value of $158,027 in 1915.

Annual Production of Marble.

Calendar Year.	Short Tons.	Value.	Calendar Year.	Short Tons.	Value.
1886	501	$9,900	1896	224	$ 2,405
1887	242	6,224	1897 to 1907 inclusive.	Nil.	Nil.
1888	191	3,100	1908	.....	125,000
1889	83	980	1909	.....	158,441
1890	780	10,776	1910	.....	158,779
1891	240	1,752	1911	.....	162,783
1892	240	3,600	1912	.....	260,764
1893	590	5,100	1913	.....	249,975
1894	Nil.	Nil.	1914	.....	132,533
1895	200	2,000	1915	.....	158,027
			1916	28,498	118,810

The imports of marble during the calendar year 1916, were valued at $171,849, as compared with $152,454 in 1915, and $465,563 in 1914.

The annual imports of marbles since 1880 are shown in the general table of imports.

SANDSTONE.

The value of the production of sandstone in 1916 is reported as $146,244, as compared with a value of $249,336 in 1915. A large portion of the sandstone is quarried for building purposes, though large quantities are used for rubble and paving.

Of the production in 1916, building and ornamental stone was sold to the value of $37,804, this amount, including rough stone valued at $36,513, and dressed stone valued at $1,291. The production of rubble and riprap in 1916 was 74,677 tons, valued at $53,529, and of crushed stone 29,772 tons, valued at $46,721.

Of the production in 1915, building and ornamental stone was sold to the value of $52,066. There was included in this amount, rough stone, valued at $40,401, and dressed stone valued at $11,665. The production of rubble and riprap was $91,531 tons, valued at $147,032, and 20,015 tons of crushed stone, valued at $28,147.

Value of Sandstone Production by Provinces, 1916.

Province.	Building and ornamental.	Paving.	Rubble and Riprap.		Crushed.		Total value.
			Short tons.	Value.	Short tons.	Value.	
Nova Scotia	$ 10,253		14,302	$ 12,872	5,000	$ 7,500	$ 30,625
New Brunswick	7,120		57,978	38,912			46,032
Quebec		$ 8,190			12,651	21,814	30,004
Ontario	13,931		2,397	1,745	12,121	17,407	33,083
British Columbia	6,500						6,500
Total	37,804	8,190	74,677	53,529	29,772	46,721	146,244

Value of Sandstone Production by Provinces, 1915.

Province.	Building and ornamental.	Paving.	Rubble and Riprap.		Crushed.		Total value.
			Short tons.	Value.	Short tons.	Value.	
Nova Scotia	$ 10,164		42,000	$ 23,100			$ 33,264
New Brunswick	25,155		144,343	120,022			145,177
Quebec		$18,000			13,406	$18,417	36,417
Ontario	2,357	3,591	5,170	3,190	6,609	9,730	19,588
Alberta	390	500					890
British Columbia	14,000						14,000
Total	52,066	22,091	191,513	147,032	20,015	28,147	249,336

Value of Sandstone Production by Provinces, 1909-1914.

Province.	1909.	1910.	1911.	1912.	1913.	1914.
Nova Scotia	$ 21,850	$ 16,425	$ 23,440	$ 20,645	$ 62,490	$ 61,124
New Brunswick	30,609	51,793	35,337	68,260	70,787	236,647
Quebec			450			17,000
Ontario	62,824	62,247	54,032	59,240	54,738	59,923
Alberta	90,383	240,858	158,344	81,391	136,984	60,272
British Columbia	168,513	130,825	179,580	99,816	71,783	51,774
Total	374,179	502,148	451,183	329,352	396,782	487,140