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CANADA  
DEPARTMENT OF MINES

HON. LOUIS CODERRE, MINISTER; R. G. McCONNELL, B.A., DEPUTY MINISTER.

MINES BRANCH

EUGENE HAANEL, PH.D., DIRECTOR.

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ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

During the Calendar Year

1913

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JOHN McLEISH, B.A.

*Chief of the Division of Mineral Resources and Statistics.*



OTTAWA

GOVERNMENT PRINTING BUREAU

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## LETTER OF TRANSMITTAL.

DR. EUGENE HAANEL,  
Director of Mines,  
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 1913.

A preliminary report on the mineral production during 1913 was sent to press February 27, 1914, and issued within the following week.

Parts of the present report—including a "General Summary of the Mineral Production in Canada during 1913," "Report on the Production of Iron and Steel in Canada during 1913," "Report on the Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals, in Canada during 1913," "Report on the Production of Coal and Coke in Canada during 1913," and "Report on the Production of Cement, Lime, Clay Products, Stone, and Other Structural Materials in Canada during 1913" have already been separately published.

In the preparation of this report, Mr. Cosmo T. Cartwright has again devoted special attention to the metalliferous subjects, having prepared the special chapters on gold, silver, copper, lead, nickel, zinc, and miscellaneous metallic minerals, and Mr. J. Casey has given particular care to the compilation of the statistics.

Free use has been made of the reports published by the Provincial Bureaus of Mines; and grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have, with few exceptions, 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,  
SEPTEMBER 9, 1914.

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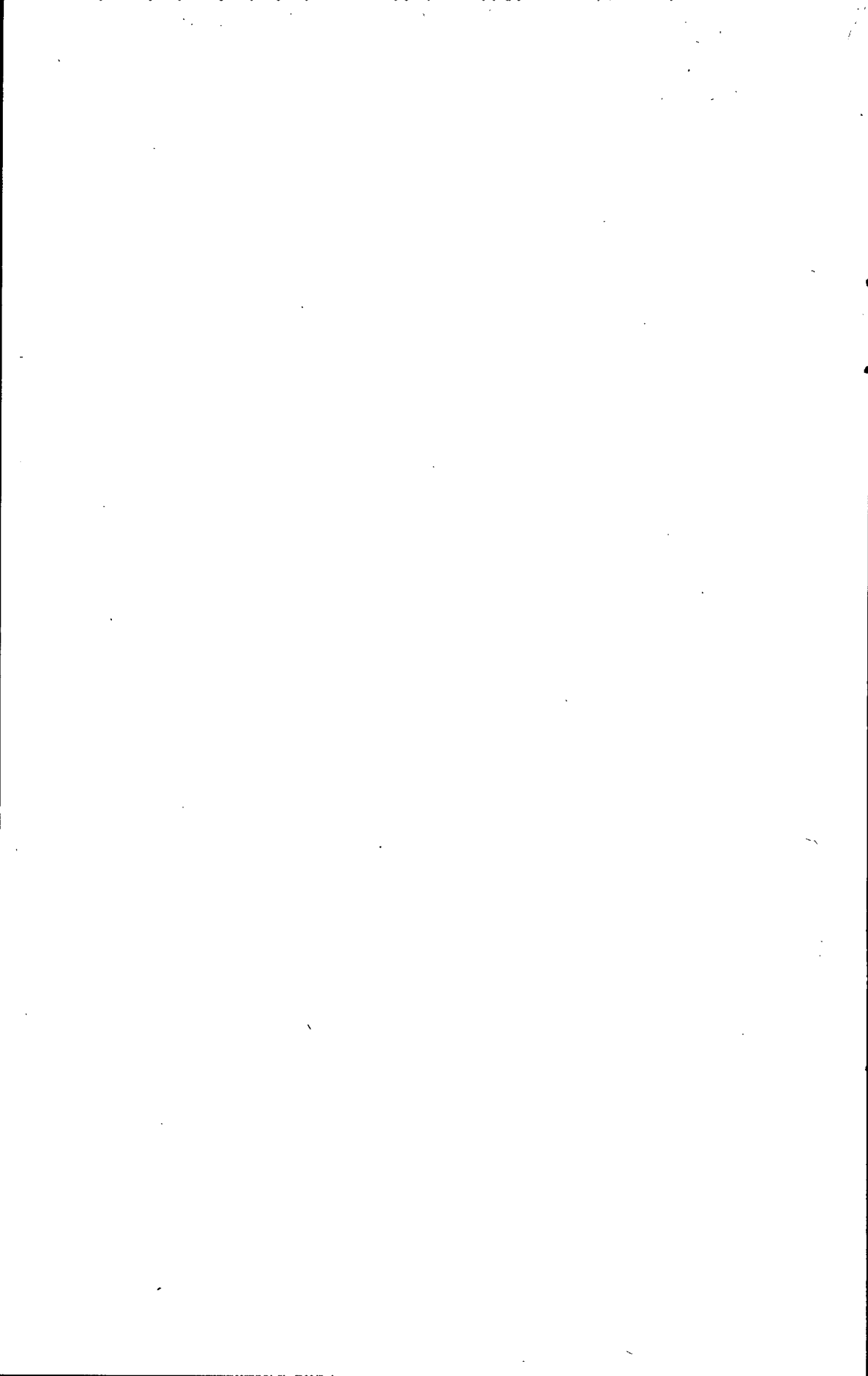
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## EXPLANATORY NOTES.

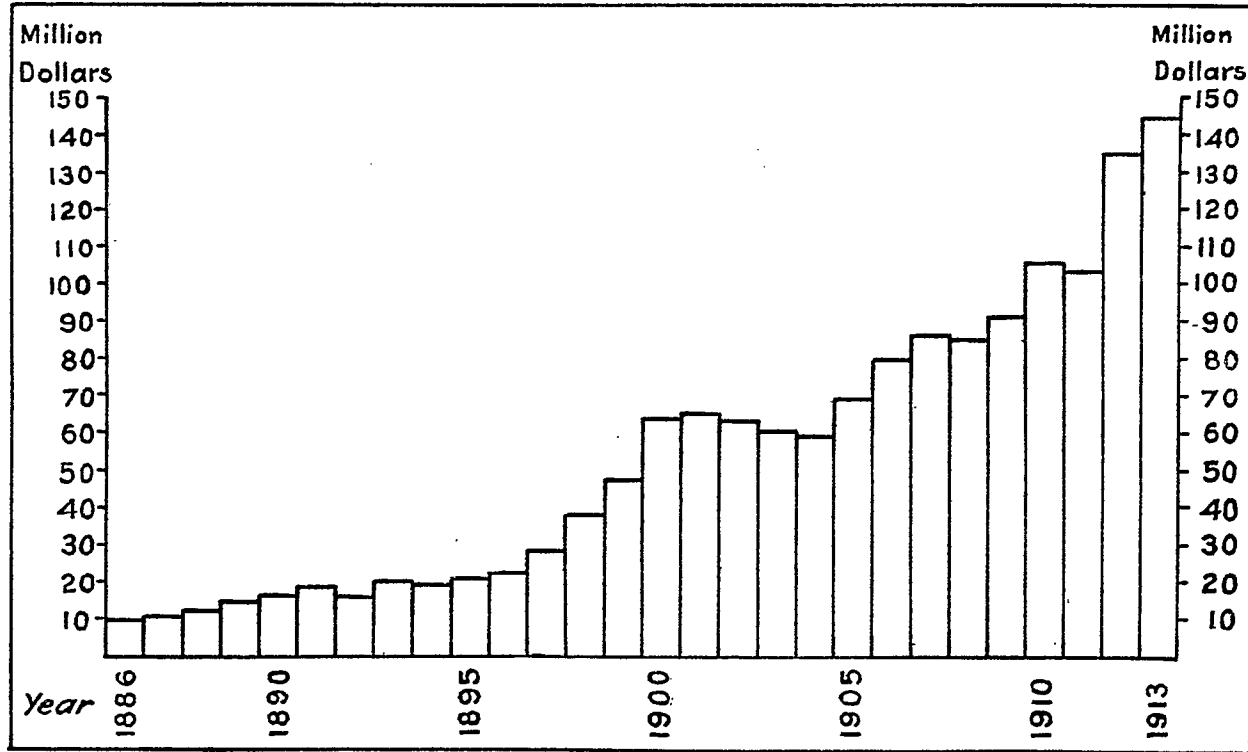
The term "ton" used throughout this report signifies a ton of 2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The Government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal 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. In the case of lead, however the New York price is so much higher than that of London, that the Montreal price—about midway between these two—is now used. The value of non-metallic products is given as at the mine or point of shipment.

*ANNUAL MINERAL PRODUCTION OF CANADA 1886-1913*





THE  
MINERAL PRODUCTION OF CANADA

During the Calendar Year

1913

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**General Summary.**

Broad statements of the mineral production of the country in terms of a total valuation are of chief importance from the point of view of comparison.

The term 'mineral production' is so comprehensive that there is a wide divergence in methods, not only in the compilation of quantities of mineral products, but also in the adoption of a basis of valuation. During the past four years the reports published by this Division have presented results obtained from two methods of compiling statistics of metal production, or the production of metalliferous ores. In the first method which has been the basis of the statistics here shown since 1886, the metallic production is stated in terms of the refined or recoverable metals produced and valued at the values of the refined metals. In the other method a total is compiled on the basis of the values of the ores produced or shipped from the mines in so far as these values are reported or are obtainable, a method which naturally gives a total aggregate value somewhat lower than that of the refined product. In both methods the non-metallic products are similarly compiled, viz.: on the general basis of the products and their values as used or marketed, with certain important exceptions; coal for instance being included as coal, notwithstanding that a portion of the output may be made into and sold as coke by some of the colliery operators.

No matter what method may be used to arrive at a total, the result is certain to be subject to objection because of some difficulty or inconsistency so that, as already stated, the total value is useful chiefly as a means of comparing the results of one year with those of another and then only in a very general way.

The records of greatest importance in mineral statistics are those showing the quantities of products produced and shipped from mines and works, the home consumption, and the foreign trade, and in this respect it has been endeavoured to make the report as complete as possible.

## Annual Mineral Production in Canada since 1886.

Year.	Value of production.	Value per capita.	Year.	Value of production.	Value per capita.
	\$	\$ cts.		\$	\$ cts.
1886.....	10,221,255	2 23	1900.....	64,420,877	12 04
1887.....	10,321,331	2 23	1901.....	65,797,911	12 16
1888.....	12,518,894	2 67	1902.....	63,231,836	11 36
1889.....	14,013,113	2 96	1903.....	61,740,513	10 83
1890.....	16,763,353	3 50	1904.....	60,082,771	10 27
1891.....	18,976,616	3 92	1905.....	69,078,999	11 49
1892.....	16,623,415	3 39	1906.....	79,286,697	12 81
1893.....	20,035,082	4 04	1907.....	86,865,202	13 75
1894.....	19,931,158	3 98	1908.....	85,557,101	13 16
1895.....	20,505,917	4 05	1909.....	91,831,441	13 70
1896.....	22,474,256	4 38	1910.....	106,823,623	14 93
1897.....	28,485,023	5 49	1911.....	103,220,994	14 42
1898.....	38,412,431	7 32	1912.....	135,048,296	18 27
1899.....	49,234,005	9 27	1913.....	145,634,812	18 77

The total value of the mineral production in Canada in 1913, compiled on the basis of applying to the metals their values when refined, was \$145,634,812 or an average value per capita of \$18.77. The total value compiled on the basis of mine shipments will be referred to under that heading. Notwithstanding the financial depression which became more pronounced as the year progressed, this production shows a very substantial increase over that of the previous year. The total value of the production in 1912 was \$135,048,296 or an average of \$18.27 per capita, compared with which the production in 1913 shows an increase of \$10,586,516 or 7.8 per cent. The 1913 production was not only the largest recorded in aggregate amount, but also the highest per capita, and the increase over the previous year is particularly gratifying in view of the very great advance made in 1912 over all previous years.

The records of the annual mineral production in Canada since 1886 shown in the above table indicate the rapid growth which the mineral industry has made in Canada.

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. Since 1906 the total production has shown an increase of over 80 per cent and an increase of nearly 50 per cent in production per capita.

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 1913 as compared with that of 1912.

### Comparative Statement of Mineral Production for Years 1912 and 1913.

Product.	1912.			1913.			Increase (+) or Decrease (-).		Increase (+) or Decrease (-).		
	Quantity.	Value (a)	Per cent of total.	Quantity.	Value (a)	Per cent of total.	Quantity.	%	Value.	%	
<i>Metallic.</i>											
Cobalt oxide..... Lbs.	{	349,054	156,256	0.24	660,079	525,028	0.48		375,611		
Nickel oxide..... "					268,304	80,561					
Cobalt material, mixed cobalt and nickel oxides..... "		1,285,280	163,988		90,266						
Copper (b)..... "		77,832,127	12,718,548	9.42	76,976,925	11,753,606	8.07	- 855,202	1.10	- 964,942	7.58
Gold..... Ozs.		611,885	12,648,794	9.37	802,973	16,598,923	11.40	+ 191,088	31.23	+ 3,950,129	31.23
Iron pig from Canadian ore (c)..... *Tons		36,355	450,886	0.33	73,508	996,429	0.68	+ 37,153	102.19	+ 545,543	120.99
Iron ore sold for export (k)..... "		118,129	328,950	0.24	216,614	430,561	0.30	+ 98,485	83.37	+ 101,611	30.89
Lead (d)..... Lbs.		35,763,476	1,597,554	1.18	37,662,703	1,754,705	1.21	+ 1,898,227	5.31	+ 157,151	9.84
Nickel (e)..... "		44,841,542	13,452,463	9.96	49,676,772	14,903,032	10.23	+ 4,835,230	10.78	+ 1,450,569	10.78
Platinum..... Crude ozs.					18	489		+	18	+	489
Silver (f)..... Ozs.		31,955,560	19,440,165	14.40	31,845,803	19,040,924	13.07	- 109,757	0.34	- 399,241	2.05
Zinc ore..... Tons.		6,415	215,149	0.16	7,889	186,827	0.13	+ 1,474	22.97	- 28,322	13.16
Total.....		61,172,753	45.30		66,361,351	45.57			+ 5,188,598	8.48	

Comparative Statement of Mineral Production for Years 1912 and 1913.—Continued.

Product.	1912.			1913.			Increase (+) or Decrease (-).		Increase (+) or Decrease (-).				
	Quantity.	Value. (a)	Per cent of total.	Quantity.	Value. (a)	Per cent of total.	Quantity.	%	Value.	%			
<i>Non-metallic.</i>													
		\$	%		\$	%			\$				
Actinolite.....	Tons	92	1,000	66	720	—	26	28.26	280	28.00			
Arsenious oxide.....	"	2,045	89,262	1,692	101,463	0.07	353	17.26	12,201	13.67			
Asbestos.....	"	111,561	3,117,572	2.30	136,951	3,830,909	2.63	+	25,390	22.76	+	713,337	22.88
Asbestic.....	"	24,740	19,707	24,135	19,016	—	605	2.45	691	3.51			
Chromite.....	"												
Coal.....	"	14,512,829	36,019,044	26.67	15,012,178	37,334,940	25.64	+	499,349	3.44	+	1,315,896	3.65
Corundum.....	"	1,960	239,091	0.18	1,177	137,036	0.09	—	783	39.95	—	102,055	42.68
Feldspar.....	"	13,733	30,916	16,790	60,795	+	3,057	22.26	29,879	96.65			
Fluorspar.....	"	40	240	0	0	—	40	—	240	—			
Graphite.....	"	2,060	117,122	2,162	90,282	0.06	102	4.95	26,840	22.92			
artificial.....	"	1,151		1,092		—	59	5.13		—			
Grindstones.....	"	4,412	52,090	4,837	51,325	—	425	9.63	765	1.47			
Gypsum.....	"	578,458	1,324,620	0.98	636,370	1,447,739	0.99	+	57,912	10.01	+	123,119	9.29
Magnesite.....	"	1,714	9,645	515	3,335	—	1,199	69.95	6,310	65.42			
Manganese.....	"	75	1,875	0	0	—	75	—	1,875	—			
Mica.....	"		143,976	0.10		194,304	0.13	—		—	+	50,328	34.96
<i>Mineral pigments—</i>													
Barytes.....	Tons	464	5,104	641	6,410	+	177	38.15	1,306	25.59			
Ochres.....	"	7,654	32,410	5,987	41,774	—	1,667	21.78	9,364	28.89			
Mineral water.....			172,465	0.13		173,677	0.12	—	1,212	0.70			
Natural gas (g).....	M. Ft	15,286,803	2,362,700	1.75	20,477,838	3,309,381	2.27	+	5,191,035	33.96	+	946,681	40.07
Peat.....	Tons	700	2,900	2,600	10,100	+	1,900	271.43	7,200	248.28			
Petroleum (h).....	Bls.	243,336	345,050	0.26	228,030	406,439	0.28	—	15,256	6.27	+	61,389	17.79
Phosphate.....	Tons	164	1,640	385	3,643	+	221	134.76	2,003	122.13			
Pyrites.....	"	81,526	314,085	0.23	158,566	521,181	0.36	+	77,040	94.49	+	207,096	65.94
Quartz.....	"	100,242	195,216	0.14	78,261	169,842	0.12	—	21,981	21.93	—	25,374	13.00
Salt.....	"	95,053	459,582	0.34	100,791	491,280	0.38	+	5,738	6.04	—	31,698	6.90
Talc.....	"	8,270	23,132	12,250	45,980	+	3,980	48.13	22,848	98.77			
Tripolite.....	"	38	230	620	12,138	+	582	—	11,908	—			
Total.....			45,080,674	33.38		48,463,709	33.28		+	3,383,035	7.50		

Structural Materials and Clay Products.		\$	%		\$	%		\$			
Cement, Portland.....	Bls.	7,132,732	9,106,556	6.74	8,658,805	11,019,418	7.57	+ 1,526,073	21.40	+ 1,912,862	21.05
Clay products—											
Brick, common.....	No.	769,191,532	7,010,375	5.19	668,426,675	5,917,373	4.07	-100,764,857	13.10	- 1,093,002	15.59
Brick, pressed.....	"	125,180,422	1,609,854	1.19	116,802,053	1,458,733	1.00	- 9,378,369	7.49	- 151,121	9.39
Brick, paving.....	"	4,579,500	85,989		4,208,295	75,669		- 371,205	8.10	- 10,320	12.00
Brick, moulded and ornamental.....		371,356	8,595		875,355	15,423		+ 503,999	135.71	+ 6,828	79.44
Fireclay, and fireclay products.....			125,585			142,738	0.10			+ 17,153	13.66
Fireproofing and architectural terra-cotta.....			448,853	0.33		461,387	0.32			+ 12,534	2.79
Kaolin.....	Tons	20	160		500	5,000		+ 480		+ 4,840	
Pottery.....			43,955			53,533				+ 9,578	22.30
Sewer-pipe.....			884,641	0.65		1,035,906	0.66			+ 151,265	17.10
Tile, drain.....	No.		357,862	0.26		338,552	0.24			- 19,310	5.40
Lime.....	Bus.	8,475,839	1,844,849	1.37	7,558,484	1,609,398	1.11	- 917,355	10.82	- 235,451	12.76
Sand-lime brick.....	No.	96,448,402	1,020,336	0.76	92,586,676	906,665	0.63	- 3,861,726	4.00	- 113,721	11.14
Sand and gravel (n).....			1,512,099	1.12		2,258,874	1.56			+ 746,775	49.39
Slate.....	Squares	1,894	8,939		1,432	6,444		- 462	24.29	- 2,495	27.91
Stone—											
Granite.....			1,373,119	1.02		1,653,791	1.14			+ 280,672	20.44
Limestone.....			2,762,936	2.04		3,204,091	2.20			+ 441,155	15.96
Marble.....			260,764	0.19		249,975	0.71			- 10,789	4.14
Sandstone.....			329,352	0.24		396,782	0.28			+ 67,430	20.47
Total.....			28,794,869	21.32		30,809,752	21.15			+ 2,014,883	7.00
Grand total.....			135,048,296	100.00		145,634,812	100.00			+10,586,516	7.84

\*Short tons throughout. (a) The metals copper, lead, nickel, and silver 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 16.341 cents per pound, in 1912; and 15.269 cents per pound in 1913. (c) The total production of pig-iron in Canada in 1912 was 1,014,587 tons valued at \$14,550,999, of which it is estimated 978,232 tons valued at \$14,100,113 should be credited to imported ores; in 1913 the total production was 1,128,967 tons valued at \$16,540,012, of which 1,055,459 tons valued at \$15,543,583 are credited to imported ores. (d) Refined lead and lead contained in base bullion exported at 4.467 cents per pound in 1912, and 4.659 cents in 1913, the average prices in Montreal. (e) Nickel content of matte produced valued at 30 cents in 1912 and 1913. (Increasing quantities of nickel-copper matte are now being used in making monel metal which is sold at a price much below that of refined nickel). The value of the nickel contained in matte, as returned by the operators, was about 10 cents per pound for both years. (f) Estimated recoverable silver at 60.835 cents per ounce in 1912, and at 59.791 cents in 1913. (g) Gross returns for sale of gas. (h) Quantity on which bounty was paid and valued at \$1.418 per barrel in 1912, and at \$1.782 in 1913. (k) In 1912 and 1913 figures as reported by the producers, which differ slightly from those of the Trade and Navigation reports. (n) Partial record only of production.

Of the production in 1913, metallic products were valued at \$66,361,351, or 45.5 per cent of the total. Non-metallic products, excluding structural materials, were valued at \$48,463,709, or 33.3 per cent of the total, and structural materials, \$30,809,752, or 21.2 per cent. Compared with 1912 the metallic products showed an increase of nearly 8.5 per cent; non-metallic products an increase of 7.5 per cent, and structural materials an increase of 7 per cent. Amongst metallic products the chief increases were in gold, iron, lead, and nickel, and the principal decreases in copper and silver. Amongst the non-metallic products, the chief increases were in asbestos, coal, feldspar, gypsum, mica, natural gas, pyrites, salt, and talc, and the decreases, in corundum and quartz. In the case of petroleum there was a decrease in the number of barrels produced, but on account of the higher price obtained, an increase in total value.

The structural materials showed increases in the production of cement, stone, and sand and gravel, and decreases in the aggregate production of clay products, and in lime, sand-lime brick, and slate.

Coal still continues as the most important mineral product in Canada, both in point of tonnage and value. The continuance during 1913 of the labour strike at the mines of the Canadian Collieries (Dunsmuir) Ltd., and its extension to the other collieries on Vancouver island, seriously restricted the output, nevertheless this product contributed 25.6 per cent of the total, as against 26.6 per cent in 1912. The metals come next in importance with silver contributing 13.07 per cent of the grand total; gold 11.4 per cent; nickel 10.23 per cent, and copper 8.07 per cent. With the increase in output from the Porcupine district, gold has advanced from fifth to third place in order of value. From 1898 to 1903, or during the period of maximum gold production in the Yukon, gold was in point of value the most important mineral product. The total value of the metals in 1913 was somewhat smaller than it might otherwise have been because of the slightly lower average prices obtained.

With the exception of lead and nickel, all the metals showed a falling off in average price. Copper dropped from 16.341 cents per pound in 1912, to 15.269 cents, a decrease of 1.072 cents. Silver dropped from 60.835 cents per ounce, to 59.791 cents per ounce on the New York market, a loss of 1.044 cents. The average price of spelter in New York decreased from 6.943 cents per pound, to 5.648 cents in 1913, and tin from 46.096 cents per pound in 1912, to 44.252 cents in 1913. The average price of lead in Montreal increased from 4.467 cents per pound in 1912 to 4.659 cents in 1913. There was also an increase in the average price of lead in London. The New York price, however, fell off from 4.471 cents in 1912 to 4.370 cents in 1913.

## Metal Prices.

	1908.	1909.	1910.	1911.	1912.	1913.
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
Copper, New York.....	13-208	12-982	12-738	12-376	16-341	15-269
Lead ".....	4-200	4-273	4-446	4-420	4-471	4-370
" London.....	2-935	2-839	2-807	3-035	3-895	4-072
" Montreal*.....	3-364	3-268	3-246	3-480	4-467	4-659
Nickel, New York.....	43-000	40-000	40-000	40-000	40-000	40-000
Silver ".....	52-864	51-503	53-486	53-304	60-835	59-791
Spelter ".....	4-720	5-503	5-520	5-758	6-943	5-648
Tin ".....	29-465	29-725	34-123	42-281	46-096	44-252

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

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 of the general table, and in the chapter on iron and steel) and the total value thereof in 1913 was exceeded only by the production of coal, copper, and gold. There is also a large production of aluminium from imported ores, for which no value is included in the general table of production.

The production of cement in 1913 constituted 7.57 per cent of the total, clay products 6.4 per cent; stone 4.33 per cent; asbestos 2.6 per cent; and natural gas 2.27 per cent.

## 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 1913 was \$79,803,874, as compared with \$68,590,225 in 1912. This value includes for 1913 mine products to the value of \$59,073,167, and manufactures valued at \$20,730,707, as against mine products valued at \$54,349,640, and manufactures valued at \$14,240,585 in 1912. 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 95 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, 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 1912-1913, and about 21 per cent to Great Britain.

A great variety of mineral products, chiefly in a manufactured or semi-manufactured condition, are annually imported into Canada, and these imports have been increasing with much greater rapidity than has Canada's domestic mineral production. The total value of such imports during the calendar year 1913, was \$252,806,046, as compared with imports valued at \$238,212,835 in 1912; \$181,773,708 in 1911, and \$147,305,012 in 1910. Of the total imports in 1913, over \$58,000,000 was made up of the cruder forms of mineral products such as coal, diamonds unset and bort, iron ore, asphaltum, ores of metals, alumina, sand and gravel, etc., as against \$50,000,000 for similar products in 1912. The imports of iron and steel in 1913 included in this table, were valued at \$134,778,658, as against \$128,321,146 in 1912. Imports of the metals, aluminium, antimony, copper, gold, silver, lead, platinum, tin, and zinc, and manufactures thereof, and metallic alloys, reached a total value of nearly \$26,000,000, as compared with a value of over \$27,000,000 in 1912; petroleum and products of, \$13,238,429, as against \$11,858,533 in 1912; clays and clay products \$6,760,752, as against \$6,592,540 in 1912.

Over 50 per cent of the total imports were in iron and steel products, and the principal increases in imports in 1913 were in coal, iron and steel, and in petroleum and petroleum products.



## EXPORTS.

## Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1912 and 1913.

	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
MINE PRODUCTS.				
		\$		\$
Arsenic..... Lbs.	3,847,906	101,310	2,606,767	107,094
Asbestos..... Tons	88,008	2,349,353	103,812	2,348,047
Asbestos sand.....			24,766	138,737
Barytes..... Cwt.	68	114		
Coal..... Tons	2,127,133	5,821,593	1,562,020	3,961,351
Copper, fine in ore, etc..... Lbs.	76,542,643	8,800,267	81,879,080	9,479,480
“ black or coarse and in pigs..... “	1,945,921	236,212	771,280	123,431
Feldspar..... Tons	12,779	44,114	15,966	62,767
Gold..... \$		10,014,654		12,770,838
Gypsum..... Tons	364,643	423,208	417,302	504,383
Lead, in ore, etc..... Lbs.	299,240	8,193	329,960	9,136
Mica..... “	895,338	334,054	817,152	240,775
Mineral pigments..... “	6,032,640	34,513	3,912,400	18,931
Mineral water..... Gals.	9,690	4,710	3,640	526
Nickel, in ore, etc..... Lbs.	44,221,860	4,661,758	49,459,017	5,195,560
Oil, mineral, crude, etc..... Gals.	18,500	3,994	3,650	379
Oil, refined..... “	36,945	6,147	24,273	3,188
Ores—				
Corundum..... Tons	1,928	205,819	1,077	121,741
Iron..... “	118,129	382,005	126,124	426,681
Manganese..... “	10	300	8	303
Other ores..... “	15,573	530,270	10,835	658,808
Platinum..... Ozs.	92	3,821	153	7,929
Plumbago..... Cwt.	33,074	70,763	32,842	85,368
Pyrites..... Tons	5,938	11,935	46,066	211,640
Salt..... Cwt.	2,892	3,723	4,609	3,047
Sand and gravel..... Tons	660,090	459,952	644,633	440,956
Silver..... Ozs.	34,911,922	19,494,416	37,371,569	21,441,220
Stone, building..... Tons	108,516	28,795	191,981	82,640
“ ornamental..... “	2,339	1,826	1,942	687
“ crushed..... “			4,814	3,126
Other products of the mine.....		311,851		124,392
Total mine products.....		54,349,640		59,073,167

## EXPORTS.

## Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1912 and 1913.—Continued.

	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
MANUFACTURES.				
Acetate of lime.....	Lbs.	14,691,678		322,069
Acid, sulphuric.....	"		2,494,740	15,295
Agricultural implements—				
Cultivators.....	No.	5,059	7,795	201,753
Drills.....	"		10,364	634,121
Harrows.....	"	4,734	100,579	127,482
Harvesters.....	"	15,341	1,634,208	2,439,319
Hay rakes.....	"	6,646	199,092	247,445
Mowing machines.....	"	16,213	562,502	847,253
Parts of.....	\$			915,142
Ploughs.....	No.	13,580	412,460	465,505
Reapers.....	"	3,243	195,155	317,710
Seeders.....	"	70	7,040	
Threshing machines.....	"	761	214,499	712,270
All other.....	"		1,964,071	503,235
Aluminium, in bars.....	Cwt.	182,857	2,002,363	1,762,214
" manufactures of.....	\$		10,898	8,203
Asbestos, manufactures of.....				73,446
Bricks.....	M	694	8,493	8,579
Calcium carbide.....	Lbs.	7,549,137	230,503	153,702
Cement.....	\$		2,436	1,739
Clay, manufactures of.....	"		256	27,201
Coke.....	Tons	57,744	252,763	308,410
Earthenware, and all manufactures of.....	\$		10,001	16,553
Fertilizers.....	\$			2,439,923
Grindstones, manufactured.....	\$		26,535	54,867
Gypsum and plaster ground.....	\$		6,495	5,795
Iron and steel:—				
Castings, N.E.S.....	\$		27,113	61,362
Gas buoys and parts of.....	\$		83,583	35,462
Hardware, tools, etc.....	\$		91,731	101,990
" N.E.S.....	\$		48,474	70,767
Machinery (Linotype machines).....	\$		6,555	9,631
" N.E.S.....	\$		474,996	435,333
Pig-iron.....	Tons	6,976	310,702	351,646
Scrap iron and steel.....	Cwt.	332,641	145,250	483,813
Sewing machines.....	No.	24,158	259,617	114,438
Steel and manufactures of.....	\$		785,731	1,051,004
Stoves.....	No.	1,390	21,110	23,858
Typewriters.....	"	4,025	277,583	201,763
Vehicles—				
Automobiles.....	"	3,028	2,013,734	3,305,382
" parts of.....	\$		105,330	210,623
Bicycles.....	No.	101	9,058	8,058
" parts of.....	\$		54,322	16,901
Washing machines.....	"			15,372
Lime.....	\$		35,097	29,234
Metals:—				
Brass, old and scrap.....	Cwt.		32,144	293,572
Copper.....	"		24,972	324,903
Metallic shingles, etc.....	\$			119,673
Metals, n.o.p.....	\$		261,752	399,792
Mineral and aerated waters (in bottles).....	\$			970
Naphtha and gasoline.....	Gals.	25,791	4,261	4,284
Oil, n.o.p.....	"	397,039	119,686	634,861
Phosphorus.....	Lbs.	543,620	60,806	171,663
Plumbago, manufactures of.....	\$		53,920	73,395
Stone, building.....	\$		103	24,284
" ornamental.....	\$		2,458	7,381
Tar.....	\$		76,261	30,628
Tin, manufactures of.....	\$		69,692	53,783
Total manufactures.....	\$	14,240,535		20,730,707
Grand total.....	\$	68,590,225		79,803,874

## EXPORTS.

Showing Destination of Mine Products during the Fiscal Years,  
1910-11, 1911-12, and 1912-13.

Destination.	1910-11. Value.	1911-12. Value.	1912-13. Value.
<i>British Empire.</i>			
	\$	\$	\$
United Kingdom.....	6,726,015	5,555,599	12,066,622
Australia and Tasmania.....	161,017	178,260	73,283
Bermuda.....	66,525	62,494	5,315
British South Africa.....		10,460	33,415
"    Guiana.....		1,492	37,983
"    India.....	2,768		
"    W. Indies.....	11,904	13,635	15,383
Hong Kong.....	376,553	434,202	491,121
Newfoundland and Labrador.....	580,632	618,766	498,989
New Zealand.....	2,309	1,050	948
Total British Empire.....	7,927,723	6,875,958	13,223,059
<i>Other Countries,</i>			
Alaska.....	392,715	305,086	327,325
Argentina.....	1,333	24,313	66,315
Austria-Hungary.....	720	1,410	32,474
Belgium.....	220,244	101,661	141,924
Brazil.....			54,760
Chili.....		19,669	
China.....	301,870	103,904	511,155
Costa Rica.....	2,376		
Cuba.....	10,161	21,590	8,852
Denmark.....		448	877
Dutch Guiana.....	48		
France.....	116,326	74,487	114,370
French Africa.....			2,127
Germany.....	239,596	248,925	172,966
Haiti.....			843
Holland.....	21,609	5,260	27,529
Italy.....	8,000	4,358	7,430
Japan.....	85,247	58,773	54,976
Mexico.....	302,055	159,345	69,946
Miquelon and St. Pierre.....	24,941	30,205	47,093
Peru.....		3,682	
Philippines.....		2,824	
Portuguese Africa.....		20,340	
Roumania.....			4,791
San Domingo.....	1,000	1,000	
Spain.....		1,471	
Switzerland.....	300	159	
United States.....	33,129,505	33,259,580	42,541,751
Uruguay.....	1,742	68	31,983
Total other countries.....	34,859,838	34,448,558	44,219,487
Grand total.....	42,787,561	41,324,516	57,442,546

## IMPORTS.

## Imports of Products of the Mine and Manufactures of Mine Products—Calendar Years 1912 and 1913.

Products.	1912 Value.	1913 Value.
	\$	\$
Alumina.....	448,061	614,713
Alum, alum cake, and chloralum.....	151,850	198,613
Aluminium and manufactures.....	533,705	745,694
Antimony regulus.....	60,456	49,408
Antimony salts.....	7,197	2,421
Arsenic, oxide and sulphide of.....	21,153	18,820
Asbestos.....	461,449	520,082
Asphaltum.....	863,456	905,829
Bells and gongs.....	110,015	130,351
Bismuth.....	6,378	4,940
Blanc fixe and satin white.....	34,794	38,043
Blast furnace slag.....	110,148	71,114
Borax.....	112,022	104,787
Brick and tile.....	2,255,569	1,928,735
Brick, fire, of a kind not made in Canada, and n.o.p.....	953,621	1,192,857
Bromine and bromides.....	145	385
Burrstones.....	1,409	1,784
Cement, Portland and manufactures.....	1,979,227	427,032
Chalk, Cornwall stone, feldspar, fluorspar, etc.....	167,990	164,879
Clays.....	288,394	324,290
Coal, anthracite, bituminous, slack, and run of mine.....	39,478,037	47,949,119
Coal tar and coal pitch.....	217,861	225,765
Coke.....	1,702,856	2,180,830
Coke, ground for electric batteries.....	4,792	9,942
Copper and manufactures of.....	7,047,356	7,414,610
Cryolite.....	56,591	33,487
Crucibles, clay or plumbago.....	82,324	73,971
Chloride of lime.....	113,346	115,614
Cyanides of potassium, sodium, cyanogen, or cpd of bromine.....	143,978	217,472
Diamonds, unset, and bort.....	3,623,424	3,223,711
Earthenware.....	3,094,956	3,314,870
Earths, crude.....	13,007	9,527
Electric carbons.....	58,951	98,944
Emery.....	177,187	184,649
Fertilizers, compound or manufactured.....	530,351	505,904
Flint, quartz, silic, etc.....	50,571	74,529
Foundry facings.....	23,536	24,226
Fullers earth.....	10,390	13,190
Fossils.....	3,994	3,237
Gannister.....	2,151	1,776
Gold and silver and manufactures of.....	3,618,701	2,736,517
Graphite and manufactures of.....	73,160	82,262
Grindstones.....	112,020	145,247
Gypsum and plaster of Paris.....	268,103	188,252
Hydrofluosilicic acid.....		46,517
*Iron and steel—Total, 1912, \$128,321,146; 1913, \$134,778,658—		
Agricultural implements.....	4,358,074	4,138,893
Bar iron or steel, rolled, whether in coils, bundles, rods or bars.....	3,561,709	4,381,341
Castings, iron or steel, n.o.p.....	1,592,930	1,644,991
Cutlery.....	1,337,732	1,322,054
Engines, locomotive and others.....	5,293,016	5,714,765
Iron, pig.....	3,512,969	3,247,405

\*These statistics of imports of iron and steel have been compiled from the Reports of Trade and Commerce and evidently do not include as many items as the record which has been compiled directly from the Reports of Trade and Navigation for the chapter on Iron and Steel. According to the latter compilation the imports of iron and steel for the twelve months ending December, 1913, were valued at \$141,272,357, and during the twelve months ending March 31, 1913, were valued at \$144,400,940.

## IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products  
Calendar Years 1912 and 1913—Continued.

Products.	1912 Value.	1913 Value.
Iron and steel— <i>Con.</i>	\$	\$
Iron or steel blooms, billets, puddled bars and loops, ingots, clogged ingots, slabs, or other forms, n.o.p., etc.....	1,558,393	1,212,314
Iron or steel rolled, angles, tees, beams, channels, girders, etc.....	6,636,978	10,202,516
“ “ rolled plates, not less than 30" wide or $\frac{1}{2}$ " thick.....	1,750,175	2,744,321
“ “ rolled plate, universal mill or rolled edge bridge plates...	1,153,135	1,812,399
“ “ skelp, sheared or rolled in grooves, etc.....	2,643,010	2,972,094
“ “ sheets, flat galvanized, Canada plates, etc.....	1,539,645	2,654,421
Machines and machinery.....	37,826,662	33,099,458
Steel rails.....	3,761,108	4,886,117
Tubing.....	4,044,377	4,265,875
Tools and implements.....	1,501,799	1,448,166
Wire.....	4,781,714	4,711,570
All other iron and steel and manufactures of.....	41,457,670	44,229,958
Iron ore.....	(b)3,932,074	3,877,324
Iron sand.....	13,347	10,168
Kainite.....	231	1,970
Lead and manufactures; litharge.....	1,806,221	1,215,433
Lime.....	207,481	233,271
Lithographic stone.....	7,081	7,152
Manganese, oxide of.....	27,707	46,990
Magnesia.....	29,641	12,226
Meerscham.....	109	111
Mercury or quicksilver, cinnabar.....	72,171	109,493
Metallic alloys:—		
Babbitt metal.....	49,387	41,112
Brass and manufactures of.....	4,942,531	4,667,768
Britannia metal.....	53,585	43,417
German silver, nickel, and nickel silver.....	172,344	249,192
Type metal.....	1,195	1,981
Mineral and bituminous substances.....	191,241	198,519
Mineral water, including aerated water.....	273,698	257,153
Nickel anodes.....	23,125	8,512
Ochres, etc.....	69,021	233,554
Ores of metals, n.o.p., cobalt ore.....	927,428	894,989
Paraffin wax.....	85,491	72,351
Paraffin candles.....	34,029	37,546
Petroleum and products of.....	11,853,533	13,238,429
Phosphate (fertilizer).....	24,586	16,070
Platinum and manufactures of.....	232,163	145,674
Potash and manufactures of.....	324,964	414,165
Precious stones.....	522,298	360,473
Pumice.....	21,310	17,861
Salt.....	485,950	565,283
Saltpetre.....	100,500	81,797
Sand and gravel.....	445,781	440,343
Slate and manufactures of.....	200,643	235,474
Sand paper.....	189,782	171,516
Soda products: barilla, bichromate, caustic, salt, and salt cake.....	896,070	998,993
Stone and manufactures of (including marble).....	1,467,143	1,640,849
Soda, nitrate of.....	1,537,379	1,645,320
Sulphate of iron (copperas).....	5,178	5,036
Sulphur and phosphorus.....	810,702	638,970
Sulphuric acid.....	35,325	4,054
Talc.....	4,414	10,706
Tin and manufactures of (including tinware).....	6,697,165	7,073,375
Whiting and prepared chalk.....	162,364	151,380
Zinc and manufactures of.....	1,824,519	1,576,943
	\$238,212,835	\$252,806,046

(b) Nine months only.

## METALLIC ORES AND PRODUCTS.

*Antimony.*—There has been no production of antimony during the past two years, and no export of antimony ore is recorded in 1912 or 1913. The imports of antimony or regulus thereof, in 1913, were 667,050 pounds, valued at \$49,408, and of antimony salts 23,649 pounds, valued at \$2,421, or a total value of imports of \$51,829. In 1912, the imports were antimony and regulus 998,045 pounds, valued at \$60,456, and antimony salts 55,683 pounds, valued at \$7,197, or a total value of imports of \$67,653.

*Cobalt.*—Cobalt oxide and cobalt material are being produced in Canadian smelters, the production in 1913 of cobalt oxide being 660,079 pounds valued at \$525,028, nickel oxide 268,304 pounds, valued at \$80,561, and of cobalt residues and mixed oxides to the value of \$90,266 containing 403,882 pounds cobalt and 293,870 pounds nickel. During 1912, the production of cobalt oxide and nickel oxide was 349,054 pounds, valued at \$156,256, and of cobalt material and mixed cobalt and nickel oxides 1,285,280 pounds, valued at \$163,988.

There was an import of 422 hundredweight of cobalt ore valued at \$11,487 during 1913.

*Copper.*—The production of copper contained in blister, matte, or ore, which was practically all exported, was 76,976,925 pounds in 1913, valued at \$11,753,606, as compared with 77,832,127 pounds in 1912, valued at \$12,718,548.

The exports in 1913 were reported as 82,650,360 pounds, valued at \$9,602,911, as against exports of 78,488,564 pounds, valued at \$9,036,479, in 1912. The total imports of copper in 1913 were valued at \$7,414,610; and included crude and manufactured copper to the extent of 43,054,418 pounds, valued at \$7,044,297, together with other manufactures of copper of which the quantity is not recorded, valued at \$370,313. The copper imports in 1912 were valued at \$7,047,356, including 42,832,747 pounds of crude and manufactured copper, valued at \$6,741,895, and other copper manufactures of which the quantity is not recorded, valued at \$305,461.

*Gold.*—The total value of the production of gold in 1913 was \$16,598,923, representing 802,973 fine ounces, as compared with \$12,648,794, representing 611,885 fine ounces of metal in 1912.

The Yukon placer production in 1913 was 282,320 fine ounces, valued at \$5,836,072.

Of the total production in 1913 about \$6,346,072 were derived from alluvial workings; \$5,185,544 as bullion from milling ores, and \$5,067,307 from ores and concentrates sent to smelters. In 1912, \$6,106,677 were derived from alluvial workings; \$2,270,331 as bullion from milling ores, and \$4,271,786 from ores and concentrates sent to smelters.

The exports of gold-bearing dust, quartz, nuggets, and gold in ore, etc., in 1913, were valued at \$12,770,838, as against \$10,014,654 in 1912.

The imports of gold bullion during the calendar year 1913 were \$840,435, of gold coin \$12,495,028, and of manufactures of gold and silver \$1,055,837.

*Pig-Iron.*—The total production of pig-iron in Canadian blast furnaces in 1913 was 1,128,967 tons, valued at \$16,540,012, of which it is estimated 1,055,459 tons, valued at \$15,543,583, should be credited to imported ores, and 73,508 tons, valued at \$996,429, to domestic ores. In 1912 the total production was 1,014,587 tons, valued at \$14,550,999, of which 978,232 tons, valued at \$14,100,113, should be credited to imported ores, and 36,355 tons, valued at \$450,886 to domestic ores.

The exports of pig-iron, including ferro-products, in 1913, were 6,326 tons, valued at \$351,646, as against 6,976 tons, valued at \$310,702, in 1912. The imports of pig-iron in 1913 were 235,843 tons, valued at \$3,234,877, ferro-manganese, etc., 30,355 tons, valued at \$940,443, and charcoal pig 926 tons, valued at \$12,528, as compared with imports in 1912 of pig-iron 272,565 tons, valued at \$3,511,599, ferro-manganese, etc., 19,810 tons, valued at \$469,884, and charcoal pig 115 tons, valued at \$1,370.

The total exports of iron and steel and manufactures thereof, in 1913, were valued at \$13,999,149, as against \$10,682,484 in 1912. The imports of iron and steel and manufactures thereof during the calendar year 1913 were valued at \$141,272,357, as compared with \$144,400,949 during the fiscal year ending March 31, 1913.

*Iron Ore.*—The total shipments of iron ore from Canadian mines in 1913 were 307,634 tons, valued at \$629,843, as compared with 215,883 tons, valued at \$523,315, in 1912. The quantity of imported iron ore used in Canada in 1913 was about 2,110,828 tons, as compared with 2,019,165 tons of imported ore used in 1912.

*Lead.*—The production of lead in 1913 was 37,662,703 pounds, valued at \$1,754,705, as against 35,763,476 pounds, valued at \$1,597,554, in 1912. The exports of lead in 1913 were: lead in ore, etc., 329,960 pounds, valued at \$9,136; while in 1912 the exports were: lead in ore, etc., 299,240 pounds, valued at \$8,193. The total value of the imports of lead and manufactures of, in 1913, was \$1,215,433, as compared with imports in 1912, valued at \$1,806,221.

*Nickel.*—The production of nickel contained in nickel-copper matte produced in Canada and exported for refinement was, in 1913, 49,676,772 pounds, valued at \$14,903,032, as compared with a production of 44,841,542 pounds, in 1912, valued at \$13,452,463. During 1913 there were smelted 823,403 tons of ore, producing 47,150 tons of matte, as against 725,065 tons

of ore, producing 41,925 tons of matte, in 1912. Small quantities of nickel-oxide are also produced in connexion with the treatment of the Cobalt District silver ores. The exports of nickel contained in ore, matte, etc., during 1913, were 49,459,017 pounds, valued at \$5,195,560; being 5,164,512 pounds to Great Britain, 44,224,119 pounds to the United States, and 70,386 pounds to other countries. In 1912, the exports were 44,221,860 pounds, valued at \$4,661,758: being 5,072,867 pounds to Great Britain and 39,148,993 pounds to the United States. The imports of nickel and nickel anodes in 1913 were valued at \$8,512, as against a value of \$23,125 imported in 1912. There was also an importation of nickel-silver in bars, ingots, valued at \$162,520, and of manufactures of nickel, valued at \$86,672, in 1913.

*Silver.*—The production of silver contained in bullion, or estimated as recovered from mattes and ores, etc., exported, was in 1913, 31,845,803 fine ounces, valued at \$19,040,924, as compared with 31,955,560 fine ounces, valued at \$19,440,165, in 1912. About 89·2 per cent of the production in 1913 was derived from "Cobalt District" of Ontario. The production of silver in 1905 was only 6,000,023 ounces, and in 1900, 4,468,225 ounces. The exports of silver contained in ores, mattes, etc., in 1913, were 37,371,569 ounces, valued at \$21,441,220; as against exports of 34,911,922 ounces, valued at \$19,494,416, in 1912. The imports of silver bullion during the calendar year 1913 were valued at \$840,245, as compared with bullion imports of \$1,100,344 in 1912.

*Zinc.*—The shipments of zinc ore in 1913 were 7,889 tons, valued at \$186,827, as compared with shipments of 6,415 tons, valued at \$215,149, in 1912. The total value of the imports of zinc and manufactures of zinc, in 1913, was \$1,576,943, as compared with imports, valued at \$1,824,519, in 1912.

#### NON-METALLIC PRODUCTS.

*Actinolite.*—A production of 66 tons, valued at \$720, was reported in 1913, as compared with 92 tons, valued at \$1,000, in 1912.

*Arsenic.*—Smelter returns show a production in 1913 of 1,692 tons of arsenious oxide, valued at \$101,463, as compared with a production in 1912 of 2,045 tons, valued at \$89,262.

The exports of arsenic in 1913 were 1,303 tons, valued at \$107,094, as against 1,924 tons, valued at \$101,310, in 1912. The imports of arsenious oxide in 1913 were 18,788 pounds, valued at \$1,061, as compared with 76,528 pounds, valued at \$1,722, in 1912. The imports of sulphide of arsenic in 1913 were 455,394 pounds, valued at \$17,759, and in 1912, 451,928 pounds, valued at \$19,431.



*Asbestos.*—The shipments of asbestos in 1913 were 136,951 tons, valued at \$3,830,909, and of asbestic, 24,135 tons, valued at \$19,016. The shipments in 1912 were of asbestos 111,561 tons, valued at \$3,117,572, and of asbestic, 24,740 tons, valued at \$19,707. The shipments in 1913 consisted of 5,660.3 tons of crude asbestos, valued at \$989,162, and 131,291 tons of mill stock, valued at \$2,841,747. Considerable quantities both of crude and of mill stock were held in manufacturers' hands at the close of the year.

Exports in 1913 were 103,812 tons of asbestos, valued at \$2,848,047, as against 88,008 tons, valued at \$2,349,353, in 1912. There were also exported in 1913, 24,766 tons of asbestic sand, valued at \$138,737.

Imports of asbestos and manufactures of asbestos in 1913 were valued at \$520,082, and in 1912, \$461,449.

*Chromite.*—During 1913 and 1912 there were no shipments of chromite reported.

*Coal.*—The production of coal in 1913 was 15,012,178 tons, valued at \$37,334,940, as against 14,512,829 tons, valued at \$36,019,044, in 1912. The exports of coal in 1913 were 1,562,020 tons, valued at \$3,961,351, as compared with 2,127,133 tons, valued at \$5,821,593, in 1912. The total imports of coal in 1913 were 18,201,953 tons, valued at \$47,949,119, as against imports in 1912 of 14,595,810 tons, valued at \$39,478,037.

The 1913 imports included 10,743,473 tons of bituminous round and run of mine coal, valued at \$21,756,658; 4,642,057 tons of anthracite and anthracite dust, valued at \$22,034,839; and of bituminous slack, such as will pass through a  $\frac{3}{4}$ " screen, 2,816,423 tons, valued at \$4,157,622.

The 1912 imports included 8,491,840 tons of bituminous round and run of mine coal, valued at \$16,846,727; 4,184,017 tons of anthracite and anthracite dust, valued at \$20,080,388; and 1,919,953 tons of bituminous slack, such as will pass through a  $\frac{3}{4}$ " screen, valued at \$2,550,922. The consumption of coal in 1913 was approximately 31,582,545 tons, as against 26,934,800 tons in 1912.

*Coke.*—The total quantity of oven coke made in 1913 was 1,517,133 tons, the quantity sold or used was 1,530,499 tons, valued at \$5,919,596; as compared with 1,406,028 tons made, in 1912, and 1,411,229 tons sold or used, valued at \$5,164,331. The quantity of coal charged to coke ovens in 1913 was 2,247,913 tons, as compared with 2,053,807 tons in 1912. The exports of coke in 1913 were 68,235 tons, valued at \$308,410, and in 1912, 57,744 tons, valued at \$252,763. The imports of coke in 1913 were 723,906 tons, valued at \$2,180,830, as compared with imports of 628,174 tons, valued at \$1,702,856, in 1912.

*Corundum.*—The total sales of grain corundum in 1913 were 1,177 tons, valued at \$137,036, as compared with sales of 1,960 tons, valued at \$239,091 in 1912. Exports for 1913 were 1,077 tons, valued at \$121,741.

*Feldspar.*—Shipments of feldspar in 1913 were 16,790 tons, valued at \$60,795, as compared with 13,733 tons, valued at \$30,916, in 1912. The exports are recorded as 15,966 tons, valued at \$62,767, in 1913, and 12,779 tons, valued at \$44,114, in 1912.

*Fluorspar.*—There was no fluorspar shipped in 1913, a small shipment of about 40 tons, valued at \$240, being reported in 1912. Canadian furnaces in 1913 used 10,687 tons of fluorspar. Imports of hydrofluosilicic acid were 1,182,293 pounds, valued at \$46,517.

*Graphite.*—Shipments of crude and milled graphite during 1913 totalled 2,162 tons, valued at \$90,282, as against 2,060 tons, valued at \$117,122, in 1912. The production of artificial graphite in 1913 was reported as 1,092 tons, as compared with 1,151 tons in 1912.

Exports of plumbago in 1913 are reported as 1,642 tons, valued at \$85,368, and manufactures of plumbago valued at \$24,284. Exports in 1912 were: plumbago 1,654 tons, valued at \$70,763, and manufactures of plumbago valued at \$58,920. Imports of graphite in 1913 were valued at \$156,233, and included: plumbago not ground \$9,375; blacklead \$8,633; plumbago ground and manufactures of, \$64,254; and crucibles of clay or plumbago, \$73,971. In 1912 the imports were valued at \$155,484, including: plumbago not ground \$7,249; blacklead \$9,587; plumbago ground and manufactures of, \$56,324; and crucibles of clay or plumbago, \$82,324.

*Grindstones.*—The production of grindstones, scythestones, and wood pulpstones, in 1913, was 4,837 tons, valued at \$51,325, as compared with 4,412 tons, valued at \$52,090, in 1912. The exports in 1913 were manufactured grindstones valued at \$54,867; and in 1912 manufactured grindstones valued at \$26,535. The imports of abrasives in 1913 included: grindstones valued at \$145,247; burrstones, \$1,784; emery in bulk, crushed or ground, \$48,995; manufactures of emery, carborundum, etc., \$135,654; pumice stone, \$17,861; also iron sand, \$10,168; sandpaper, \$171,516; The 1912 imports comprised: grindstones valued at \$112,020; burrstones, \$1,409; emery in bulk, crushed or ground, \$46,616; manufactures of emery, carborundum, etc., \$130,571; pumice stone, \$21,310; also iron sand, \$13,347; sandpaper, \$189,782.

*Gypsum.*—The total shipments of gypsum, crude and calcined, in 1913, were 636,370 tons, valued at \$1,447,739, as compared with shipments of 578,458 tons, valued at \$1,324,620 in 1912. The tonnage of gypsum mined or quarried in 1913 was 684,726, and the quantity calcined 147,532 tons.

In 1912, 549,856 tons of gypsum were mined or quarried, and 133,392 tons calcined. The shipments in 1913 included: crude gypsum 499,460 tons, valued at \$615,493; ground gypsum 10,281 tons, valued at \$20,576; and calcined gypsum 126,629 tons, valued at \$811,670. In 1912 the shipments comprised: crude gypsum 453,577 tons, valued at \$525,345; ground gypsum 15,487 tons, valued at \$29,244, and calcined gypsum 109,394 tons, valued at \$770,031.

The exports of gypsum in 1913 were: 417,302 tons of crude gypsum, valued at \$504,383, and gypsum ground or calcined, valued at \$5,795. The 1912 exports were: 364,643 tons of crude gypsum, valued at \$423,208, and gypsum ground; or calcined, valued at \$6,495.

The imports of gypsum in 1913 were valued at \$188,252, including: crude gypsum, 4,522 tons, valued at \$21,763; ground gypsum, 2,496 tons, valued at \$11,770; and plaster of Paris, 20,113 tons, valued at \$154,719. The total value of imports in 1912 was \$268,103, made up of: crude gypsum, 3,503 tons, valued at \$16,254; ground gypsum, 7,072 tons, valued at \$19,651; and plaster of Paris, 32,496 tons, valued at \$232,198.

*Magnesite.*—Shipments of magnesite in 1913 were 515 tons, valued at \$3,335, and in 1912, 1,714 tons, valued at \$9,645. Imports of magnesia in 1913 were 290,975 pounds, valued at \$12,226.

*Manganese.*—There were no shipments of manganese in 1913, a shipment of 75 tons, valued at \$1,875, being reported in 1912. The exports in 1913 were 8 tons, valued at \$303, as against 10 tons, valued at \$300, in 1912. The 1913 imports included, 2,588 tons manganese oxide, valued at \$46,990, as compared with 1,256 tons, valued at \$27,707, in 1912.

*Mica.*—The value of the mica production in 1913, as reported by mine operators, was \$194,304, as compared with \$143,976 in 1912. The exports of mica in 1913 were 817,152 pounds, valued at \$240,775, as against 895,338 pounds, valued at \$334,054, in 1912.

*Mineral Pigments.*—Shipments of barytes in 1913 were 641 tons, valued at \$6,410, as against 464 tons, valued at \$5,104, in 1912. The production of ochres, iron oxides, in 1913 was 5,987 tons, valued at \$41,774, as compared with 7,654 tons, valued at \$32,410, in 1912.

In 1913 there were no exports of barytes, exports for 1912 being 68 hundredweight, valued at \$114. The exports of iron oxides in 1913 were 1,956 tons, valued at \$18,931, as against 3,016 tons, valued at \$34,513, in 1912. The imports in 1913 were: ochres and ochrey earth and raw siennas, 1,663 tons, valued at \$43,119; and oxides, dry fillers, fireproof umbers, and burnt siennas, 4,387 tons, valued at \$240,435, as compared with imports in 1912, comprising: ochres and ochrey earth and raw siennas, 1,737 tons,

valued at \$40,165; and oxides, dry fillers, fireproof umbers, and burnt siennas, 762 tons, valued at \$29,456.

*Mineral Water.*—The value of the production of mineral water in 1913 for which returns were received was \$173,677, as compared with a value of \$172,465, in 1912. The imports of mineral and aerated waters in 1913 were valued at \$257,153, as against a value of \$273,698, in 1912. The exports in 1913 were valued at \$1,496, as against \$4,710, in 1912.

*Natural Gas.*—The production of natural gas in 1913 was 20,478 million cubic feet, valued at \$3,309,381, as compared with 15,287 million cubic feet, valued at \$2,362,700, in 1912.

*Peat.*—Shipments of peat for fuel purposes in 1913 were 2,600 tons, valued at \$10,100, as compared with 700 tons, valued at \$2,900, in 1912.

*Petroleum.*—The production of crude petroleum shows a further falling off, but in quantity only, in 1913, the production being 228,080 barrels or 7,982,798 gallons, valued at \$406,439; as compared with 243,336 barrels or 8,516,762 gallons, valued at \$345,050, in 1912.

Exports of refined oil in 1913 were 24,273 gallons, valued at \$3,188, and 36,945 gallons, valued at \$6,147, in 1912. There was an export in 1913 of naphtha and gasoline of 17,875 gallons, valued at \$4,284, crude, mineral oil, 3,650 gallons, valued at \$379, and also an export of other oils, N.E.S., of 634,861 gallons, valued at \$171,663, which may have included products of petroleum.

While the production has been decreasing the imports have been increasing; the total import of petroleum oils, crude and refined, in 1913, was 222,779,028 gallons, valued at \$13,238,429, in addition to 1,628,837 pounds of paraffin wax and candles, valued at \$109,897. The oil imports included: crude oil, 162,061,926 gallons, valued at \$5,250,835; refined and illuminating oils 19,393,627 gallons, valued at \$1,394,440; gasoline 29,525,180 gallons, valued at \$4,822,941; lubricating oils 6,789,451 gallons, valued at \$1,172,986, and other petroleum products 5,008,844 gallons, valued at \$597,227.

The total imports in 1912 were 186,787,484 gallons, valued at \$11,858,533, and 2,144,006 pounds of paraffin wax and candles, valued at \$119,520. The oil imports included: crude oil, 120,082,405 gallons, valued at \$3,996,842; refined and illuminating oils 14,748,218 gallons, valued at \$1,012,735; gasoline 40,904,598 gallons, valued at \$5,347,767; lubricating oils 6,763,800 gallons, valued at \$1,077,712, and other petroleum products 4,288,463 gallons, valued at \$423,477.

*Phosphate.*—Shipments of phosphate or apatite in 1913 were 385 tons, valued at \$3,643, as compared with 164 tons, valued at \$1,640, in 1912. There were no exports in 1913 or 1912. There was an export of phosphorus

in 1913, of 534,340 pounds, valued at \$73,395; while in 1912, 543,620 pounds, valued at \$66,806, were exported. The imports of phosphate rock (fertilizer) in 1913 were valued at \$16,070; phosphorus, 17,600 pounds, valued at \$5,856, and manufactured fertilizers valued at \$505,904. The imports in 1912 included: phosphate rock (fertilizer), valued at \$24,586; phosphorus, 13,807 pounds, valued at \$4,012, and manufactured fertilizers valued at \$580,351.

*Pyrites.*—The production of pyrites in 1913 was 158,566 tons, valued at \$521,181, as compared with 81,526 tons, valued at \$314,085, in 1912. The exports in 1913 were 46,066 tons, valued at \$211,640, as against exports of 5,938 tons, valued at \$11,935, in 1912. The imports of brimstone or sulphur in 1913 were 30,433 tons, valued at \$633,114, as against 38,647 tons, valued at \$806,690, in 1912.

*Quartz.*—The production of quartz in 1913 was reported as 78,261 tons, valued at \$169,842, as compared with a production in 1912 of 100,242 tons, valued at \$195,216. There were imported during 1913, 690 tons of silex or crystallized quartz, valued at \$13,811, and 6,708 tons flint, valued at \$60,718; and in 1912, 629 tons of silex, valued at \$10,680, and 2,802 tons flint, valued at \$39,891.

*Salt.*—The total sales of salt in 1913 were 100,791 tons, valued at \$491,280, (exclusive of packages). The value of the packages used was \$262,479. In 1912 the sales were 95,053 tons, valued at \$459,582, and value of packages used \$224,696.

Exports of salt in 1913 were 460,900 pounds, valued at \$3,047, and in 1912, 289,150 pounds, valued at \$3,723. The total imports of salt in 1913 were valued at \$565,283, and included: 31,508 tons, valued at \$147,775, subject to duty; and 112,939 tons, valued at \$417,508, duty free. The 1912 imports were valued at \$485,950, and included: 30,067 tons, valued at \$133,869, subject to duty; and 109,639 tons, valued at \$352,081, duty free.

Among the imports of soda products in 1913 are included: soda ash or barilla, 66,323,869 pounds, valued at \$492,115; soda bichromate, 674,456 pounds, valued at \$33,767; caustic soda in packages of 25 pounds or more, 15,896,076 pounds, valued at \$286,432; sal soda 8,688,607 pounds, valued at \$53,649; nitrate of soda, 80,721,971 pounds, valued at \$1,645,320, and sulphate of soda, 25,902,190 pounds, valued at \$133,030.

*Talc.*—The production of talc in 1913 was 12,250 tons, valued at \$45,980, as against 8,270 tons, valued at \$23,132, in 1912. Imports of talc for the calendar year 1913 were 402 tons, valued at \$10,706.

*Tripolite.*—There were 620 tons of tripolite, valued at \$12,138, shipped in 1913, and 38 tons, valued at \$230, in 1912.

## STRUCTURAL MATERIALS AND CLAY PRODUCTS.

*Cement.*—The total sales of cement in 1913 were 8,658,805 barrels, valued at \$11,019,418, as against 7,132,732 barrels, valued at \$9,106,556, in 1912, showing an increase of 1,526,073 barrels. The exports of cement in 1913 were valued at \$1,739, as compared with exports valued at \$2,436, in 1912.

The imports of cement in 1913 included: manufactures of cement valued at \$17,729; and Portland cement 889,324 hundredweight (254,093 barrels), valued at \$409,303. The imports in 1912 were: manufactures of cement valued at \$9,698; and Portland cement 5,020,446 hundredweight (1,434,413 barrels), valued at \$1,969,529. The consumption of Portland cement in Canada in 1913 was approximately 8,912,898 barrels, as compared with 8,567,145 barrels in 1912.

*Clay Products.*—The total value of the production of clay products in Canada in 1913 was \$9,504,314, as compared with a total value of \$10,575,709 in 1912. Brick and tile products alone were valued in 1913 at \$7,805,750, as against \$9,072,675 in 1912. The value of sewerpipe production in 1913 was \$1,035,906, as compared with \$884,641, in 1912. The only clay products exported in 1913 were 977,000 building brick, valued at \$8,579, manufactures of clay valued at \$27,201, and earthenware valued at \$16,553; against 694,000 building brick, valued at \$8,493, manufactures of clay valued at \$256, and earthenware valued at \$10,001, in 1912. The total imports of clay products in 1913 were valued at \$6,760,752, and included: brick and tile valued at \$3,121,592; earthenware and chinaware \$3,314,870; and clays valued at \$324,290. The total imports in 1912 were valued at \$6,592,540, and included: brick and tile valued at \$3,209,190; earthenware and chinaware \$3,094,956, and clays valued at \$288,394.

*Kaolin.*—In 1913 a shipment of 500 tons valued at \$5,000 was reported, as compared with shipments in 1912 of 20 tons valued at \$160.

*Lime.*—The total production of lime in 1913 was 7,558,484 bushels, valued at \$1,609,398, as compared with 8,475,839 bushels, valued at \$1,844,849, in 1912. The exports of lime in 1913 were valued at \$29,234, as against exports valued at \$35,097, in 1912. The imports of lime in 1913 were 386,693 barrels, valued at \$238,271, and in 1912, 329,925 barrels, valued at \$207,481.

*Sand-Lime Brick.*—The total sales of sand-lime brick in 1913 were 92,586,676, valued at \$906,665, an average value of \$9.79 per thousand. The sales in 1912 were 96,448,402, valued at \$1,020,386, an average value of \$10.58 per thousand.

*Slate.*—The production of slate in 1913 was 1,432 squares, valued at \$6,444, and 1,894 squares, valued at \$8,939, in 1912.

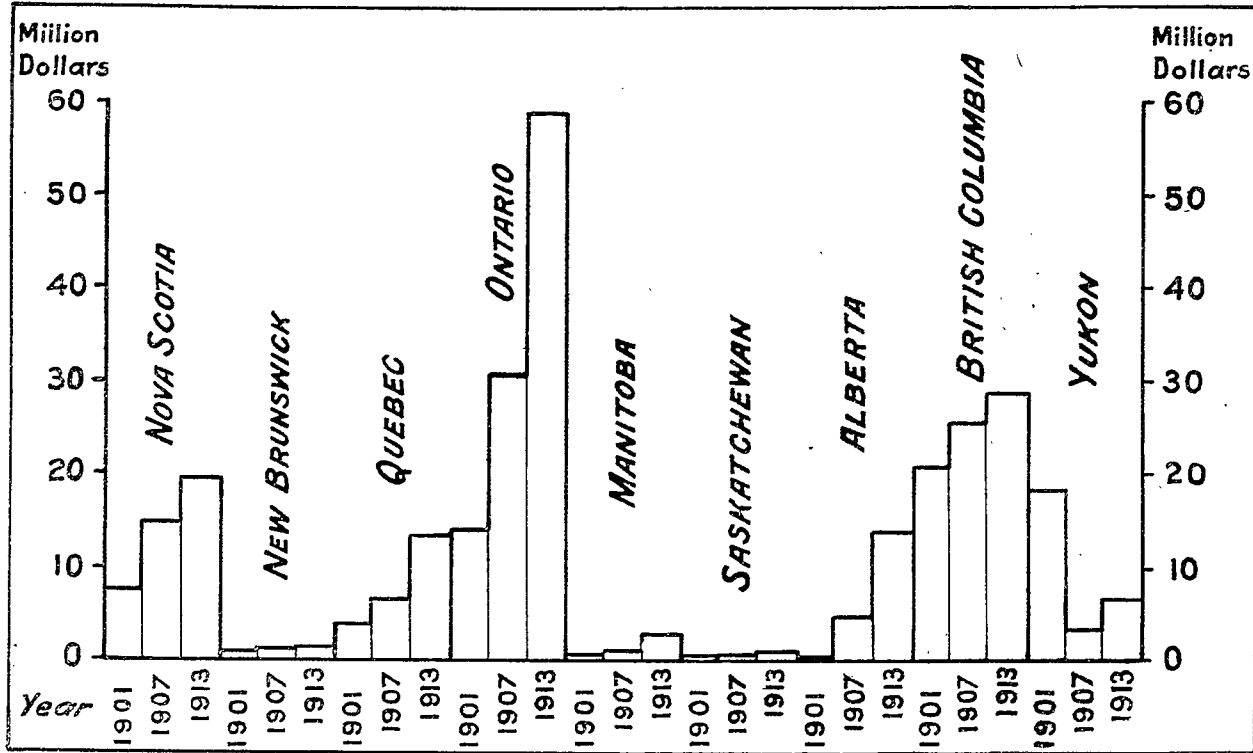
The imports of slate in 1913 were valued at \$235,474, and included: roofing slate valued at \$97,730; school writing slate, \$51,953; slate pencils \$9,166, and manufactures of slate, \$76,625. The imports in 1912 were valued at \$200,643, and included: roofing slate valued at \$88,911; school writing slate \$39,858; slate pencils, \$6,978; and manufactures of slate, \$65,896.

*Stone.*—The total value of the production of stone of all kinds in 1913 was \$5,504,639, as compared with a value of \$4,726,171 in 1912. The value of stone exports in 1913 was \$93,840, as against \$33,242 in 1912; and the total value of stone imported in 1913 was \$1,640,849, as against imports valued at \$1,467,143, in 1912.

The production in 1913 included: granite, valued at \$1,653,791; limestone, \$3,204,091; marble, \$249,975, and sandstone, \$396,782. In 1912 the production of granite was valued at \$1,373,119; limestone, \$2,762,936; marble, \$260,764, and sandstone, \$329,352.

*Sand and Gravel.*—According to returns received which cannot be said to be complete, the production of sand and gravel in 1913 was valued at \$2,258,874, as compared with \$1,512,099, in 1912. The exports of sand and gravel in 1913 were 644,633 tons, valued at \$440,956, and the imports 439,673 tons, valued at \$440,343.

COMPARATIVE PRODUCTION OF THE PROVINCES 1901-1907 and 1913





## PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1912 and 1913 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. The provinces maintained the same order of magnitude of output with the exception that Saskatchewan replaced New Brunswick for the smallest production in 1913. Ontario continues as the largest contributor to the total, having a production of \$59,167,749 or 40.6 per cent, as against \$51,985,876 or 38.5 per cent of the total in 1912. British Columbia was second, with a production of \$28,086,312 or 19.3 per cent of the total, as against \$30,076,635 or 22.3 per cent of the total in the previous year. There was a falling off in the total in this Province, as also in Manitoba and Saskatchewan, all the other provinces showing an increased production. Nova Scotia, third in importance, had a production of \$19,376,183 or 13.3 per cent of the total in 1913. Alberta in fourth place had a production of \$15,054,046, or 10.3 per cent; Quebec occupied fifth place, with a production of \$13,475,534 or 9.3 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 naturally not 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 Shawenegan Falls, which is made from imported bauxite.

## Mineral Production by Provinces, 1911, 1912, and 1913.

Province.	1911.		1912.		1913.	
	Value of production.	Per cent of total.	Value of production.	Per cent of total.	Value of production.	Per cent of total.
	\$	%	\$	%	\$	%
*Nova Scotia.....	15,409,397	14.93	18,922,236	14.01	19,376,183	13.30
New Brunswick.....	612,330	0.59	771,004	0.57	1,102,613	0.76
Quebec.....	9,304,717	9.01	11,656,998	8.63	13,475,534	9.25
Ontario.....	42,796,162	41.46	51,985,876	38.50	59,167,749	40.63
Manitoba.....	1,791,772	1.74	2,463,074	1.83	2,214,496	1.52
Saskatchewan.....	636,706	0.62	1,165,642	0.86	881,142	0.60
Alberta.....	6,662,673	6.46	12,073,589	8.94	15,054,046	10.34
British Columbia....	21,299,305	20.63	30,076,635	22.27	28,086,312	19.29
Yukon.....	4,707,432	4.56	5,933,242	4.39	6,276,737	4.31
Dominion.....	103,220,994	100.00	135,048,296	100.00	145,634,812	100.00

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

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## Mineral Production of Nova Scotia, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold..... Ozs.	4,385	90,638	2,174	44,035
Iron ore sold for export..... Tons	30,857	168,877	20,436	21,049
Pig-iron from Canadian ore*..... "			2,617	39,255
Barytes..... "	404	5,104	641	6,410
Coal..... "	7,783,888	17,374,750	7,980,073	17,812,663
Grindstones..... "	374	3,760	350	4,900
Gypsum..... "	376,082	481,493	404,801	479,515
Manganese..... "	75	1,875	0	0
Tripolite..... "	38	230	620	12,138
Clay products..... "		272,053		332,272
Lime..... Bus.	709,596	145,121	854,812	171,339
Stone..... "		324,630		350,511
Other products..... "		53,705		101,196
Total.....		18,922,236		19,376,183

\*The total production of pig-iron in Nova Scotia in 1912 was 424,094 tons valued at \$6,374,910, and in 1913, 480,068 tons valued at \$7,201,020.

## Mineral Production of New Brunswick, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Iron ore sold for export..... Tons.	71,520	127,716	80,941	144,537
Coal..... "	44,780	89,560	70,311	166,637
Grindstones..... "	4,038	48,330	4,487	46,425
Gypsum..... "	82,757	185,821	103,954	279,395
Natural gas..... M cub. ft.	173,903	36,549	828,603	174,147
Petroleum..... Bls.	2,679	3,799	2,111	3,762
Clay products..... "		54,910		62,269
Lime..... Bus.	616,835	133,742	392,985	98,841
Stone..... "		90,577		103,732
Other products..... "				22,868
Total.....		771,004		1,102,613

NOVA SCOTIA  
MINERAL PRODUCTION

## Mineral Production of Quebec, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper..... Lbs.	3,282,210	536,346	3,455,887	527,679
Gold..... Ozs.	642	13,270	701	14,491
Iron ore sold for export..... Tons.	1,185	4,232	5,102	26,999
Silver..... Ozs.	9,465	5,758	34,573	20,672
Zinc ore..... Tons.			335	6,700
Asbestos and asbestic..... "	136,301	3,137,279	161,086	3,849,925
Feldspar..... "	100	2,000	74	1,554
Graphite..... "	604	50,680	103	9,620
Magnesite..... "	1,714	9,645	515	3,335
Mica..... "		81,044	620	125,488
Mineral water..... Gals.	92,873	36,736		30,805
Ochres, iron oxides..... Tons.	7,654	32,410	5,987	41,774
Peat..... "	500	2,000	2,000	8,000
Phosphate..... "	164	1,640	385	3,643
Pyrites..... "	60,849	243,396	87,314	349,256
Quartz..... "	556	1,240	1,008	2,000
Cement..... Bls.	2,714,685	3,134,499	2,940,211	3,430,023
Clay products.....		1,680,300		1,601,816
Kaolin..... Tons.	20	160	500	5,000
Lime..... Bus.	1,729,614	474,595	1,616,446	418,008
Slate..... Squares...	1,894	8,939	1,432	6,444
Stone.....		1,957,703		2,329,461
Other products.....		243,126		662,841
Total.....		11,656,993		13,475,534

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

## Mineral Production of Ontario, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Nickel oxide..... Lbs.	{ 349,054	156,256	268,304	80,561
Cobalt oxide..... "			660,079	525,028
Cobalt-nickel residues, mixed cobalt and nickel oxides..... "	1,285,280	163,088	.....	90,266
Copper.....	22,250,601	3,635,971	25,835,929	3,952,522
Gold..... Ozs.	80,523	1,788,596	219,801	4,543,690
Iron ore, sold for export..... Tons.	14,567	28,125	110,135	237,976
Iron, pig, from Canadian ore (a)..... "	36,355	450,886	70,889	957,174
Lead..... Lbs.	.....	.....	33,000	1,537
Nickel..... "	44,841,542	13,452,463	49,676,772	14,903,032
Silver..... Ozs.	29,214,025	17,772,352	28,411,261	16,987,377
Zinc ore..... Tons.	10	3,750	.....	.....
Actinolite..... "	92	1,000	66	720
Arsenious oxide..... "	2,045	89,262	1,692	101,463
Corundum..... "	1,960	239,091	1,177	137,036
Feldspar..... "	13,633	28,916	16,716	59,241
Fluorspar..... "	40	240	0	0
Graphite..... "	1,456	66,442	2,059	80,662
Gypsum..... "	53,119	176,056	62,315	208,029
Mica.....	.....	62,932	478	68,816
Mineral water.....	.....	131,529	.....	138,072
Natural gas..... M. cub. ft.	12,529,463	2,036,245	12,474,745	2,055,768
Peat..... Tons.	200	900	600	2,100
Petroleum..... Bls.	240,657	341,251	225,969	402,677
Pyrites..... Tons.	20,677	70,689	71,252	171,925
Quartz..... "	99,686	193,976	77,253	167,842
Salt..... "	95,053	459,532	100,791	491,280
Talc..... "	8,270	23,132	12,250	45,980
Cement..... Bls.	3,044,713	3,372,897	3,992,988	4,311,133
Clay products.....	.....	4,864,700	.....	5,220,467
Lime..... Bus.	3,376,193	573,269	3,254,482	573,209
Sand-lime brick..... No.	36,371,002	328,548	48,211,502	420,177
Stone.....	.....	1,109,164	.....	1,593,168
Other products.....	.....	363,668	.....	638,771
Total.....	.....	51,085,876	.....	59,167,749

(a) The total production of pig-iron in Ontario in 1912 was 589,593 tons, valued at \$8,176,089; in 1913, 648,899 tons, valued at \$9,333,992.

## Mineral Production of Manitoba, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Calcined gypsum..... Tons.	66,500	481,250	65,100	479,500
Clay products.....		1,018,051		514,358
Lime..... Bus.	818,237	168,257	576,938	107,281
Cement..... Bls.	12,127	16,068	179,342	326,856
Sand-lime brick..... No.	27,594,874	294,700	19,619,555	198,878
Stone.....		383,095		389,904
Other products.....		101,653		197,719
Total.....		2,463,074		2,214,496

## Mineral Production of Saskatchewan, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Coal..... Tons.	225,342	368,135	212,897	358,192
Brick, common and pressed..... No.	30,538,771	332,943	18,175,000	189,820
Lime..... Bus.	4,000	1,440	35,000	10,000
Sand-lime brick..... No.	16,292,114	207,671	7,290,714	86,753
Other products.....		255,453		236,877
Total.....		1,165,642		881,142

## Mineral Production of Alberta, 1912 and 1913.

Products.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold..... Ozs.	73	1,509		
Coal..... Tons.	3,240,577	8,113,525	4,014,755	10,418,941
Natural gas..... M. ft.	2,583,437	289,906	7,174,490	1,079,466
Cement..... Bls.	821,165	1,775,898	956,169	1,947,933
Clay products.....		1,366,184		893,408
Lime..... Bus.	704,035	166,520	465,250	115,355
Sand-lime brick..... No.	10,732,000	139,952	15,464,905	176,794
Stone.....		81,391		156,984
Other products.....		148,704		265,165
Total.....		12,073,589		15,054,046

## Mineral Production of British Columbia, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper (a)..... Lbs.	50,526,656	8,256,561	45,791,579	6,991,916
Gold..... Ozs.	251,815	5,205,485	297,459	6,149,027
Lead..... Lbs.	37,763,476	1,597,554	37,626,899	1,753,037
Platinum..... Crude ozs.			18	489
Silver..... Ozs.	2,651,002	1,612,737	3,312,343	1,980,483
Zinc ore.....	6,405	211,399	7,554	180,127
Coal..... Tons.	3,208,997	10,028,116	2,714,420	8,482,562
Gypsum..... "			200	1,300
Mineral water.....		4,200		4,800
Cement..... Bls.	511,539	767,038	574,258	980,560
Clay products.....		996,568		684,904
Lime..... Bus.	517,329	181,905	362,571	115,365
Sand-lime brick..... No.	5,458,412	49,515	Nil.	
Stone.....		779,611		530,879
Other products.....		385,946		180,863
Total.....		30,076,685		28,086,312

(a) Smelter recoveries of copper.

## Mineral Production of Yukon, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper..... Lbs.	1,772,600	289,670	1,843,530	281,489
Gold..... Ozs.	268,447	5,549,296	282,838	5,846,780
Lead..... Lbs.			2,804	131
Silver..... Ozs.	81,058	49,318	87,626	52,392
Coal..... Tons.	9,245	44,958	19,722	95,945
Total.....		5,933,242		6,276,737

### Mineral Production by Provinces, 1899-1913.

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			20,531,853	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.....	14,195,730	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	135,048,296
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

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

## MINE PRODUCTION.

Reference has already been made in the introduction to this report, to the compilation of a total value of the mineral production of Canada in which the metallic ores are included at the value of the ores as mined or shipped from the mines. Since 1910 this Branch 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.

There are two industries: gold placer mining, and the production of crude petroleum for which it has not been possible as yet 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 the wages paid.

Statistics covering each of the past four years are shown in the accompanying tables. According to the records shown the total value of the mineral production on this basis was \$126,444,201 in 1913, as against \$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 1913, was 1,529, as against 1,437, in 1912; the total number of men employed 71,011 in 1913, as against 66,734 in 1912; the total wages paid \$50,368,602 in 1913, as against \$45,502,479 in 1912.

The total number of metalliferous mines shipping in 1913, exclusive of placer and hydraulic workings, was 183 as against 163, in 1912; number of men employed in 1913, 12,437, as against 10,612 in 1912; wages paid \$11,746,400 in 1913, compared with \$10,113,578 in 1912; tons of ore mined 4,736,288 in 1913, as against 4,194,517 in 1912; tons of ore, concentrates or metal shipped from mines, 3,423,414, as against 3,360,451 in 1912; total net value of shipments including placer gold \$47,170,740 in 1913, compared with \$46,457,423 in 1912.

In non-metalliferous mining, exclusive of stone quarries, clay works, etc., and not including petroleum wells, there were employed in 1913 an average of 34,207 men, earning in wages \$25,752,148, as against 33,954 men and \$23,877,781 paid in wages in 1912. The tonnage mined in 1913, chiefly coal, was 18,636,039, and tons shipped, 16,198,066, as against 17,165,628 tons mined and 15,548,981 tons shipped in 1912. The total net value of the shipment in 1913 was \$48,463,709, and \$45,080,674 in 1912.

The manufacture of cement, clay products, and lime, and the quarrying of stone, etc., employed in 1913 an average of 24,367 men, to whom was paid in wages \$12,870,054, and the net value of products shipped was \$30,809,752. These operations in 1912 engaged an average of 22,168 men, earning \$11,511,120 in wages, and the net value of the products shipped was \$28,794,869.



It should be remembered 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, or in blast furnace operations.

The total value of the production given herewith is considerably less than that shown in the table of mineral production, given on page 13, the difference being due entirely to the fact that the values accruing through metallurgical reduction and refining, are not included in these tables. The values of the ores given herein are in general those furnished by the operators. In certain cases, however, where mining, smelting, and refining operations are carried on by the same operator, it becomes a matter of no small difficulty to satisfactorily subdivide profits among the various operations, particularly when there is no general market for the class of ores treated, and it is quite possible that some of the values used are too low.

There has been added to the statement of ore shipment in 1913, a table showing the quantities of metals contained in the ores shipped, the record showing the total quantities of metals contained without any deductions or allowances being made for smelter or treatment losses. Comparison of this record of metal contents of ore shipments with statistics of the production of the metals is not in all cases feasible because of the long lapse of time between the shipment from the mine and the treatment at the smelter.

## Mine Production, 1910.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	971		443,998	335,768	259,418	574,362
Milling gold ores—							
Bullion shipped.....							659,987
Concentrate.....	47	969		725,989	133,021	8,997	565,340
Silver-cobalt ores—							
Mine bullion shipped.....						35	542,034
Ore and concentrate.....	38	1,623	1,322	2,642,133	274,780	35,627	15,344,470
Nickel-copper ores....	7	660	286	719,237	652,392	652,392	2,609,568
Copper ores.....	3	118	97	105,366	54,220	36,714	172,162
Silver-lead and zinc ores.....	48	592	282	850,416	180,070	58,418	1,668,415
Copper-gold-silver ores.....	19	1,432	487	1,872,242	1,953,591	1,924,405	7,888,306
Shipping mines not reporting:—							
Silver-lead.....	12						
Copper-gold.....	9				1,994	1,994	
Placer mining—							
Yukon.....							4,550,000
British Columbia....							540,000
Other provinces.....							1,850
Total metallic....	191	8,839		7,359,381	3,595,836	2,978,000	35,116,494
Total non-metallic.....		36,210		22,698,000	16,143,993	13,800,989	37,757,153
Total structural material.....		17,259		7,547,000			19,627,592
Total.....		62,308		37,604,381			92,501,244

## Mine Production, 1911.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Sur-face.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	943		449,468	421,113	210,344	522,319
Milling gold ores— Bullion shipped.....							513,991
Concentrates.....	45	1,085		954,659	118,758	8,026	663,213
Silver-cobalt ores— Mine bullion shipped.....						130	2,007,440
Ore and concentrate	36	1,794	1,448	2,722,228	254,290	25,539	14,400,245
Nickel-copper ores....	7	858	425	889,894	612,511	612,511	2,450,044
Copper ores.....	2	119	67	98,084	66,088	39,047	247,555
Silver-lead and zinc ores.....	40	528	297	809,862	120,323	48,660	1,186,996
Gold-copper-silver ores.....	22	1,495	563	1,933,385	1,602,247	1,486,931	7,727,696
Placer mining— Yukon.....							4,606,812
British Columbia...							426,000
Other provinces....							8,202
Total metalliferous...	160	9,622		7,857,580	3,195,330	2,431,188	34,760,513
" non-metalliferous		32,126		18,469,420	13,890,468	12,247,348	34,405,960
Total structural mate- rials.....		19,004		8,327,508			22,709,611
		60,752		35,154,508			91,876,084

## Mine Production, 1912.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	524		371,938	171,792	215,883	523,315
Milling gold ore—							
Bullion shipped.....	43					5	2,278,066
Concentrates.....		1,671		1,551,006	290,297	6,114	669,727
Silver-cobalt ores—							
Mine bullion shipped	31					164	2,899,360
Ore and concentrate		1,685	1,448	3,107,286	319,348	29,106	14,592,559
Nickel-copper ores....	8	970	830	1,404,652	737,726	737,726	2,953,306
Copper ores.....	3	154	95	160,765	64,952	60,860	508,993
Silver-lead and zinc							
ores.....	50	597	331	1,002,203	202,343	66,377	2,767,741
Gold-copper-silver							
ores.....	20	1,434	873	2,515,728	2,408,059	2,244,193	13,113,144
Tungsten concentrates						14	7,840
Placer mining—							
Yukon.....							5,576,493
British Columbia...							555,500
Other provinces.....							11,379
Total metalliferous...	163	10,612		10,113,578	4,194,517	3,360,451	46,457,423
" non-metalliferous	443	33,954		23,877,781	17,165,628	15,548,981	45,080,674
Total structural							
materials.....	831	22,168		11,511,120			28,794,869
	1,437	66,734		45,502,479			120,332,966

## Mine Production, 1913.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	12	877		529,934	324,935	307,634	629,843
Milling gold ore—							
Bullion shipped.....						11	5,060,018
Concentrates.....	50	2,210		2,079,005	515,855	10,269	873,901
Silver-cobalt ores—							
Mine bullion shipped.....						206	4,539,906
Ore and concentrate.....	30	2,089	1,525	3,387,069	456,241	40,579	12,565,718
Nickel-copper ores....	9	1,258	617	1,665,659	784,697	784,697	3,138,788
Copper ores.....	3	191	92	155,318	97,899	87,376	458,136
Silver-lead and zinc ores.....	57	830	468	1,287,761	256,302	85,978	3,276,812
Zinc products.....						Zinc 7,889	186,827
Gold-copper-silver ores.....	22	1,418	867	2,641,654	2,300,359	2,098,775	10,056,739
Placer mining—							
Yukon.....							5,874,052
British Columbia.....							510,000
Other provinces.....							
Total metalliferous... " non-metalliferous	183 435	12,437 34,207		11,746,400 25,752,148	4,736,288 18,636,039	3,423,414 16,198,066	47,170,740 48,463,709
Total structural materials.....	911	24,367		12,870,054			30,809,752
	1,529	71,011		50,368,602			126,444,201

## Mine Production 1913, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.
Milling gold ore—						
Bullion.....	250,851	59,015				
Concentrates.....	46,959	33,898		2,354	142,497	
Silver-cobalt ores—						
Mine bullion shipped.....		7,599,929				
Ore and concentrate.....		21,802,174				
Nickel-copper ores.....			51,203,607	27,010,719		
Copper ores.....	738	36,393		4,996,393		
Silver-lead zinc ores.....	999	2,564,155			53,807,570	
Zinc products.....		143,459				7,069,800
Gold-copper-silver ores.....	207,486	733,758		60,090,180		
Placer mining—						
Yukon.....	282,320	63,522				
British Columbia.....	24,671					
Total.....	814,024	33,096,303	51,203,607	92,099,646	53,950,067	7,069,800

## Labour and Wages Statistics Covering Non-Metalliferous Mines During 1911, 1912, and 1913.

	1911.			1912.			1913.		
	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.
<b>NON-METALLIC.</b>			\$			\$			\$
Asbestos and asbestic.....	12	2,707	1,231,896	10	2,955	1,401,653	10	2,951	1,687,957
Coal.....	195	26,141	15,695,735	244	27,581	20,784,843	236	27,917	22,065,141
Feldspar.....	6	78	29,918	4	80	31,437	5	73	33,900
Graphite.....	7	302	106,000	7	221	86,831	6	135	63,714
Grindstones, pulpstones, scythestones.....	6	134	29,300	6	149	35,057	5	125	27,500
Gypsum.....	19	1,233	517,800	19	1,381	579,952	18	1,400	641,735
Mica and phosphate.....	30	231	73,870	26	241	95,415	27	209	85,334
Mineral pigments: barytes, and ochres.....	5	82	25,568	4	65	21,270	4	64	25,818
Mineral water.....	17	102	37,963	14	90	34,550	14	79	36,639
Natural gas.....	40	276	263,093	76	433	302,012	78	547	614,425
Peat.....	3	16	2,800	3	27	4,450	2	37	5,000
Pyrites.....	6	162	112,294	4	115	110,888	6	151	131,161
Quartz.....	8	145	52,543	7	128	80,340	6	130	69,441
Salt.....	12	225	123,040	12	231	155,648	12	251	178,386
Others†.....	9	292	167,595	7	257	153,385	6	133	85,997
<b>Total non-metallic.....</b>	<b>375</b>	<b>32,126</b>	<b>18,469,420</b>	<b>443</b>	<b>33,954</b>	<b>23,877,781</b>	<b>435</b>	<b>34,207</b>	<b>25,752,148</b>
<b>STRUCTURAL.</b>									
Cement.....	24	3,010	2,103,838	26	3,461	2,623,902	27	4,276	3,466,451
Clay products.....	419	9,131	3,524,058	460	10,450	4,504,213	456	11,218	4,696,801
Lime.....	75	1,056	523,513	78	1,103	576,217	77	1,076	577,841
Sand-lime brick.....	16	337	166,902	20	544	349,192	22	589	239,398
Sand and gravel (a).....		No record..		54	875	527,425	110	1,042	607,554
Slate.....	1	33	9,187	1	25	12,055	1	35	12,544
Stone.....	191	5,437	2,500,005	192	5,710	2,918,116	218	6,131	3,219,465
<b>Total structural.....</b>	<b>726</b>	<b>19,004</b>	<b>8,827,508</b>	<b>831</b>	<b>22,168</b>	<b>11,511,120</b>	<b>911</b>	<b>24,367</b>	<b>12,870,054</b>
<b>" non-metalliferous.....</b>	<b>1,101</b>	<b>51,130</b>	<b>27,296,928</b>	<b>1,274</b>	<b>56,122</b>	<b>35,388,901</b>	<b>1,346</b>	<b>58,574</b>	<b>38,622,202</b>

†Includes: in 1911 and 1912—actinolite, chromite, corundum, fluorspar, magnesite, manganese, talc, and tripolite. Includes: in 1913—actinolite, corundum, tripolite, and talc. (a) No record in 1911. Partial record only in 1912 and 1913.

## SMELTER PRODUCTION.

Statistics of the production of copper, lead, and silver smelters and refineries, showing the tonnage of ore treated, the matte, blister, base bullion, or refined metal produced, etc., have been collected by this Branch, since 1908.

The active smelting companies in 1913 were as follows:—

- The Mond Nickel Company, Coniston, Ont.
- The Canadian Copper Company, Copper Cliff, Ont.
- The Coniagas Reduction Company, Thorold, Ont.
- The Deloro Mining and Reduction Co., Deloro, Ont.
- The Buffalo and Ontario Smelting Co., Kingston, Ont.
- The Dominion Refineries, Ltd., North Bay, Ont.
- The Metals Chemical Co., Ltd., Welland, Ont.
- The North American Smelting Co., Kingston, Ont.
- The Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B.C.
- The Granby Consolidated Mining, Smelting and Power Co., Ltd., Grand Forks, B.C.
- The British Columbia Copper Co., Ltd., Greenwood, B.C.

The total quantity of ores and concentrates treated in these works during 1913 was 3,037,391 tons, as compared with 3,005,410 tons in 1912. The largest proportion of the total tonnage about 70 per cent in 1913 consists of the copper-gold-silver ores of British Columbia, chiefly from the Boundary, (Phoenix and Greenwood), Rossland, and Coast (Britannia and Texada Island) districts. The nickel-copper ores of the Sudbury district, Ontario, contributed about 27 per cent of the tonnage, the balance being lead ores and other ores treated in lead furnaces and the silver-cobalt ores of Ontario.

The quantities of these several classes of ores smelted during the past six years have been as follows:—

Year.	Nickel-copper ores.	Silver-cobalt ores.	Lead ores.	Copper-gold silver ores.	Totals
1908.....	360,180	7,182	53,545	1,797,488	2,218,395
1909.....	462,336	8,384	54,539	1,850,889	2,376,148
1910.....	628,947	9,466	57,549	1,987,752	2,683,714
1911.....	610,834	9,330	55,408	1,517,981	2,193,553
1912.....	725,065	8,097	59,932	2,212,316	3,005,410
1913.....	823,403	6,124	88,110	2,119,754	3,037,391

The products obtained in Canada from the treatment of these ores include: pig lead produced at Kingston, Ont., refined pig lead and lead pipe produced at Trail, B.C.; and fine gold, fine silver, copper sulphate, and

antimony produced from the residues of the Trail lead refinery; silver bullion, white arsenic, nickel oxide, and cobalt oxide produced in Ontario, from the Cobalt District ores. Refined antimony was produced in New Brunswick in 1909. In addition to these refined products, blister copper, copper matte, nickel-copper matte, cobalt material or mixed nickel and cobalt oxides are produced and exported for refining outside of Canada.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada for smelting.

It should also be explained that the figures include the results of the treatment in British Columbia of a small quantity of imported ores.

### Smelter and Refinery Production in Canada.

Matte, blister copper, and other smelter products obtained and exported for refining.	1909.	1910.	1911.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.	Tons.
(1) Blister copper.....	14,239	13,918	10,710	17,063	15,270
(2) Copper matte.....	11,597	11,519	11,320	6,727	5,159
(3) Nickel-copper matte.....	25,845	33,033	32,607	41,925	47,150
(4) Lead bullion.....	2,010				
(5) Cobalt material.....		54	630	642	122

Refined products produced and metals contained in unrefined smelter products exported.	1911.		1912.		1913.	
	Refined products.	Metals contained in matte, blister, and base bullion.	Refined products.	Metals contained in matte, blister, and base bullion.	Refined products.	Metals contained in matte, blister, base bullion and speiss.
Gold.....Ozs.	15,270	175,189	12,118	184,815	11,977	213,270
Silver....."	19,078,768	585,896	17,572,217	686,171	13,789,709	934,601
Lead.....Lbs.	23,525,050		35,893,190		37,923,043	
Copper....."		29,855,868		58,405,910		59,245,722
Copper sulphate....."	197,187		87,110		130,533	
Nickel....."		34,098,744		44,841,542		49,676,772
Cobalt oxide....."					660,079	
Nickel oxide....."	154,174		349,054		263,304	
White arsenic....."	4,194,209		4,090,768		3,384,249	

(1) Blister copper carrying gold and silver values.

(2) Copper matte

(3) Bessemer nickel-copper carrying small gold and silver values as well as metals, of the platinum group.

(4) Unrefined lead bullion carrying silver values.

(5) Cobalt material carrying nickel and silver values.



*Nickel-Copper Ores.*—These ores of the Sudbury district, together with a small tonnage from the Alexo mine in the district of Nipissing, Ontario, are treated in the smelters of the Canadian Copper Company at Copper Cliff, and the Mond Nickel Company at Coniston, formerly at Victoria Mines. In addition to the nickel and copper which will probably average slightly over 3 per cent nickel, and 2 per cent copper, these ores of the Sudbury district contain small amounts of gold, silver, platinum, and palladium. The present metallurgical practice involves the following processes:—

- I. Roasting the ores in open heaps, to remove part of the sulphur.
- II. Smelting in water-jacketed blast furnaces, to produce a low grade matte, containing 33 per cent copper-nickel and nearly all the precious metals.
- III. Converting the furnace matte in Bessemer basic converters, to make a matte containing about 80 per cent copper-nickel.
- IV. Refining the converter matte, separating the nickel, copper, and precious metals.

At the present time the first three processes only are carried on in Canada. The converter matte is shipped to the United States and to England for final treatment.

The total quantity of nickel-copper ore mined during 1913 was 784,697 tons and the quantity smelted 823,403 tons. There were produced 47,150 tons of Bessemer matte, containing 12,938 tons of copper and 24,838 tons of nickel. This is the largest production since the beginning of operations in 1886. In 1912 there were smelted 725,065 tons of ore, from which was produced 41,925 tons of Bessemer matte, containing 11,116 tons of copper and 22,421 tons of nickel.

Statistics of smelter production from these ores since the commencement of this industry are shown in the following table:

### Smelter Production of the Nickel-Copper Ores of the Sudbury District.

Calendar Year.	Ore mined.	Ore smelted.	Matte shipped.	Value matte.	Nickel content of matte.	Copper content of matte.
	Tons.	Tons.	Tons.	\$	Tons.	Tons.
1886.....	3,307	30,000			900	1,500
1887.....	567					
1888.....						
1889.....	44,990	40,146	3,274		432	733
1890.....					718	651
1891.....	83,300	72,558	10,336		2,018	2,064
1892.....	74,381	57,022			1,207	1,102
1893.....			9,425		1,991	1,821
1894.....	103,223	96,038	11,681	766,422	2,454	2,604
1895.....	74,135	68,618	10,188	890,834	1,944	2,288
1896.....	94,966	71,027	10,750	416,594	1,699	1,584
1897.....	93,154	96,370	13,968		1,999	2,750
1898.....	123,820	121,924			2,759	4,187
1899.....	159,957	172,761		702,341	2,872	2,834
1900.....	196,420		23,336	1,076,306	3,540	3,364
1901.....	315,692	255,958		1,661,839	4,594	4,318
1902.....	269,538	211,847	25,311	1,327,448	5,347	3,553
1903.....	136,033	207,030	13,832	2,686,469	6,253	3,576
1904.....	203,388	118,470	10,154	2,193,198	5,274	2,455
1905.....	277,766	251,421	17,405	4,019,814	9,438	4,386
1906.....	343,814	340,059	20,310	4,628,011	10,745	5,264
1907.....	351,916	359,076	22,025	3,289,332	10,595	6,996
1908.....	409,551	360,180	21,210	2,930,989	9,572	7,503
1909.....	451,892	462,336	25,845	1,913,012	13,141	7,873
1910.....	652,392	628,947	35,033	5,380,064	18,636	9,630
1911.....	612,511	610,834	32,607	4,945,593	17,049	8,966
1912.....	737,726	725,065	41,925	6,303,102	22,421	11,116
1913.....	784,697	823,403	47,150	7,076,945	24,838	12,938

*Silver-Copper-Nickel-Arsenic Ores.*—The first shipments of silver ores from the Cobalt district were made in 1904, and in 1906 the first works for the treatment of these ores in Canada were established by the Canadian Copper Company, at Copper Cliff, Ont. This plant was closed down however in 1913 because of the extended treatment of these ores in cyanide plants at the mines. Operations were continued at the plants of the Coniagas Reduction Company, at Thorold, and the Deloro Mining and Reduction Company, at Deloro, Ont., but that of the Canada Refining and Smelting Company, at Orillia, was not operated during 1913. At each of these plants when in operation, nickel and cobalt oxide are recovered in addition to silver bullion and white arsenic. Other smaller plants have been established at Kingston, North Bay, and Welland.

A large proportion of the ore tonnage shipped from the Cobalt district is still sent to smelters in the United States, although during the past three

years there has been a considerable increase in the treatment of these ores by cyanidation and the recovery of silver at the mine in the form of bullion. Thus we find a further falling off, during 1913, in the recovery of silver at Ontario smelters and an increased amount of bullion produced at the mines.

The treatment of these ores in Ontario smelters during the past four years has given the following results:

	1910.	1911.	1912.	1913.
Ore treated..... Tons.	9,466	9,330	8,097	6,124
Products recovered—				
Silver produced†..... Ozs.	14,574,839	17,753,167	15,675,218	11,356,707
White arsenic..... Lbs.	3,003,467	4,194,209	4,090,768	3,384,249
Speiss or residues..... Tons.	3,074			
Cobalt oxide..... Lbs.}	13,508	154,174	349,054	660,079
Nickel oxide..... " }				268,304
Mixed cobalt and nickel oxides and cobalt material..... "	108,178	1,260,832	1,285,280	243,737

†Fine ounces contained in silver bullion, fineness ranging from 850 to 998.

In his annual report on the mining industry tributary to the Temiskaming and Northern Ontario Railway, Mr. A. A. Cole, has published the following records of production at the three most prominent silver smelters.

#### *Canadian Copper Company.*

"In the autumn of 1912 the Canadian Copper Company decided to close up and abandon its Cobalt plant and since that time has accepted no cobalt ores."

"The following statement shows the ore treated and the production of the Cobalt plant of the Canadian Copper Company from the commencement of operations to their close in 1913."

Year.	Ore treated.	Silver fine.	METALLIC.		White arsenic.
			Cobalt.	Nickel.	
			Pounds.	Pounds.	
	Pounds.	Ounces.	Pounds.	Pounds.	Pounds.
1906.....	1,767,692·5	1,282,692·78	9,021	3,987	.....
1907.....	4,560,627·5	3,829,542·82	331,151	138,427	510,622
1908.....	9,857,072·5	8,551,532·07	464,171	268,140	942,827
1909.....	10,651,189·5	8,779,014·55	690,737	463,588	1,242,722
1910.....	9,792,511·0	8,696,624·87	346,433	260,756	843,619
1911.....	6,744,108·0	6,584,102·46	238,684	234,323	680,074
1912.....	3,667,301·0	3,523,207·80	223,163	209,330	476,156
1913.....	186,602·0	47,590·00	15,506	7,161	95,669
	47,227,104·0	41,294,357·35	2,318,916	1,585,712	4,791,689

*Coniagas Reduction Company, Thorold, Ont.*

"The output of this smelter up to the 31st December, 1913, is as follows:"

Year.	Ores treated.	Silver, fine.	Cobalt, oxide.	Nickel, oxide.	White arsenic.
	Tons.	Ounces.	Tons.	Tons.	Tons.
1908.....	266.8	360,683	5.5	1.5	13.5
1909.....	1,116.9	1,659,604	0.9	.....	100.0
1910.....	2,017.25	3,485,243	53.8	13.2	557.7
1911.....	2,821.50	5,770,271	60.5	17.3	766.1
1912.....	2,288.77	4,824,632	129.0	50.7	636.7
1913.....	2,509.8	4,977,012	250.6	115.6	319.4
	11,021.02	21,077,455	500.3	198.3	2,393.4

*Deloro Mining and Reduction Company, Ltd., Deloro, Ont.*

"In order to increase the output of this company's plant at Deloro and at the same time effect certain economies in production extensive additions are under construction. The principal extensions consist firstly in the installation of a blast furnace of double the capacity of the present one."

"This, in conjunction with an increased capacity in the roasting plant will enable the company to handle from 300 to 400 tons of silver-cobalt ore per month. It is planned to balance the whole plant in proportion to this. Already various changes and additions have been made in the oxide plant which have materially increased the capacity of that section. With further additions which are now going on, the capacity will be still further increased in a comparatively short time, and as this means more work for the silver plant, on account of the increased quantity of revert, etc., the actual capacity of the silver plant for ore will be governed to some extent by the output of the oxide plant, hence the wide range in the smelting capacity quoted above."

"This plant treats both high grade ore and concentrates, as well as a limited quantity of those table concentrates which are highly silicious."

"It is expected to have extensions completed and the plant working to full capacity early in the spring of 1914. Already contracts have been closed covering the entire output of the oxide plant for a year ahead."

### Production of Deloro Smelter, 1908 to 31st December, 1913.

	Ore treated.	Silver, fine.	Cobalt and mixed oxides.	Refined arsenic.
	Tons.	Ounces.	Tons.	Tons.
Previous to 1913.....	11,065	20,339,860	500	3,275
During 1913.....	2,920	6,350,500	190	893
	13,985	26,690,360	690	4,168

*Lead Ores.*—Two lead smelting plants were in operation during 1913. The small plant at Kingston, Ontario, built by the North American Smelting Company, and completed in 1912, was operated in 1913, chiefly on British Columbia and imported ores and lead waste. The lead smelter and refinery at Trail, B.C., owned by the Consolidated Mining and Smelting Company, treated practically all the lead ore mined in southern British Columbia with the exception of the small tonnage that went to Kingston.

In the lead refinery at Trail, the bullion from the smelter is cast into anodes and re-deposited electrolytically upon cathode sheets of refined lead. The refined lead is cast into pigs or manufactured into lead pipe. The slimes from the tank room carry gold, silver, antimony, arsenic, and copper.

The first two are recovered as fine metals, and the copper as copper sulphate. Antimony is also recovered, though not regularly, and bearing metal is manufactured.

The annual production of refined lead, fine gold and silver, and copper sulphate has been as follows:—

Calendar Year.	Refined lead.	Fine gold.	Fine silver.	Copper sulphate.
	Lbs.	Ozs.	Ozs.	Lbs.
1904.....	7,519,440	4,336	551,450	56,000
1905.....	15,304,509	8,602	1,088,328	77,175
1906.....	20,471,314	9,993	1,263,809	143,135
1907.....	26,607,461	10,395	1,631,422	97,751
1908.....	36,549,274	15,346	1,956,039	203,379
1909.....	41,833,614	18,241	2,003,003	51,405
1910.....	32,987,508	13,298	1,798,960	163,223
1911.....	23,525,050	15,270	1,325,601	197,187
1912.....	35,254,790	12,118	1,896,999	87,110
1913.....	36,218,784	11,977	2,433,002	130,533

“At Trail the principal improvements have been alterations in the machine and blacksmith shops, and the transfer of machinery for these

shops from the old Le Roi plant; the re-building of one of the copper furnaces and increasing its length to thirty-five feet; preparation for installation of a new lead furnace, and for re-building the lead furnaces; preparations for the installment of a new blower and of cranes for handling material in the blast furnace building; re-building of the Heberlein plant to reduce costs of operation and to take care of increased tonnage of lead ores; including the installation of a crane for handling the Heberlein pots, and of a 24 x 36 jaw crusher and grab bucket for handling sinter, and the purchase of additional Heberlein pots; the purchase of additional electric locomotives; of two Wedge roasters to take care of increased tonnage of lead ores; the installation of a gas-producer for the Dwight and Lloyd roasters, to replace firing with gasoline."

*Gold-Silver-Copper Ores of British Columbia.*—Three copper smelters were active in British Columbia during 1913. These were the Trail copper furnace of the Consolidated Mining and Smelting Company, treating the ores of the Rossland camp and other ores of the district; the Grand Forks plant of the Granby Consolidated Mining, Smelting and Power Co., and the Greenwood plant of the British Columbia Copper Company, treating chiefly the low grade ores of the Boundary district.

On the Coast the Tye Copper Company's furnace at Ladysmith was idle throughout the year. Construction was continued by the Granby Company on their new furnace at Anyox, Observatory inlet, Portland canal, which was completed and blown in on March 16, 1914.

The aggregate production of British Columbia copper smelters during the past five years including the foreign ores treated, was as follows:

	1910.	1911.	1912.	1913.
Ore smelted..... Tons.	1,987,752	1,517,981	2,212,316	2,119,754
Smelter products—				
Matte..... "	11,519	11,320	6,727	5,159
Blister..... "	13,913	10,710	17,069	15,270
Metallic content of matte and blister—				
Gold..... Ozs.	197,181	175,189	184,815	213,279
Silver..... "	636,140	585,896	686,171	934,601
Copper..... Lbs.	36,800,283	29,855,868	36,174,185	33,370,176

*Trail Smelter.*—Statistics of the production of the Trail smelter, including both the copper and lead furnaces, have been published in the annual reports of the Company, the figures since 1896 having been as follows:—

## Production of Trail Smelter.

Year ending June 30.	Ore smelted.	METALS CONTAINED IN MATTE AND BULLION PRODUCED.			
		Gold.	Silver.	Lead.	Copper.
		Tons.	Ozs.	Ozs.	Lbs.
1906 (6 months only).....	157,640	64,590	1,074,255	15,133,683	2,399,161
1907.....	222,573	69,168	1,100,271	20,283,083	3,443,310
1908.....	305,956	121,380	2,224,888	32,157,139	4,004,468
1909.....	347,417	114,920	2,443,475	43,675,077	4,637,631
1910.....	487,125	137,614	2,162,406	42,368,316	5,974,959
1911.....	388,785	119,067	1,458,753	24,026,015	4,421,988
1912.....	296,458	129,739	1,765,992	26,072,074	2,914,141
1913 (15 mos. to Sept. 30, 1913.)..	407,124	186,017	3,224,408	48,325,252	3,454,814
Production from 1894 to Sept. 30, 1913.....	3,551,051	1,332,929	23,449,031	299,295,896	54,244,747

*Granby and Anyox Smelters.*—The Granby smelter is situated at Grand Forks in the Boundary district, and the Anyox smelter at Observatory inlet, Portland canal; both are owned by the Granby Consolidated Mining, Smelting and Power Company. The ores treated at Grand Forks are those from the Company's mines at Phoenix together with a small tonnage of custom ore; while the Anyox smelter will treat the ores from the Hidden Creek properties.

The smelter at Anyox, which was not blown in until March of 1914, was described in the *Engineering and Mining Journal*, of January 3, 1914, from which the following extracts have been taken.

"The Hidden Creek reduction works of the Granby Consolidated Mining, Smelting & Power Co., Ltd., is rapidly approaching completion, and early in 1914 is expected to be ready for blowing in on ores from the company's mines nearby, in which some 8,000,000 tons of ore containing more than 2.0 per cent copper have been developed; and incidentally a much larger tonnage of lower-grade ore. Because of the higher tenor of the Hidden Creek ores, the new works of 2,000 tons daily capacity will produce as much copper as the older plant at Grand Forks, B.C., which smelts more than double this tonnage."

"The works are on Granby Bay, formerly called Goose Bay, an indentation in the western shore of Hastings Arm, which, with Alice Arm, merges into Observatory Inlet."

"The furnaces, of which there are three, are 50 inches wide by 30 feet long, and are the regular type of rectangular water-jacketed matting furnace made by the Traylor Engineering & Mfg. Co. The furnaces are provided with  $4\frac{1}{2}$  inch tuyers at 10 inch centers. The slag tap is at the side. The

converter room is in one end of the main smelter building, in which are three converter stands. The converters of the Great Falls type are 12 feet in diameter."

"The downtakes from the furnaces, and the flue from the converter hoods, lead into a large dust chamber by the side of the main smelter building. From the center of the chamber the main flue leads up the hill to the reinforced-concrete stack 22 feet in diameter by 153 feet high, the top of which is about 300 feet above the furnaces."

"The Granby Company has secured from the British Columbia government the right to reclaim a large area of ground by filling in a shallow-water area in Granby Bay directly in front of the smelter site with slag. Thus is a convenient dumping ground for the slag obtained, and as the dump grows, the area of the company's new-made land will gradually increase."

"Power will be generated at a hydro-electric plant, on Granby Bay, just below the smelter site. The water of Falls Creek will be impounded by a crib and rock-filled dam, one mile back of the smelter. A 6 foot wooden-stave pipe will convey the water from the reservoir to the Pelton wheels in the power house, at an available head of 400 feet."

"The company will, for the present, secure coke and such coal as is needed, from the Crow's Nest Pass mines, in southwestern Alberta and also from mines near Tacoma, Wash. Limestone for flux will come from a deposit on the Portland Canal, 25 miles below Stewart."

The Phoenix ores are of particular interest because of the low tenor of their metal values, their self-fluxing character, and the large tonnage treated. The percentage of metals contained has been decreasing and the recovery of metals during the year ending June 30, 1913, as shown in the Company's annual report was: copper 17.68 pounds; silver 0.208 ounces, and gold 0.0326 ounces per ton of ore smelted.

The first furnace of 300 tons capacity was completed in 1900, and since that date the capacity of the plant has been increased from time to time until at present there are eight furnaces with a total capacity of about 4,500 tons per day. The converter plant was first installed in 1902, and enlarged in 1909.

The quantities of ores smelted and the total production of metals shown in the accompanying table, are compiled from the Company's annual published reports.

The blast furnace department was operated throughout the year and handled:—

Granby ore.....	1,264,690 tons.
Foreign ore.....	15,179 "
Converter slag and matte.....	48,078 "
Flue dust.....	4,422 "
Average per cent of coke used per ton of ore 13.36.	



The tonnage of ore smelted during the year was 1,279,869, as against 739,519 in 1912, and 984,346 in 1911.

The average smelting cost for the year was \$1.214, as against \$1.256 in 1912.

The converting department produced 22,683,181 lbs. of copper in 1913, as against 13,226,360 lbs. in 1912, and 17,858,860 lbs. in 1911. The converters in 1913 handled 34,500 tons of 32.9 per cent matte.

### Ores Smelted and Metals Recovered at Granby Smelter.

Year ending June 30.	ALL MATERIALS SMELTED.			METALS PRODUCED.			
	Granby ore.	Foreign.		Total.	Gold.	Silver.	Copper.
		Ore.	Matte.				
	Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.
1901.....	169,087	7,832	.....	176,919	8,871	34,990	5,435,955
1902.....	293,645	4,454	3,001	301,100	30,736	274,511	10,836,851
1903.....	289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904.....	516,059	36,182	4,290	556,531	54,493	275,935	16,020,936
1905.....	550,738	39,332	.....	590,120	42,930	215,449	14,224,692
1906.....	796,188	36,158	.....	832,346	50,020	316,947	19,939,004
1907.....	649,022	16,893	.....	665,915	32,738	201,337	16,410,576
1908.....	853,432	24,179	.....	882,011	40,063	300,204	21,092,238
1909.....	964,789	19,944	.....	984,733	45,760	335,520	21,901,528
1910.....	1,175,548	21,829	.....	1,197,377	48,752	356,746	22,754,899
1911.....	959,563	24,783	.....	984,346	41,707	343,178	17,858,860
1912.....	721,719	17,800	.....	739,519	33,932	225,305	13,231,121
1913.....	1,264,690	15,179	.....	1,279,869	47,266	324,336	22,688,614
Total.....	9,209,063	272,306	13,514	9,494,883	512,494	3,482,032	215,947,132

*Greenwood Smelter.*—The plant of the British Columbia Copper Company, at Greenwood, B.C., includes three large furnaces, having a total daily capacity of from 2,400 to 2,500 tons, and a converter plant.

The last annual published report of the Company covering the year ending December 31, 1913, contains the following references to smelting operations:—

“Six hundred and twelve thousand nine hundred and seven (612,907) tons of ore were treated at the company’s smelter, being:

353,422 tons of British Columbia Copper Co.’s ore, and  
259,485 tons of custom ore.

“There were produced—

8,296,902 lbs. of fine copper;

137,051.72 ozs. of silver;

26,640.629 ozs. of gold;

the proceeds of which, with miscellaneous earnings, amounted to \$1,904,694.52.”

“Owing to shortage of ore, the smelter was unable to operate at more than 82 per cent of actual capacity. During a period covering about four months, at two different times, it was attempted to run three furnaces; the balance of the year the two large furnaces were in operation. As against this the individual furnace efficiency was the highest ever attained at this plant. The slags showed lower metal losses than for any previous year.”

“Costs were higher for several reasons: shortage of ore; extra labour on coke stock pile, occasioned by various periods of coke shortage; many expensive renewals and repairs to plant and machinery, which were taken up in operation expenses; same overhead expenses as when running full capacity.”

#### General Operating Cost—

“The yield in gold, copper, and silver from the company ores was less than ever before. A comparative table is shown below as against the results for 1912.”

	1912.	1913.
Yield of copper per ton of B.C. Copper Co.'s copper-bearing ores.....Lbs.	13.600	12.175
Yield of gold and silver in B.C. Copper Co.'s ores.....	\$0.762	\$10.573
Average price realized for copper.....	16.664c.	15.071c.
Cost of producing copper from B.C. Copper Co.'s ores, crediting expenditure with gold and silver contents of ore; per lb. of fine copper.....	12.855 c.	17.903c.
Cost per ton of handling ore, including all expenses from 'ore in place' to sale of the contained metals.....	\$2.4596	\$2.8108

# METALLIC ORES.

## ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Shawenegan Falls, Quebec, from bauxite ores imported from France, Germany, and the United States 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, 1913, the imports of alumina were 30,704,200 pounds, or 15,352 tons, while the exports of aluminium in ingots, bars, etc., during the same period, were 13,015,000 pounds, or 6,507 tons, besides manufactures of aluminium, valued at \$8,203.

The imports of alumina and exports of aluminium during the past nine years are shown in tabular form as follows:—

### Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of alumina.		EXPORTS OF ALUMINIUM.		
			Ingots, bars, etc.		Manufactures.
	Lbs.	Value. \$	Lbs.	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	13,285,700	2,002,363	10,898
1913.....	30,704,200	614,713	13,015,000	1,762,214	8,203

The price of aluminium, No. 1, ingots in New York varied between  $27\frac{3}{4}$  cents per pound in March and  $18\frac{1}{2}$  cents in December, the average for the year being 23.64 cents.

In Europe prices for aluminium for several years have been considerably lower than in the United States. In 1909 the prices per pound at works in Europe are reported by the Metallgesellschaft as having ranged from  $13\frac{1}{2}$  to 16 cents; in 1910, from 14 to  $17\frac{1}{4}$  cents; in 1911, from 11 to  $13\frac{1}{2}$  cents; and in 1912, from  $13\frac{1}{2}$  to  $18\frac{1}{2}$  cents.

## ANTIMONY.

The production of antimony in Canada has been not only small, but spasmodic.

In 1907 the production was 2,016 tons of antimony ore shipped, valued at \$65,000, and 63,850 pounds of refined antimony, valued at \$5,108.

In 1908 customs returns showed an export of 148 tons of antimony ore, valued at \$5,443.

In 1909, in addition to the shipment of 35 tons of concentrates, there were produced about 61,200 pounds of antimony metal, chiefly at the works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, a small recovery being also reported from the Consolidated Mining and Smelting Company's refinery at Trail, B.C.

The total production of antimony in 1910, as reported to this Branch, consisted of 364 tons of antimony concentrates, valued at \$13,906, shipped from West Gore, Nova Scotia.

The auriferous antimony property at West Gore, formerly operated by the Dominion Antimony Company, Limited, was taken over in July, 1909, by the West Gore Antimony Company.

The mines and works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, have not been in operation since 1909.

In British Columbia, some of the lead ores contain a small percentage of antimony—about one-third of one per cent. Some refined antimony was recovered at Trail in 1907 and 1909, the recovery being somewhat irregular.

No production is reported in 1913.

### Annual Shipments of Antimony Ore\*.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	665	31,490	1905 (a).....	527	.....
1887.....	584	10,860	1906 (a).....	782	.....
1888.....	345	3,696	1907*.....	2,016	65,000
1889.....	55	1,100	1908 (b).....	148	5,443
1890.....	26½	625	1909*.....	35	1,575
1891.....	10	60	1910.....	364	13,906
1892 to 1897.....	Nil.	Nil.	1911.....	.....	.....
1898.....	1,344	20,000	1912.....	.....	.....
1899 to 1904.....	Nil.	Nil.	1913.....	.....	.....

(a) As recorded by the Nova Scotia Department of Mines; no value given.

(b) Exports.

\*In addition to the shipments shown in the table, refined antimony was produced in 1907 to the extent of 63,850 pounds valued at \$5,108 and in 1909, 61,207 pounds valued at \$4,285.

## Exports of Antimony Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1880.....	40	1,948	1899.....	6½	190
1881.....	34	3,308	1900.....	210	3,441
1882.....	323	11,673	1901.....	10	1,643
1883.....	165	4,200	1902.....	90	13,658
1884.....	483	17,875	1903.....	33	4,332
1885.....	758	36,250	1904.....	160	7,237
1886.....	665	31,490	1905.....	525	27,118
1887.....	229	9,720	1906.....	420	17,064
1888.....	352½	6,894	1907.....	1,327	37,807
1889.....	30	695	1908.....	148	5,443
1890.....	38	1,000	1909.....	4	120
1891.....	3½	60	1910.....	239	14,095
1892 to 1897.....	Nil.	Nil.	1911.....	57	4,946
1898.....	1,232	15,295	1912.....	Nil.	Nil.
			1913.....	Nil.	Nil.

## Imports of Antimony.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	42,247	5,903	1897.....	134,661	8,031
1881.....	.....	7,060	1898.....	156,451	12,350
1882.....	183,597	15,044	1899.....	289,066	16,851
1883.....	105,346	10,355	1900.....	186,997	20,001
1884.....	445,600	15,564	1901.....	350,737	24,714
1885.....	82,012	8,182	1902.....	504,822	39,276
1886.....	89,787	6,951	1903.....	868,146	65,434
1887.....	87,827	7,122	1904.....	418,943	27,112
1888.....	120,125	12,242	1905.....	186,454	12,828
1889.....	119,034	11,206	1906.....	403,918	56,297
1890.....	117,066	17,439	1907 (9 mos.).....	321,385	71,493
1891.....	114,084	17,483	1908.....	484,899	66,484
1892.....	180,308	17,680	1909.....	444,254	32,133
1893.....	181,823	14,771	1910.....	563,662	40,681
1894.....	139,571	12,249	1911.....	640,208	42,234
1895.....	79,707	6,131	1912.....	533,517	35,462
1896.....	163,209	9,557	1913.....	937,294	62,104
					\$
1913 { Antimony, or regulus of, not ground, pulverized or otherwise manufactured.....			Duty free.	881,155	54,832
Antimony salts.....			“	56,139	7,272
Total.....				937,294	62,104

## 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 production of cobalt.

By the smelters they are regarded as silver ores and no allowance is made to the mine owners for cobalt contained therein. During the past year, however, the high-grade mill at the Nipissing mine has been shipping its residues high in cobalt and receiving payment therefor.

The recovery of this metal in Canada has been in the form of cobalt oxide and mixed oxides of cobalt and nickel, the smelters thus producing cobalt oxide being those of the Coniagas Reduction Company at Thorold, Ont., the Deloro Mining and Reduction Company at Deloro, Ont., the Dominion Refineries, Limited, North Bay, Ont., and the Metals Chemical Company at Welland. The Buffalo and Ontario Smelting Company at Kingston produced some mixed oxides. According to direct returns there were produced during 1913, 660,079 pounds of cobalt oxide, valued at \$525,028, and mixed oxides of cobalt and nickel, and cobalt bearing residues valued at \$90,266, as well as 268,304 pounds of nickel oxide valued at \$80,561.

In 1911 there were produced 154,174 pounds of cobalt and nickel oxides and 1,260,832 pounds of cobalt material and mixed cobalt and nickel oxides, the total value being \$221,690. In 1912 the production was: cobalt oxide and nickel oxide, 349,054 pounds, valued at \$156,256, and cobalt material and mixed oxides, 1,285,280 pounds, valued at \$163,988.

No information is available as to the quantities recovered from ores shipped to smelters outside of Canada.

The following table shows the ore shipments, estimated cobalt content, and value received by the shippers for cobalt, as published by the Ontario Bureau of Mines:—

Year.	Ores shipped.	Estimated total cobalt content.	Per cent.	Value received by shippers for cobalt.
	Tons.	Tons.	%	\$
1904.....	158	16	10.1	19,960
1905.....	2,144	118	5.5	100,000
1906.....	5,335	321	6.0	80,704
1907.....	14,788	739	5.0	104,426
1908.....	25,624	1,224	4.7	111,118
1909.....	30,677	1,533	5.0	94,965
1910.....	34,282	1,098	3.2	54,699
1911.....	26,653	852	3.2	170,890
1912.....	21,933	934	3.2	314,381
1913.....	20,877	821	3.2	420,386

The figures for the last four years for this table are based on the assumption that the ores and concentrates as shipped contain 3.20 per cent cobalt, but the values attached are those obtained by the refiners on the sale of the products as marketed.

Cobalt is not now quoted on the open market.

Some researches on cobalt and cobalt alloys were undertaken by Dr. H. T. Kalmus, at Queen's University, and a report has been issued.<sup>1</sup>

In 1907 an Act was passed by the Ontario Legislature, authorizing the payment of bounties on certain nickel, cobalt, copper, and arsenic products, mined and refined in the Province. The Act and Amendment are quoted following:—

### **An Act to Encourage the Refining of Metals in Ontario.**

Whereas, it is desirable to encourage the refining of nickel, cobalt, copper and arsenic ores within the Province;

Therefore His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This Act may be cited as 'The Metal Refining Bounty Act.'

2. 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 upon 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 upon 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 herein mentioned is not to exceed in all \$60,000 in any one year.

Class 2.—On refined metallic cobalt or on refined oxide of cobalt, 6 cents per pound on the free metallic cobalt or on the cobalt contained in the oxide of cobalt; but cobalt upon 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 cobalt products herein mentioned is not to exceed in all \$30,000 in any one year.

Class 3.—On refined metallic copper or on refined sulphate of copper, 1½ cents per pound on the free metallic copper or on the copper contained in the sulphate of copper; or on any copper product carrying at least 95 per cent of metallic copper, one-half cent per pound; but copper upon 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

<sup>1</sup>Mines Branch No. 259 "Preparation of Metallic Cobalt by Reduction of the Oxide." Report on, by H. T. Kalmus, B. Sc., Ph. D.

amount to be paid as bounty on the copper products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 4.—On white arsenic, otherwise known as arsenious acid, produced from mispickel ores and not from ores carrying smaltite or niccolite or cobaltite, one-half cent per pound; but the amount to be paid as bounty on the arsenic compound herein mentioned is not to exceed in all \$15,000 in any one year.

(1) Provided, however, that if so much of any of the above-mentioned classes of refined products is refined in the Province in any one year that the amount hereby set apart in respect of the said class would be insufficient to pay the bounties herein provided therefor, then the bounty payable to the refiners of such class of refined products shall abate and be payable upon a *pro rata* basis so that not more than the maximum amount herein specified for any of the said classes shall be paid in respect of said class in any one year.

(2) Provided, also, that the bounties herein provided for shall cease and determine with the payment of any sum or sums which shall have been earned during the period of five years from the passing of this Act.

(3) No person, firm or company shall be entitled to claim or receive any of the bounties in this Act provided for unless such person, firm or company shall have been at all times prepared and ready and willing during the period for which the bounty is claimed, to smelt, treat and refine ores from which the same product as that on which the bounty is claimed can be produced, belonging to any other person, firm or company, at rate and on terms and conditions approved by the Lieutenant-Governor in Council, or shall have been ready to purchase such ores at rates approved by the Lieutenant-Governor in Council as current market rates.

### **An Act to Amend the Act to Encourage the Refining of Metals in Ontario.**

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. Subsection 2 of section 2 of The Metal Refining Bounty Act is amended by striking out the word 'five' where the same appears in the last line of the said subsection, and substituting therefor the word 'ten.'



## COPPER.

The total production of copper in Canada in 1913, estimated on the basis of smelter recovery from ores treated, was 76,976,925 pounds, which, at the average price of copper for the year in New York, 15.269 cents per pound, would be worth \$11,753,606.

On a similar basis the production for 1912 was 77,832,127 pounds, valued at \$12,718,548, a falling off in quantity and, owing to the decrease in the price of the metal, a still greater falling off in value.

In the case of British Columbia the metal is mainly derived from ores low in copper content and since, in smelting the copper, losses are necessarily high, running as high in some cases as 25 per cent and over, the difference between the copper content of the ore as shipped by the mine, and the metal recovered from the ore at the smelter, is considerable.

Statistics of the copper production for the years previous to 1909 include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores received at the smelters, for which smelter returns were received during the year, and show a relatively higher copper production than the figures published for the Province of Ontario, which are based on copper content of matte produced.

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines in British Columbia 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.

### Production of Copper by Provinces 1911, 1912 and 1913

Provinces.	1911.		1912.		1913.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Quebec.....	2,436,190	301,503	3,282,210	536,346	3,455,887	527,679
Ontario.....	17,932,263	2,219,297	22,250,601	3,635,971	25,885,929	3,952,522
British Columbia...	35,279,558	4,366,198	50,526,656	8,256,561	45,791,579	6,991,916
Other districts*.....	‡	.....	1,772,660	289,670	1,843,530	281,489
Total.....	55,648,011	6,886,998	77,832,127	12,718,548	76,976,925	11,753,606

\*Includes Nova Scotia and Yukon.

‡A shipment is reported from New Brunswick.

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 1913 are reported by the Customs Department as 82,650,360 pounds, of which 77,323,592 pounds were exported to the United States, and 5,325,468 pounds to Great Britain, and 1,300 pounds to other countries.

The exports in 1912 were 78,488,564 pounds.

*Prices.*—The price of copper in New York varied between 17½ cents per pound at the beginning of January and 14 cents per pound in the middle of July.

The monthly average prices in cents per pound of electrolytic copper in New York are shown for a period of five years in the accompanying table:—

### Monthly Average Prices of Electrolytic Copper in New York.

Months.	1909.	1910.	1911.	1912.	1913.
	Cts.	Cts.	Cts.	Cts.	Cts.
January.....	13.893	13.620	12.295	14.094	16.488
February.....	12.949	13.332	12.256	14.084	14.971
March.....	12.337	13.255	12.139	14.098	14.713
April.....	12.563	12.733	12.019	15.741	15.291
May.....	12.893	12.550	11.989	16.031	15.436
June.....	13.214	12.404	12.385	17.234	14.672
July.....	12.880	12.215	12.463	17.190	14.190
August.....	13.007	12.490	12.405	17.498	15.400
September.....	12.870	12.379	12.201	17.508	16.328
October.....	12.700	12.553	12.189	17.314	16.337
November.....	13.125	12.742	12.616	17.326	15.182
December.....	13.298	12.581	13.552	17.376	14.224
Yearly average.....	12.982	12.733	12.376	16.341	15.269

In London the monthly average prices of standard copper were as follows in pounds sterling per ton of 2,240 pounds:—

### Monthly Average Prices of Standard Copper in London.

Months.	1909.	1910.	1911.	1912.	1913.
	£	£	£	£	£
January.....	57.638	60.923	55.604	62.760	71.741
February.....	61.197	59.388	54.970	62.893	65.519
March.....	56.231	59.214	54.704	65.884	65.329
April.....	57.363	57.233	54.035	70.294	63.111
May.....	59.338	56.313	54.313	72.352	63.807
June.....	59.627	55.310	56.368	73.259	67.140
July.....	58.556	54.194	56.670	76.636	64.166
August.....	59.393	55.733	56.264	78.670	69.200
September.....	59.021	55.207	55.253	78.762	73.125
October.....	57.551	56.722	55.176	76.389	73.383
November.....	58.917	57.634	57.253	76.890	63.275
December.....	59.906	56.069	62.063	75.516	65.223
Yearly average.....	58.732	57.054	55.973	72.942	63.335

Statistics showing the annual copper production of 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.

Calendar Year.	Lbs.	INCREASE OR DECREASE.		Value.	INCREASE OR DECREASE.		Average price per pound.
		Lbs.	%		\$	%	
				\$			Cts. <sup>100</sup> / <sub>100</sub>
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.....	13,300,302	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	11,763,606	(d) 964,942	7.59	15.269

\*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. (See explanation in text).

Statistics of the exports of copper as collected by the Customs Department are shown in the table following, and statistics of imports in the two succeeding tables. The total imports of copper, in so far as weights are given, amounted, during the fiscal year ending March, 1913, to 44,649,566 pounds. During the calendar year 1913 the total imports were valued at \$7,414,610 and included crude and manufactured copper to the extent of 43,054,418 pounds, valued at \$7,044,297, together with other copper manufactures valued at \$370,313, of which the quantity is not stated.

In detail these imports comprise:—

	Pounds.	Valued at.
Copper, (pigs, ingots, scrap, blocks, etc.).....	5,910,900	\$ 932,885
“ in bars, rods, coils, etc.....	29,387,900	4,886,846
“ in strips, sheets or plates.....	4,255,900	782,974
“ tubing, etc.....	884,920	205,797
“ wire.....	572,341	127,320
“ sulphate.....	2,037,714	107,960
“ crude precipitate.....	4,743	515

### Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1885.....		262,600	1899.....	11,371,766	1,199,908
1886.....		249,259	1900.....	23,631,523	1,741,885
1887.....		137,966	1901.....	32,488,872	3,404,908
1888.....		257,260	1902.....	26,094,498	2,476,516
1889.....		168,457	1903.....	38,364,676	3,873,827
1890.....		398,497	1904.....	38,553,282	4,216,214
1891.....		348,104	1905.....	40,740,861	5,443,873
1892.....		277,632	1906.....	42,398,538	7,303,366
1893.....	4,792,201	269,160	1907.....	54,688,450	8,749,609
1894.....	1,025,389	91,917	1908.....	51,136,371	5,934,559
1895.....	3,742,352	230,965	1909.....	54,447,750	5,882,246
1896.....	5,462,052	281,070	1910.....	56,964,127	5,840,553
1897.....	14,022,610	850,336	1911.....	55,287,710	5,467,725
1898.....	11,572,381	840,243	1912.....	78,488,564	9,036,479
			1913.....	82,650,360	9,602,911

### Copper:—Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	31,900	2,130	1897.....	49,000	5,449
1881.....	9,800	1,157	1898.....	1,050,000	80,000
1882.....	20,200	1,984	1899.....	1,655,000	246,740
1883.....	124,500	20,273	1900.....	1,144,000	180,990
1884.....	40,200	3,180	1901.....	951,500	152,274
1885.....	28,600	2,016	1902.....	1,767,200	325,832
1886.....	82,000	6,969	1903.....	2,038,400	252,594
1887.....	40,100	2,507	1904.....	2,115,300	270,315
1888.....	32,300	2,322	1905.....	1,944,400	266,548
1889.....	32,300	3,288	1906.....	2,627,700	441,854
1890.....	112,200	11,521	1907 (9 mos.).....	2,616,600	520,971
1891.....	107,800	10,452	1908.....	3,612,400	650,597
1892.....	343,600	14,894	1909.....	2,732,300	383,441
1893.....	168,300	16,331	1910.....	4,690,700	617,630
1894.....	101,200	7,397	1911.....	5,023,700	641,749
1895.....	72,062	6,770	1912.....	5,542,000	699,442
1896.....	86,905	9,226	1913.....	5,690,700	929,668
1913 { Copper, old and scrap or in blocks.....			Duty free.	569,100	82,274
{ Copper in pigs or ingots.....			“	5,121,600	847,394
Total.....				5,690,700	929,668

## Imports of Manufactures of Copper.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	123,061	1891.....	563,522	1902.....	1,281,522
1881.....	159,163	1892.....	422,870	1903.....	1,291,635
1882.....	220,235	1893.....	458,715	1904.....	1,191,610
1883.....	247,141	1894.....	175,404	1905.....	1,775,881
1884.....	134,534	1895.....	251,615	1906.....	2,660,303
1885.....	181,469	1896.....	285,220	1907 (9 mos.)....	2,545,600
1886.....	219,420	1897.....	264,587	1908.....	2,713,060
1887.....	325,365	1898.....	786,529	1909.....	2,086,205
1888.....	303,459	1899.....	551,586	1910.....	2,870,630
1889.....	402,216	1900.....	1,090,280	1911.....	3,742,940
1890.....	472,668	1901.....	951,045	1912.....	4,494,723
				1913.....	6,618,862

	Duty.	Lbs.	Value.
(Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured.....	Free.	30,573,300	5,103,844
Copper, in strips, sheets or plates, not planished or coated, etc.....	"	4,481,100	874,070
Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured.....	"	889,056	201,217
1913} Copper rollers, for use in calico printing.....	"		8,674
Copper and manufactures of:—			
Nails, tacks, rivets and burrs or washers.....	30 %		4,600
Wire, plain, tinned or plated.....	15 "	466,802	105,515
Wire cloth, etc.....	25 "		7,239
All other manufactures of, n.o.p.....	30 "		313,703
Total.....			6,618,862

## Quebec.

The mines of the Eastern Townships were still more active during 1913 with an increased copper production therefrom. This amounted to 3,455,887 pounds, valued at \$527,679, representing the estimated recovery from 87,314 tons of ore and concentrates. Statistics of the copper production of Quebec province since 1886 are shown in the table following:—

## Quebec:—Production of Copper.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886.....	3,340,000	367,400	1900.....	2,220,000	359,418
1887.....	2,937,900	330,514	1901.....	1,527,442	246,178
1888.....	5,562,864	927,107	1902.....	1,640,000	190,666
1889.....	5,315,000	730,813	1903.....	1,152,000	152,467
1890.....	4,710,606	741,920	1904.....	760,000	97,455
1891.....	5,401,704	695,469	1905.....	1,621,243	252,752
1892.....	4,883,480	564,042	1906.....	1,081,169	381,930
1893.....	4,468,352	480,348	1907.....	1,517,990	303,659
1894.....	2,176,430	208,067	1908.....	1,282,024	169,330
1895.....	2,242,462	241,288	1909.....	1,088,212	141,272
1896.....	2,407,200	261,903	1910.....	877,347	111,757
1897.....	2,474,970	279,424	1911.....	2,436,190	301,503
1898.....	2,100,235	252,658	1912.....	3,282,210	536,346
1899.....	1,632,560	287,494	1913.....	3,455,887	527,679

## Ontario.

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

The chief companies are: The Canadian Copper Co., Limited, shipping from the Creighton, Crean Hill, the No. 2 and the No. 3, or Frood mines; and the Mond Nickel Co., Limited, operating the Garson, Victoria No. 1, North Star and Worthington. The Alexo mine, near Porquis Junction, on the Timiskaming and Northern Ontario Railway, shipped a considerable tonnage of nickel copper ore to the Mond Nickel Company's smelter.

The British America Nickel Corporation did some development work at the Murray and Whistle mines, but made no production. During the year the Mond Nickel Company opened their new smelter at Coniston, and closed the old plant at Victoria Mines.

The total tonnage of nickel-copper ores smelted in 1913 was 823,403 tons. There were produced during the year 47,150 tons of bessemer matte, containing 12,938 tons of copper and 24,838 tons of nickel, the shipping value of the matte being approximately \$7,076,945. Details of the production of these ores are given more completely and in tabular form in the article on "Nickel" and also under "Smelter Production."

The feature of the year in this district was the large increase in known ore bodies as discovered by diamond drilling.

A few shipments were made of copper ore from Dane to United States smelters, and payments were made for a small amount of copper in shipments from the Cobalt district to American smelters.

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 will be found in the chapter on cobalt, under the heading "Metal Refining Bounty Act."

Statistics of the copper production of Ontario since 1886 are given in the table following:—

### Ontario:—Production of Copper.

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

### British Columbia.

According to returns received from the smelters, the total quantity of copper contained in matte, blister, and copper-sulphate produced in British Columbia smelters during 1913, and including an estimate of smelter recovery for copper ores exported, was 45,791,579 pounds, after deducting the amount of copper produced from foreign ores. The production of 1912 on a similar basis was 50,526,656 pounds, and in 1911, 35,279,558 pounds.

Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this Province, according to statistics collected and published by the Provincial Department of Mines, reached a total of 46,460,305 pounds in 1913, as compared with 51,546,537 pounds in 1912. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, and the production by districts since 1908 are shown in the tables following:—

## British Columbia:—Copper Content of Ores Shipped.†

Calendar Year.	COPPER CON- TAINED IN ORES SHIPPED.		INCREASE.		Value.
	Lbs.	Lbs.	Lbs.	%	
1894.....	324,680				\$ 31,030
1895.....	952,840	628,160		103.00	102,526
1896.....	3,818,556	2,865,716		301.00	415,459
1897.....	5,325,180	1,506,624		39.00	601,213
1898.....	7,271,678	1,946,498		36.00	874,783
1899.....	7,722,591	450,913		6.00	1,359,948
1900.....	9,977,080	2,254,489		29.00	1,615,289
1901.....	27,603,746	17,626,666		177.00	4,448,896
1902.....	29,636,057	2,032,311		7.00	3,445,488
1903.....	34,359,921	4,723,864		16.00	4,547,735
1904.....	35,710,128	1,350,207		3.7	4,579,110
1905.....	37,092,251	1,982,123		5.6	5,876,222
1906.....	42,990,488	5,298,237		14.1	8,287,706
1907.....	40,832,720	*2,157,768		*5.02	8,168,177
1908.....	47,274,614	6,441,894		15.8	6,244,031
1909.....	45,597,245	*1,677,369		*3.6	5,918,522
1910†.....	38,243,934				4,871,512
1911†.....	36,927,656	*1,316,278		*3.4	4,571,644
1912†.....	51,546,537	14,618,881		39.6	8,408,513
1913†.....	46,460,305	*4,996,232		9.7	7,094,489

\*Decrease. †As published by British Columbia Bureau of Mines. ‡Allowing 5 pounds copper per ton of ore for smelter losses.

## British Columbia:—Production of Copper by Districts.\*

—	1908.	1909.	1910.†	1911.†	1912.†	1913.†
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cariboo.....						1,838
Cassiar.....	490,873	137,651		19,151	88,403	1,336
West Kootenay—						
Nelson.....	53,243	186,572	231,936		26,257	815,126
Trail creek.....	5,042,244	3,509,909	3,577,745	3,429,702	2,539,900	2,538,661
Yale—						
Boundary.....	40,178,521	40,603,042	31,354,985	22,327,359	33,372,199	28,621,973
Ashcroft } Kamloops }.....	3,269		1,178	152,723		37,578
Coast districts.....	1,506,464	1,160,071	3,078,090	10,998,721	15,420,778	14,443,793
Total.....	47,274,614	45,597,245	38,243,934	36,927,656	51,456,537	46,460,305

\*Copper content of ores shipped. †After deducting five pounds of copper per ton of ore for slag losses.

According to direct returns in 1913, the ores of the Boundary district produced about 63.5 per cent of the total, the Rossland mines about 4.9 per cent, and the Coast district 29.8 per cent.



In the Boundary the production was mainly from the mines of three of the large smelting companies: the Granby Consolidated Mining, Smelting and Power Co., Limited; the British Columbia Copper Co., Limited, and the New Dominion Copper Co., Limited. The two first named 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 1 per cent in copper, and from \$1 to \$2 in gold and silver.

The chief producing mines of the district were the Granby mines at Phoenix, the Mother Lode of the British Columbia Copper Company at Deadwood, and the Rawhide, of the New Dominion Copper Company, near Phoenix.

The British Columbia Copper Company have been steadily developing their properties at Princess Camp in the Similkameen, employing a large number of men.

Next in importance in point of production came the Coast district, with heavy shipments from the Britannia mines on Howe sound and the Marble Bay mine on Texada island. Several new properties were opened up at various points on the coast and active development was continued by the Granby Consolidated Mining, Smelting and Power Co., Limited, at their Hidden Creek property on Observatory inlet.

In the interior the main shippers at Rossland were the Centre Star, 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 of the British Columbia Copper Co., and the Silver King of the Consolidated Mining and Smelting Co. A considerable amount of work was done on mines in the northern interior in the neighbourhood of New Hazelton.

### **Yukon.**

The main shipments from this Territory were from the Pueblo mine at Whitehorse, which shows an increased tonnage over 1912. Some smaller properties also shipped, and it is reported that the owners of the Pueblo are reopening the War Eagle in the same neighbourhood.

## GOLD.

*Refined Metal.*—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, 1913, was 109,907.74 ounces, being the weight after melting, valued at \$1,448,625.37, after deducting office charges.

The assay charge was removed January, 1913, leaving the melting charge, equivalent to one-eighth of one per cent of the value of the bullion, thus placing the charges on a par with those of American offices. The result has been an increase of nearly 50 per cent in the value of receipts, the value for 1912 being \$974,077.14 after melting.

A refinery is in operation at the Royal Mint at Ottawa and shipments of gold have been received from various provinces.

There is but one other refinery in Canada producing fine gold; that of the Consolidated Mining and Smelting Co. of Canada, Limited, at Trail, B.C., where the gold is mainly recovered from the high grade silver-lead ores and the "dry" ores shipped to the smelter. Its annual output is given below.

### Production of Refined Gold at Trail, B.C.

Year.	Ozs.
1904.....	4,336
1905.....	8,602
1906.....	9,993
1907.....	10,395
1908.....	15,346
1909.....	18,241
1910.....	13,298
1911.....	15,270
1912.....	12,113
1913.....	11,977

*Mine Production.*—The production of gold in Canada—made up of gold derived from alluvial workings, gold obtained from the crushing of free milling quartz ores, and gold obtained from ores and concentrates sent to copper and lead smelters, etc., reached a total in 1913, of 802,973 fine ounces, valued at \$16,598,923, as compared with 611,885 fine ounces, valued at \$12,648,794, in 1912, and 473,159 fine ounces, valued at \$9,781,077, in 1911.

The production by provinces in 1911, 1912, and 1913, is shown in the table following:—

## Production of Gold by Provinces, 1911, 1912, and 1913.

	1911.		1912.		1913.	
	Ozs.(fine †)	Value.	Ozs.(fine †)	Value.	Ozs.(fine †)	Value.
		\$		\$		\$
Nova Scotia.....	7,781	160,854	4,385	90,638	2,174	44,935
Quebec.....	613	12,672	642	13,270	701	14,491
Ontario.....	2,062	42,625	86,523	1,788,596	219,801	4,543,690
Alberta.....	10	207	73	1,509	.....	.....
British Columbia...	(a) 238,496	4,930,145	251,815	5,205,485	297,459	6,149,027
Yukon.....	224,197	4,634,574	268,447	5,549,296	282,838	5,846,780
Totals.....	473,159	9,781,077	611,885	12,648,794	802,973	16,598,923

† Calculated from the value: one dollar = 0.048375 ozs.

	1911.	1912.	1913.
	\$	\$	\$
(a) As follows: Gold from placer mining .....	426,000	555,500	510,000
Gold from vein mining.....	4,504,145	4,649,985	5,639,027
	4,930,145	5,205,485	6,149,027

The exact value of fine gold is  $\frac{387}{1000}$  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  $\frac{387}{1000}$  or 0.048375.

Of the total production in 1913, about \$6,346,072, or 38.2 per cent, is to be attributed to alluvial workings; \$5,185,544, or 31.2 per cent, was derived from stamp mill bullion, and \$5,067,307, or 30.6 per cent from ores sent to the smelters. Nova Scotia shows a decrease, and from Alberta no production is reported, but the other provinces all show increases, that for Ontario being most notable, due mainly to the increase from Porcupine district.

Statistics of the annual gold production of Canada are shown in the following table:—

### Annual Production of Gold in Canada, 1858-1913.

Calendar Year.	Ozs. (fine†)	Value.	Calendar Year.	Ozs. (fine†)	Value.
		\$			\$
1858.....	34,104	705,000	1886.....	70,782	1,463,196
1859.....	78,129	1,615,072	1887.....	57,460	1,187,804
1860.....	107,806	2,228,543	1888.....	53,145	1,098,610
1861.....	128,973	2,666,118	1889.....	62,653	1,295,159
1862.....	135,391	2,798,774	1890.....	55,620	1,149,776
1863.....	202,498	4,186,011	1891.....	45,018	930,614
1864.....	199,605	4,126,199	1892.....	43,905	907,601
1865.....	192,898	3,987,562	1893.....	47,243	976,603
1866.....	152,555	3,153,597	1894.....	54,600	1,128,688
1867.....	145,775	3,013,431	1895.....	100,798	2,083,674
1868.....	134,169	2,773,527	1896.....	133,262	2,754,774
1869.....	102,720	2,123,405	1897.....	291,557	6,027,016
1870.....	83,415	1,724,348	1898.....	666,386	13,775,420
1871.....	105,187	2,174,412	1899.....	1,028,529	21,261,584
1872.....	90,283	1,866,321	1900.....	1,350,057	27,908,153
1873.....	74,346	1,536,871	1901.....	1,167,216	24,128,503
1874.....	97,856	2,022,862	1902.....	1,032,161	21,336,667
1875.....	130,300	2,693,533	1903.....	911,559	18,843,500
1876.....	97,729	2,020,233	1904.....	796,374	16,462,517
1877.....	94,304	1,949,444	1905.....	684,951	14,159,195
1878.....	74,420	1,538,394	1906.....	556,415	11,502,120
1879.....	76,547	1,532,353	1907.....	406,517	8,382,780
1880.....	63,121	1,304,824	1908.....	476,112	9,842,105
1881.....	63,524	1,313,153	1909.....	453,865	9,382,230
1882.....	60,288	1,246,268	1910.....	493,707	10,205,835
1883.....	53,863	1,113,246	1911.....	473,159	9,781,077
1884.....	51,202	1,058,439	1912.....	611,885	12,648,794
1885.....	55,575	1,148,829	1913.....	802,973	16,598,923

†Calculated from the value: one dollar=0.048375 ozs.

Gold was first discovered in various provinces about 1858 and reached a maximum of over four million dollars in 1863. From that year it more or less steadily decreased until 1892, when the production was only \$907,601, but the discovery of gold in the Yukon caused a rapid increase to a second high point of \$27,908,153 in 1900, from which it fell until 1907, and after a stationary period around the ten million mark, has increased rapidly since the discovery of the Porcupine mines in Ontario.

### Nova Scotia.

The gold production of this Province in 1913, which is derived almost entirely from quartz ores, is estimated at 2,174 fine ounces, valued at \$44,935, and shows a further decrease from previous years.

The principal operators in 1913 were:—

Switzer Mining Co., Fifteenmile Stream.

Stillwater Mining Co., Moose River.

Touquoy Gold Mining Co., Moose River.

J. R. McDonald, Moose River.  
 M. J. Higgins, Moose River.  
 Caribou Gold Mines, Limited, Caribou.  
 Golden Group Mining Co., Montagu.  
 Loon Brook Gold Mining Co., Montagu.  
 Geo. J. Hiseler, Chezzetcook.  
 Petpeswick Mining Co., Lake Catcha.  
 Dominion Leasing Co., Tangier.  
 Boston and Goldenville Gold Mining Co., Shier's Point.  
 L. A. Munger, Harrigan Cove.  
 Goldenville Mining Co., Goldenville.  
 Stormont Mining Co., Goldboro'.  
 Norman McMillan, Lawrencetown.  
 Dr. C. C. Ellis, Millers Lake.  
 Alex. Greenough, Oldham.  
 H. M. Rogers, Clyburn Brook (Victoria county).

Statistics of the annual production since 1862; the production of gold by districts during the twelve months ending September 30, 1913, as collected and published by the Provincial Mines Department; and the production from 1862 to 1913, by districts, according to the same authority, are shown in the tables following:—

### Nova Scotia:—Annual Production of Gold.

Cal. Year.	Tons treated.	Ozs. (fine)	Value.	Yield of gold per ton.	Cal. Year.	Tons treated.	Ozs. (fine)	Value.	Yield of gold per ton.
			\$	\$				\$	\$
1862....	6,473	6,863	141,871	21.91	1888..	36,178	21,137	436,939	12.08
1863....	17,000	13,180	272,448	16.02	1889..	39,160	24,673	510,673	13.02
1864....	21,431	18,883	390,349	18.21	1890..	42,749	22,978	474,990	11.11
1865....	24,421	24,011	496,357	20.32	1891..	36,351	21,841	451,503	12.42
1866....	32,157	23,776	491,491	15.28	1892..	32,552	18,855	389,965	11.98
1867....	31,384	25,763	532,563	16.96	1893..	42,354	18,436	381,095	8.99
1868....	32,259	19,377	400,555	12.41	1894..	55,357	18,834	389,338	7.04
1869....	35,144	16,855	348,427	19.91	1895..	60,600	21,919	453,119	7.47
1870....	30,824	18,740	387,392	12.56	1896..	69,169	23,876	493,568	7.13
1871....	30,787	18,139	374,972	12.17	1897..	73,192	27,195	562,165	7.68
1872....	17,089	12,352	255,349	14.94	1898..	82,747	26,054	538,590	6.50
1873....	17,708	11,180	231,122	13.05	1899..	112,226	29,876	617,604	5.50
1874....	13,844	8,623	178,244	12.87	1900..	87,390	28,955	598,553	6.85
1875....	14,810	10,576	218,629	14.76	1901..	91,948	26,459	546,963	5.32
1876....	15,490	11,300	233,585	15.08	1902..	93,042	30,348	627,357	6.68
1877....	17,369	15,925	329,205	18.95	1903..	103,856	25,533	527,806	5.08
1878....	17,989	11,864	245,253	13.63	1904..	45,436	10,362	214,209	4.71
1879....	15,936	12,980	268,328	16.83	1905..	57,774	13,707	283,353	4.90
1880....	13,997	12,472	237,823	18.42	1906..	66,059	12,223	252,676	3.82
1881....	16,556	10,147	209,755	12.66	1907..	53,550	13,075	282,686	4.82
1882....	21,081	13,307	275,000	13.04	1908..	61,636	11,842	244,799	3.97
1883....	25,954	14,571	301,207	11.60	1909..	56,790	10,193	210,711	3.71
1884....	25,186	15,163	313,554	12.44	1910..	43,006	7,928	163,391	3.81
1885....	28,390	20,945	432,971	14.98	1911..	18,328	7,781	160,854	8.78
1886....	29,010	22,038	455,564	15.70	1912..	14,360	4,385	90,638	6.31
1887....	32,280	20,009	413,631	12.81	1913..	7,324	2,174	44,935	6.13

Total fine ounces gold..... 890,293  
 Total value..... \$18,404,071

**Nova Scotia:—District Details of Gold Production, Year Ending September 30, 1913.**

District.	Tons crushed.	TOTAL YIELD OF GOLD			AVERAGE YIELD OF GOLD PER TON.		
		oz.	dwt.	grs.	oz.	dwt.	grs.
Beaver Dam.....	12	3	5	0	5	10	
Caribou.....	687	459	5	17	13	9	
Caribou (Moose River).....	325	86	0	0	5	7	
Cow Bay.....	4	2	0	0	10	0	
Fifteen Mile Brook.....	783	304	18	3	7	19	
Lake Catcha.....	1,185	353	10	9	5	23	
Millers Lake.....	15	6	15	0	9	0	
Montagu.....	99	18	16	3	3	19	
Oldham.....	255	162	6	0	12	18	
Pleasant River Barrens.....		7	17	0			
Renfrew.....	476	190	19	0	8	1	
Shier's point.....	563	82	19	0	2	23	
Stormont.....	20	8	6	0	8	7	
Tangier.....	2,900	677	15	14	4	16	
<b>Totals.....</b>	<b>7,324</b>	<b>2,364</b>	<b>12</b>	<b>22</b>	<b>6</b>	<b>11</b>	

**Nova Scotia:—Production of Gold from 1862 to 1913.**

District.	Tons crushed.	TOTAL YIELD OF GOLD.			AVERAGE YIELD OF GOLD PER TON.			Valued at \$19 per oz.
		oz.	dwt.	grs.	oz.	dwt.	grs.	
*Caribou and Moose River.....	221,039	60,741	8	12	5	12	1,154,087	
Montagu.....	29,622	42,191	19	9	1	8	801,647	
Oldham.....	58,990	67,505	8	22	1	2	1,282,604	
Renfrew.....	61,795	48,699	7	19	15	18	925,288	
Sherbrooke.....	300,213	153,090	1	4	10	5	2,908,711	
Stormont.....	525,257	120,558	4	13	4	14	2,290,606	
Tangier.....	67,012	28,908	11	9	8	15	549,263	
†Uniacke.....	63,351	43,933	1	17	13	21	835,679	
Waverley.....	155,520	69,980	10	16	9	0	1,329,630	
‡Brookfield.....	93,527	38,709	2	2	8	7	735,473	
§Salmon River.....	118,819	41,852	5	20	7	1	795,193	
¶Whiteburn.....	6,907	9,800	0	2	1	8	186,200	
Lake Catcha.....	30,822	27,822	0	18	18	1	528,619	
¶Rawdon.....	12,189	9,606	5	10	15	18	182,519	
Wine Harbour.....	77,396	34,992	15	11	9	1	664,363	
**Fifteenmile Stream.....	36,878	17,363	0	5	9	10	329,897	
Malaga Barrens.....	22,926	20,305	12	6	17	17	385,807	
§West Gore (from Stibnite ore) ..	3,240	4,512	15	10	1	7	85,743	
Other districts.....	144,935	75,367	2	22	10	9	1,431,975	
<b>Totals.....</b>	<b>2,030,438</b>	<b>915,989</b>	<b>14</b>	<b>11</b>	<b>9</b>	<b>0</b>	<b>17,403,804</b>	

\*From 1869, †from 1868, ‡from 1883, §from 1887, ¶from 1882, ¶from 1887, \*\*from 1883, §from 1905.

## Quebec.

No alluvial production is reported from Quebec in 1913, but there was an increased tonnage and accompanying increase in value of the gold produced from the pyritic mines of the Eastern Townships.

## Quebec:—Annual Production of Gold.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1877.....	583	12,057	1896.....	145	3,000
1878.....	868	17,937	1897.....	44	900
1879.....	1,160	23,972	1898.....	295	6,089
1880.....	1,605	33,174	1899.....	238	4,916
1881.....	2,741	56,661	1900.....	Nil.	Nil.
1882.....	827	17,093	1901.....	145	3,000
1883.....	860	17,787	1902.....	391	8,073
1884.....	422	8,720	1903.....	180	3,712
1885.....	103	2,120	1904.....	140	2,900
1886.....	193	3,981	1905.....	191	3,940
1887.....	78	1,604	1906.....	165	3,412
1888.....	181	3,740	1907.....	Nil.	Nil.
1889.....	58	1,207	1908.....	Nil.	Nil.
1890.....	65	1,350	1909.....	193	3,990
1891.....	87	1,800	1910.....	124	2,565
1892.....	628	12,987	1911.....	613	12,672
1893.....	759	15,696	1912.....	642	13,270
1894.....	1,412	29,196	1913.....	701	14,491
1895.....	62	1,281			
				16,899	349,293

\*Calculated from the value: one dollar=0.048375 ozs.

## Ontario.

The feature of the year in Ontario's gold production is not merely the increase from the Porcupine district, but the fact that the past year's production exceeds the total of all other years since 1886. The principal producers in 1913 were:—

Canadian Exploration Co., Long Lake mine, Algoma district.

Northern Gold Reefs, Ltd., St. Anthony mine, Sturgeon lake, Rainy River district.

Redeemer Mining Co., New Find mine, Sturgeon lake, Rainy River district.

Elizabeth Gold Mining Co., Elizabeth mine, Steeprock lake, Rainy River district.

The Dome Mines Co., Ltd., Dome mine, Timiskaming district.

The Dome Lake Mines, Ltd., Dome Lake mine, Timiskaming district.

Hollinger Gold Mines, Ltd., Hollinger mine, Timiskaming district.

Acme Gold Mines, Acme mine, Timiskaming district.

The McIntyre Porcupine Mines, Ltd., McIntyre mine, Timiskaming district.

The Porcupine Crown Mines, Ltd., Porcupine Crown mine, Timiskaming district.

Wm. C. Offer, *et al.*, Porphyry Hill mine, Timiskaming district.

Mines Leasing and Dev. Co., Rea mine, Timiskaming district.

Porcupine Three Nations Gold Mining Co., Ltd., Three Nations mine, Timiskaming district.

Lucky Cross Mines of Swastika, Ltd., Lucky Cross mine, Timiskaming district.

Swastika Mining Co., Ltd., Swastika mine, Timiskaming district.

Tough Oakes Gold Mines, Tough Oakes mine, Timiskaming district.

La Mine d'Or Huronia, Ltd., Huronia mine, Timiskaming district.

Statistics of the production of gold in Ontario since 1887 are shown in the table following:—

### Ontario:—Annual Production of Gold.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	327	6,760	1901.....	11,844	244,837
1888.....	Nil.	Nil.	1902.....	11,118	229,328
1889.....	Nil.	Nil.	1903.....	9,096	188,036
1890.....	Nil.	Nil.	1904.....	1,935	40,000
1891.....	97	2,000	1905.....	4,402	91,000
1892.....	344	7,118	1906.....	3,202	66,193
1893.....	708	14,637	1907.....	3,212	66,399
1894.....	1,917	39,624	1908.....	3,212	66,389
1895.....	3,015	62,320	1909.....	1,569	32,425
1896.....	5,563	115,000	1910.....	3,039	63,849
1897.....	9,157	189,294	1911.....	2,062	42,625
1898.....	12,863	265,889	1912.....	86,523	1,788,596
1899.....	20,394	421,591	1913.....	219,801	4,543,690
1900.....	14,391	297,495			
				429,841	8,885,595

\*Calculated from the value: one dollar=0.048375 ozs.

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

#### *The Dome Mines Co., Limited.*

Year ending March 31, 1914.

“Record of production for twelve months ending March 31, 1914.	
Tons of ore milled.....	145,305
Total value of ore treated.....	\$1,274,598.29
Average value per ton.....	\$ 8.77
Bullion recovered by amalgamation.....	Ozs. 730,866.79
Bullion recovered by cyanidation.....	Ozs. 473,730.85



Per cent of value recovered by amalgamation.....	60.7
Per cent of value recovered by cyanidation.....	39.3
Total value recovered.....	\$1,204,597.64
Per cent of value recovered.....	94.51

*Hollinger Gold Mines, Limited.*

Year ending December 31, 1913.

	Hollinger.	Acme.	Total.
"Tons of ore milled.....	138,291	1,840	140,131
Average value per ton.....	\$18.56	\$12.49	
Total values sent to mill.....	\$2,566,414.59	\$22,978.17	\$2,589,392.76
Average tons per day.....			383.92
Per cent of possible running time.....			86.3
Stamp duty tons per 24 hours of running time.....			11.51
Values lost in tailings.....			\$101,370.18
Values recovered.....			\$2,488,022.58
Total values per ton in tailings.....			\$ 0.723
Per cent of gold extracted.....			96.085

**Manitoba.**

Several companies report development work but there was no production during the year from the Province.

**Saskatchewan.**

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver Lake. A number of prospectors went in with the opening of navigation.

**Alberta.**

In past years there has been a small production of gold from the gravels of the Saskatchewan river. No recovery, however, is reported in 1913. Statistics of the production from the above mentioned source since 1887 are shown in the table following.

### Alberta:—Annual Production of Gold.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	102	2,100	1901.....	726	15,000
1888.....	58	1,200	1902.....	484	10,000
1889.....	967	20,000	1903.....	48	1,000
1890.....	193	4,000	1904.....	24	500
1891.....	266	5,500	1905.....	121	2,500
1892.....	508	10,506	1906.....	39	800
1893.....	466	9,640	1907.....	33	675
1894.....	726	15,000	1908.....	50	1,037
1895.....	2,419	50,000	1909.....	25	525
1896.....	2,661	55,000	1910.....	89	1,850
1897.....	2,419	50,000	1911.....	10	207
1898.....	1,209	25,000	1912.....	73	1,509
1899.....	726	15,000	1913.....		
1900.....	242	5,000			
				14,684	303,549

\*Calculated from the value: one dollar=0.048375 ozs.

### British Columbia.

The gold production of British Columbia in 1913, as reported to the Department, amounted to \$6,149,027, comprising: placer gold \$510,000; bullion from milling ores, \$661,705; and smelter recoveries, \$4,977,322. The statistics for lode gold represent, as closely as can be ascertained, the actual gold recovery based on smelter recoveries and bullion shipments.

There was a considerable decrease in the placer production. Of the 1913 production, 8 per cent was from alluvial workings, 11 per cent from mill bullion, and 81 per cent from ores sent to the smelters.

Statistics of the production by districts in 1913, as published by the Provincial Department of Mines, and the total annual production since 1858 are given in the tables following.

## British Columbia:—Production of Gold by Districts, 1913.\*

Districts.	GOLD PLACER.		GOLD LODE.	
	Ozs.	Value.	Ozs.	Value.
		\$		\$
Cariboo:—				
Cariboo.....	6,550	131,000	.....	.....
Quesnel.....	1,500	30,000	.....	.....
Omineca.....	300	6,000	62	1,231
Cassiar:—				
Atlin.....	15,750	315,000	1,355	28,008
All other.....	650	13,000	29	599
East Kootenay:—				
Fort Steele.....	100	2,000	.....	.....
West Kootenay:—				
Ainsworth.....	.....	.....	25	517
Nelson.....	50	1,000	26,324	544,117
Slocan.....	.....	.....	252	5,209
Trail creek.....	.....	.....	137,004	2,831,873
Others.....	100	2,000	54	1,116
Lillooet.....	150	3,000	1,368	28,277
Yale:—				
Grand Forks, Greenwood, and Osoyoos.....	50	1,000	101,195	2,091,701
Similkameen.....	150	3,000	1	20
Yale, Ashcroft and Kamloops.....	100	2,000	25	517
Coast.....	50	1,000	4,560	94,255
	25,500	510,000	272,254	5,627,490

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

## British Columbia:—Annual Production of Gold.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		\$			\$
1858.....	34,104	705,000	1887.....	33,558	693,709
1859.....	78,129	1,615,072	1888.....	29,834	616,731
1860.....	107,806	2,228,543	1889.....	28,489	588,923
1861.....	128,973	2,666,118	1890.....	23,918	494,436
1862.....	128,528	2,656,903	1891.....	20,792	429,811
1863.....	189,318	3,913,563	1892.....	19,327	399,525
1864.....	180,722	3,735,850	1893.....	18,360	379,535
1865.....	168,887	3,491,205	1894.....	25,664	530,530
1866.....	128,779	2,662,106	1895.....	61,289	1,266,954
1867.....	120,012	2,480,868	1896.....	86,504	1,788,206
1868.....	114,792	2,372,972	1897.....	131,805	2,724,657
1869.....	85,865	1,774,978	1898.....	142,215	2,939,852
1870.....	64,675	1,336,956	1899.....	203,295	4,202,473
1871.....	87,048	1,799,440	1900.....	228,916	4,732,105
1872.....	77,931	1,610,972	1901.....	257,292	5,318,703
1873.....	63,166	1,305,749	1902.....	288,333	5,961,409
1874.....	89,233	1,844,618	1903.....	284,103	5,873,036
1875.....	119,724	2,474,904	1904.....	275,975	5,704,908
1876.....	86,429	1,786,648	1905.....	285,529	5,902,402
1877.....	77,796	1,608,182	1906.....	269,886	5,579,039
1878.....	61,688	1,275,204	1907.....	236,216	4,883,020
1879.....	62,407	1,260,058	1908.....	236,858	5,029,880
1880.....	49,044	1,013,827	1909.....	250,320	5,174,579
1881.....	50,636	1,046,737	1910.....	261,386	5,403,318
1882.....	46,154	954,085	1911.....	238,496	4,930,145
1883.....	38,422	794,252	1912.....	251,815	5,205,435
1884.....	35,612	736,165	1913.....	297,459	6,149,027
1885.....	34,527	713,738			
1886.....	43,714	903,651			
				7,091,810	146,600,762

‡Calculated from the value: one dollar = 0.048375 ozs.

Among the camps of the Province, Rossland comes first as gold producer, with the Boundary, second, and then Nelson and the Coast districts.

The chief producers in the Rossland district were: the Centre Star and Le Roi groups owned by the Consolidated Mining and Smelting Co. of Canada, Ltd., and the Le Roi II (Josie) Mine of the Le Roi No. 2 Mining Co., Ltd.

The Boundary production of gold is from the low grade ores of the district which will average only about 0.04 to 0.05 ounces of gold per ton. The principal operating mines in 1913 were the Granby mines at Phoenix, the Mother Lode at Deadwood, and Rawhide, near Phoenix. In addition to these the Nickel Plate mine at Hedley is the premier gold mine of the Province, and the Jewel-Denero mine at Long Lake, near Greenwood, entered the shipping list toward the close of the year.

A considerable number of shippers contributed to the shipments from the Nelson division, and a small production came from the Coast where the Marble Bay mine was the chief gold producer.

## Yukon.

The production of the Yukon in 1913 was \$5,846,780, as compared with \$5,549,296 in 1912, an increase of \$297,484, or 5.36 per cent. In this is included the production from the 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  $2\frac{1}{2}$  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, as shown by the experience of the United States assay office, has been about \$16.50 per ounce. At the Canadian assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1913, 15,235.29 ounces from the Yukon, valued, after all charges had been deducted, at \$247,188.95, showing an average value of \$16.22 per ounce.

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  $2\frac{1}{2}$  per cent has been collected, is shown in the accompanying table:—

### Production of Crude Gold in the Yukon District.

Month.	1908.	1909.	1910.	1911.	1912.	1913.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
January.....	2,404.00	69.50	16.68	.....	5.25	19.30
February.....	47.30	115.33	749.28	435.66	525.29	56.90
March.....	16.65	848.39	193.81	13.30	0.50	.....
April.....	947.00	3.75	0.50	.....	.....	1,293.69
May.....	6,851.96	117.33	43.83	16,719.16	26,158.66	5,557.35
June.....	51,530.90	62,254.92	54,301.17	38,499.39	54,243.03	67,594.39
July.....	35,291.11	52,126.43	37,942.31	42,783.38	58,283.29	57,873.50
August.....	37,930.99	47,440.83	47,673.06	47,677.49	56,975.55	63,315.92
September.....	39,654.27	44,466.20	57,695.65	48,333.63	53,225.29	58,641.62
October.....	37,028.98	26,572.23	51,838.18	58,690.82	66,518.01	66,798.37
November.....	1,989.39	4,358.69	21,404.29	11,097.51	11,648.08	26,565.50
December.....	5,491.76	892.75	3,563.75	13,130.63	7,432.72	5,183.50
	219,244.31	239,766.35	275,472.51	277,430.97	335,015.07	352,900.04

In 1913 the placer production is estimated at \$5,836,072 in gold, representing 282,320 fine ounces of metal, and 63,522 fine ounces of silver,

valued at \$37,980, being at the average price of silver for the year, making the total valuation of the Yukon placer output \$5,874,052. In 1912 the placer production was estimated at \$5,576,493, representing 267,988 fine ounces of gold, valued at \$5,539,808, and 60,302 fine ounces of silver, valued at \$36,685.

Statistics of the annual production of gold in the district since 1885 are shown in the following table:—

### Annual Production of Gold in Yukon.

Calendar Year.	Ozs. (fine†).	Value.	Calendar Year.	Ozs. (fine†).	Value.
		\$			\$
1885).....	4,837	100,000	1900.....	1,077,553	22,275,000
1886).....			1901.....	870,750	18,000,000
1887.....	3,386	70,000	1902.....	701,437	14,500,000
1888.....	1,935	40,000	1903.....	592,594	12,250,000
1889.....	8,466	175,000	1904.....	507,938	10,500,000
1890.....	8,466	175,000	1905.....	381,001	7,876,000
1891.....	1,935	40,000	1906.....	270,900	5,600,000
1892.....	4,233	87,500	1907.....	152,381	3,150,000
1893.....	8,514	176,000	1908.....	174,150	3,600,000
1894.....	6,047	125,000	1909.....	191,565	3,960,000
1895.....	12,094	250,000	1910*.....	221,091	4,570,362
1896.....	14,513	300,000	1911*.....	224,197	4,634,574
1897.....	120,937	2,500,000	1912*.....	268,447	5,549,296
1898.....	483,750	10,000,000	1913*.....	282,838	5,846,780
1899.....	774,000	16,000,000			
				7,369,955	152,350,512

†Calculated from the value: one dollar=0.048375 ozs.

\*Including a small production from lode mines.

Since 1898 a royalty to the extent of \$4,115,974 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 from \$1 to \$2 less than 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

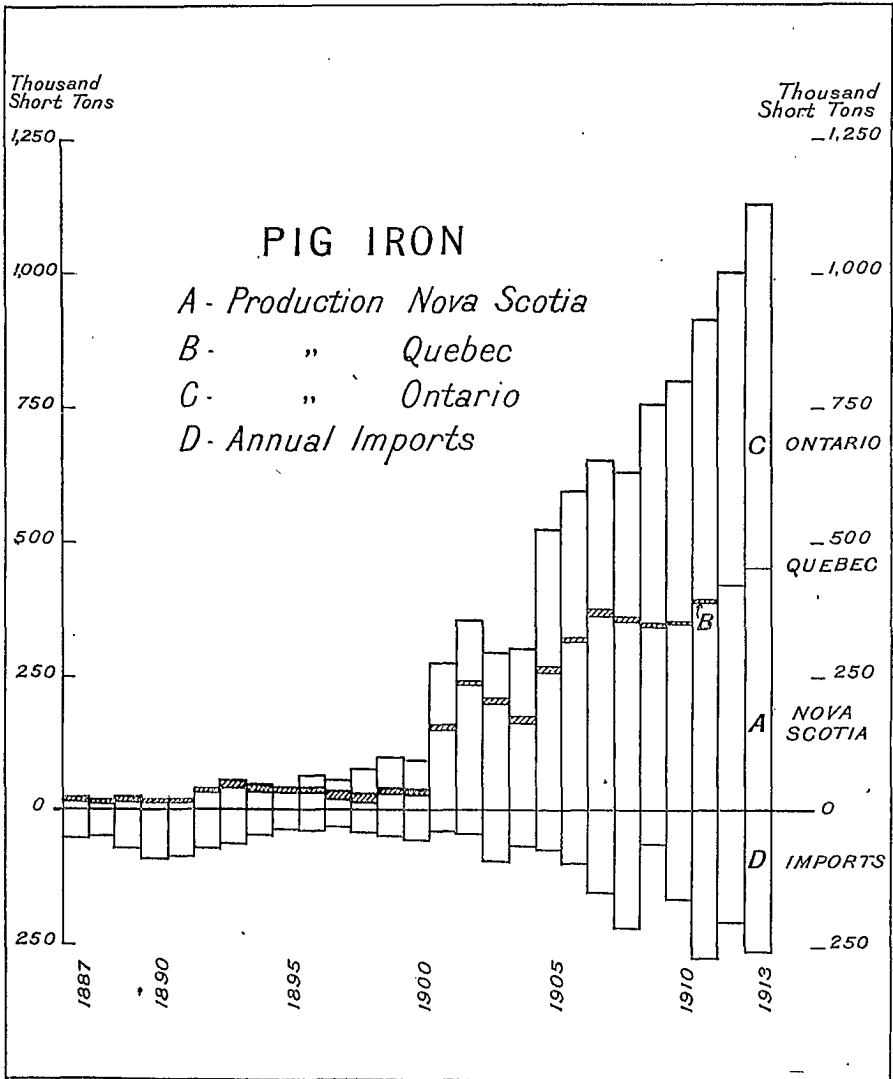
## Gold Production in the Yukon, and Royalty Collected.†

Fiscal Year.	Total gold production.	Total exemption.	Royalty collected on.	Royalty paid.
	\$	\$	\$	\$ cts.
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.....	9,809,464	2,501,744	7,307,720	730,771 99
1901.....	9,162,082	1,927,666	7,236,522	592,660 98
1902.....	9,566,340	1,199,114	8,367,225	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
1907 (9 months).....	3,304,791	.....	3,304,791	82,622 42
1908.....	2,820,162	.....	2,820,162	70,505 65
1909.....	3,260,282	.....	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

†From the Report of the Yukon and Mining Lands Branch of the Department of the Interior.

During the calendar year 1913 there were imported: gold bullion valued at \$840,435; gold coins, \$12,495,028; and manufactures of gold and silver, valued at \$1,055,837.

The exports of gold in dust, nuggets, etc., in the same period were valued at \$12,770,838.





# IRON AND STEEL.

## INTRODUCTORY.

Statistics of iron ore and of pig-iron and steel production in 1913 show increased shipments of iron ore from Canadian mines, an increased production of pig-iron and steel in Canadian furnaces and steel plants, and an increase in the imports of most classes of iron and steel products, but the general relationship of domestic iron ore supplies to furnace requirements exhibits no important change from the conditions that have obtained for a number of years past. Canadian furnaces continue to be operated almost entirely on imported ores, and Canadian iron and steel plants supply probably less than 30 per cent of the present consumption.

The accompanying table gives a summary of the chief statistics relating to iron and steel, while more detailed records will be found in the tables following.

**Summary of Iron and Steel Statistics, 1910-13**

	1910.	1911.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Iron ore shipped.....	259,418	210,344	215,883	307,634
Canadian iron ore charged to blast furnaces....	149,505	67,434	71,538	139,436
Imported iron ore charged to blast furnaces...	1,377,035	1,628,368	2,019,165	2,110,828
Iron ore charged to steel furnaces.....	39,332	42,892	43,006	55,018
Pig-iron made.....	800,797	917,535	1,014,587	1,128,967
Pig-iron and ferro-alloys, exported.....	9,763	5,870	6,976	6,326
Pig-iron imported.....	243,859	208,487	272,565	236,769
Ferro-alloys made.....	7,177	7,507	7,334	8,075
Ferro-alloys imported.....	18,900	17,226	19,810	30,355
Pig-iron consumption.....	1,060,970	1,144,885	1,307,820	1,397,840
Pig-iron used in steel furnaces.....	690,913	700,679	706,895	913,722
Steel ingots and castings made.....	322,284	832,396	957,681	1,168,993
Steel rails made.....	399,762	399,760	471,422	554,481
Canadian coke used in iron blast furnaces.....	491,281	543,933	609,183	710,260
Imported coke used in iron blast furnaces.....	476,838	577,388	656,815	706,888
Iron and steel imported.....	(b) 915,425	(b) 1,171,911	(b) 1,323,348	(c) 1,832,475
Number of completed blast furnaces.....No.	17	18	19	22
Number of men employed in blast furnaces "	1,403	1,773	1,358	1,589
Wages paid in blast furnaces.....\$	1,006,727	1,097,354	993,941	1,149,345
Value of pig-iron produced.....\$	11,245,622	12,307,125	14,550,999	16,540,012
Value of iron and steel goods exported. (c) \$	7,895,489	9,907,281	10,682,484	13,999,149
Value of iron and steel goods imported. (d) \$	59,952,197	85,319,541	102,568,332	141,272,357

(b) Figures cover the fiscal year ending March 31 and include all iron and steel goods for which weights are given. For details see Table 20.

(c) Figures cover the calendar year. For details see Tables 19 and 20.

(d) Figures cover the fiscal year ending March 31, except for 1913 when the calendar year is represented. For details see Tables 21 and 22.

Comment has been made in previous reports on the comparatively small proportion of Canada's consumption of iron and steel now supplied from the country's domestic resources, and this fact is again emphasized in the statistics of production, imports, and exports for 1913. It is somewhat difficult to arrive at a complete estimate of the total consumption of iron in Canada because of the large value of iron and steel goods imported for which the quantity cannot be stated, nevertheless the percentage of consumption available from Canadian mines can be closely gauged.

The imports and exports of iron and steel goods (not including iron ore) may be subdivided into two classes comprising the materials of which the quantity is stated and materials or goods of which the value only is recorded. Thus the net imports during 1913 may be arrived at as follows:—

	Iron and steel goods the quantity of which is recorded.		Other goods of which the value only is given.
	Tons.	Value.	Value.
Imports.....	1,832,475	\$55,927,607	\$85,344,750
Exports.....	51,882	835,459	13,163,600
Net Imports.....	1,780,593	\$55,092,148	\$72,181,060

It is probably safe to estimate that the value of \$72,181,060 of net imports represents not less than 100,000 tons of iron or steel and probably not more than 720,000 tons. Assuming these limits and assuming further that the iron or steel represents 50 per cent of the original ore charged, we have net imports of iron and steel goods (exclusive of iron ore) equivalent to a tonnage of iron ore between the limits of 3,761,186 tons and 5,004,806 tons. Adding the consumption of iron ore in Canadian iron and steel furnaces, we have a total equivalent consumption of iron ore not less than 6,066,468 tons and probably not exceeding 7,310,088 tons. The production of iron ore in Canada in 1913, viz., 307,634 tons, was, therefore, sufficient to supply probably over 4.2 per cent but not more than 5 per cent of the country's requirement of iron.

### IRON ORE.

The total shipments of iron ore from Canadian mines in 1913 were 307,634 tons valued at \$629,843 at the shipping point, as compared with shipments in 1912 of 215,883 tons valued at \$523,315. Of the total shipments in 1913, 91,020 tons were sent to blast furnaces in Canada, 196,151 tons to the United States, 12,927, to Scotland, and 7,536 tons to Holland.

The shipments comprised 92,386 tons of hematite and roasted siderite, 209,886 tons of magnetite (including some ores with an admixture of hematite), and 5,362 tons of titaniferous iron ore. Shipments in 1912 included 86,971 tons of hematite, 127,727 tons of magnetite, and 1,185 tons of titaniferous ore.

There was no active mining of iron ore in Nova Scotia during the year, but shipments of 20,436 net tons of 50 per cent ore were made from stock piles at the Torbrook mines in Annapolis county, by the Canada Iron Corporation.

The mines at Austin Brook, near Bathurst, N.B., owned by the same Company, were operated during the greater part of the year, and shipments of 86,416 net tons of 48 per cent ore were made chiefly to Philadelphia, U.S.A., a small tonnage going to Sydney, N.S.

In the Province of Quebec, titaniferous ore was shipped from Ivory-on-the-Lake, in the Township of Beresford, Terrebonne county, and from St. Urbain on the north shore of the St. Lawrence. These ores are high in titanium and were shipped to the Titanium Alloy Manufacturing Company, at Niagara Falls, N.Y.

In Ontario the principal operating mines were the Helen and Magpie, near Michipicoten, and the Moose Mountain at Selwood. The total shipments from the mines in the Province during the year were 195,680 tons, as against 112,321 tons in 1912. The Buffalo Union Furnace Co. operated the Belmont mine, near Cordova Mines, Hastings county, shipping to the new furnace at Port Colborne, Ont., and to the Company's furnaces at Buffalo, N. Y. The ore is a magnetite averaging about 51.50 per cent metallic iron. The Bessemer and Childs mines, also in Hastings county, were worked by the Canada Iron Mines, Ltd. The ores from both mines, the former averaging 49.30 per cent and the latter 38.70 per cent iron, were shipped to Trenton, Ont., where the Company has erected a concentrator. A small tonnage of concentrates averaging 56.45 per cent iron were marketed during the year. The Tivani Electric Steel Company spent two months opening up the Orton mine in Tudor township; and a small tonnage of titaniferous ore averaging 50 per cent iron and 7 per cent titanium was shipped. It is proposed to utilize this ore in the small electric steel furnace which this Company has constructed at Belleville. For several years past a small tonnage of magnetite concentrates recovered as a by-product in the treatment of corundum ores at Craigmont has been shipped. These concentrates are not, however, used as a source of iron, but are employed in the manufacture of school blackboards.

The Moose Mountain mines were operated during the greater part of the year and, in addition to the cobbled ore averaging 55.50 per cent in iron, there were shipped 3,315 tons of briquettes, averaging 62.71 per cent, from the Grondal magnetic concentrating works, installed for the treatment of Moose Mountain low grade ores. The Algoma Steel Corporation

operated the Helen and Magpie mines. The hematite ore shipped from the former averaged 55 per cent and was sent to Sault Ste. Marie and Hamilton. The ore at the Magpie is siderite, for the treatment of which a roasting plant has been erected; 22,327 tons of roasted siderite averaging 52 per cent iron were shipped during the year, while 3,146 tons of raw ore averaging about 36 per cent iron, were also shipped for experimental purposes.

No production has been reported from the Province of British Columbia during the past seven years.

The production by provinces during the past three years was as follows:—

IRON.—TABLE 1.

## Production of Iron Ore by Provinces, 1911-12-13.

Provinces.	1911.		1912.		1913.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
New Brunswick.....	51,120	69,464	71,520	127,716	86,416	153,820
Nova Scotia.....	22	50	30,857	168,877	20,436	21,049
Quebec.....	3,616	6,479	1,185	4,252	5,102	26,999
Ontario.....	175,586	446,326	112,321	222,490	195,680	427,075
	210,344	522,319	215,883	523,315	307,634	629,843

The production during 1912 and 1913, classed as magnetite (including concentrates and some ores with an admixture of hematite), hematite (including roasted siderite), and titaniferous iron ores, was as follows:—

IRON.—TABLE 2.

## Classified Production of Iron Ore, 1912-13.

Character of ore.	1912.			1913.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Magnetite.....	128,913	216,368	1 68	215,248	442,702	2 06
Hematite.....	86,971	306,947	3 53	92,336	187,141	2 03
	215,883	523,315	2 42	307,634	629,843	2 04

A record of the production by provinces in past years is shown in Tables 3 and 4. There was a considerable production in Ontario previous to 1886 which is not recorded.

IRON.—TABLE 3.

## Production of Iron Ore, by Provinces, 1886-1913.

Calendar Year.	New Brunswick.	Nova Scotia	Quebec.	Ontario.	British Columbia.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1886.....		44,338		16,032	3,941	64,361
1887.....		43,532	13,404	16,598	2,796	76,330
1888.....		42,611	10,710	16,894	3,372	78,587
1889.....		54,161	14,533		15,487	84,181
1890.....		49,206	22,305			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	32,950	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

IRON.—TABLE 4.

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

Calendar Year.	Tons.	Calendar Year.	Tons.
1876.....	15,274	1881.....	39,843
1877.....	16,879	1882.....	42,135
1878.....	56,600	1883.....	52,410
1879.....	29,889	1884.....	54,885
1880.....	51,193	1885.....	48,129

Following is a list of the principal producers of iron ore in Canada:—

Canada Iron Corporation, Limited, Imperial Bank Building, Montreal, Que.  
 Titanic Iron Ore Mining and Export Co., Baie St. Paul, Que.  
 Manitou Iron Mining Co., Montreal, Que.  
 Loughborough Mining Co., Schenectady, N.Y.  
 Canadian Iron Ore Co., 1231 St. Valier St., Quebec, Que.  
 The Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont.  
 Canada Iron Mines, Ltd., Toronto, Ont.  
 Atikokan Iron Co., Ltd., Port Arthur, Ont.  
 Moose Mountain, Limited, Sellwod, Ont.  
 Tivani Electric Steel Co., Belleville, Ont.  
 Buffalo Union Furnace Co., Buffalo, N. Y.

#### EXPORTS AND IMPORTS OF IRON ORE.

According to returns received direct from mine operators, 196,151 tons were shipped to the United States, 12,927 tons to Scotland, and 7,536 tons to Holland, or a total of 216,614 tons shipped to destinations outside of Canada during 1913. The exports from Canada during this period, according to the records published by the Department of Customs, were 126,124 tons valued at \$426,681 and included 107,624 tons valued at \$355,641 to the United States, 11,800 tons valued at \$45,312 to Great Britain, and 6,700 tons valued at \$25,728 to other countries.

The exports in 1912 were 118,129 tons valued at \$382,005, including 95,579 tons valued at \$295,213 to the United States, 16,800 tons valued at \$64,712 to Great Britain, and 5,750 tons valued at \$22,080 to other countries. The exports in 1911 were 37,686 tons valued at \$133,411, all to the United States. That the Customs Department record of exports to the United States would appear to be understated in 1913 is confirmed by the record of imports of iron ore into that country from Canada as shown in the "Monthly Summary of Commerce and Finance of the United States." According to this authority the imports of iron ore into the United States from Canada during the calendar year 1913 were 201,489 short tons valued at \$413,314, as compared with 119,476 tons valued at \$201,882 in 1912, and 56,538 tons valued at \$106,038 in 1911.

The imports of iron ore into Canada were not separately shown by the Customs Department until April, 1912. The imports during the twelve months ending December, 1913, were reported as 1,942,325 tons valued at \$3,877,824, and during the nine months ending December, 1912, 2,047,509 tons valued at \$3,932,074. The imports in 1913 included: 1,072,156 tons valued at \$3,007,653 from the United States, 869,669 tons valued at \$869,669 from Newfoundland, and 500 tons valued at \$502 from other countries.

There were used in Canadian furnaces in 1913, 2,110,828 tons of imported iron ores, as compared with 2,019,165 tons in 1912. The annual consumption of imported ores in blast furnaces, which was formerly the only record of imports, is shown in Table 11, and the total quantity of imported ores thus consumed since 1896 has been 14,656,482 tons, which practically represents the imports of iron ores during the past eighteen years.

The imported ores are obtained chiefly from Newfoundland and the iron ranges on the south shore of Lake Superior.

The Newfoundland deposits are operated by the two Canadian companies operating coal mines and steel plants at Sydney and Sydney Mines in Cape Breton.

The total quantity of Newfoundland ores shipped during 1913 from the Wabana mines was 1,605,920 short tons, of which 1,048,432 tons were shipped to Sydney and 557,488 tons to the United States and Europe.

In 1912 the shipments from Wabana, Newfoundland, were 1,331,912 short tons, of which 956,459 tons were shipped to Sydney and 375,453 tons to the United States and Europe.

According to the "United States Report of Commerce and Navigation," there were exported to Canada during the twelve months ending June, 1913, 1,367,928 tons, (2,000 pounds) of iron ore valued at \$3,684,233, and during the previous year 931,647 tons (2,000 pounds) valued at \$2,806,238.

IRON.—TABLE 5.

## Exports of Iron Ore, Calendar Years 1893-1913.

Calendar Year.	Tons.	Value.	Average value.	Calendar Year.	Tons.	Value.	Average value.
		\$	\$			\$	\$
1893.....	2,419	7,590	3 14	1903*...	363,233	922,571	2 51
1894.....		21,294		1904*...	168,828	401,738	2 38
1895.....	1,571	3,909	2 49	1905*...	168,289	407,381	2 42
1896.....	1,033	1,911	1 85	1906....	74,778	149,177	2 01
1897.....	403	811	2 01	1907....	25,901	45,907	1 77
1898.....	132	278	1 54	1908....	(a)		
1899.....	4,145	9,538	2 30	1909....	21,956	61,954	2 82
1900.....	5,527	13,511	2 44	1910....	114,499	324,186	2 83
1901*.....	306,199	762,283	2 49	1911....	37,686	133,411	3 54
1902*.....	428,901	1,065,019	2 48	1912....	118,129	332,005	3 23
				1913....	126,124	426,681	3 38

\*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.

## IRON.—TABLE 6.

## Exports of Iron Ore, Fiscal Years, 1879-1913.

Fiscal Year.	Tons.	Value.	Average value.	Fiscal Year.	Tons.	Value.	Average value.
		\$	\$			\$	\$
1879.....	3,562	7,530	2 11	1896....	14	35	2 50
1880.....	30,524	76,474	2 51	1897....	1,320	2,492	1 89
1881.....	44,677	114,850	2 57	1898....	360	402	1 16
1882.....	43,835	135,463	3 09	1899....	1,849	4,068	2 69
1883.....	44,914	138,775	3 09	1900....	4,327	7,689	1 78
1884.....	25,308	66,549	2 63	1901*....	53,401	150,657	2 53
1885.....	54,367	132,074	2 43	1902*....	525,983	1,303,901	2 43
1886.....	7,542	23,039	3 05	1903*....	293,510	733,230	2 50
1887.....	23,345	71,934	3 08	1904*....	233,850	579,883	2 43
1888.....	13,544	39,945	2 95	1905*....	224,903	540,909	2 41
1889.....	24,752	60,289	2 44	1906*....	143,040	345,540	2 33
1890.....	13,811	31,376	2 27	1907†....	34,191	65,367	1 91
1891.....	14,648	32,582	2 22	1908....	26,310	46,686	1 77
1892.....	7,707	36,935	4 79	1909....	3,933	71,063	1 82
1893.....	7,811	26,114	3 34	1910....	31,535	80,540	2 55
1894.....	1,859	9,026	4 86	1911....	104,307	304,718	2 91
1895.....	2,315	5,743	2 48	1912....	37,657	133,361	3 54
				1913....	135,587	426,633	3 15

\*See footnote to Table 5.

†Nine months ending March 31, 1907.

## IRON.—TABLE 7.

## Imports\* of Iron Ore into the United States from Canada, 1893-1913.

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	1903....	144,725	320,263	2 21
1894.....	301	756	2 51	1904....	126,995	283,765	2 23
1895.....	2,681	10,114	3 77	1905....	120,241	245,623	2 04
1896.....	39	142	3 64	1906....	113,309	220,112	1 93
1897.....	2,535	5,243	2 07	1907....	34,731	52,765	1 52
1898.....	1,313	2,904	2 21	1908....	32,124	55,617	1 73
1899.....	2,585	5,120	1 93	1909....	3,490	12,660	3 63
1900.....	4,477	5,550	1 24	1910....	36,070	97,984	2 72
1901.....	34,453	76,159	2 21	1911....	117,393	264,452	2 25
1902.....	309,527	685,540	2 21	1912....	45,089	89,336	1 98
				1913....	150,146	282,434	1 77

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



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

Year ending June 30.	Tons of 2000 lbs.	Value.	Average value.	Year ending June 30.	Tons of 2000 lbs.	Value.	Average value.
		\$	\$			\$	\$
1896.....	1,270	4,042	3 18	1905...	264,214	529,454	2 00
1897.....	10,942	34,168	3 12	1906...	254,399	608,029	2 39
1898.....	12,921	34,224	2 65	1907...	266,103	670,995	2 52
1899.....	33,598	60,497	1 80	1908...	327,918	880,197	2 68
1900.....	45,237	78,542	1 74	1909...	449,755	1,264,048	2 81
1901.....	67,994	175,689	2 58	1910...	609,617	1,636,917	2 69
1902.....	76,457	173,107	2 45	1911...	826,071	2,496,246	3 02
1903.....	86,258	264,755	3 07	1912...	931,647	2,806,238	3 01
1904.....	92,577	252,254	2 72	1913...	1,367,928	3,684,233	2 69

## Annual Shipments of Iron Ore from Wabana Mines, Newfoundland.

Calendar year.	To Canada.	To Europe and United States.	Total Shipments.
	Short tons.	Short tons.	Short tons.
1909.....	697,068	412,981	1,110,049
1910.....	808,762	450,864	1,259,626
1911.....	765,184	416,279	1,181,463
1912.....	956,459	375,453	1,331,912
1913.....	1,048,432	557,488	1,605,920

## PIG-IRON AND STEEL.

The making of iron and steel in Canada, is an industry which has been built up largely on the basis of imported ores, and the output continues to increase.

The total production of pig-iron in 1913, not including the output of ferro products which is separately tabulated, was 1,128,967 short tons (1,008,006 long tons) valued at approximately \$16,540,012, as compared with 1,014,587 short tons (905,881 long tons), valued at \$14,550,999 in 1912, and 917,535 short tons (819,228 long tons) valued at \$12,307,125 in 1911. An increase of 11.3 per cent is shown in the production of pig-iron in 1913 over the production of 1912, as compared with an increase of 10.5 per cent in 1912 over that of 1911.

At the close of the year Canada had twenty-two completed furnaces grouped in twelve separate completed plants owned by nine companies or corporations. Of the twenty-two completed furnaces, five have been idle throughout the past two years, namely, the furnace at Londonderry, N.S.; and the three small furnaces in the Province of Quebec owned or

controlled by the Canada Iron Corporation, and the furnace of the Atikokan Iron Company at Port Arthur. The aggregate daily capacity of these five furnaces was approximately 235 tons. During 1913, however, three new furnaces were brought into operation, with a total daily capacity of about 665 tons.

Of the total output of pig-iron in 1913, 23,696 tons valued at \$423,140, or \$17.86 per short ton, were made with charcoal as fuel, and 1,105,271 tons, valued at \$16,116,872 or \$14.58 per ton, with coke. The amount of charcoal pig-iron made in 1912 was 21,701 tons, and in 1911, 20,759 tons, while the quantity made with coke in 1912 was 992,886 tons, and in 1911, 896,776 tons.

The classification of the coke iron production in 1913, according to the purpose for which it was intended, was as follows: Bessemer 265,685 tons; basic 614,845 tons; foundry, including miscellaneous, 224,741 tons.

The classification of the production in 1912 was: Bessemer 256,191 tons; basic 544,534 tons; foundry, including miscellaneous, 192,161 tons.

The total production of pig-iron in 1912 and 1913 is shown by provinces in the following table, the average value per ton also being indicated. It should be explained that the value placed upon the pig-iron production in Nova Scotia is an assumed or estimated value. A large proportion of the pig-iron made in this Province is directly converted into steel, and as a very small portion only of the metal is sold as pig-iron it is difficult to obtain a satisfactory valuation for the output. It must not be inferred, therefore, that these values represent annual sales values.

There was no production of pig-iron in the Province of Quebec during the past two years. In former years this Province has had a continuous though small production of charcoal iron which commanded a high price.

IRON.—TABLE 8.

## Production of Pig-Iron by Provinces, 1912-13.

Provinces.	1912.			1913.			Percentage increase or decrease in quantity.
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.	
		\$	\$ cts.		\$	\$ cts.	%
Nova Scotia.....	424,994	6,374,910	15 00	480,068	7,201,020	15 00	+12.96
Ontario.....	589,593	8,176,089	13 87	648,899	9,338,992	14 39	+10.06
Total.....	1,014,587	14,550,999	14 34	1,128,967	16,540,012	14 65	+11.27

A record of the production by provinces since 1887 is shown in Table 9. During the past seven years the production in Ontario has increased at a more rapid rate than the production in Nova Scotia, and Ontario has now the largest output. The proportions of the total contributed by the two provinces in 1913 were: Nova Scotia 42.5 per cent, and Ontario 57.5 per cent. Since 1906 the production in Nova Scotia has increased by over 52 per cent, and the production in Ontario has increased by over 135 per cent.

IRON.—TABLE 9.

## Annual Production of Pig-Iron by Provinces, 1887-1913.

Year.	NOVA SCOTIA.		ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$	\$			\$		\$
1887.....	19,320	250,000			5,507	116,192	24,927	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.....	18,332	262,608			3,390	69,080	21,722	331,688
1891.....	21,353	309,527			2,538	59,374	23,891	337,901
1892.....	40,049	533,556			2,394	53,865	42,443	673,421
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	417,033			7,262	169,653	42,454	586,736
1896.....	32,351	400,829	28,302	368,942	6,615	154,353	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	808,167	7,094	164,849	102,943	1,377,306
1900.....	23,133	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.....	164,438	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	7,846	177,644	598,411	7,955,136
1907.....	366,456	4,211,913	275,459	4,531,309	10,047	232,004	651,962	9,125,226
1908.....	352,642	3,554,540	271,434	4,335,271	6,709	171,333	630,835	8,111,194
1909.....	345,330	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	35,255	800,797	11,245,622
1911.....	390,242	4,682,904	526,635	7,606,939	653	17,282	917,535	12,307,125
1912.....	424,994	6,374,910	539,593	8,176,089			1,014,587	14,550,999
1913.....	480,068	7,201,020	648,899	9,338,992			1,123,967	16,540,012

*Prices.*—The following brief review of pig-iron prices in 1913 has been kindly furnished by a prominent Montreal firm of iron and steel merchants:—

“The year 1912 ended with a firm market and an upward tendency, which culminated in February, after which there was a steady and continuous decline. In January, No. 1 foundry pig-iron was sold for delivery

at central Ontario points at prices ranging from \$21 to \$22 per gross ton. In February, a few sales were made at prices which were about 50 cents per ton above the January high point. In March, the market showed slight recession and pig-iron was obtainable at central Ontario points at from \$21 down to \$20; Montreal figures being \$22 down to \$21. In April and May the market continued to sag, and by the 1st June good foundry grades of pig-iron could readily be obtained in Toronto, Brantford, Galt, Guelph and such points at \$19, with \$20 prevailing for Montreal district. During July, August and September, further reductions were made; September showing about \$17.50 delivered at central Ontario points and \$18.50 delivered at Montreal. In October there was a strengthening of the market by about 50 cents per ton, but this did not last long, and in December we have to report the lowest market for the year. At the close of the year Canadian furnaces were quoting prices equal to \$16.50 to \$17 delivered central Ontario points.

"Prices on Canadian iron have been generally governed by the conditions existing in the United States, local furnaces being compelled to meet severe competition, especially from furnaces in Buffalo district. Montreal prices have usually been governed to some extent by the competition from Great Britain, but this year the British market has been relatively strong, and while a moderate tonnage of special brands has been brought into the country, high prices for same have had to be paid, and this import trade in special brands did not appreciably affect the general trend of prices."

Bessemer pig-iron at Pittsburgh was quoted at an average of \$18.15 during the first three months of the year, falling steadily during the next five months to \$16.52 in August, increasing slightly in September and October, but falling to \$16.02 in November, and \$15.77 in December.

A record of the average monthly prices per gross ton of pig-iron at Montreal during 1912 and 1913, as published by the Department of Labour, and of Bessemer pig-iron and grey forge iron at Pittsburgh for a period of ten years, as compiled by trade journals, is shown in the accompanying tables:—

## Average Monthly Prices of Pig-Iron in Canada During 1912 and 1913.

(From Report on Wholesale Prices by Department of Labour.)

	(1) Foundry No. 1, N.S. at Montreal.		(2) Summerlee No. 2 at Montreal.	
	1912.	1913.	1912.	1913.
January.....	19.75	22.00	20.00	24.00
February.....	19.00	22.00	20.00	24.00
March.....	19.00	22.00	20.00	24.00
April.....	18.50	22.00	20.00	24.00
May.....	18.50	22.00	20.00	22.50
June.....	18.50	21.00-22.00	20.00	22.50
July.....	18.50	20.00-21.00	20.00	22.50
August.....	19.00	20.00-21.00	20.00	22.50
September.....	20.00	20.00-21.00	20.00	22.50
October.....	20.50	20.00-21.00	24.00	22.50
November.....	20.50	19.50-21.00	24.00	22.50
December.....	21.50	19.50-21.00	24.00	22.50
Average.....	19.437	19.437	21.000	23.00

(1) Price per ton of 2,240 pounds, f.o.b. at Montreal, on the opening market day of each month; quotations supplied by the Dominion Iron and Steel Co., Ltd.

(2) Price per ton at Montreal, in the first week of each month, quotations from *Hardware & Metal*.

### Bessemer Pig-Iron at Pittsburgh, per Gross Ton (2,240 pounds)\*

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January.....	13 91	16 85	18 35	23 15	19 00	17 34	19 90	15 90	15 05	18 15
February.....	13 66	16 41	18 35	22 85	17 90	16 78	19 34	15 90	14 90	18 15
March.....	14 25	16 35	18 28	22 85	17 86	16 25	18 60	15 90	15 09	18 15
April.....	14 18	16 35	18 19	23 35	17 49	15 78	18 27	15 90	15 15	17 90
May.....	13 60	16 16	18 10	24 01	16 93	15 84	17 52	15 90	15 13	17 70
June.....	12 81	16 65	18 23	24 27	16 90	16 05	16 60	15 90	15 15	17 14
July.....	12 40	14 85	18 41	23 55	16 83	16 46	16 40	15 90	15 20	16 70
August.....	12 81	15 20	19 00	22 90	16 23	17 03	16 09	15 90	15 46	16 52
September.....	12 63	15 91	19 54	22 90	15 90	18 05	15 90	15 90	16 15	16 65
October.....	13 10	16 54	20 35	22 00	15 71	19 53	15 90	15 44	17 80	16 60
November.....	14 85	17 85	22 85	20 65	16 59	19 90	15 82	15 00	18 02	16 02
December.....	16 65	18 35	23 75	19 34	17 40	19 90	15 90	15 03	18 15	15 77

\*From the *Iron Age*.

**Grey Forge Pig-Iron at Pittsburgh, per Gross Ton (2,240 pounds).**

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January.....	12 81	16 11	17 30	22 58	17 00	15 40	17 40	14 09	13 40	17 15
February.....	12 75	15 99	17 29	22 20	15 99	15 09	17 02	14 27	13 40	17 15
March.....	13 17	16 00	16 91	21 76	15 90	14 65	16 15	14 40	13 40	16 92
April.....	13 09	15 77	16 66	21 72	15 45	14 40	16 09	14 40	13 65	16 17
May.....	12 62	15 57	16 49	22 38	14 90	14 40	15 90	14 27	13 78	15 17
June.....	12 27	15 18	16 35	25 15	14 90	14 77	15 20	14 00	13 90	14 71
July.....	11 92	14 55	16 41	22 96	14 90	14 85	14 52	13 90	13 90	14 55
August.....	11 89	14 36	17 75	21 90	14 71	15 21	14 30	13 90	14 15	14 25
September.....	11 75	14 72	18 35	21 15	14 40	16 15	14 15	13 84	14 65	14 25
October.....	12 30	15 66	19 47	20 40	14 40	17 02	14 15	13 65	16 18	14 26
November.....	14 25	16 58	22 45	19 17	14 90	17 27	14 09	13 47	16 50	14 25
December.....	15 85	16 97	22 85	18 40	15 25	17 40	13 90	13 40	17 15	13 95

IRON.—TABLE 10.

**Ore, Fuel, and Flux Charged to Blast Furnaces, in Years 1912 and 1913.**

	1912.			1913.		
	Quantity.	Value.	Per cent.	Quantity.	Value.	Per cent.
		\$	%		\$	%
Canadian iron ore.....Tons.	71,588	233,372	3.4	139,436	416,424	6.2
Imported iron ore..... "	2,019,165	5,173,788	96.6	2,110,328	5,775,101	93.8
Canadian coke..... "	609,183	2,284,438	48	710,260	2,663,472	50.1
*Imported coke..... "	656,815	2,344,822	52	706,388	2,416,325	49.9
Charcoal.....Bus.	1,886,748	157,402	.....	2,206,191	184,052	.....
Canadian limestone.....Tons.	544,890	399,708	77	275,537	199,729	43.7
Imported limestone..... "	160,723	132,656	23	354,582	256,085	56.3

\* Including coke made from imported coal.

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, and in 1913 about 94 per cent of the ore charged, 50 per cent of the coke, and 56 per cent of the limestone, were imported. This condition is attributed largely to questions of cost and transportation affecting the ore supplies available for each furnace. The Newfoundland ores can be cheaply and conveniently laid

down at Sydney, N.S.—in fact the iron and steel industry here has been built up on the basis of these ores and by the local coal supply. During 1913 considerable quantities of limestone have also been obtained from Newfoundland. In Ontario also, large quantities of imported ores are used. In 1913 the imported ores used in Ontario amounted to 1,095,205 tons, and the Canadian ores 133,765 tons, the imported ores being derived from the deposits south of Lake Superior. With the exception of a small quantity of charcoal used at two furnaces, the fuel (coke) used in Ontario was altogether imported, as well as a portion of the limestone flux.

IRON.—TABLE 11.

## Iron Ore, Fuel, and Flux Charged to Blast Furnaces.

Calendar Year.	IRON ORE CHARGED.		FUEL CHARGED.			Limestone. Tons.
	Canadian.	Imported.	Charcoal.	*Coke from Canadian coal.	Imported coke.	
	Tons.	Tons.	Bushels.	Tons.	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		739,561	51,629		31,585
1896.....	96,560	46,500	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.....	66,584	120,650	1,928,025	44,844	64,648	51,826
1900.....	71,341	112,042	1,799,737	45,021	59,345	52,906
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.....	82,025	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	327,032	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	543,923	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

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

## BLAST FURNACES IN CANADA IN 1913.

Of twenty-two completed furnaces, seventeen were in blast in 1913 for varying periods of time. The total daily capacity of the twenty-two furnaces is about 4,440 tons. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron and Steel Co., Sydney, C.B.—Six completed furnaces of 280 tons capacity each per day; two operated throughout 1913, four for 344, 334, 222 and 140 days each, respectively.

Nova Scotia Steel and Coal Co., Limited, New Glasgow, N.S.—One furnace at Sydney Mines, C.B., of 200 tons capacity; operated 365 days.

Londonderry Iron and Mining Co., Ltd., Londonderry, N.S.—One furnace of 100 tons capacity; idle throughout the year.

Canada Iron Corporation, Limited, Montreal, Que.—Two small furnaces of 7 and 8 tons capacity at Drummondville, Que., idle throughout the year; one furnace of 25 tons daily capacity, at Radnor Forges, Que., idle throughout the year; two furnaces of 125 tons and 250 tons at Midland, Ont., operated for 226 days and 172 days respectively.

Standard Iron Company of Canada, Limited, Deseronto, Ont.—One furnace at Deseronto with a daily capacity of 112 tons, operated for 220 days during the year 1913; one furnace of 84 tons capacity at Parry Sound, operated 92 days.

The Steel Company of Canada, Limited, Hamilton, Ont.—Two furnaces, one of 200 tons capacity operated for 259 days in 1913, a second furnace of 300 tons capacity, operated 309 days in 1913.

The Canadian Furnace Co., Limited, Port Colborne, Ont.—One furnace of 300 tons capacity, operated 95 days.

Algoma Steel Company, Limited, Sault Ste. Marie, Ont.—Three furnaces at Steelton, near Sault Ste. Marie: two of 250 tons capacity each operated for 361 and 365 days respectively; and one of 450 tons capacity operated 332 days.

The Atikokan Iron Company, Limited, Port Arthur, Ont.—One furnace of 100 tons capacity; idle throughout 1913.

On December 31, 1913, ten furnaces were in blast and twelve idle. The average number of men employed in blast furnace operations in 1913 was reported as 1,589, and the total wages paid, \$1,149,345.

## EXPORTS AND IMPORTS OF PIG-IRON.

The total exports of pig-iron, including ferro-alloys, during 1913 were 6,326 tons valued at \$351,646, or an average value per ton of \$55.59, as compared with exports of 6,976 tons valued at \$310,702, or an average of \$44.54 in 1912.



The exports during the past five years have not exceeded 10,000 tons in any one year, and have consisted largely, if not entirely, of ferro-alloys.

Considerable quantities of pig-iron are annually imported into Canada. During the calendar year 1913, the total imports of pig-iron, excluding ferro products which are separately stated, were 236,769 tons valued at \$3,247,405, and included 213,969 tons valued at \$2,888,974, or an average of \$13.50 per ton, from the United States; and 22,800 tons valued at \$358,431, or an average of \$15.72 per ton, from Great Britain. The total imports in 1912 were 272,680 tons valued at \$3,512,969, or an average of \$12.88 per ton; and in 1911, 208,487 tons valued at \$2,610,989 or an average of \$12.52 per ton. These imports included, in 1913, 926 tons of charcoal pig-iron valued at \$12,528 or \$13.52 per ton, as compared with 115 tons of charcoal pig-iron in 1912 valued at \$1,370 or an average of \$11.91 per ton.

The annual imports of these two classes of pig-iron since 1880 are shown in Table 12.

IRON.—TABLE 12.

## Annual Imports of Pig-Iron Since 1880.

Fiscal Year	PIG-IRON.			CHARCOAL PIG-IRON.			TOTAL.	
	Tons.	Value.	Average value.	Tons.	Value.	Average value.	Tons.	Value.
		\$	\$ cts.		\$	\$ cts.		\$
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, 703	13 26	2, 893	66, 602	23 02	52, 184	723, 010
1885.....	42, 279	545, 426	12 90	1, 119	27, 333	24 43	43, 398	572, 759
1886.....	42, 403	528, 433	12 45	3, 185	60, 036	18 87	45, 648	588, 569
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, 752
1890.....	(b) 87, 613	1, 148, 078	13 10				87, 613	1, 148, 078
1891.....	(b) 81, 317	1, 085, 929	13 35				81, 317	1, 085, 929
1892.....	(b) 63, 918	880, 485	12 80				63, 918	880, 485
1893.....	56, 849	682, 209	12 00	5, 944	84, 358	14 19	62, 793	766, 567
1894.....	42, 376	483, 787	11 42	2, 906	34, 968	12 03	45, 282	518, 755
1895.....	31, 637	341, 259	10 80	2, 780	31, 171	11 21	34, 417	372, 430
1896.....	36, 131	394, 591	10 92	917	11, 726	12 79	37, 048	406, 317
1897.....	25, 766	291, 783	11 32	2, 936	35, 373	12 05	28, 702	327, 161
1898.....	37, 136	382, 103	10 28	2, 250	23, 533	10 46	39, 436	405, 636
1899.....	44, 261	452, 911	10 23	1, 955	19, 123	9 78	46, 216	472, 034
1900.....	49, 767	811, 490	16 31	1, 816	38, 736	21 33	51, 583	850, 226
1901.....	35, 293	548, 033	15 53	490	7, 121	14 53	35, 783	555, 154
1902.....	39, 978	585, 077	14 64	38	726	19 11	40, 016	585, 803
1903.....	91, 730	1, 338, 574	14 59	882	16, 352	18 54	92, 612	1, 354, 926
1904.....	62, 515	894, 728	14 31				62, 515	894, 728
1905.....	71, 005	857, 879	12 08				71, 005	857, 879
1906(c)....	96, 797	1, 401, 047	14 47				96, 797	1, 401, 047
1907(d)....	150, 127	2, 280, 860	15 19	30	675	22 33	150, 157	2, 281, 535
1908(e)....	210, 053	3, 448, 125	16 42	2, 237	45, 475	20 33	212, 290	3, 493, 600
1909.....	57, 669	857, 357	14 87	922	16, 575	17 93	58, 591	873, 932
1910.....	158, 910	2, 118, 445	13 33	596	8, 990	14 58	159, 506	2, 127, 135
1911.....	254, 284	3, 376, 843	13 28	15, 818	237, 038	14 99	270, 102	3, 613, 931
1912.....	201, 058	2, 495, 859	12 41	54	618	11 44	201, 112	2, 496, 477
1913(e)....	291, 813	3, 813, 034	13 07	91	1, 133	13 00	291, 904	3, 814, 217

- (a) Comprises pig-iron of all kinds.  
 (b) These figures appear in Customs reports under heading "iron in pigs, iron kintledge, and cast iron."  
 (c) Year ending June 30, from 1880 to 1906 inclusive.  
 (d) Nine months ending March 31.  
 (e) Year ending March 31, from 1908 to date.

IRON.—TABLE 13.

## Annual Exports of Pig-Iron, 1896-1913.

Calendar Year.	Tons.	Value.	Average value.	Calendar Year.	Tons.	Value.	Average value.
		\$	\$ cts.			\$	\$ cts.
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

*World's Production.*—The production of pig-iron in other countries is given hereunder for the past six years with a view to showing the relative position occupied by Canada in the production of this metal.

IRON.—TABLE 14.

## Production of Pig-Iron in Principal Countries of the World, from 1908 to 1913: metric tons.

—	1908.	1909.	1910.	1911.	1912.	1913.
United States.....	16,191,907	26,209,677	27,741,990	24,029,296	30,665,595	31,471,980
Germany.....	11,805,321	12,644,946	14,227,455	15,280,527	17,868,909	19,201,920
United Kingdom.....	9,203,230	9,685,045	10,380,799	9,874,693	9,037,150	10,653,824
France.....	3,400,771	3,573,848	4,032,459	4,410,866	4,871,992	5,311,316
Russia.....	2,805,384	2,874,822	3,042,302	3,538,449	4,184,124	5,000,000
Austria-Hungary.....	2,041,523	2,044,573	2,006,842 (a)	2,039,867	2,312,630	.....
Belgium.....	1,270,050	1,616,370	1,803,500 (a)	2,072,843	2,301,290	2,476,530
Canada.....	572,290	686,393	726,478	832,332	920,422	1,024,467
Sweden.....	567,821	444,764	604,300	333,800	701,900	735,000
Spain.....	403,551	389,000 (a)	425,000 (a)	455,000	306,136	.....
Italy.....	112,924	207,800 (a)	343,600 (a)	253,322	373,153	.....
China.....	66,409	74,000 (a)	120,000	94,826	.....	.....
Japan.....	45,396 (a)	161,020	187,793 (a)	162,000	.....	.....
Australasia.....	30,393	29,762	42,268 (a)	36,154	.....	.....

(a) From statistics by James Watson & Co., Glasgow, Scotland.

## FERRO-PRODUCTS.

Ferro-silicon, ferro-phosphorus, and ferro-manganese were produced in Canada in electric smelting plants in 1913, the latter two products in small quantities only. Ferro-silicon and ferro-manganese were made at Welland, Ont., by the Electro Metals, Ltd., and ferro-phosphorus was made at Buckingham, Que., by the Electric Reduction Company. The Algoma Steel Corporation did not operate their electric furnace at Sault Ste. Marie during the year.

The total production in electric furnace plants during 1913 was 8,075 short tons of ferro-alloys valued at \$493,018. 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 imports of ferro-silicon, ferro-manganese, etc., during the calendar year 1913 were 30,355 tons valued at \$940,443 or an average of \$30.98. The imports for the calendar year 1912 were 19,810 tons valued at \$469,884 or an average of \$23.72 per ton; and in 1911, 17,226 tons, valued at \$429,465 or an average of \$24.93 per ton. The imports since 1887 are shown in Table 15.

IRON.—TABLE 15.

## Imports of Ferro-Manganese, Ferro-Silicon, Etc.

Fiscal Year.	Tons.	Value.	Average value.	Fiscal Year.	Tons.	Value.	Average value.
		\$	\$ cts.			\$	\$ cts.
*1887.....	123	1,435	11 67	†1900.....	1,149	39,004	34 00
*1888.....	1,883	29,812	15 83	†1901.....	1,512	38,954	25 76
*1889.....	5,868	72,108	12 29	†1902.....	6,513	150,077	23 18
*1890.....	696	18,395	27 15	†1903.....	6,350	162,710	25 62
*1891.....	2,707	40,711	15 04	†1904.....	2,975	75,554	25 40
*1892.....	1,311	23,930	18 25	†1905.....	12,935	246,815	19 08
*1893.....	529	15,858	29 98	†1906.....	15,023	462,739	30 80
*1894.....	284	9,885	34 81	†1907 (9 mos.)	16,414	610,875	37 22
†1895.....	164	5,408	32 98	†1908.....	17,417	612,062	35 14
†1896.....	652	12,811	19 65	†1909.....	13,053	388,024	29 73
†1897.....	426	9,233	21 67	†1910.....	14,952	332,486	22 24
†1898.....	1,418	22,516	15 88	†1911.....	18,796	461,331	24 54
†1899.....	1,160	22,559	19 43	†1912.....	18,274	443,770	24 28
				†1913.....	22,969	598,524	26 06

\*These amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron and steel.

†Ferro-silicon, spiegelisen, and ferro-manganese.

## CONSUMPTION OF PIG-IRON.

An estimate of the total consumption of pig-iron and ferro-alloys in Canada may be arrived at on the basis of the record of production, imports, and exports.

The total production of pig-iron in 1913 was 1,128,967 short tons, and of ferro-alloys 8,075 tons. The imports of these products during the same period were 267,124 tons, and the exports 6,326 tons. The deduced consumption of pig-iron and ferro-alloys was approximately 1,397,840 tons. Of this amount, 943,130 tons were used in steel furnaces in the production of steel, leaving 454,710 tons for foundry and other uses.

## STEEL.

The production of steel ingots and castings in 1913 was 1,168,993 tons, as compared with 957,681 tons in 1912, and 882,396 tons in 1911. In 1913 the production of open-hearth ingots was reported as 824,818 tons; Bessemer ingots 301,932 tons; direct open-hearth castings 39,217 tons; and other steels 3,026 tons. The total increase in production over 1912 was 211,312 tons or about 22.06 per cent.

The production during the past five years is shown in Table 16 following:—

IRON.—TABLE 16.

## Production of Steel, 1909-13.

	1909.	1910.	1911.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.	Tons.
<i>Ingots</i> —Open-hearth (basic).....	535,988	580,932	651,676	692,236	824,818
Bessemer (acid).....	203,715	222,668	209,817	231,044	301,932
<i>Castings</i> —Open-hearth.....	14,013	18,085	20,163	31,845	39,217
Other steels.....	1,003	599	740	2,556	3,026
Total.....	754,719	822,284	882,396	957,681	1,168,993

A statistical record of the materials used in steel furnaces has been obtained during the past four years. The total quantity of pig-iron used in steel furnaces during the year 1913 was 913,722 tons, of which 860,360 tons were produced by firms reporting, and 53,362 tons purchased. The quantity of ferro-alloys used was 29,408 tons purchased. Scrap, etc., was used to the extent of 406,403 tons, being 277,509 tons produced by the firms reporting, and 128,894 tons purchased. Ores used included 1,342

tons of manganese ore and 55,018 tons of iron ore, while 197,028 tons of limestone or dolomite flux were used, and 10,687 tons of fluorspar. In Ontario, a little over 413 million cubic feet 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.

In 1912, the total quantity of pig-iron used in steel furnaces was 735,559 tons, of which 706,895 tons were produced by firms reporting, and 28,664 tons purchased. The quantity of ferro-alloys used was 24,237 tons purchased. Scrap, etc., was used to the extent of 336,265 tons, being 223,404 tons produced by the firms reporting, and 112,861 tons purchased. Ores used included 985 tons of manganese ore, and 43,006 tons of iron ore, while 148,045 tons of limestone or dolomite flux were used, and 9,709 tons of fluorspar. In Ontario, a little over 423 million cubic feet of natural gas were used.

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 1913 have been collected by this department and are as shown in detail in Table 16 for the last five years.

IRON.—TABLE 17.

**Annual Production of Steel Ingots and Castings, 1894-1913.**

Calendar Year.	Short tons.	Calendar Year.	Short tons.	Calendar Year.	Short tons.
1894.....	28,767	1901.....	29,214	1908.....	588,763
1895.....	19,040	1902.....	203,881	1909.....	754,719
1896.....	17,920	1903.....	203,296	1910.....	822,284
1897.....	20,608	1904.....	166,381	1911.....	882,396
1898.....	24,125	1905.....	451,863	1912.....	957,681
1899.....	24,640	1906.....	639,396	1913.....	1,168,993
1900.....	26,406	1907.....	706,982		

Following is a list of firms making steel in Canada:—

Dominion Iron and Steel Company, Sydney, N.S.

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

Canadian Steel Foundries, Ltd., Montreal, Que.

Beauchemin et Fils, Sorel, Que.

The Algoma Steel Corporation, Sault Ste. Marie, Ont.

The Steel Company of Canada, Ltd., Hamilton, Ont.

The Dominion Steel Foundry Co., Ltd., Hamilton, Ont.

The Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.

The Moffat Irving Steel Works, Ltd. (Electric), Toronto, Ont.

*Rolled Products, etc.*—Complete statistics of the production of rolled products and of manufactured steel have not been received; returns from several of the largest producers, however, show a production of blooms, billets, slabs, etc., of 1,134,277 tons, of which 1,098,877 tons were used by the producer for further manufacture, and 35,400 tons sold to other rolling mills.

The production of rails was 554,481 tons; of rods, 57,389 tons; of bars, 266,915 tons; and of other rolled products, 53,835 tons. The production of steel rails in 1912 was returned as 471,422 tons, and in 1911 399,760 tons.

The production of finished rolled iron and steel in Canada from 1909 to 1913, as ascertained and published by the American Iron and Steel Association was as follows, in long tons:—

IRON.—TABLE 13.

**Annual Production of Rolled Iron and Steel, 1909-13.**

Products—Gross tons.	1909.	1910.	1911.	1912.	1913.
Rails.....	344,830	366,465	360,547	423,885	506,709
Structural shapes and wire rods..	74,136	80,993	76,617	64,082	68,048
Plates and sheets.....	36,241	26,642	14,833		
Nail plate, merchant bars, and all other finished rolled forms..	207,534	265,711	323,427	373,257	392,340
Total.....	682,741	739,811	775,424	861,224	967,097

**BOUNTIES.**

Bounties on iron and steel made in Canada were provided for by the Dominion Government in 1897 under the authority of Chapter 6, Statutes of Canada, 1897. These bounties were continued under subsequent statutes until 1911. Bounty on pig-iron and steel made in electric furnaces was available until December 31, 1912, but no claims therefor were made during the year.

Since 1896 a total of \$16,785,827 has been paid by the Government of Canada in bounties for the production of iron and steel, the annual

payments on pig-iron, puddled iron bars, steel, and manufactures of steel being shown in the following table:—

**Total Bounties on Iron and Steel Paid by the Government of  
Canada Since 1896.**

Year ended.	Pig-iron.	Puddled iron bars.	Steel.	Manufact- ures of steel.
	\$	\$	\$	\$
June 30, 1896.....	104,105	5,611	59,499	
“ 1897.....	66,509	3,019	17,366	
“ 1898.....	165,654	7,706	67,454	
“ 1899.....	187,954	17,511	74,644	
“ 1900.....	238,296	10,121	64,360	
“ 1901.....	351,259	16,703	100,058	
“ 1902.....	693,108	20,550	77,431	
“ 1903.....	666,001	6,702	729,102	
“ 1904.....	533,982	11,669	347,990	15,321
“ 1905.....	624,667	7,895	676,318	231,324
“ 1906.....	687,632	5,875	941,000	369,832
March 31, 1907 (9 months).....	385,231	312	575,259	338,999
“ 1908.....	863,817		1,092,201	347,135
“ 1909.....	693,423		838,100	333,091
“ 1910.....	573,969		695,752	538,812
“ 1911.....	261,434		350,456	526,858
“ 1912.....				166,750
“ 1913.....				
<b>Total.....</b>	<b>7,097,041</b>	<b>113,674</b>	<b>6,706,990</b>	<b>2,868,122</b>

**EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.**

The exports of iron and steel from Canada consist chiefly of manufactured goods such as agricultural implements, automobiles, bicycles, machinery, etc. Compared with the value of imports, the total value of the exports is small, amounting to not more than 10 per cent of the former. The total value of iron and steel exported during the calendar year 1913 was \$13,999,149, as compared with a value of exports in 1912 of \$10,682,484, and in 1911 of \$9,907,281. The exports during 1913 included: pig-iron and ferro-products, etc., to the value of \$351,646; crude iron and steel valued at \$483,813; stoves, gas buoys, castings, machinery, hardware, etc., valued at \$1,070,476; steel and manufactures of steel, \$1,051,004; agricultural implements, \$7,411,246; automobiles and bicycles, \$2,630,964.

The exports during 1912 in similar grouping were: pig-iron and ferro-products, etc., \$310,702; scrap iron and steel, \$145,250; stoves, gas buoys, castings, machinery, hardware, etc., \$1,290,762; steel and manufactures of steel, \$785,731; agricultural implements, \$5,967,545; automobiles and bicycles, \$2,182,494. Particulars of these exports during the past two years are shown in further detail in the accompanying table.



## IRON.—TABLE 19.

## Exports of Iron and Steel Goods, the Product of Canada, during the Calendar Years 1912 and 1913.

	1912.			1913.		
	Quantity.	Value.	Average value.	Quantity.	Value.	Average value.
		\$	\$ cts.		\$	\$ cts.
Stoves..... No.	1,390	21,110	15 19	1,371	23,858	17 40
Gas buoys and parts of... \$		83,583			35,462	
Castings, n.e.s..... \$		27,113			61,362	
Pig-iron..... Tons	6,976	310,702	44 54	6,326	351,646	55 59
Machinery (linotype machines)\$		6,555			9,631	
Machinery, n.e.s..... \$		474,996			435,333	
Sewing machines..... No.	24,158	259,617	10 75	8,122	114,438	14 09
Washing machines, etc..... \$					15,872	
Typewriters..... No.	4,025	277,583	68 96	3,048	201,763	66 20
Scrap iron and steel..... Tons	16,632	145,250	8 73	45,556	483,813	10 62
Hardware, tools, etc..... \$		91,731			101,990	
Hardware, n.e.s..... \$		48,474			70,767	
Steel and manufactures of.. \$		785,731			1,051,004	
Agricultural implements—						
Mowing machines..... No.	16,213	562,502	34 69	24,044	847,253	35 24
Reapers..... “	3,243	195,156	60 19	5,604	317,716	56 69
Drills..... “				10,364	634,121	61 18
Harvesters..... “	15,341	1,634,208	106 53	23,194	2,430,319	105 17
Ploughs..... “	13,580	412,460	30 37	15,450	465,505	30 13
Harrows..... “	4,734	100,579	21 25	7,300	127,482	17 46
Hay rakes..... “	6,046	199,092	29 96	9,846	247,445	25 13
Seeders..... “	70	7,040	100 57			
Threshing machines..... “	761	214,499	281 86	1,928	712,270	369 43
Cultivators..... “	5,059	100,043	19 78	7,795	201,758	25 88
All other..... “		1,964,071			503,235	
Parts of..... “		577,895			915,142	
Automobiles..... “	3,028	2,013,784	665 00	5,997	3,395,382	566 18
“ parts of..... “		105,330			210,623	
Bicycles..... “	101	9,058	89 68	90	8,058	89 53
“ parts of..... “		54,322			16,901	
Total.....		10,682,484			13,999,149	

## Annual Exports of Iron and Steel Products since 1884.

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

\*Agricultural implements, automobiles, and bicycles included in 1909 and subsequent years. See Table 19 for classes of products.

The total value of the imports of iron and steel goods during the calendar year 1913 was \$141,272,357, as compared with a value of \$144,400,949 imported during the fiscal year ending March, 1913, and a value of \$102,568,832 imported during the fiscal year ending March, 1912. The total value of the imports during the fiscal year 1911 was \$85,319,541, and during the fiscal year 1910, \$59,952,197.

The rapid growth in imports of iron and steel is thus clearly shown in this statistical record. It will be observed, however, that there has apparently been a check to these imports during the last nine months of 1913, there having been a falling off in the total imports during the twelve months ending December, 1913, as compared with the twelve months ending March of the same year. A detailed statement of the imports of iron and steel during the twelve months ending December, 1913, and the twelve months ending March, 1913, is shown in Tables 21 and 22, Table 21 showing the imports subject to duty, and Table 22 the imports free of duty.

The imports during the twelve months ending December, 1913, subject to duty were valued at \$125,082,378, the imports duty free during the same period being valued at \$16,189,979, making a total value of \$141,272,357. The imports during the fiscal year ending March, 1913, subject to duty were valued at \$129,131,275, and the imports duty free during the same period were valued at \$15,269,674, making a total of \$144,400,949. These imports include all classes of iron and steel goods manufactured as well as those of the cruder form. In many cases the values only of the imported goods are given, so that a total tonnage of im-

ports 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 during the two years just referred to is shown in Table 20. Thus, there were imported during the twelve months ending December, 1913, 1,832,475 tons of iron and steel goods valued at \$55,927,607, or an average value per ton of \$30.52, together with other iron and steel goods of which the quantities are not stated, valued at \$85,344,750. During the twelve months ending March, 1913, there were imported 1,875,172 tons of iron and steel goods valued at \$53,239,212 or an average of \$28.39 per ton, together with other manufactures of iron and steel of which the quantity is not stated, valued at \$91,161,737.

The cruder forms of iron and steel have been classed into twelve groups, and the imports of each of these groups since 1908 is shown in Table 20. The imports of pig-iron have varied considerably during the past six years and the imports in 1913 are not very much larger than those of 1908. The imports of ferro-products and chrome steel have increased during six years by over 90 per cent. The imports of ingots, blooms, billets and puddled bars have more than doubled in that period. The imports of scrap iron and scrap steel show an increase of about 40 per cent in the six years. The imports of plates and sheets, and of bars, rods, hoops, bands, etc., were nearly three times as great in 1913 as in 1908. The imports of structural iron and steel have increased steadily since 1909, but were larger in 1908 than in any other year of this period, with the exception of 1913. The imports of steel rails, pipe and fittings, nails and spikes, iron forgings, castings, and manufactures have varied considerably, but reached a maximum in 1913.

A very large proportion of these imports is derived from the United States, and it may be of interest here to quote from the records published in the "Commerce and Navigation of the United States" showing the exports of iron and steel goods from that country to Canada.

According to this authority there were exported to Canada from the United States during the twelve months ending June 30, 1913, 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 \$54,053,014, or a total value of imports from the United States of \$105,989,630.

During the twelve months ending June 30, 1912, the corresponding 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 during the year of \$82,658,294.

The detailed items making up these totals are shown in Table 23.

TABLE 20.

## Summary of Imports of Iron and Steel Products.\*

Material.	TWELVE MONTHS ENDING DECEMBER 1913.		
	Tons.	Value.	Average.
		\$	\$ cts.
Pig-iron.....	236,769	3,247,405	13 72
Ferro-products and chrome steel.....	30,678	970,100	31 62
Ingots, blooms, billets, puddled bars, etc.....	52,872	1,212,314	22 93
Scrap iron and scrap steel.....	104,747	1,438,255	14 21
Plates and sheets.....	305,675	13,965,805	33 19
Bars, rods, hoops, bands, etc.....	277,879	10,195,280	36 69
Structural iron and steel.....	439,871	12,739,954	23 96
Rails and connexions.....	182,421	5,120,830	28 07
Pipe and fittings (a).....	30,663	847,922	27 65
Nails and spikes.....	7,584	360,489	47 53
Wire (a).....	70,712	3,688,660	52 16
Forgings, castings, and manufactures.....	32,604	2,090,533	64 12
Total.....	1,832,475	55,927,607	30 52
Other iron and steel products valued at.....	.....	85,344,750	.....
Total value of imports of iron and steel.....	.....	141,272,357	.....

Material.	TWELVE MONTHS ENDING MARCH 1913.		
	Tons.	Value.	Average.
		\$	\$ cts.
Pig-iron.....	291,904	3,814,217	13 07
Ferro-products and chrome steel.....	23,378	637,403	27 27
Ingots, blooms, billets, puddled bars, etc.....	86,745	1,732,736	19 98
Scrap iron and scrap steel.....	103,317	1,433,562	13 88
Plates and sheets.....	376,633	13,626,135	36 18
Bars, rods, hoops, bands, etc.....	278,878	9,447,371	33 88
Structural iron and steel.....	377,551	10,595,726	28 06
Rails and connexions.....	156,318	4,290,532	27 45
Pipe and fittings (a).....	40,987	1,033,426	25 21
Nails and spikes.....	11,420	472,255	41 35
Wire (a).....	80,846	3,251,696	40 22
Forgings, castings, and manufactures.....	47,195	2,904,103	61 53
Total.....	1,875,172	53,239,212	28 39
Other iron and steel products valued at.....	.....	91,161,737	.....
Total value of imports of iron and steel.....	.....	144,400,949	.....

\*For details of these items see Tables 21 and 22.

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

### Summary of Tonnage of Iron and Steel Imported 1908-1912.

Material.	TWELVE MONTHS ENDING MARCH.				
	1908.	1909.	1910.	1911.	1912.
	Tons.	Tons.	Tons.	Tons.	Tons.
Pig-iron.....	212,290	58,591	159,506	270,102	200,317
Ferro-products and chrome steel.....	17,661	13,206	15,153	19,182	18,865
Ingots, blooms, billets, puddled bars, etc....	21,222	8,887	36,819	48,395	88,075
Scrap iron and scrap steel.....	69,213	26,212	28,797	53,824	82,665
Plates and sheets.....	126,122	116,610	200,575	205,690	243,482
Bars, rods, hoops, bands, etc.....	98,631	73,261	117,159	133,865	195,145
Structural iron and steel.....	373,871	162,735	195,748	232,585	263,573
Rails and connexions.....	52,706	32,543	55,183	36,690	98,083
Pipe and fittings.....	25,090	18,309	16,705	28,831	26,627
Nails and spikes.....	2,741	1,611	3,476	3,374	7,201
Wire.....	57,046	39,375	68,211	64,850	69,650
Forgings, castings, and manufactures.....	22,357	14,394	18,093	24,523	24,665
Total.....	1,079,000	565,734	915,425	1,171,911	1,323,348

### Annual Imports of Iron and Steel Products since 1895.

Year.	Value.	Year.	Value.
Twelve months ending June	\$	Twelve months ending March	\$
1895.....	8,002,285	1908.....	61,819,698
1896.....	9,283,480	1909.....	40,393,431
1897.....	10,143,560	1910.....	59,952,197
1898.....	15,190,251	1911.....	85,319,541
1899.....	18,536,293	1912.....	102,568,832
1900.....	26,242,078	1913.....	144,400,949
1901.....	23,556,488	Twelve months ending December	
1902.....	30,062,833	1913.....	141,272,357
1903.....	37,730,224		
1904.....	38,987,364		
1905.....	39,068,726		
1906.....	40,341,305		
1907*.....	43,222,626		

\* Nine months ending March.

IRON.—TABLE 21.

## Imports of Iron and Steel Goods Subject to Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1913.			CALENDAR YEAR, 1913.		
	Quantity.	Values.	Value per unit.	Quantity.	Values.	Value per unit.
		\$	\$ cts.		\$	\$ cts.
Agricultural implements, n.o.p. viz.—						
Binding attachments.....		49,319			33,319	
Cultivators and weeders.....	No. 8,115	66,416	8 18		60,426	
Drills, seed.....	" 7,632	232,478	37 01	7,295	241,749	33 14
Farm, road, or field rollers.....	" 203	81,296	400 47	617	129,269	209 51
Forks, pronged.....	" 13,039	7,278	0 56	16,143	7,929	0 49
Harrows.....	" 7,489	176,853	23 62	3,642	198,020	54 37
Harvesters, self-binding.....	" 2,316	215,129	92 89	3,796	337,849	89 00
Hay loaders.....	" 1,066	52,371	49 13	478	24,206	50 64
Hay tedders.....	" 2	86	43 00	6	126	21 00
Hoes.....	" 7,779	2,031	0 26	9,052	2,344	0 26
Horse rakes.....	" 1,901	44,203	23 25	1,466	41,868	28 56
Knives, hay or straw.....	" 10,173	3,533	0 35	14,719	4,325	0 29
Knives edging.....	" 2,541	1,442	0 57	2,338	1,646	0 58
Lawn mowers.....	" 13,918	57,383	4 12	15,701	64,828	4 13
Manure spreaders.....	" 353	21,585	61 15	499	33,502	67 14
Mowing machines.....	" 2,352	76,662	32 59	1,439	47,765	33 19
Ploughs.....	" 27,389	1,371,243	50 07		1,366,959	
Post hole diggers.....	" 4,199	4,412	1 05	3,517	5,005	1 42
Potato diggers.....	" 3,527	65,344	18 53	1,618	54,222	33 51
Rakes, n.o.p.....	" 18,844	4,994	0 27	20,868	5,744	0 28
Reapers.....	" 1,389	68,599	49 39	679	40,402	59 50
Scythes.....	Doz. 2,734	12,291	4 50	2,661	13,037	4 90
Sickles or reaping hooks.....	" 290	619	2 13	516	1,212	2 35
Snaths.....	" 7	38	5 43	3	17	5 67
Spades and shovels of iron or steel, n.o.p.....	" 10,877	48,166	4 43	9,566	42,910	4 49

Spade and shovel blanks, and iron or steel cut to shape for the same...	"	2,359	4,638	1 97	1,021	2,259	2 21
Parts of agricultural implements paying 12½ per cent and 17½ per cent...	\$		513,680			590,256	
Parts of agricultural implements paying 12½, 17½, and 20 per cent.....	"		1,111,271			680,973	
All other agricultural implements, n.o.p.....	"		102,124			106,736	
Anvils and vises.....	"		127,920			99,339	
Cart or wagon skeins or boxes.....	Tons.	226.9	17,240	75 98	217.9	15,862	72 79
Springs, n.o.p., and parts thereof, of iron or steel, for railway, tramway, or other vehicles.....	"	1,088.9	104,342	95 82		162,557	
Axle and axle parts, n.o.p., and axle blanks and parts thereof, of iron or steel for railway, tramway, or other vehicles.....	"	14,153.1	774,677	54 74		621,777	
Bar iron or steel, rolled, whether in coils, bundles, rod or bars, comprising rounds, ovals, squares, and flats, n.c.p.....	"	135,231.1	3,916,390	28 96	139,932.6	4,381,341	31 31
Butts and hinges, n.o.p.....	"		170,238			156,840	
Canada plates, Russia iron, terne plate, and rolled sheets of iron and steel coated with zinc spelter or other metal, of all widths or thicknesses, n.o.p.	Tons.	11,973.7	582,870	48 68	8,639.2	490,791	56 81
Castings, iron or steel, n.o.p.....	\$		1,774,296			1,644,991	
Cast-iron pipe of every description.....	Tons.	40,987.3	1,033,426	25 21	30,662.5	847,922	27 65
Cast scrap iron.....	"	46,513	622,998	13 39	49,874.0	659,319	13 22
Chains, coil chain, chain links, and chain shackles of iron or steel of ½" diameter, and over.....	"	3,719.7	220,896	59 39	3,112.8	217,175	69 77
Chains, n.o.p.....	\$		179,024			158,914	
Tacks, shoe.....	Tons.	18.5	3,121	168 70	24.2	3,143	129 88
Nails, brads, spikes, and tacks of all kinds, n.o.p.....	"	589.5	59,456	100 86	317	44,486	140 33
Engines, etc.—							
Locomotives for railways.....	No.	202	787,411	3,898 07	171	692,370	4,048 95
Locomotive parts.....	\$		128,828			144,309	
Motor cars for railway and tramways.....	No.	155	348,505	2,248 42	109	199,945	1,834 36
Engines, fire.....	"	25	35,520	1,420 50	15	61,984	4,132 27
Engines, gasoline.....	"	27,255	3,413,595	125 25	25,126	3,150,314	125 38
Engines, steam.....	"	483	475,980	985 47	476	547,866	1,150 98
Boilers, steam.....	"	1,118	368,565	329 66		454,726	
Boilers, n.o.p.....	"	6,599	397,371	60 22		337,890	
Fire extinguishing machines, including sprinklers for fire protection.....	\$		136,775			125,861	
Fittings, iron or steel, for iron or steel pipe of every description.....	Tons.		1,265,091			1,165,364	
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.....	"	393	10,701	27 23	567	16,853	29 72
Ferro-silicon, spiegeleisen, and ferro-manganese.....	"	22,969	598,524	26 06	30,355	940,443	30 98
Forging of iron and steel of whatever size, 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.....	"	3,416.9	339,119	99 25	2,442.1	263,975	108 09
Hardware, viz., builders, cabinet-makers, upholsterers, harness-makers, saddlers, and carriage hardware, including curry-combs, n.o.p.....	\$		956,597			956,703	
Horse, mule, and ox shoes.....	"		31,536			39,362	
Iron or steel billets, weighing not less than 60 pounds per lineal yard.....	Tons.	82,850.9	1,641,909	19 82	51,765.4	1,178,151	22 76
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.....	"	1,720.3	42,227	24 55	654.5	10,379	20 61

IRON.—TABLE 21—Continued.

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

Material.	TWELVE MONTHS ENDING MARCH, 1913.			CALENDAR YEAR, 1913.			
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.	
		\$	\$ cts.		\$	\$ cts.	
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.....	Tons.	18,171.1	910,052	50 08	971,735		
Iron in pig.....	"	291,813	3,813,034	13 07	3,234,877	13 72	
Iron in pig charcoal.....	"	91	1,183	13 00	12,528	13 53	
Locks of all kinds.....	\$		669,185		568,263		
Machines, machinery, etc.—							
Automobiles and motor vehicles of all kinds.....	No.	8,377	9,738,839	1,162 57	6,956	8,233,529	1,183 66
Automobiles and motor vehicles, parts of.....	\$		778,948			3,004,156	
Cranes and derricks.....	No.	285	744,711	2,613 02	360	850,636	2,363 02
Fanning mills.....	"	1,258	24,179	19 22	1,199	22,915	19 11
Grain crushers.....	"	204	3,080	15 10	421	6,469	15 37
Hay presses.....	"				219	43,779	199 90
Windmills and complete parts thereof.....	"	994	35,011	35 22		43,562	
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, cranes, derricks, and percussion coal cutters.....	\$		451,377			601,531	
Portable machines:—							
Fodder or feed cutters.....	No.	527	9,892	18 77	2,053	19,016	9 26
Horse powers for farm purposes.....	"	12	310	25 83	12	265	22 09
Portable engines with boilers in combination and traction engines for farm purposes.....	"	4,024	7,369,219	1,831 32	1,864	3,539,078	1,898 65
Portable sawmills and planing mills.....	"	13	12,366	951 23	31	10,284	331 74
Steam shovels.....	"	102	513,720	5,036 47	97	603,827	6,225 02
Threshing machine separators.....	"	3,293	2,176,077	660 82	1,820	1,025,296	563 75



Threshing machine separators, parts of, including wind-stackers, baggers, weighers and self-feeders for same, and finished parts thereof for repairs, when imported separately.....	\$		486,954			499,832	
All other portable machines, n.o.p., and parts.....	"		132,546			60,552	
Concrete mixing machines.....	No.				208	110,059	529 13
Sewing machines.....		19,556	430,066	21 99	18,446	364,265	19 75
Sewing machines, parts of.....	\$		130,354			119,061	
Adding machines.....	No.					269,358	160 52
Machines, typewriting.....	"	18,146	1,141,903	62 93	13,997	848,834	60 64
Machines, type-casting and type-setting, and parts thereof, adapted for use in printing offices.....	"		438,632			150,975	
Machines specially designed for ruling, folding, binding, embossing, creasing, or cutting paper or cardboard, when for use exclusively by printers, bookbinders, and by manufacturers or articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood.....	"		384,870			363,600	
Lithographic presses and type-making accessories for same.....	\$		112,400			610,189	
Printing presses.....	"		598,302				
Cement making machines.....	"					187,991	
Coal handling machines.....	"					120,359	
Paper and pulp mill machines.....	"					417,898	
Rolling mill machines.....	"					123,758	
Sawmill machines.....	"					189,976	
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 purposes.....	"		1,371,120			2,180,923	
All machinery composed wholly or in part of iron or steel, n.o.p., and iron or steel castings, and iron or steel integral parts of all machinery specified in tariff item 453.....	"		19,789,912			17,118,296	
Machines, washing.....	No.	11,959	105,828	8 85	9,578	88,420	9 23
Nails and spikes, composition and sheathing nails.....	Tons	278.8	19,194	68 85	293.9	17,725	60 31
Nails and spikes, cut (ordinary builders).....	"	629.7	24,331	38 64	202.8	9,127	45 00
Railway spikes.....	"	7,792.1	241,254	30 96	5,272.6	194,194	36 83
Nails, wire of all kinds, n.o.p.....	"	2,111.7	124,899	59 15	1,473.1	91,814	62 33
Pumps, hand, n.o.p.....	No.	34,296	148,487	4 33	32,662	131,463	4 02
Pumps, steam.....	"				1,707	277,709	162 69
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	150,538	3,867,833	25,69	177,041	4,886,117	27 59
Railway fish plates.....	"	2,084	87,968	42 21	3,366	146,493	43 52
Railway tie-plates.....	"	639	21,937	34 33	2,014	88,220	43 80
Rolled iron or steel angles, tees, beams, channels, girders and other rolled shapes or sections, not punched or drilled or further manufactured than rolled, n.o.p.....	"	89,462.4	2,510,757	28 06	107,494.8	3,201,384	29 78

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

Material	TWELVE MONTHS ENDING MARCH, 1913.			CALENDAR YEAR, 1913.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
		\$	\$ cts.		\$	\$ cts.
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 shapes, and not being railway bars or rails.....	Tons. 200,678.5	5,319,456	26 51	249,435.1	7,074,279	28 36
Rolled iron or steel hoop, band, scroll, or strip, 12 inches or less in width, No. 13 gauge and thicker, n.o.p.....	" 7,946.4	255,828	32 19	7,342.6	246,635	33 59
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.....	" 17,702.1	717,148	40 51	13,985.8	651,338	46 57
Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled grooves, n.o.p.....	" 42,116.7	1,225,605	29 10	47,444.4	1,517,344	31 98
Rolled iron or steel plates not less than 30" in width and not less than 1/4" in thickness, n.o.p.....	" 56,436.8	1,547,067	27 41	65,190.6	1,939,739	29 75
Rolled iron or steel sheets, polished or not, No. 14 gauge and thinner, n.o.p.....	" 66,065.1	3,075,053	46 55	51,776.5	2,545,347	49 16
Rolls of chilled iron or steel.....	" 143.3	7,335	51 19	194.5	11,457	58 90
Sad or smoothing hatters' and tailors' irons.....	\$ .....	15,996	.....	.....	10,945	.....
Safes, doors for safes and vaults.....	\$ .....	247,068	.....	.....	192,803	.....
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.....	Gross 973,423	117,085	12	.....	110,442	.....
Scales, balances, weighing beams, and strength-testing machines of all kinds.....	\$ .....	189,823	.....	.....	178,365	.....
Shafting, round, steel, in bars not exceeding 2 1/2" diameter.....	Tons 3,979	142,346	35 77	4,416.6	161,238	36 51
Shafting, steel, turned, compressed or polished.....	\$ .....	.....	.....	.....	15,074	.....
Sheets or plates of steel, cold rolled with sheared edges over 14 gauge, and not less than 1 1/2" wide for the manufacture of mower bars, hinges, typewriters, and sewing machines.....	Tons. 859.8	37,660	43 80	742.1	30,294	40 82
Sheets, flat, of galvanized iron or steel.....	" 27,853.8	1,537,691	55 21	19,416.7	1,193,044	61 44
Sheets, iron or steel, corrugated, galvanized.....	" 357	23,131	64 79	203.2	14,975	73 70

Sheets, iron or steel corrugated not galvanized.....	Tons	376.2	16,361	43 49	293.3	13,895	47 37
Skates, of all kinds, roller or other, and parts thereof.....	Pairs	118,453	72,258	61		79,972	
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	112,996.2	2,779,978	24 60	106,963.5	2,957,887	27 65
Steel billets, n.o.p.....	"	2,174.5	48,600	22 35	452.5	14,784	32 67
Stoves, of all kinds, for coal, wood, oil, spirits or gas.....	\$		1,057,647			902,256	
Stove urns of metal, and dovetails, chaplets, and hinge tubes of tin for use in the manufacture of stoves.....	"		28,239			25,748	
Switches, frogs, crossings, and intersections for railways.....	Tons	3,056.5	312,794	102 34		324,694	
Iron or steel railway bars or rails, which have been in use in the tracks of railways in Canada and which have been exported from Canada, and returned thereto after having been re-rolled, and weighing not less than 56 pounds per lineal yard when re-rolled and which are to be used by the railway company importing them on their own tracks.....	"						
Tubing:—							
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4" diameter, n.o.p.....	\$		1,586,452			774,683	
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, n.o.p.....	"		486,067			419,294	
Seamless steel tubing, valued at not less than 3½ cents per lb.....	Tons	538.8	54,986	102 05	724.6	82,538	113 91
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements.....	\$		20,089			14,895	
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, n.o.p.....	"		1,014,005			1,572,658	
Iron or steel pipe, not butt or lapwelded, and wire bound wooden pipe, not less than 30" internal diameter when for use exclusively in alluvial gold mining.....	"		3,467			84	
Ware—Agate, granite, or enamelled iron or steel ware.....	"		311,832			349,564	
Ware—Iron or steel hollow ware, plain black or coated, n.o.p., and nickel and aluminium kitchen or household hollow ware.....	"		182,556			224,552	
Wire bale ties.....	Bundles of 250 ties	7,848	4,850	62		5,943	
Wire bound wooden pipe, n.o.p.....	\$		757			723	
Wire cloth or woven wire and netting of iron and steel.....	Tons	1,770.6	196,374	110 91	2,370.8	260,186	109 75
Wire, crucible cast steel, valued at not less than 6 cents per lb.....	"	122.3	36,501	298 45	122.9	38,687	314 79
Wire screens, doors, and windows.....	\$		42,650			49,703	
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	826.6	74,352	89 95	938.9	74,774	79 64
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered.....	"		1,219,534			1,099,921	
Wire of iron and steel all kinds, n.o.p.....	"	5,907.5	324,097	54 86	6,105.3	332,419	54 44
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, n.o.p.....	"	4,681.7	619,062	132 23	4,339.3	642,905	148 16
Iron or steel nuts, rivets, or bolts with or without threads, nut bolt, and hinge blank, and T and strap hinges of all kinds, n.o.p.....	"	4,422.5	341,631	77 25	3,792.2	324,320	85 52

IRON.—TABLE 21—*Concluded.*

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

Material.	TWELVE MONTHS ENDING MARCH, 1913.			CALENDAR YEAR, 1913.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
		\$	\$ cts.		\$	\$ cts.
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.....	Tons. 56,804.4	810,564	14 27	54,869.3	828,860	15 10
Penknives, jack-knives, and pocket knives of all kinds.....	\$ 127,908				103,792	
Knives and forks of steel, plated or not, n.o.p.....	" 361,686				342,946	
All other cutlery, n.o.p.....	" 899,528				875,316	
Guns, rifles, including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms.....	" 900,031				887,236	
Bayonets, swords, fencing foils, and masks.....	" 7,465				7,453	
Needles of any material or kind, n.o.p.....	" 148,969				140,685	
Steel, chrome steel.....	Tons. 408.8	38,879	95 11	323	29,657	91 82
Steel plate, universal mill or rolled edge plates of steel over 12" wide, imported by manufacturers of bridges or of structural work, or for use in car construction.....	" 52,645.6	1,384,935	26 31	62,543.6	1,812,399	28 98
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels.....	" 2,152.3	60,027	27 89	2,985.8	88,421	29 61
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.....	" 10,249	1,226,071	119 63	9,907.9	1,197,321	120 84
Steel balls adapted for use in bearings of machinery and vehicles.....	\$ 27,511				27,134	
Flat steel, cold rolled, not over ½" thick, for the manufacture of cups and cones for ball bearings.....	Tons. 30.2	1,886	62 45	26.8	2,222	82 91
Steel wool.....	" 16.5	4,730	286 67		4,995	
Tools and implements— Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes and poles for the same.....	\$	139,584			91,339	
Axes.....	Doz. 13,807	72,127	5 22	11,492	66,088	5 75

Saws.....	\$	163,200		155,005
Files and rasps, n.o.p.....	"	158,719		149,962
Tools, hand or machine, of all kinds, n.o.p.....	"	1,107,217		985,772
Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground, or otherwise manufactured.....	"	180		278
Manufactures, articles or wares of iron and steel, or of which iron and steel (or either) are the component materials of chief value, n.o.p.....	"	11,765,265		11,206,350
Total.....		129,131,275		125,082,378

IRON.—TABLE 22.

Imports of Iron and Steel Goods Free of Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1913.			CALENDAR YEAR, 1913.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
		\$	\$ cts.		\$	\$ cts.
Anchors for vessels.....	Tons. 358-4	30,288	84 51	330-4	27,282	82 57
Chain, malleable sprocket or link belting.....	\$	273,697			303,463	
Cream separators, and steel bowls for.....	"	467,849			429,741	
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.....	"	229,094			277,660	
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 18" in diameter; flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3" in diameter; acetylene gas lanterns and parts thereof, and tobin bronze in bars or rods.....	"	21,174			7,035	
Gun barrels, in single tubes, forged, rough bored.....	"	460				
Iron or steel rods over $\frac{1}{8}$ " in diameter for manufacturing of chain.....	Tons. 1,952-4	49,624	25 42	1,093-2	30,777	28 15
Iron or steel, rolled round wire rods, in the coil, not over $\frac{3}{8}$ " in diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories.....	" 91,919-3	2,144,405	23 33	79,608-4	1,962,235	24 65
Boiler plate of iron or steel not less than 30" in width, and not less than $\frac{1}{2}$ " in thickness, for use exclusively in the manufacture of boilers.....	" 21,535-1	663,105	30 79	24,348-2	804,582	33 04
Flat galvanized iron or steel sheets.....	" 23,095	1,717,963	61 11	34,768-4	2,135,558	61 42
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 cts. per lb.....	" 4,983	727,546	146 01	4,813-8	798,549	165 89
Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, n.o.p.....	" 7,377-4	344,345	46 68	15,909-3	771,694	48 50
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.....	" 330-9	12,947	38 09	865-5	36,165	41 79

Iron tubing, lacquered or brass covered, not over 2" in diameter, and brass trimmings, when imported by manufacturers of iron or brass bedsteads, for use exclusively for the manufacture of such articles in their own factories.....	\$	336,024				285,798	
Iron tubing, brass covered, not over 2" 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.....	"	345				408	
Iron tubing, lacquered or brass covered, not over 2" 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.....	"	19,929				7,015	
Iron tubing for manufacture of extension rods for windows.....	"	7,804				5,285	
Iron or steel, beams, sheets or plates, ankles, knees, masts or parts thereof and cable chains for wooden, iron, steel or composite ships or vessels... Tons.		16,593.7	470,526	28 36	20,397.6	651,892	31 96
Locomotive and car wheel tires of steel in the rough.....	"	10,426.6	548,148	52 57	11,801.5	625,636	53 01
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. ....	\$	196,295				245,208	
Scrap iron and scrap steel, old, and fit only to be manufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada.....	Tons.	40	500	12 50	3.7	76	20 54
Skelp iron or steel, sheared or rolled in grooves, not over 4½" wide, for the manufacture of rolled iron tubes not over 1½" in diameter.....	"	1,033.1	27,209	26 34	849.1	22,959	27 04
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; wrought iron tubing, butt or lap welded; threaded, or coupled or not, over 4" in diameter; 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.....	\$	1,259,692				1,033,571	
Diamond drills, not to include motive power.....	"	68,313				70,549	
Appliances of iron and 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.....	"	533,926				259,722	

IRON.—TABLE 22—Continued.

Imports of Iron and Steel into Canada Free of Duty.—Continued.

Material.	TWELVE MONTHS ENDING MARCH, 1913.			CALENDAR YEAR 1913.			
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value. per unit.	
		\$	\$ cts.		\$	\$ cts.	
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.....	\$	44,591			22,934		
Briquette making machines.....		29,276			3,708		
Newspaper printing presses, of not less value by retail than \$1,500 each, of a class or kind not made in Canada.....	No.	134	598,675	4,467 72	122	513,348	4,207 77
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.....	\$		14,725			25,329	
All materials, or parts in the rough, unfinished, and screws, nuts, bands, and springs to be used in rifles to be manufactured at any such factory for the Government of Canada.....	"		43,317			60,656	
Machines, typesetting and typesetting and parts thereof, adapted for use in printing offices.....	"					504,837	
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.....	"		61,113			19,449	
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.....	"		45,800			56,265	
Machines, traction ditching (not being ploughs) adapted for tile drainage on farms, valued at retail at not more than \$3,000 each.....	No.				138	54,681	396 24
Mould boards or shares, or plough plates, land sides, or other plates for agricultural implements, when cut to shape from rolled plates of steel, but not moulded, punched, polished, or otherwise manufactured.....	Tons.	6,890.5	388,863	56 43	4,963.6	290,245	58 47
Sewing machine attachments.....	\$		46,965			39,739	
Steel for manufacturing ball bearings.....	Tons.	1.1	166	150 91			
Steel balls adapted for use on bearings on machinery and vehicles.....	\$		2,159			1,996	
Steel, rolled, for saws and straw cutters, not tempered, or ground, nor further manufactured than cut to shape without indented edges.....	Tons.	1,206.2	176,142	146 03	1,309.9	187,929	143 46



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.....	Tons.	3	253	84 33	0-9	92	102 22
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.....	"	1,014-4	46,219	45 56	1,032	48,042	46 55
Steel, crucible sheet, 11 to 16 gauge, 23" to 18" 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.....	"	847-7	53,088	62 63	593-8	46,491	78 29
Steel No. 20 gauge and thinner, but not thinner than 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories.....	"	11-2	1,490	133 04	48-9	6,891	140 92
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, and corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories.....	"	432-9	53,968	124 67	377-4	50,227	133 09
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..	"	179-4	9,387	52 32	179-6	10,084	56 15
Steel No. 24 and 17 gauge, in the sheets 63" long and from 18" to 32" wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories.....	"	109-4	4,269	39 02	88-5	3,566	40 29
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.....	"	1-2	690	575 00	0-6	264	440 00
Swedish rolled iron, and Swedish rolled steel nail rods, under half an inch in diameter, for the manufacture of horseshoe nails.....	"	1,177-1	53,067	45 08	4,419-7	119,225	26 98
Steel seamless tubing valued at not less than 3½ cents per pound.....	"	104-4	17,717	169 70	114-5	21,092	184 21
Steel rolled or drawn square tubing adapted for use in the manufacture of agricultural implements.....	\$		196				
Steel or iron tubes, rolled, not joined or welded, not more than 1½" in diameter, n.o.p.....	"		35,847			33,921	
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine hollers.....	"		903,016			1,048,288	
Barbed fencing wire of iron or steel.....	Tons.	22,306-1	887,974	39 81	13,451-7	566,670	42 13
Wire crucible cast steel, valued at not less than 6 cents per pound.....	"	7-8	2,344	300 51	6-5	1,947	299 54
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge....	"	41,169-9	1,414,429	34 36	38,282-8	1,387,528	36 24
Wire rope for use exclusively for rigging of ships and vessels.....	"	67-1	9,930	147 99	119-2	13,226	110 95
Wire, steel, valued at not less than 2½ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope...	"	2,250-3	172,790	76 79	3,296-6	258,399	78 38
Total.....			15,269,674			16,189,979	

IRON.—TABLE 23.

Imports of Iron and Steel into Canada from the United States.\*

Material.	TWELVE MONTHS ENDING JUNE, 1912.		TWELVE MONTHS ENDING JUNE, 1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Bar iron.....	Short Tons. 9,591.9	308,745	11,773.8	429,181
Bars or rods of steel—				
Wire rods.....	“ 53,582.9	1,412,910	82,474.3	2,134,198
All other.....	“ 95,215.9	2,859,441	124,761.6	3,921,471
Billets, ingots and blooms of steel.....	“ 60,008.5	1,200,710	87,968.2	1,865,120
Bolts, nuts, rivets and washers.....	“ (a).....	3,220.2	218,805	
Hoop, band and scroll.....	“ 7,206.2	281,946	9,436.3	376,561
Horseshoes.....	“ (a).....	271.1	24,894	
Nails and spikes—				
Cut.....	“ 5,419.6	159,215	8.3	488
Railroad spikes.....	“ (a).....	6,218.4	224,193	
Wire.....	“ 1,245.9	52,498	2,262.4	106,693
All other, including tacks.....	“ 3,113.1	176,371	628.0	48,063
Pig-iron.....	“ 157,480.9	1,979,355	248,846.1	3,124,550
Pipes and fittings.....	“ 76,248.5	3,578,892	78,618.7	4,175,057
Radiators and cast-iron heating boilers.....	“ 3,819.9	250,552	8,989.5	653,182
Rails for railways.....	“ 132,973.1	3,369,894	155,051.7	3,980,657
Scrap and old, fit only for remanufacture.....	“ 64,365.3	737,167	84,523.0	1,032,971
Sheets and plates—				
Iron, galvanized.....	“		41,505.6	2,428,687
“ all other.....	“		15,568.1	692,434
Steel, plates.....	“ 43,790.6	2,030,648	220,528.7	6,706,433
“ sheets.....	“		120,309.0	3,916,734
Structural iron and steel.....	“ 209,207.2	7,457,232	269,250.2	9,242,288
Tin plates, terne plates, and taggers tin.....	“ 144,721.9	5,150,353	58,289.2	4,065,672
Wire and manufactures of—				
Wire, barbed.....	“ 21,497.9	895,725	16,094.8	656,185
“ all other.....	“ 43,638.2	1,750,586	49,318.8	1,912,069
	1,175,464.3	36,637,305	1,695,916.0	51,936,616

Builders' hardware and tools—				
Locks.....	\$		1,762,066	479,985
Hinges, and other builders' hardware.....	No.			1,712,768
Car wheels.....	No.	3,749	36,021	107,300
Castings, not elsewhere specified.....	\$		1,312,729	1,656,680
Cutlery—				
Razors.....	"		(a)	46,962
Table.....	"		27,841	24,409
All other.....	"		175,666	132,951
Enamelware—				
Baths, tubs.....	No.		(a)	2,058
Lavatories and sinks.....	\$		(a)	33,415
All other.....	"		(a)	156,987
Firearms.....	"		503,710	163,394
Machinery, machines and parts of—				
Adding machines.....	No.		288,617	1,551
Air-compressing machinery.....	"		(a)	331,477
Brewers machinery.....	"		112,627	333,448
Cash registers.....	"	1,026	81,234	311,638
Cream separators.....	"		(a)	124,133
Electrical machinery.....	\$		1,869,761	8,980
Elevators and elevator machinery.....	"		(a)	344,424
Laundry machinery.....	"		167,735	423,725
Lawn mowers.....	"		(a)	232,726
Metal working machinery (including metal working machine tools).....	"		1,362,326	51,379
Milling machinery.....	"		(a)	2,326,270
Mining machinery.....	"		1,224,011	423,227
Paper-mill machinery.....	"		(a)	2,223,659
Printing presses and parts of.....	"		1,265,657	980,196
Pumps and pumping machinery.....	"		701,144	920,522
Refrigerating machinery, ice-making machinery, etc.....	"		170,564	873,431
Sewing machines and parts of.....	"		484,637	289,777
Shoe machinery.....	"		274,338	527,726
Steam and other power engines and parts of—				300,356
Electric locomotives.....	No.	8	46,745	21
Gas, stationary.....	"	766	130,713	991
Gasoline, automobile.....	"	6,844	769,195	8,906
" marine.....	"	1,842	305,842	1,771
" stationary.....	"	5,096	754,570	9,699
" traction.....	"	1,710	3,166,507	2,013
Steam, locomotives.....	"	107	472,046	160
" marine.....	"	3	18,000	79
" stationary.....	"	245	247,729	360
" traction.....	"	259	478,526	540
Engines, all other.....	"		(a)	1,450
All other engines and parts of.....	\$		1,910,440	1,058,600
Sugar-mill machinery.....	"		24,431	871,371
				1,436,320
				35,761

IRON.—TABLE 23—*Concluded.*

Imports of Iron and Steel into Canada from the United States.—*Continued.*

	TWELVE MONTHS ENDING JUNE, 1912.		TWELVE MONTHS ENDING JUNE, 1913.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Machinery, machines and parts of— <i>Concluded.</i>				
Textile machinery.....		(a)		858,568
Typesetting machines, linotype and others.....		(a)		394,635
Typewriting machines and parts of.....		944,600		954,904
Windmills and parts of.....		71,044		59,720
Woodworking machinery, sawmill machinery.....		382,752		439,173
Woodworking machinery, all other.....		375,446		477,345
All other.....		10,627,184		10,872,249
Railway truck material (except rails and spikes) such as switches, frogs, fish-plates, splice-bars, etc.....		(a)		73,261
Safes.....	No.	4,320	3,403	208,277
Scales, and balances.....		\$ 159,851		158,349
Stoves, ranges and parts of.....		\$ 1,041,935		1,314,725
Tools not elsewhere specified—				
Axes.....		(a)		83,122
Hammers and hatchets.....		(a)		74,947
Saws.....		267,810		346,887
Shovels and spades.....		(a)		23,099
All other.....		1,636,924		1,866,713
Wire manufactures—woven wire fencing.....		(a)		114,395
Wire manufactures—all others.....		(a)		430,238
All other manufactures of steel.....		10,100,055		7,877,122
		46,020,989		54,053,014
Total value.....		82,658,294		105,989,630

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

(a) Not separately stated in 1912.

## LEAD.

The following statistics of the production of lead in Canada in 1913 are based on direct smelter returns, and represent mainly the amount of lead refined in Canada, and shipped as pig lead or manufactured products.

Though mainly from British Columbia, there was yet a small production in 1913 both from Ontario and the Yukon, the total production for the year being 37,662,703 pounds, valued at \$1,754,705. In 1912 the production was 35,763,476 pounds.

While a considerable increase is shown, it would appear from comparison of the metal content of ores shipped to the smelters in 1912 and 1913, that a large tonnage of ore was in stock at the smelters at the close of 1913, so that a far greater increase took place in the output of the mines than is indicated by the smelter recovery for the year.

In valuing the lead production for 1913, the average price per pound at Montreal has been used. The New York market is practically closed to Canadian lead by the high tariff, and to the London market price must be added the freight, etc., to reach the Canadian market. The price at Montreal, the main Canadian market, is usually lower than that at New York (the year 1913 being an exception) and higher than that at London, and is probably a more equitable valuation to place upon the Canadian production.

Statistics showing the lead production since 1887 are given in the following table:—

### Annual Production of Lead.

Calendar Year.	Lbs.	Price per lb.	Value.	Calendar Year.	Lbs.	Price per lb.	Value.
		Cts.	\$			Cts.	\$
1887.....	204,800	5.400	9,216	1901.....	51,900,958	4.334	2,249,387
1888.....	674,500	4.420	29,812	1902.....	22,956,381	4.069	934,095
1889.....	165,100	3.930	6,488	1903.....	18,139,283	4.237	768,562
1890.....	105,000	4.480	4,704	1904.....	37,531,244	4.309	1,617,221
1891.....	88,665	4.350	3,857	1905.....	56,864,915	4.707	2,676,632
1892.....	808,420	4.090	33,064	1906.....	54,608,217	5.657	3,089,187
1893.....	2,135,023	3.730	79,636	1907.....	47,738,703	5.325	2,542,086
1894.....	5,703,222	3.290	187,636	1908.....	43,195,733	4.200	1,814,221
1895.....	16,461,794	3.230	531,716	1909.....	45,857,424	*3.690	1,692,139
1896.....	24,199,977	2.980	721,159	1910.....	32,987,508	3.687	1,216,249
1897.....	39,018,219	3.530	1,396,853	1911.....	23,784,969	†3.480	827,717
1898.....	31,915,319	3.780	1,206,399	1912.....	35,763,476	†4.467	1,597,554
1899.....	21,862,436	4.470	977,250	1913.....	37,662,703	†4.659	1,754,705
1900.....	63,169,821	4.370	2,760,521				

\*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.

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 is in operation at Trail, B.C., at the smelter there, treating the base bullion produced by the lead blast furnaces.

At the refinery are produced pig lead, fine gold, fine silver, copper sulphate, refined antimony, and babbitt metal, and lead pipe is also manufactured. The refined lead finds a market in Canada, the United States, and the Orient, though in the last few years the greater part of it has been used in Canada.

The production of refined lead, including pig lead and lead pipe, has been as follows:—

Year.	Refined lead produced.	Year	Refined lead produced.
1904.....	7,519,440	1909.....	41,883,614
1905.....	15,804,509	1910.....	32,987,508
1906.....	20,471,314	1911.....	23,784,969
1907.....	26,607,461	1912.....	35,715,258
1908.....	36,549,274	1913.....	36,413,821

The North American Smelting Company erected a plant at Kingston, Ontario, which started operations during the latter part of 1912, treating ores from the United States, British Columbia, and Ontario, and this continued in 1913.

Some British Columbia ores were treated at the Tacoma Smelting Works, Tacoma, Washington, U.S.A.

*Prices.*—The price of lead in London averages  $\frac{1}{2}$  to 2 cents per pound lower than in New York.

The average price for soft lead in 1913 on the London market was £18 6s. 2d. per long ton, as compared with £17 15s. 11d. in 1912, and £13 19s. 3d. in 1911.

The price of lead on the Canadian market at Montreal is intermediate between the New York and London values. Montreal is the main Canadian market. 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. The average price of lead in Montreal in 1913 was 4.659 cents per pound, against 4.072 in London, and 4.370 in New York.

The monthly and yearly average prices for lead in Montreal for the past five years are given in the following table:—

**Price of Pig Lead at Montreal.\***

Month.	1909.	1910.	1911.	1912.	1913.
January.....	3.35	3.48	3.31	3.93	4.32
February.....	3.38	3.40	3.32	3.97	4.18
March.....	3.42	3.34	3.34	4.03	4.05
April.....	3.35	3.21	3.26	4.10	4.42
May.....	3.26	3.13	3.20	4.08	4.66
June.....	3.23	3.15	3.27	4.34	4.98
July.....	3.12	3.13	3.33	4.57	4.93
August.....	3.08	3.11	3.45	4.84	5.02
September.....	3.14	3.11	3.03	5.47	5.02
October.....	3.26	3.23	3.77	5.07	4.99
November.....	3.28	3.31	3.93	4.53	4.82
December.....	3.34	3.35	3.95	4.55	4.52
Average.....	3.268	3.246	3.480	4.467	4.659

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

The average prices of lead in New York as quoted by the *Engineering and Mining Journal*, are shown in the following table:—

**Monthly Average Prices of Lead in New York, in Cents per Pound.**

Month.	1903	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
January.....	4.075	4.347	4.552	5.600	6.000	3.691	4.175	4.700	4.483	4.435	4.321
February.....	4.075	4.375	4.450	5.464	6.000	3.725	4.018	4.613	4.440	4.026	4.325
March.....	4.442	4.475	4.470	5.350	6.000	3.838	3.986	4.459	4.394	4.073	4.327
April.....	4.567	4.475	4.500	5.404	6.000	3.993	4.168	4.376	4.412	4.200	4.381
May.....	4.325	4.423	4.500	5.685	6.000	4.253	4.287	4.315	4.373	4.194	4.342
June.....	4.210	4.196	4.500	5.750	5.760	4.466	4.350	4.343	4.435	4.392	4.325
July.....	4.075	4.192	4.524	5.750	5.288	4.447	4.321	4.404	4.499	4.720	4.353
August.....	4.075	4.111	4.665	5.750	5.250	4.530	4.363	4.400	4.500	4.569	4.624
September.....	4.243	4.200	4.850	5.750	4.813	4.515	4.342	4.400	4.485	5.048	4.698
October.....	4.375	4.200	4.850	5.750	4.750	4.351	4.341	4.400	4.265	5.071	4.402
November.....	4.218	4.200	5.200	5.750	4.376	4.330	4.370	4.442	4.298	4.615	4.293
December.....	4.162	4.600	5.422	5.900	3.658	4.213	4.560	4.500	4.450	4.303	4.047
Average.....	4.237	4.309	4.707	5.657	5.325	4.200	4.273	4.446	4.420	4.471	4.370

The average monthly prices of soft lead in London, England, as published by Julius Matton, of London, and "*Metallgesellschaft*" of Frankfort-on-the-Main, were, from 1904 to 1913, as follows:—

**Average Monthly Prices of Lead in London, £ per Long Ton.**

Month.	1904.			1905.			1906.			1907.			1908.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	11	11	2	12	17	6	16	17	6	19	16	0	14	10	6
February.....	11	11	10	12	9	3	16	0	4	19	11	8	14	5	6
March.....	12	0	9	12	5	11	15	17	9	19	14	6	14	1	4
April.....	12	5	1	12	13	2	15	16	6	19	16	7	13	13	10
May.....	11	15	11	12	15	3	16	13	6	19	17	7	13	2	7
June.....	11	10	5	13	0	0	16	15	6	20	6	0	12	15	7
July.....	11	13	4	13	12	2	16	11	7	20	8	2	12	19	6
August.....	11	14	9	13	19	2	17	1	3	19	0	3	13	9	10½
September.....	11	15	9	13	19	0	18	4	4	19	17	6	13	3	6
October.....	12	3	9	14	13	7	19	7	9	18	13	0	13	7	3
November.....	12	17	10	15	6	9	19	5	6	17	4	11	13	12	2
December.....	12	15	6	17	1	0	19	12	6	14	9	4	13	3	6
Yearly average.....	11	19	8	13	14	5	17	7	0	19	1	10	13	10	5

Month.	1909.			1910.			1911.			1912.			1913.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	13	3	6	13	3	11	13	0	8	15	11	3	17	1	11
February.....	13	5	5	13	7	3	13	1	11	15	13	9	16	8	5
March.....	13	8	3½	13	2	9	13	2	11	15	19	8	15	19	8
April.....	13	7	0	12	13	9	12	18	5	16	6	6	17	8	10
May.....	13	5	3	12	11	8	12	19	2	16	10	2	13	14	3
June.....	13	2	4	12	13	9	13	5	5	17	11	8	19	10	8
July.....	12	13	3	12	11	8	13	10	11	18	8	9	19	7	10
August.....	12	10	6	12	10	10	14	1	4	19	5	8	19	15	3
September.....	12	15	3	12	12	6	14	15	1	21	9	0	19	14	10
October.....	13	4	4	13	2	0	15	6	1	20	3	0	19	9	5
November.....	13	1	4½	13	4	6	15	15	5	18	4	7	17	13	9
December.....	13	2	11½	13	3	9	15	13	4	18	1	6	17	8	3
Yearly average.....	13	1	8	12	19	0	13	19	3	17	15	11	18	6	2

*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 follows:—

3-4 GEORGE V, CHAPTER 29.

**An Act Respecting the Payment of Bounties on Lead Contained in Lead-bearing Ores Mined in Canada.**

(Assented to June 6, 1913.)

Whereas, under the provisions of chapter 31 of the statutes of 1903 and of chapter 43 of the statutes of 1908, as amended by chapter 37 of the statutes of 1910, the amount of bounty payable on lead contained in lead-bearing ores mined in Canada was not to exceed two million four hundred and fifty thousand dollars; and whereas the time within which the said amount is payable for the purpose aforesaid expires, under the provisions of the said chapter 43, on the thirtieth day of June, nineteen hundred and thirteen, and there will then remain unexpended of the said sum approximately six hundred thousand dollars: Therefore 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 Lead Bounties Act, 1913*.

**2.** The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, nineteen hundred and thirteen, such bounty to be paid to the producer or vendor of such ores: Provided that the sum to be paid as such bounty shall not exceed two hundred and fifty thousand dollars in any year ending on the thirtieth day of June; provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

**2.** The total amount of bounty payable under the provisions of chapter 31 of the statutes of 1903, chapter 43 of the statutes of 1908 (as amended

by chapter 37 of the statutes of 1910), and of this Act, shall not exceed two million four hundred and fifty thousand dollars.

**3.** Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty per cent may be paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

**2.** If at the close of any year it appears that during the year the quantity of lead produced on which the bounty is authorized, exceeds sixteen thousand six hundred and sixty-seven tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 2 of this Act.

**4.** If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada, and exported for treatment abroad.

**5.** If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this act to the producers of such ores.

**6.** The Governor in Council may make regulations for carrying out the intention of this Act.

**7.** The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June one thousand nine hundred and eighteen.

The regulations under which the Act is administered are as follows:—

**1.** The Minister of Trade and Commerce is charged with the administration of this Act.

**2.** All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the

name of the mine producing such ore, its situation, the names of the president, secretary, and manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the manager of the mine or of the official authorized to make the claim.

4. Claims may be made monthly, that is, immediately after the close of each calendar month, and be in such form, and contain such evidence, as may seem to the Minister, from time to time, necessary.

5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ore shall at all times be under the supervision of the officers of the Department of Trade and Commerce, appointed or detailed for the purpose.

7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such day not to be later than the last day of the calendar month during which the ore was unloaded from cars at the smelter grounds.

9. The lead contents of ores shall, for the purpose of this Act, be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the smelting works at which the ores are smelted, and shall be verified and certified to by the officer of the Department of Trade and Commerce appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted pro rata according to the quantity smelted during the fiscal year, from the amount payable to such claimants at the close of each fiscal year.

**Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1914.**

Year ending.	Bounty paid.	Year ending.	Bounty paid.
	\$		\$
June 30, 1899.....	76,665	March 31, 1907 (9 mos.).....	1,995
" 30, 1900.....	43,335	" 31, 1908.....	51,001
" 30, 1901.....	30,000	" 31, 1909.....	307,433
" 30, 1902.....		" 31, 1910.....	340,542
" 30, 1903.....	4,380	" 31, 1911.....	248,534
" 30, 1904.....	195,627	" 31, 1912.....	179,288
" 30, 1905.....	330,645	" 31, 1913.....	68,065
" 30, 1906.....	90,196	" 31, 1914.....	8,179
		Total.....	\$ 1,975,885

*Exports and Imports:*—According to Trade and Navigation reports, the total quantity of lead contained in ore and concentrates exported during the calendar year 1913 was 329,960 pounds valued at \$9,136. During 1912 the export was 299,240 pounds valued at \$8,193.

Details of exports 1909 to 1913 are as follows:—

**Exports of Lead, 1909 to 1913.**

	LEAD IN ORE, CONCENTRATES, ETC.		PIG LEAD.	
	Lbs.	Value.	Lbs.	Value.
		\$		\$
1909.				
To United States.....	6,096,852	126,478	280	8
To other countries.....	129,216	6,100	11,301,680	361,056
Total.....	6,226,068	132,578	11,301,960	361,064
1910.				
To United States.....	46,800	1,308	59,605	2,295
To other countries.....			7,652,648	245,879
Total.....	46,800	1,308	7,712,253	248,174
1911.				
To United States.....	65,100	1,826	71,961	2,806
To other countries.....				
Total.....	65,100	1,826	71,961	2,806
1912.				
To United States.....	299,240	8,193		
To other countries.....				
Total.....	299,240	8,193		
1913.				
To United States.....	329,960	9,136		
To other countries.....				
Total.....	329,960	9,136		

The exports of lead since 1873 are shown in the following table:—

### Exports of Lead.

Calendar Year.	Lbs.	Value.	Calendar Year:	Lbs.	Value.
		\$			\$
1873.....		1,993	1894.....	5,792,700	144,509
1874.....		127	1895.....	23,075,892	435,071
1875.....		7,510	1896.....	26,480,320	462,095
1876.....		66	1897.....	43,802,697	925,144
1877.....		720	1898.....	37,375,078	885,485
1878.....			1899.....	15,799,518	466,950
1879.....		230	1900.....	57,642,029	1,917,690
1880.....			1901.....	45,590,995	1,804,687
1881.....			1902.....	17,761,484	457,170
1882.....		32	1903.....	18,624,303	426,466
1883.....		5	1904.....	25,868,823	559,461
1884.....		36	1905.....	41,657,403	1,046,541
1885.....			1906.....	21,436,022	736,007
1886.....			1907.....	25,591,883	1,029,898
1887.....		724	1908.....	18,454,594	622,464
1888.....		18	1909.....	17,528,028	493,642
1889.....		18	1910.....	7,759,053	249,482
1890.....			1911.....	137,061	4,632
1891.....		5,000	1912.....	299,240	8,193
1892.....		2,509	1913.....	329,960	9,136
1893.....		3,099			

The principal imports of lead during the calendar years 1911, 1912, and 1913 were as follows:—

	Calendar year 1911.		Calendar year 1912.		Calendar year 1913.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Old, scrap, pig, and block.....	9,989	495,923	14,089	940,583	5,600	464,117
Bars and sheets.....	1,542	55,458	961	93,702	747	62,527
Pipe.....	256	19,426	344	32,423	233	21,679
Shot and bullets.....	4	1,053	239	23,163	215	19,582
Manufactures of lead.....		108,012		144,571		155,178
Tea lead.....	1,344	134,160	1,606	167,716	1,737	217,009
Litharge.....	899	65,743	1,296	113,941	500	50,734
Total.....	14,034	879,775	18,535	1,516,099	9,032	990,826
Metallic lead contained in imported lead pigments.....	1,597	169,501	2,345	290,122	1,852	224,607
	15,631	1,049,276	20,880	1,806,221	10,884	1,215,433

Statistics of the annual imports since 1880 of (1) lead; (2) manufactures of lead; (3) litharge; (4) dry white and red lead, are given in the tables following:—

## Imports of Lead.

Fiscal Year.	OLD, SCRAP, AND FIG.		Average price.	BARS, BLOCKS, SHEETS.		Average price.	TOTAL.	
	Cwt.	Value.		Cwt.	Value.		Cwt.	Value.
		\$	\$ cts.		\$	\$ cts.		\$
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	14,967	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, FIG, AND BLOCK.*			BARS AND SHEETS.†			TOTAL.	
	Cwt.	Value.		Cwt.	Value.		Cwt.	Value.
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	176,327
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	11,635	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
1907.....	79,575	277,470	3 49	13,710	56,630	4 13	93,285	334,100
1908.....	63,921	284,604	4 45	17,253	75,186	4 36	81,174	359,790
1909.....	50,110	151,173	3 02	13,754	46,093	3 35	63,864	197,266
1910.....	113,249	191,971	1 70	11,446	37,004	3 23	124,695	228,975
1911.....	116,655	334,159	2 86	15,587	55,312	3 55	132,242	389,471
1912.....	241,030	602,990	2 50	29,901	52,886	1 77	270,931	655,876
1913.....	242,053	849,332	3 51	20,237	98,935	4 88	262,290	948,267

\*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.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$ 15,400	1892.....	\$ 22,636	1903.....	\$ 134,151
1881.....	22,629	1893.....	33,733	1904.....	129,093
1882.....	17,282	1894.....	29,361	1905.....	147,177
1883.....	25,556	1895.....	38,015	1906.....	163,793
1884.....	31,361	1896.....	50,722	1907.....	162,425
1885.....	36,340	1897.....	60,735	1908.....	243,926
1886.....	33,078	1898.....	63,179	1909.....	213,167
1887.....	19,140	1899.....	91,497	1910.....	234,930
1888.....	18,816	1900.....	104,736	1911.....	235,248
1889.....	16,315	1901.....	107,260	1912.....	272,625
1890.....	25,600	1902.....	120,020	1913.....	148,141
1891.....	23,898				

## Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	3,041	\$ 14,334	1892.....	10,384	\$ 34,343	1903.....	13,921	\$ 47,761
1881.....	6,126	22,129	1893.....	7,685	24,401	1904.....	9,894	32,633
1882.....	4,900	16,051	1894.....	38,547	28,685	1905.....	17,865	57,736
1883.....	1,532	6,173	1895.....	11,955	32,953	1906.....	10,165	39,836
1884.....	5,235	18,132	1896.....	10,710	32,817	1907.....	11,311	49,183
1885.....	4,990	16,156	1897.....	12,028	34,538	1908.....	19,052	90,785
1886.....	4,928	16,003	1898.....	10,446	32,904	1909.....	12,117	43,597
1887.....	6,397	21,865	1899.....	9,530	32,518	1910.....	18,101	62,174
1888.....	7,010	23,808	1900.....	9,139	29,176	1911.....	16,543	59,887
1889.....	8,089	31,082	1901.....	11,132	51,944	1912.....	16,419	59,908
1890.....	9,453	31,401	1902.....	13,002	47,021	1913.....	26,402	116,960
1891.....	7,979	27,613						

The imports of white and red lead and orange mineral during the fiscal year 1913 amounted to 6,331,760 pounds, valued at \$320,998. During the calendar year ending December the imports were 4,609,225 pounds valued at \$224,607. The decrease from 1903 to 1910 was consequent to the establishment of corroding works in Canada; and the increase since, due to the excess of consumption over home production.

Detailed statistics of imports of lead pigments during the calendar years 1911, 1912, and 1913 are shown in the table following, with statistics of imports during the fiscal years since 1885 in the table next succeeding.

## Imports of White and Red Lead in 1911, 1912, and 1913.

	Calendar Year 1911.		Calendar Year 1912.		Calendar Year 1913.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Lead, white, dry.....	1,467,193	58,335	2,499,725	138,627	1,162,082	61,424
Lead, white, ground in oil.....	1,033,732	46,986	714,362	37,916	1,057,683	59,444
Lead, red, dry and orange mineral.....	1,571,508	64,180	2,539,767	113,579	2,389,460	103,739
	4,072,433	169,501	5,753,854	290,122	4,609,225	224,607

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

Fiscal Year.	Lbs.	Value.	Average price.	Fiscal Year.	Lbs.	Value.	Average price.
		\$	Cts.			\$	Cts.
1885.....	5,540,753	198,913	3-69	1900.....	14,679,920	634,492	4-32
1886.....	6,703,077	213,258	3-18	1901.....	10,241,601	461,368	4-50
1887.....	6,998,820	233,725	3-34	1902.....	15,584,164	603,532	3-87
1888.....	6,361,334	216,654	3-41	1903.....	19,203,786	758,371	3-95
1889.....	7,066,465	267,236	3-78	1904.....	16,925,585	662,098	3-91
1890.....	10,859,672	381,959	3-52	1905.....	17,376,588	638,381	3-67
1891.....	8,560,615	337,407	3-94	1906.....	10,412,891	417,444	4-01
1892.....	10,238,766	351,686	3-42	1907.....	5,956,626	290,629	4-88
1893.....	10,865,183	364,680	3-36	1908.....	7,830,860	420,537	5-37
1894.....	10,958,170	353,053	3-22	1909.....	4,687,416	195,258	4-17
1895.....	8,730,052	282,353	3-22	1910.....	3,585,021	141,114	3-94
1896.....	11,711,406	367,569	3-14	1911.....	3,967,091	161,897	4-08
1897.....	10,310,463	347,539	3-37	1912.....	3,810,971	153,860	4-17
1898.....	12,682,808	448,659	3-54	1913.....	6,331,760	320,998	5-07
1899.....	14,507,945	514,842	3-55				

The production of lead as already shown was, in 1913, 18,832 tons, while the exports of lead were 165 tons, leaving 18,667 tons as the consumption of Canadian lead.

The imports of lead during the calendar year 1913 are shown to have been 10,884 tons, not including certain manufactures of lead valued at \$155,178, so that the total consumption of lead in 1913 probably exceeded 30,000 tons.

## Nova Scotia.

There was no production from this Province during the year.



## Ontario.

A small shipment was made very early in the year to the North American smelter, but no further shipments are reported.

## British Columbia.

As already stated, almost all the production of 1913 was from British Columbia, and there was a decided increase, as is shown in the table following. However, as already pointed out, the amounts of lead in ore shipped from the mines, shows an even greater increase than the smelter recoveries indicate.<sup>1</sup>

The record given in this table for the years 1909 to 1913 inclusive represents the recovery of lead at smelter or refinery as distinguished from the figures given for the same years in the table next succeeding, which indicate the quantities of lead in ore sent to the smelters.

## British Columbia:—Production of Lead.

Calendar Year.	Lbs.	Value.	Price per pound.	Calendar Year.	Lbs.	Value.	Price per pound.
		\$	Cts.			\$	Cts.
1887.....	204,800	9,216	4.40	1901.....	51,582,906	2,235,603	4.334
1888.....	674,500	29,813	4.42	1902.....	22,536,381	917,005	4.069
1889.....	165,100	6,488	3.93	1903.....	18,089,283	766,443	4.237
1890.....	Nil.	.....	.....	1904.....	36,646,244	1,579,086	4.309
1891.....	Nil.	.....	.....	1905.....	56,580,703	2,663,254	4.707
1892.....	808,420	33,064	4.09	1906.....	52,408,217	2,964,733	5.657
1893.....	2,131,092	79,490	3.73	1907.....	47,738,703	2,542,086	5.325
1894.....	5,703,222	187,636	3.29	1908.....	43,195,733	1,814,221	4.200
1895.....	16,461,794	531,716	3.23	1909.....	45,857,424	1,692,139	*3.690
1896.....	24,190,977	721,159	2.98	1910.....	32,937,508	1,216,249	3.687
1897.....	38,841,135	1,390,513	3.58	1911.....	23,784,969	827,717	†3.480
1898.....	31,693,559	1,198,017	3.78	1912.....	35,763,476	1,597,554	†4.467
1899.....	21,862,436	977,250	4.47	1913.....	37,626,899	1,753,037	†4.659
1900.....	62,158,621	2,760,031	4.37				

\*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.

<sup>1</sup>Under the heading "Mine Production" (See page 42) will be found a table showing mine shipments.

## British Columbia:—Production of Lead by Districts.\*

	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar.....				1,695	238,578	41,512	6,579
East Kootenay—							
Fort Steele.....	37,526,194	30,204,788	27,004,528	23,874,562	17,158,069	18,238,238	18,525,083
Other districts.....	73,842	358,270	18,724	66,010	.....	2,249,237	2,495,355
West Kootenay—							
Ainsworth.....	3,654,775	4,790,216	10,298,343	2,558,353	289,009	4,863,894	9,027,861
Nelson.....	1,582,113	345,424	1,097,069	1,245,844	1,928,836	2,293,000	1,936,418
Slocan.....	4,305,826	6,572,268	4,976,199	6,406,358	6,705,571	16,944,811	22,643,766
Other districts.....	570,534	903,552	979,916	470,241	522,615	240,762	521,771
Yale.....	25,419	21,215	21,567	35,683	29,719	.....	45,982
Cariboo—							
Omineca.....							156,862
	47,738,703	43,195,733	44,396,346	34,658,746	26,872,397	44,871,454	55,364,677

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

The greater number of the lead camps of the Province were active, especially the Slocan and Ainsworth in the south, and the Omineca (Hazelton) in the north.

The old Hot Springs camp at Ainsworth was especially noticeable for its increased shipments.

East Kootenay was fairly quiet though the Sullivan was a heavy shipper.

In the north, the Silver Standard at New Hazelton made some large shipments to Trail, and the Harris Mines also shipped. A considerable amount of development and prospecting is being done in this district.

### Yukon.

A few small shipments of lead-bearing ores were made from the Yukon in 1913. Although not important contributors to the tonnage of lead produced, they draw attention to the possibilities of that Territory, where as yet little lode mining has been done.

## 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 consist of quartz veins containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks.

In Canada mercury has been reported as occurring also in ores of the Cobalt district, and in the neighbourhood of Field, B.C., and Sechart on the west coast of Vancouver island.

### Production of Mercury.

Calendar Year.	Flasks. (76½ lbs.)	Price per flask.	Value.
1895.....	71	\$ cts. 33 00	\$ 2,343
1896.....	58	33 44	1,940
1897.....	9	36 00	324

### Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$			\$
1882.....	2,443	965	1893.....	50,711	22,998	1904.....	151,107	80,658
1883.....	7,410	2,991	1894.....	36,914	14,483	1905.....	103,330	48,412
1884.....	5,848	2,441	1895.....	63,732	25,703	1906.....	150,364	69,505
1885.....	14,490	4,781	1896.....	77,869	32,353	1907 (9 mos.)	98,368	45,662
1886.....	13,316	7,142	1897.....	76,058	33,534	1908.....	178,411	76,549
1887.....	18,409	10,618	1898.....	59,759	36,425	1909.....	92,220	46,217
1888.....	27,951	14,943	1899.....	103,017	51,695	1910.....	283,980	146,914
1889.....	22,931	11,844	1900.....	85,342	51,987	1911.....	128,980	74,956
1890.....	15,912	7,677	1901.....	140,610	94,564	1912.....	106,953	60,943
1891.....	29,775	20,223	1902.....	97,283	56,615	1913 Duty free	148,967	77,891
1892.....	30,936	15,038	1903.....	164,968	91,625			

## MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada there has been very little production of the metal.

In 1902, about 6,500 pounds of molybdenum ore valued at \$400, were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber of Toronto.

In 1903, Mr. A. W. Chisholm of Kingston, reported the shipment to the United States, and elsewhere, of 85 tons of molybdenum ore valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV, Sheffield township, Addington county.

Some work was done in 1913 on a considerable number of properties in Ontario and Quebec and one in British Columbia, but only a small amount of ore was raised, and that was shipped for experimental treatment.

Prices have varied very considerably during the year, as the market is small and demand and supply uncertain.

The following quotations from the Engineering and Mining Journal of New York, of January 24, 1914, well describes conditions:—

"A subscriber asks for weekly quotations on molybdenum ore. It is impracticable to give market quotations weekly, or even monthly, for molybdenum ore as the market is still too limited and too easily demoralized by any large shipment. However, according to a leading buyer, the prospects for molybdenum are much better this year. The standard ore should contain a minimum of 85 per cent  $\text{MoS}_2$ .

"Such ore would be worth from \$8 to \$10 per unit, providing the ore be free from copper, arsenic, bismuth and tungsten. Any one of these elements will reduce the price of the ore. For instance: 90 per cent ore free from these elements is at present worth \$12.50 per unit, practically twice the price of tungsten ore. Lower grade ores are worth much less. In addition, ore shipments arrive unexpectedly sometimes, and as soon as there are accumulations of ore the prices drop suddenly. On account of these conditions it is impracticable to name standing prices that would be of assistance to shippers."

The principal purchasers in the United States are:—The Electro-metallurgical Company of America, New York; Primos Chemical Company, Primos, Penn.; DeGobias and Atkins, San Francisco, Cal. In Germany, Friedrich Krupp, of Essen, is a large user of molybdenum.

During 1911 a report on the "Molybdenum Ores of Canada" was issued by the Mines Branch.<sup>1</sup>

<sup>1</sup>No. 93, "Report on the Molybdenum Ores of Canada," by T. L. Walker, Ph.D., Mines Branch, Department of Mines, Ottawa, 1911.

## NICKEL.

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

The past two 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, and by the Ontario Bureau of Mines, Toronto.<sup>1</sup>

The production of ore and its reduction to a Bessemer matte was carried on in 1913 to a greater extent than in any other year. There were mined 784,697 tons of ore. There were smelted 823,403 tons, from which were produced 47,150 tons Bessemer matte, carrying approximately 24,838 tons of nickel and 12,938 tons of copper, the net value of the matte being \$7,076,945. This matte, which is shipped to the United States and Great Britain for refining, carries about 80 per cent of the combined metals, having averaged for the past year 52.7 per cent of nickel and 27.4 per cent copper.

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

Compared with 1912, there was an increase in matte production of 5,225 tons, or 12.4 per cent, and the increase in total nickel content was 2,417 tons, or 10.8 per cent, and in copper 1,822 tons, or 16.4 per cent.

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<sup>1</sup>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. XIV, Part III., 1904.

The Nickel Industry, with special reference to the Sudbury Region, Ont. Report by A. P. Coleman, Ph.D., Mines Branch, Ottawa, No. 170, 1913.

The following were the aggregate results of the operations of the nickel-copper deposits of Ontario during the past four years:—

	1910.	1911.	1912.	1913.
	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Ore mined.....	652,392	612,511	737,726	784,697
Ore smelted.....	628,947	610,834	725,065	823,403
Bessemer matte produced.....	35,033	32,607	41,925	47,150
Copper content of matte.....	9,630	8,966	11,116	12,938
Nickel " ".....	18,636	17,049	22,421	24,838
Spot value of matte.....	\$5,380,064	\$4,945,592	\$6,303,102	\$7,076,945
Wages paid miners and smelters.....	\$1,698,152	\$1,830,526	\$2,026,609	\$3,291,956
Men employed.....	1,882	1,885	3,110	3,436

According to Customs returns, exports of nickel in matte, etc., were, for the twelve months ending December 31, as follows:—

	1909.	1910.	1911.	1912.	1913.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
To Great Britain.....	3,843,763	5,335,331	5,023,393	5,072,867	5,164,512
To United States.....	21,772,635	30,679,451	27,596,578	39,148,993	44,224,119
To other countries.....					70,386
	25,616,398	36,014,782	32,619,971	44,221,860	49,459,017

The above figures of the production of nickel do not include that recovered from the silver-cobalt ores of the Cobalt district. Returns are received of the recovery as nickel oxide at Canadian works, but a considerable amount of nickel is 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.

During 1913 there were shipped from the metallurgical and reduction works of Ontario, 660,079 pounds of cobalt oxide, 268,304 pounds of nickel oxide, also mixed oxides and residues valued at \$90,266, the total value being \$695,855. The residues contained a considerable quantity of nickel which, however, was not paid for.

*Bounty on Refined Nickel and Nickel Oxide:*—Under the term 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 ore 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 herein mentioned is not to exceed in all \$60,000 in any one year.”

The full text of the Act will be found in the chapter on “Cobalt.”

The price of refined nickel in New York during 1913 was quoted at 40 to 45 cents per pound for large lots on contract basis. During 1912 the price was the same.

Monel metal is finding an extended use in commerce; as this is put on the market at a price much lower than the final value of the metal content an allowance has been made by adopting a lower price per pound than market quotations.

Statistics of the quantities of nickel contained in matte produced, etc., will be found in the chapter on “Smelter Production.”

### Annual Production of Nickel.

Calendar Year.	Pounds of nickel in matte shipped.	Average price per lb.	Value.	Calendar Year	Pounds of nickel in matte shipped.	Average price per lb.	Value.
		Cts.	\$			Cts.	\$
1889.....	*830,477	60	498,286	1902.....	10,693,410	47	5,025,903
1890.....	1,435,742	65	933,232	1903.....	12,505,510	40	5,002,204
1891.....	4,035,347	60	2,421,208	1904.....	10,547,883	40	4,219,153
1892.....	2,413,717	58	1,399,956	1905.....	18,876,315	40	7,550,526
1893.....	3,982,982	52	2,071,151	1906.....	21,490,955	42	8,948,834
1894.....	4,907,430	38½	1,870,958	1907.....	21,139,793	45	9,535,407
1895.....	3,888,525	35	1,360,984	1908.....	19,143,111	43	8,231,538
1896.....	3,397,113	35	1,188,990	1909.....	26,282,991	36	9,461,877
1897.....	3,997,647	35	1,399,176	1910.....	37,271,033	30	11,181,310
1898.....	5,517,690	33	1,820,838	1911.....	34,093,744	30	10,229,623
1899.....	5,744,000	36	2,067,840	1912.....	44,841,542	30	13,452,463
1900.....	7,080,227	47	3,327,707	1913.....	49,676,772	30	14,903,032
1901.....	9,189,047	50	4,594,523				

\*Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are: The Canadian Copper Company (the International Nickel Company, Copper Cliff and New York), the Mond Nickel Company, Coniston, Ont., and

London, England. The latter Company is now operating its new smelter at Coniston in place of that at Victoria Mines.

Some prospecting and development work was done by the British America Nickel Corporation.

The Alexo mine on the Porcupine Branch of the Timiskaming and Northern Ontario Railway, produced during the year, shipping nickel-copper ore to the Mond smelter at Coniston.

Reference has already been made to the occurrence of nickel as one of the minor constituents of the silver ores of the Cobalt district. The quantity of nickel contained in ores of this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore and concentrates shipped.	Nickel content (estimated.)
	Tons.	Tons.
1904.....	158	14
1905.....	2,144	75
1906.....	5,335	160
1907.....	14,788	370
1908.....	25,624	612
1909.....	30,677	766
1910.....	34,282	604
1911.....	26,653	392
1912.....	21,933	429
1913.....	20,877	377

A large portion of these ores was treated in the Ontario smelters, at Deloro, Thorold, Kingston, North Bay, and Welland. At several of these plants in addition to silver bullion and white arsenic, there is a recovery of the oxides of nickel and cobalt.

Statistics of the exports and imports of nickel as compiled by the Customs Department reports, are shown in the following tables:—

#### Exports of Nickel Contained in Ore, Matte, or Other Product.

Calendar Year.	Value.	Calendar Year.	Lbs.	Value.	Average price.
	\$			\$	Cts.
1890.....	89,568	1903.....	12,699,227	1,116,099	8.78
1891.....	667,230	1904.....	11,233,869	1,091,349	9.71
1892.....	293,149	1905.....	17,313,059	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.....	521,733	1908.....	19,419,893	1,866,624	9.61
1896.....	653,213	1909.....	25,616,398	2,676,433	10.45
1897.....	723,130	1910.....	36,014,732	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	5,195,500	10.50
1901.....	751,080				
1902.....	1,007,211				



## Imports of Nickel and Nickel Anodes.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1890.....	3,154	1898.....	5,882	1906.....	15,976
1891.....	3,889	1899.....	9,449	1907.....	19,511
1892.....	3,208	1900.....	6,988	1908.....	36,870
1893.....	2,905	1901.....	12,029	1909.....	14,930
1894.....	3,523	1902.....	15,448	1910.....	23,266
1895.....	4,267	1903.....	26,177	1911.....	22,693
1896.....	4,737	1904.....	14,682	1912.....	34,121
1897.....	4,737	1905.....	19,076	1913.....	19,749

During the calendar year 1913 there was an import of nickel, nickel-silver, and German silver in ingots and bars to the extent of 42,726 pounds, valued at \$14,705, and nickel in bars and rods, 549,765 pounds, valued at \$147,815.

The only other important producer of nickel ore outside of Canada is the French colony, New Caledonia. The exports of nickel from this source since 1898 have been as follows in metric tons:—

Exports of Nickel Ore and Matte from New Caledonia.<sup>1</sup>

Year.	Nickel ore. Metric tons.	Year.	Nickel ore. Metric tons.	Year.	Nickel ore. Metric tons.	Nickel matte. Metric tons.
1898.....	53,200	1903.....	77,360	1908.....	108,000	.....
1899.....	103,908	1904.....	98,655	1909.....	86,000	.....
1900.....	100,319	1905.....	125,289	1910.....	89,000	.....
1901.....	133,814	1906.....	<sup>2</sup> 118,890	1911.....	<sup>3</sup> 120,059	2,933
1902.....	129,653	1907.....	120,106	1912.....	72,315	5,097
				1913.....	93,108	5,892

<sup>1</sup>Statistique de l'Industrie Minière en France et en Algérie, Paris.

<sup>2</sup>For 1906 and following years, the figures represent production.

<sup>3</sup>For 1911 and following years, statistics are taken from Mining Journal, London.

The following extract from the Mining Journal, London, May 16, 1914, may be of interest:—Referring to the mineral industry of New Caledonia, it says:—

“In 1913 the total value of ores and mattes exported reached £320,000. The average value per ton of nickel ore was 25s.; of chrome ore 25s.; and of nickel mattes £24. The shipment of nickel ores is in the hands of four companies; viz.: Le Nickel, 51,306 tons; Hautes-Fourneaux 27,016; Béchade 9,111; and Mont-Dô 5,675 tons. The nickel mattes shipped were treated

in the works of the following companies: Hautes-Fourneaux 3,467; Le Nickel 2,314, and Usines de Tao 111 tons."

"The percentage of nickel in the ores exported was 6.25 to 6.30 per cent, whilst that of the nickel mattes varied between 43 and 45 per cent, except that of the Usines de Tao which reached 50 per cent. The fine metal contained in the mattes was about 2,563 tons extracted from 64,000 tons of ore. Consequently the total quantity of nickel ores raised in 1913 attained 157,000 tons, an increase over the preceding year of 46,000.

The production of raw nickel at smelting works (partly estimated is given by the Metallgesellschaft as follows, in metric tons:—

### Production of Raw Nickel at Smelting Works, in Metric Tons.

Producing country.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
United States of North America and Canada.....	4,500	6,500	6,500	7,000	9,000	10,000	12,000	15,000	.....
England.....	3,100	3,200	3,200	3,000	3,200	3,500	4,500	5,200	.....
Germany*.....	2,700	2,800	2,600	3,000	3,500	4,500	5,000	5,000	.....
France.....	2,200	1,800	1,800	1,400	1,200	1,500	2,000	2,100	.....
Other countries.....	.....	.....	.....	200	400	600	1,000	1,200	.....
Total production†.....	12,500	14,300	14,100	14,600	17,300	20,100	24,500	28,500	30,000

\*The figures of production stated for Germany only cover the output in the Kingdom of Prussia; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production which is, however, not important.

†The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonia and Canadian ores.

Statistics of the average yearly prices in Europe, as given by the same authority, are as follows:—

### Yearly Average Prices of Nickel in Europe in Cents per Pound, and Marks per Kilogram.

Year.	Prices in marks per kilo.	Cents per lb.	Year.	Prices in marks per kilo.	Cents per lb.
1889.....	4.50	48.6	1901.....	3.00	32.4
1890.....	4.50	48.6	1902.....	3.20	34.6
1891.....	4.50	48.6	1903.....	3.30	35.6
1892.....	4.50	48.6	1904.....	3.30	35.6
1893.....	3.80	41.0	1905.....	3.30	35.6
1894.....	3.60	38.9	1906.....	3.30	41.0
1895.....	2.60	28.1	1907.....	3.50	37.8
1896.....	2.50	27.0	1908.....	3.25	35.2
1897.....	2.50	27.0	1909.....	3.25	35.2
1898.....	2.50	27.0	1910.....	3.25	35.2
1899.....	2.50	27.0	1911.....	3.25	35.2
1900.....	3.00	32.4	1912.....	3.25	35.2
			1913.....	3.25	35.2

## 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 1913 operators in the Cariboo district of British Columbia report a recovery of 18 crude ounces of platinum valued at \$489. More attention is being paid to the recovery of this metal especially in the Similkameen where it is proposed to re-work some of the old placers.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and since 1902 considerable quantities of these metals have been recovered from the residues resulting from the treatment of the mattes from Sudbury.

Since 1906 no record of the recovery of metals of the platinum group from the Sudbury District ores has been published, but the International Nickel Company have been good enough to inform us that the recovery of gold, silver, platinum, and palladium at their works in New Jersey for the six years ending December 31, 1912, was as follows:—

Year.	Gold.	Silver.	Platinum.	Palladium.
	Ozs.	Ozs.	Ozs.	Ozs.
1907.....	993.572	63,400.70	226.800	607.300
1908.....	5,238.181	139,329.29	172.316	382.287
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

In view, however, of the fact that other material has been treated in the Company's works 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.

## Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Crude Oz.	Value.
	\$		\$			\$
1887.....	5,600	1894.....	950	1901.....	.....	457
1888.....	6,000	1895.....	3,800	1902.....	.....	46,502
1889.....	3,500	1896.....	750	1903.....	.....	33,345
1890.....	4,500	1897.....	1,600	1904.....	.....	10,872
1891.....	10,000	1898.....	1,500	1905.....	.....	500
1892.....	3,500	1899.....	825	1906.....	.....	*
1893.....	1,800	1900.....	Nil.	1907-1912.....	.....	**
				1913.....	18	480

\*See under Palladium.

\*\*See explanation in text.

## Annual Production of Palladium.

	Ozs.	Value.
1902 Palladium.....	4,411	\$ 86,014
1903 ".....	3,177	61,952
1904 ".....	952	18,564
1905 Metals of the platinum group.....	1,502	28,116
1906 ".....	314	5,652
1907-1912.....	*	
1913.....		

\*See explanation in text.

## Imports of Platinum.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1883.....	113	1893.....	14,082	1903.....	21,251
1884.....	576	1894.....	7,151	1904.....	28,112
1885.....	792	1895.....	3,937	1905.....	61,719
1886.....	1,154	1896.....	6,185	1906.....	54,494
1887.....	1,422	1897.....	9,031	1907 (9 mos.).....	113,485
1888.....	13,475	1898.....	9,781	1908.....	60,390
1889.....	3,167	1899.....	9,671	1909.....	45,534
1890.....	5,215	1900.....	57,910	1910.....	84,435
1891.....	4,055	1901.....	20,263	1911.....	137,241
1892.....	1,952	1902.....	10,357	1912.....	191,370
				1913*.....	221,321

\*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.

## SILVER.

Silver, due to the development of the Cobalt camp in Ontario, has risen to second place in point of total value of output in our list of mineral products, coal being first.

In 1913 the total production of silver, including that produced as bullion, and the metal estimated as recovered from ores sent to smelters or otherwise treated, was 31,845,803 fine ounces, compared with a production of 31,955,560 ounces in 1912, a decrease of 109,757 ounces.

The average value of fine silver in 1913 was, however, according to New York quotations, 59.791 cents per ounce, as compared with an average value of 60.835 cents in 1912, a decrease of 1.71 per cent.

The total value of the silver production in 1913 was \$19,040,924, a decrease of 2.05 per cent from the value, \$19,440,165, in 1912.

A comparison of 1912 and 1911 shows a decrease for 1912 of 603,484 ounces, or 1.85 per cent in quantity, and an increase of \$2,084,893, or 14.13 per cent in value.

Statistics of the annual production of silver since 1887 are given in the following table:—

**Annual Production of Silver 1887-1913.**

Year.	Ozs.	Value.	Average price per oz.	Year.	Ozs.	Value.	Average price per oz.
		\$	Cts.			\$	Cts.
1887.....	355,083	347,271	98.00	1900.....	4,468,225	2,740,362	61.33
1888.....	437,232	410,998	94.00	1901.....	5,539,192	3,265,354	58.95
1889.....	383,318	358,785	93.60	1902.....	4,291,317	2,238,351	52.16
1890.....	400,687	419,118	104.60	1903.....	3,198,581	1,709,642	53.45
1891.....	414,523	409,549	98.00	1904.....	3,577,526	2,047,095	57.22
1892.....	310,651	272,130	86.00	1905.....	6,000,023	3,621,133	60.35
1893.....		330,128	77.00	1906.....	8,473,379	5,659,455	66.79
1894.....	847,697	534,049	63.00	1907.....	12,779,799	8,348,659	65.33
1895.....	1,578,275	1,030,299	65.28	1908.....	22,106,233	11,686,239	52.86
1896.....	3,205,343	2,149,593	67.06	1909.....	27,529,473	14,178,504	51.50
1897.....	5,553,456	3,323,395	59.79	1910.....	32,869,264	17,580,455	53.49
1898.....	4,452,333	2,593,929	58.26	1911.....	32,559,044	17,355,272	53.30
1899.....	3,411,644	2,032,658	59.58	1912.....	31,955,560	19,440,165	60.83
				1913.....	31,845,803	19,040,924	59.79

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 pro-

duction 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. Since then there has been a falling-off in quantity, but owing to the higher price of the metal the total value has been higher, that recorded in 1912 being \$19,440,165, while 1913 was \$19,040,924.

Ontario in 1905 produced 40·9 per cent of the output of Canada, in 1911 the percentage was 93·8, while in 1913 its percentage was 89·2, with British Columbia next with 10·4 per cent. Statistics of the annual production in each province are shown in the table following:—

### Production of Silver by Provinces, 1887-1913.

Calendar Year.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		YUKON TERRITORY.	
	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.
		\$		\$		\$		\$
1887.....	190,495	186,304	146,898	143,666	17,090	17,301	.....	.....
1888.....	208,064	195,580	149,388	140,425	79,780	74,993	.....	.....
1889.....	181,609	169,986	148,517	159,012	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	185,000	96,985
1903.....	17,777	9,502	23,600	15,287	2,996,204	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	1,980,433	87,626	52,392

The average weekly price of fine silver in New York during 1913 varied between  $63\frac{3}{4}$  cents per ounce in January and a minimum of  $56\frac{1}{8}$  cents in March, the average monthly price for the year being 59·791 cents per ounce.

In London the average monthly price of silver in 1913 was 27·576 pence per standard ounce 0·925 fine. For the year 1912 the average monthly price per fine ounce in New York was 60·835 cents.

The average monthly prices of silver in New York from 1909 to 1913, and in London during 1913, are shown in tabulated form following:—

### Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.					London.— Pence per Standard ounce (a).
	1909.	1910.	1911.	1912.	1913.	1913.
January.....	51.750	52.375	53.795	56.260	62.938	28.983
February.....	51.472	51.534	52.222	59.043	61.642	28.357
March.....	50.468	51.454	52.745	58.375	57.870	26.660
April.....	51.428	53.221	53.825	59.207	59.490	27.416
May.....	52.905	53.870	53.308	60.880	60.361	27.825
June.....	52.538	53.462	53.043	61.290	58.990	27.199
July.....	51.043	54.150	52.630	60.654	58.721	27.074
August.....	51.125	52.912	52.171	61.606	59.293	27.355
September.....	51.449	53.295	52.440	63.078	60.640	27.986
October.....	50.923	55.490	53.340	63.471	60.793	28.083
November.....	50.703	55.635	55.719	62.792	58.995	27.263
December.....	52.226	54.428	54.905	63.365	57.760	26.720
Average for the year.....	51.503	53.486	53.304	60.835	59.791	27.576

(a) 925 parts fine.

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 that Province, and finds a market in Canada, the United States, and China.

The annual production of fine silver at Trail since 1904 has been as follows:—

Year.	Fine ozs.	Year.	Fine ozs.
1904.....	551,450	1910.....	1,798,960
1905.....	1,088,328	1911.....	1,325,601
1906.....	1,263,809	1912.....	1,896,999
1907.....	1,631,422	1913.....	2,433,002
1908.....	1,956,039		
1909.....	2,003,003	Total.....	15,948,613

In Ontario, ores from the Cobalt district are treated by:—

The Coniagas Reduction Co., Thorold, Ont.

The Deloro Mining and Reduction Co., Deloro, Ont.

The Buffalo and Ontario Smelting and Refining Co., Kingston,  
Ont.

Dominion Refineries Limited, North Bay, Ont.

Metals Chemical Co., Welland, Ont.

Silver bullion of a fineness varying from 850 to 998.2 is produced at the works, other products being white arsenic, 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; and in 1913, 11,356,707 fine ounces. The decrease is accounted for by the treatment of the greater part of the high grade ore in the camp itself.

United States smelters report the receipt of 19,792,317 pounds of ore containing 4,889,980 ounces of silver, and 1,254 ounces of gold. The latter metal would indicate the inclusion of a shipment from Porcupine, or Kirkland Lake, but the major part of the ore is from Cobalt.

### 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.

### Ontario.

From a production of \$118,376, in 1904, the silver output of the Province has grown to \$17,772,352 in 1912. In 1913 there is a slight decrease in both quantity and value, the amounts being 28,411,261 ounces, valued at \$16,987,377. This constitutes 89.2 per cent of the production of Canada; which country, as a whole, now ranks third as a silver producer.

According to returns received by this Department, there were shipped from the mines 29,741 tons of ore and 10,838 tons of concentrates having a total value of \$12,565,718, besides silver bullion containing 7,599,929 ounces of silver.

A good deal of this ore was milled within the district and shipped as bullion, consequently there is a difference between mine shipments as here given and district shipments.

The silver content of ore shipped was estimated at 13,601,286 ounces, or an average of 457 ounces per ton, and the concentrates shipped as 8,260,888 ounces, an average of 762 ounces per ton, the total silver content of ore, concentrates and bullion shipped from the Cobalt District mines



being 29,462,103 ounces. The mine owners receive payment for only 39 to 98 per cent of the silver content, and in estimating and valuing the production a deduction of 5 per cent is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 28,368,994 ounces, valued at \$16,962,105.

Payments for cobalt content were made only in the case of the residues from the Nipissing high grade mill, and the Timiskaming mine also received returns from a small copper content in some of its shipments.

In the following table a record of shipments since 1904 is given, the figures of the first three years being those published by the Ontario Bureau of Mines.

### Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1913.

Year.	SHIPMENTS.		SILVER CONTENT.		SILVER IN OUNCES, PER TON.		Silver bullion shipments. Fine ounces.	Total value of silver.
	Ore. Tons.	Concentrate. Tons.	Ore. Ozs.	Concentrate. Ozs.	Ore.	Concentrate.		
								\$
1904.....	158.....		206,875.....		1,309.....			118,376
1905.....	2,144.....		2,451,356.....		1,143.....			1,473,192
1906.....	5,335.....		5,401,766.....		1,013.....			3,607,894
1907.....	14,644.....		9,982,363.....		682.....			6,521,178
1908.....	25,682.....	*	19,398,545.....	*	755.....	*		10,254,847
1909.....	27,835.....	3,059	22,349,717.....	3,627,819	803.....	1,186	143,440	12,784,126
1910.....	28,684.....	6,943	23,797,111.....	7,111,579	830.....	1,024	1,003,111	16,241,755
1911.....	15,417.....	9,329	20,065,621.....	8,118,231	1,300.....	870	3,766,022	16,279,443
1912.....	17,899.....	11,217	15,929,289.....	9,774,697	890.....	871	4,778,852	17,762,384
1913.....	29,741.....	10,838	13,601,286.....	8,260,888	457.....	762	7,599,929	16,962,105

\*Included in ore.

As the camp has developed, the average grade of ore shipped has gradually diminished. The introduction of concentration plants in 1908 has tended to keep the shipments up to a high standard, but there is a growing tendency to treat the ore at the mines and convert it into bullion for shipment.

The total metal content of these ores as estimated by the Ontario Bureau of Mines is shown in the next table. The figures for ore shipments and silver contents while not identical, agree very closely with those given in the previous table.

## Total Production Cobalt Mines, 1904-1913.\*

Year.	ORE AND CON- CENTRATE SHIPPED.	METALLIC CONTENT.			
		Nickel.	Cobalt.	Arsenic.	Silver.
		Tons.	Tons.	Tons.	Ozs.
1904.....	158	14	16	72	206,375
1905.....	2,144	75	118	549	2,451,356
1906.....	5,335	180	321	1,440	5,401,766
1907.....	14,758	370	739	2,953	10,023,311
1908.....	25,624	612	1,224	3,672	19,437,875
1909.....	30,677	766	1,533	4,294	25,897,825
1910.....	34,282	904	1,098	4,897	30,645,181
1911.....	26,653	392	852	3,806	31,507,791
1912.....	21,933	429	934	4,166	30,243,859
1913.....	20,877	377	321	3,663	29,631,975

\*As per Ontario Bureau of Mines.

†Bullion shipments from mines included.

While the greater number of the mining companies, hold unrestricted titles to their properties, several are operated on a royalty basis of mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. A. A. Cole, Mining Engineer to the Commission has in his annual report some interesting statistics from which the following tables and extracts have been drawn:—

## Ore Shipments from the Cobalt District for the Years 1904 to 1913.

Mine.	1904. to 1908.	1909.	1910.	1911.	1912.	1913.	Totals. 1904-1913.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Badger.....				27.10			27.10
Bailey.....	118.80	36.85		20.00	41.57	150.35	367.57
Beaver.....		51.38	140.06	790.81	402.97	292.21	1,677.43
Buffalo.....	2,972.04	648.86	1,185.77	1,275.19	1,251.64	66.13	7,399.63
Casey-Cobalt.....	10.00	8.50	48.40	277.74	214.34	401.54	960.52
Chambers-Ferland.....	223.89	517.88	885.92	622.85	501.29	223.78	2,975.61
City of Cobalt.....	811.65	566.82	329.40	281.30	230.00	105.14	2,324.31
Cobalt Lake.....	225.97	95.47	296.80	2,111.32	1,035.22	1,196.33	5,011.11
Cobalt Townsite.....	320.93	27.35	310.99	703.51	1,944.77	2,762.54	6,070.09
Colonial.....	55.38		178.60	114.10	86.48	21.56	456.12
Coniagas.....	3,510.24	800.93	1,261.46	1,813.89	2,119.87	1,620.40	11,132.79
Crown Reserve.....	657.35	3,167.52	2,814.25	977.32	561.65	791.15	8,969.24
Drummond.....	1,572.86	1,225.47	2,194.41	714.83	458.85	610.06	6,776.48
Foster.....	704.18	113.90					818.08
Green Meehan.....	135.42			102.98		12.96	251.36
†Hargrave.....	28.45		343.68	102.44	17.35		491.92
Hudson Bay.....	1,243.76	743.64	260.33	898.88	694.55	609.14	4,450.30
Imperial Cobalt.....	14.61						14.61
Kerr Lake.....	1,193.30	1,173.42	5,088.78	1,292.58	788.10	933.35	10,469.33
King Edward (Watts)	388.31	146.58	134.12	20.00		37.21	776.22
LaRose.....	9,181.14	6,757.21	5,131.53	3,581.54	3,511.40	3,275.14	31,437.96
†Lawson.....	75.73						75.73
Lost and Found.....					65.20	8.80	74.00
Lumsden.....						20.00	20.00
McKinley-Darragh.....	3,098.35	1,056.49	2,393.39	3,238.04	2,673.40	2,865.66	15,325.93
Nancy Helen.....	231.42	116.32					347.74
Nipissing.....	8,778.32	6,470.52	6,833.81	2,952.20	1,869.27	1,950.22	28,854.34
Nova Scotia.....	554.11	224.79					778.90
North Cobalt.....		6.87		3.00			9.87
O'Brien.....	5,091.62	1,419.11	608.57	628.44	711.43	703.43	9,162.60
*Penn Canadian.....	265.32	339.01	285.62	22.40	126.35	332.18	1,370.88
Peterson Lake Leases							
Gould.....						9.00	9.00
(Little Nipissing)...	40.67	39.62	313.76	28.45			422.50
(Nova Scotia).....		121.15					121.15
Seneca Superior.....					432.97	457.93	890.90
Provincial.....	75.84		52.05	100.54	22.22		250.65
†Princess.....	3.93						3.93
Red Rock.....	45.71						45.71
Right of Way.....	925.66	1,608.99	981.41	666.06	243.24	146.12	4,571.48
Rochester.....			28.30				28.30
Silver Bar.....	0.58			2.72		20.00	23.30
Silver Cliff.....	160.44	149.06	156.84	92.30		48.05	606.69
Silver Leaf.....	252.39						252.39
Silver Queen.....	1,539.94	316.64			31.25	201.98	2,089.81
Timiskaming.....	999.52	852.14	1,119.12	855.60	967.31	406.26	5,199.95
Timiskaming-Cobalt.	88.45						88.45
Trethewey.....	2,630.33	1,134.50	536.64	602.98	579.10	537.54	6,121.09
†University.....	231.51						231.51
Victoria.....	0.47						0.47
Violet.....	36.00						36.00
Waldman.....			38.81				38.81
Wyandoh.....			24.15				24.15
Total.....	48,544.59	29,942.99	33,976.97	24,921.71	21,631.79	20,916.16	179,934.21

†The shipment in 1905 was made by the White Silver Mining Co., the former owner of the Hargrave property.

‡Shipments from Lawson, Princess, and University, since 1907, included with La Rose.

\*Shipments up to the end of 1911 made by the Cobalt Central Mining Company former owner of the Penn Canadian.

## MILLING.

"Milling this year becomes a still more important feature in the work of the Cobalt mines. The tonnage of low grade ore treated during the year shows an increase of 46 per cent over the previous year."

"The only new mill coming into operation was that of the Northern Customs. It is situated at mileage 104 north of the LaRose mine and one mile north of Cobalt. It started operations a few days before the end of the year and in that time treated 1,158 tons of LaRose ore."

Mills and mines.	Tons milled.	CONCENTRATES.			Concentration ratio.
		Jigs.	Tables.	Total.	
Beaver.....	24,334	113.0	197.3	310.3	78-1
Buffalo.....	71,042			1,227.3	58-1
Casey-Cobalt.....	9,949	18.2	252.6	270.8	37-1
Cobalt Lake.....	37,616	239.6	790.9	1,030.5	37-1
Cobalt Reduction—					
LaRose.....	5,452		147.0	147.0	37-1
Townsite.....	8,829	3.0		155.1	56-1
Colonial.....	1,500		22.0	22.0	68-1
Right of Way.....	5,013		84.8	84.8	59-1
Coniagas.....	55,283	201.0	710.0	911.0	61-1
Hudson Bay.....	22,639	154.4	568.1	722.5	31-1
King Edward.....	1,975	1.5	66.5	68.0	29-1
McKinley-Darragh.....	68,057	183.0	1,848.0	2,031.0	31-1
Nipissing Reduction—					
Silver Queen.....	15,674	343.7	113.3	457.0	34-1
Northern Customs—					
Comet (Drummond).....	11,291	11.8	503.0	514.8	22-1
LaRose.....	38,714		1,012.4	1,012.4	38-1
Townsite.....	31,545	29.5	431.3	460.8	68-1
O'Brien.....	40,036	114.0	269.0	383.0	105-1
Penn Canadian.....	16,648	109.9	189.4	299.3	56-1
Bailey.....	3,156	33.5	50.3	83.8	38-1
Comet (Drummond).....	194	0.7	5.5	6.2	31-1
Timiskaming.....	32,307	107.4	409.3	516.7	63-1
Trothewey.....	35,294	100.0	484.4	584.4	60-1
Total.....	531,548			11,301.7	47-1

Cyanide mills.	Tons.	Ozs. bullion produced.
Dominion Reduction.....		
Comet (Drummond).....	3,928	
Crown Reserve.....	29,548	481,718
Hargrave.....	157	
Kerr Lake.....	22,471	
Seneca Superior.....	60	
Nipissing, Low Grade.....	77,133	1,981,371
	133,297	

Total tons milled by water concentrating mills..... 531,548

Total tons milled by cyanide mills..... 133,297

Total tons milled, 1913..... 664,845

## SMELTING.

"The market for Cobalt silver ores has been more restricted this year than previously and at times it has been difficult to dispose of stocks on hand particularly if running high in arsenic. In the autumn of 1912 the Canadian Copper Company decided to close up and abandon its Cobalt plant and since that time has accepted no Cobalt ores. The market was further restricted by the withdrawal of the Canada Smelting and Refining Company on account of a fire which put its works out of commission early in January 1913. This Company has since been repairing the damage done by the fire and is now cleaning up the residues at the plant, no new ore is to be accepted till these residues are disposed of."

Practically all of the ores from the Cobalt district treated in Canada were taken by:

1. Coniagas Reduction Company, Thorold Ont.
2. Deloro Mining and Reduction Company, Deloro, Ont.

"Most of the foreign shipments went to the United States. A few were shipped to the Saxon Government by the Crown Reserve Mining Co. Regular shipments of cobalt-nickel residues from the Nipissing high grade mill were made by the Nipissing Mining Company to H. Wiggins & Co., of Birmingham, England. In this case payment was made for the cobalt contents as well as the silver. The American Smelting and Refining Company took most of the shipments going to the United States though occasional shipments were also accepted by the Pennsylvania Smelting Company, Carnegie, Pa., the Balbach Smelting and Refining Company, Newark, N.J. and the United States Metals Refining Company, Chrome, N.J."

A number of the shipping mines of Cobalt have published annual reports containing some details of their operations from which the following extracts have been taken:—

*Beaver Consolidated Mines, Limited.*

Year ended February 28, 1914.

"*Mill*:—During the first half of the year the mill treated nearly 80 tons a day. We replaced our four foot Hardinge ball mill by a six foot Hardinge ball mill and since that time have been milling up to 100 tons a day. Our average for the year was 86 tons. We herewith submit a condensed report of the mill for the year during which it operated 293½ days.

"Ore milled.....	25,256 tons.
Concentrates produced.....	324.13 "
Silver in concentrates.....	379,764.5 ozs.
Earnings less milling and marketing costs.	\$168,630.63.

*“Silver Production.*—During the year we shipped 762,698·9 ounces of silver valued at \$438,551.88 (average price of silver 57½ cents an ounce), as against 689,921 ounces shipped in the previous year valued at \$409,211.93 (average price of silver 59·3 cents an ounce).”

*The Buffalo Mines Limited.*

Year ending April 30, 1914.

“Shipments:—

*“Ore and concentrates.*—During the year two cars were shipped containing 57 tons of table concentrates, the smelter returns of which amounted to 81,607 ounces, of which 9,194 ounces were of this year’s production. There were also several small sales of native silver amounting to 175 ounces.

*Bullion.*—There were also shipped during the year 115,575 pounds or 57¾ tons of refined bullion, the returns of which amounted to 1,484,231 ounces. Total returns for shipments and sales of this year’s production amounted to 1,493,600 ounces.”

*The Coniagas Mines, Limited.*

Year ending October, 31, 1913.

“The total tonnage of ore milled was 54,890 or an average of 2·95 tons per stamp per 24 hours as compared with 53,627 tons averaging 2·86 tons per stamp for previous year.”

“There were 6·11 tons high grade concentrates shipped and 423 tons low grade slimes the former averaging 2,094 ounces per ton and the latter 103 ounces per ton, the heads of the mill averaging 28·3 ounces per ton as compared with 34·12 for the previous year. The sand tailings from mill averaged 3·52 ounces per ton and slime tailings 6·13; the average of general tails was 4·23 ounces.”

“There was a total of 736 tons mine ore shipped which averaged 3,057 ounces per ton.”

*Crown Reserve Mining Company, Limited*

Year ending Dec. 31, 1913.

## SHIPMENTS.

	Net weight.	Ounces silver.	Gross value.	Cost of treatment.	Net value.
	Tons.		\$	\$	\$
High grade.....	312.63	1,138,896	671,571.34	12,457.41	659,113.93
Bullion.....	4.10	112,470	67,135.67	449.47	66,686.20
	316.73	1,251,366	738,707.01	12,906.88	725,800.13
Milled ore, shipped as bullion.....	19.10	525,312	317,564.85	3,247.00	314,317.85
	335.83	1,776,678	1,056,271.86	16,153.88	1,040,117.98

"*Lake Drainage.*—Permission having been granted on May 1st, 1913, by the Mining Commission of Ontario to the Crown Reserve Mining Company, Limited, and the Kerr Lake Mining Company, Limited, jointly to pump out the water and mud from the bed of Kerr Lake, construction work was immediately begun".

*Kerr Lake Mining Company, Limited.*

## Ore Production for the Year ending Aug. 31, 1913.

Grade of ore.	Net weight.	Silver content.	Average silver content per ton.
	Lbs.	Ozs.	Ozs.
1st Class.....	768,998	1,287,035	3347.00
2nd ".....	323,030	72,783	450.60
Jig and table concentrates.....	383,020	133,682	959.10
Bullion from metallies.....		31,834	
Mill ore.....	18,252.3 (tons)	534,641	29.29
		2,109,975	

August estimated in part.

*LaRose Consolidated Mines Company.*

Year ended Dec. 31, 1913.

## SHIPMENTS.

	Dry tons.	Net value per ton.	Ounces silver.	Net value.	Per cent of total.
		\$		\$	
Silver, cobalt, Nickel ore.....	1,275,822	827.00	1,914,741.20	1,055,110.94	75.7
Low grade Siliceous ore.....	1,076,529	43.33	121,168.58	46,645.00	3.4
Nuggets.....	6,120	13,441.54	138,667.70	82,262.23	5.9
Concentrates.....	915,918	228.74	418,198.40	209,505.60	15.0
	3,274,389	425.58	2,592,775.88	1,393,523.77	100.0

*McKinley-Darragh-Savage Mines of Cobalt, Limited.*

Year ended Dec. 31, 1913.

Total ounces of silver recovered:—

McKinley 1,647,880; Savage 566,156—Total 2,214,036.

## OUNCES OF SILVER SHIPPED TO DATE:

	1906.	1907.	1908.	1909.	1910.	1911.
McKinley.....	42,673	632,983	720,779	1,265,300	2,213,238	1,964,783
Savage.....			17,433	59,404	408,650	604,871
Total.....	42,673	632,983	738,212	1,324,704	2,621,888	2,569,654
	1912.	1913.	Total to January 1, 1914.			
McKinley.....	2,075,326	1,672,431	10,587,513			
Savage.....	629,542	556,066	2,275,966			
Total.....	2,704,868	2,228,497	12,863,479			



*Nipissing Mines Company.*

Year ending Dec. 31, 1913.

Summary of shipments, 1913.

*Nipissing Production only.—*

Dry tons shipped.....	1,328,625
Gross ounces of silver contained.....	4,844,169.41
Gross silver value.....	\$ 2,919,143.93
Average price received per ounce, cents.	60.261
Received from sales of cobalt and nickel.....	\$ 26,183.38
Gross silver, cobalt and nickel value....	\$ 2,945,327.31
Marketing charges.....	\$ 24,621.04
Net value received from sales.....	\$ 2,920,706.27

"The residue from the high grade mill carries twenty to forty ounces of silver, 8% to 10% cobalt, 4% to 6% nickel, and 30% to 40% arsenic. This is sold to the manufacturers of cobalt products and during the year shipments of 1,659 tons were made which netted the Company \$62,484."

*Peterson Lake Silver Cobalt Mining Company, Limited.*

Year ending April 30, 1914.

"*Ore Production.*—The Seneca Superior Lease produced during the year 1,406,772.29 ounces of silver paid for by the smelter having an estimated value of \$828,578.31 of which the Peterson Lake Company estimate \$207,144.57 in royalty will be received."

"The Gould lease has produced 59,016.42 ounces of silver paid for by the smelter valued at \$34,298.80. The Peterson Lake royalty from this was \$8,574.72."

"We have produced from Number Two shaft, twenty-five tons of ore which is ready for shipment. We estimate this at 1,300 ounces per ton."

*Right of Way Mines, Limited.*

Year ending Dec. 31, 1913.

## ORE SHIPMENTS.

	Dry weight in pounds.	Silver content.  Ozs.	Gross value.	Net value.
First Grade.....	86,685	53,159.7	\$31,377.60	\$28,416.61
Second ".....	62,204	2,507.0	1,484.57	868.23
Concentrates.....	139,645	44,359.3	25,238.53	22,246.16
Total.....	288,534	100,026.0	\$58,150.70	\$51,531.00

*Trethewey Silver-Cobalt Mines, Limited.*

Year ending Dec. 31, 1913.

## SHIPMENTS IN 1913.

	Net dry weight. Tons.	Ave. assay silver. Ozs. per ton.	Total silver contents.	Gross value.	Net smelter returns.
To Deloro Mg. & R.Co.....	314.3475	1,669.5	524,799.33	\$310,515.20	\$289,713.38
To A.S. & R. Co., Denver.....	272.8675	234.4	63,962.27	38,158.76	30,340.66
To London (Bullion).....			10,273.81	6,166.89	6,055.52
Total.....	587.2150		599,035.41	\$354,840.85	\$326,109.56

*Wettlaufer Lorrain Silver Mines, Limited.*

Year ending Dec. 31, 1913.

## SHIPMENTS.

	Pounds.	Ounces silver.	Net value.
First Class.....	84,000	147,425.26	\$83,784.76
Second ".....	60,000	11,417.87	5,605.87
Concentrates.....	120,000	72,965.57	38,612.30
Bullion.....	1,941	17,182.05	10,071.43
Total.....	265,941	248,990.75	\$138,074.36

**British Columbia.**

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 production in 1913, based on smelter recoveries, was 3,312,343 ounces, valued at \$1,980,483.

The leading silver producers of the Province in order of importance were: The Standard, Sullivan, Rambler-Cariboo, Number One, Vancouver and Blue Bell.

The Granby mines at Phoenix, on account of their large tonnage of copper ores, come second, with the others maintaining their respective places.

During 1913 the Sandon and Silverton and adjoining camps were very active. Much interest also centres in the Ainsworth camp, where the Consolidated Mining and Smelting Company reopened the Highland,

Number One and Maestro, with important results. The Silver Hoard also shipped a considerable tonnage and the Blue Bell, though its ore is low in silver, ranks high as a silver producer on account of its heavy tonnage.

### Production of Silver in British Columbia by Districts, 1909-1913.\*

	1909.	1910.	1911.	1912.	1913.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Cariboo—					
Ormineca.....					46,298
Cassiar.....	4,569	1,454	29,976	5,868	4,714
Kootenay, East—					
Fort Steele division.....	580,240	501,475	330,235	376,918	362,311
Other divisions.....	825	243		7,405	4,756
Kootenay, West—					
Ainsworth division.....	352,555	233,010	77,375	301,755	447,015
Nelson division.....	75,908	45,787	76,774	164,182	129,011
Slocan division.....	738,175	964,634	793,926	1,657,105	1,841,226
Trail Creek division.....	80,026	87,833	88,076	87,530	109,535
Other divisions.....	169,435	107,753	67,884	43,536	23,397
Yale—					
Boundary.....	492,333	460,945	326,849	389,341	394,048
Yale.....		3	343		461
Coast and other districts.....	38,676	47,104	100,926	98,468	103,034
Total.....	2,532,742	2,450,241	1,892,364	3,132,108	3,465,856

\*From the Minister of Mines Reports, British Columbia.

### Yukon.

The figures of the silver production of the Yukon given in the second table of this article represent the silver alloyed with the placer gold, together with a small amount from the lode mines of the district. On an average about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings.

The production may be given as follows:—

	Placer	Value.	Lode	Value.	Total	Value.
	ozs.		ozs.		ozs.	
		\$		\$		\$
1909.....	45,000	23,176			45,000	23,176
1910.....	50,000	26,743	37,418	20,013	87,418	46,756
1911.....	50,300	26,812	62,408	33,206	112,708	60,078
1912.....	60,302	36,685	20,766	12,633	81,068	49,318
1913.....	63,522	37,980	24,104	14,412	87,626	52,392

## Exports.

The following table shows the statistics of silver contained in ore, matte or other form exported from Canada since 1886 as compiled from the reports of Trade and Navigation, published by the Customs Department. The exports during 1913 were 37,371,569 ounces, valued at \$21,441,220, as against exports of 34,911,922 ounces valued at \$19,494,416, in 1912.

## Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	25,957	1895.....	994,354	1904.....	1,904,394
1887.....	206,284	1896.....	2,271,959	1905.....	2,777,218
1888.....	219,008	1897.....	3,576,391	1906.....	5,686,444
1889.....	212,163	1898.....	2,902,277	1907.....	9,941,849
1890.....	204,142	1899.....	1,623,905	1908.....	12,403,482
1891.....	225,312	1900.....	2,341,872	1909.....	15,719,909
1892.....	56,688	1901.....	2,026,727	1910.....	15,649,537
1893.....	213,695	1902.....	1,820,058	1911.....	15,807,366
1894.....	359,731	1903.....	1,089,474	1912.....	19,494,416
				1913.....	21,441,220

## 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. This occurrence has not yet been found of economic value. It has been visited by several officers of the Geological Survey, and reports upon it may be found in the Summary Reports of the Geological Survey Branch of the Department of Mines, for 1907, 1908, 1910, and 1911.

In the Summary Report for 1912 Mr. Wright gives the following notes:—

“All of the prospects for tin are located in the muscovite granite, but there are only two that are worthy of mention here.

The Reeve's tin mine, located south of Lake Ramsay, is a 20 foot shaft on a pegmatitic zone in aplitic muscovite granite. The bulk of the pegmatite is made up of feldspar and quartz. Associated with these are many pneumatolic minerals, of which muscovite, lepidolite, and fluorite are the most common. The cassiterite is said to have occurred as nuggets in the open spaces among the other minerals.

The pegmatite zone is 10 feet wide, and has been stripped for 20 feet. It was thought that this was the full length of the zone, but further development has shown that it may continue farther towards the east. The zone has no distinct wall, but grades into the aplitic country rock. Thus it is not a true pegmatite dyke, but an example on a large scale of the 'blow-outs' which are so common in this type of rock.

The other interesting prospect for tin is on the north bank of the outlet of Camp lake, about one-half mile below the lake. The lead is a well-defined zone 2 to 4 feet wide, made up of intersecting quartz stringers and the altered country rock. The quartz stringers have a general trend parallel to the main lead and carry chalcopyrite, pyrite, cassiterite, fluorite, and associated minerals. The mineral bearing solutions of the quartz veins have altered the walls into a greenish silicified mass which grades into the fresh granite about 1 foot from the vein. Generally the quartz veins are so close together that the whole mass of the included country rock is altered and mineralized.

The lead has been stripped north from the river bank for 350 feet, and two shafts sunk 30 and 50 feet respectively, and so far the nature of the lead has not changed. Southward the vein has been off-set to the southwest, about 60 feet, by a fault located in the bed of the river. As yet no work has been done on this part of the lead.

At the present time negotiations are under way to obtain an option on the property in order to do some further developing."

### Tin in Black Sands.

During 1913 a sample shipment of one ton of black sand was made from the Atlin district of British Columbia, which is reported to have assayed 6.71 per cent tin. The black sand was obtained from alluvial sluice boxes in this camp. Stream tin has also been found in some of the Yukon placer deposits and a small quantity recovered in the gold dredging operations is reported to have been marketed, though no direct returns of production have been obtained.

### Imports of Tin and Tinware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	281,880	1891.....	1,206,918	1902.....	2,293,958
1881.....	413,924	1892.....	1,594,205	1903.....	2,712,186
1882.....	790,285	1893.....	1,242,994	1904.....	2,389,557
1883.....	1,274,150	1894.....	1,310,389	1905.....	2,791,757
1884.....	1,018,493	1895.....	973,397	1906.....	3,336,948
1885.....	1,060,883	1896.....	1,237,684	1907 (9 mos.).....	2,719,813
1886.....	1,117,368	1897.....	1,274,108	1908.....	4,059,281
1887.....	1,187,312	1898.....	1,550,851	1909.....	2,985,361
1888.....	1,164,273	1899.....	1,372,813	1810.....	3,822,443
1889.....	1,243,794	1900.....	2,418,455	1911.....	4,647,784
1890.....	1,239,756	1901.....	2,339,109	1912.....	5,420,175
				1913.....	7,242,494
				Duty.	\$
				Free.	8,228
				"	5,131,900
				"	1,201,428
				"	1,260,908
				25%	575,595
					7,242,494

1913	Tin crystals.....	Free.		8,228
	Tin in blocks, pig, and bars.....	"	5,131,900	2,286,142
	Tin plates and sheets.....	"	1,201,428	4,178,323
	Tin foil.....	"	1,260,908	194,206
	Tinware, plain, japanned or lithographed, and all manufactures of tin, N.E.S.....	25%		575,595
	Total.....			7,242,494

## TUNGSTEN.

No production of tungsten is reported during 1913.

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 these deposits were developed by the Scheelite Mines, Limited, who have obtained very satisfactory results.

During 1912, the Scheelite Mines, Limited, continued development and prospecting work and operated their mill, making a shipment of 14 tons of tungsten concentrates—the first shipment from Nova Scotia—carrying 72 per cent tungstic acid.

In the Summary Report for 1910, Mr. Faribault refers to a discovery in Queens county as follows:—

“A new discovery of tungsten ore in the form of scheelite has been made by A. N. Prest, at Middlefield, Queens county, near the Fifteen Mile Brook gold mine, and prospecting was started last fall in order to trace the float to the parent vein.”

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 the southwest Miramichi. 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.

Prices were better in 1913 than in 1912, and according to the Engineering and Mining Journal, New York, January 24, 1914, ranged from \$6 to \$7.50 per unit of 20 pounds of tungsten trioxide.

## ZINC.

The production of zinc ore in Canada in 1913, as obtained by direct returns from producers, was 7,889 tons, valued at \$186,827, the greater part being from British Columbia. The zinc content of these shipments was returned as 7,069,800 pounds, which, if valued at the average New York price of spelter during the year, 5.648 cents, would be worth \$399,302.

The ore shipped from British Columbia 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 British Columbia shipments were heavy as a result of the activity of the Slocan mines and mills. There were also shipments from Notre Dame des Anges, Portneuf county, Quebec.

During the year 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 per cent 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 concentrates shipped, the lead duty applies. The result of the decreased duties has been a considerable increase in zinc shipments.

During 1913 there were received at American smelting works from Canadian mines 7,074 tons of zinc concentrates, containing 5,941,727 pounds of zinc.

In 1912 these works reported the receipt of 7,190 tons containing 6,392,983 pounds of zinc.

The imports of zinc, taken as an index of consumption, show a fairly steady increase. The total imports of zinc in blocks and pigs and spelter, were in 1880 some 744 tons; in 1889 they had risen to 1,427 tons and remained fairly stationary the next ten years. In 1899 they were 1,213 tons and rose to 4,110 for the fiscal year 1909.

During the calendar year 1913 the imports were 8,664 tons, in addition to which there were 6,341 tons zinc white valued at \$525,643, zinc manufactures to the value of \$54,898; also zinc dust, 206 tons, valued at \$26,403; and sulphate and chloride of zinc, 317 tons, valued at \$17,424.



Statistics of the production and imports of zinc, and the average monthly prices of spelter on the New York and London markets, are given in the following tables:—

### Annual Production of Zinc.

Calendar Year.	ZINC ORE SHIPPED.		METALLIC ZINC IN ORE SHIPPED.	
	Tons.	Spot value.	Lbs.	Final value.
		\$		\$
1898.....	1,162	11,000	788,000	36,011
1899.....	865	18,165	814,000	46,805
1900.....	261	4,810	212,000	9,342
1901.....				
1902.....	158	1,659	142,200	6,882
1903.....	1,000	10,500	900,000	48,660
1904.....	597	3,700	477,568	24,256
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	16,463,204	906,245
1910.....	5,063	120,003	4,361,712	240,766
1911.....	2,590	101,072	2,346,849	135,132
1912.....	6,415	215,149	5,354,700	371,777
1913.....	7,889	186,827	7,069,800	399,302

\*Figures not available.

(a) Includes 7,424 tons shipped late in 1908.

### Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880.....	13,805	67,881	1891.....	17,984	105,023	1902.....	34,871	141,560
1881.....	20,920	94,015	1892.....	21,881	127,302	1903.....	26,646	142,827
1882.....	15,021	76,631	1893.....	26,446	124,360	1904.....	25,553	138,057
1883.....	22,765	94,799	1894.....	20,774	90,680	1905.....	25,141	141,514
1884.....	18,945	77,373	1895.....	15,061	63,373	1906.....	24,462	158,438
1885.....	20,954	70,598	1896.....	20,223	80,784	1907 (9 mos.)	18,427	126,221
1886.....	23,146	85,599	1897.....	11,946	57,754	1908.....	30,362	191,081
1887.....	26,142	98,557	1898.....	35,148	112,785	1909.....	26,222	141,066
1888.....	16,407	65,827	1899.....	18,785	107,477	1910.....	35,040	201,777
1889.....	19,782	83,935	1900.....	28,748	156,167	1911.....	34,659	206,746
1890.....	18,236	92,530	1901.....	20,527	103,457	1912.....	33,379	213,141
						1913.....	99,311	617,138

## Imports of Spelter.\*

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880.....	1,073	5,301	1891.....	6,249	31,459	1902.....	18,356	80,757
1881.....	2,904	12,276	1892.....	13,909	62,550	1903.....	23,159	110,817
1882.....	1,654	7,779	1893.....	10,721	49,822	1904.....	33,952	164,751
1883.....	1,274	5,196	1894.....	8,423	35,615	1905.....	37,941	206,244
1884.....	2,239	10,417	1895.....	9,249	30,245	1906.....	50,137	290,686
1885.....	3,325	10,875	1896.....	10,897	40,548	1907 (9 mos.)	42,465	269,044
1886.....	5,432	18,238	1897.....	8,342	32,826	1908.....	65,593	314,369
1887.....	6,908	25,007	1898.....	2,794	13,561	1909.....	55,981	310,688
1888.....	7,772	29,762	1899.....	5,450	29,687	1910.....	132,001	658,285
1889.....	8,750	37,403	1900.....	5,836	29,416	1911.....	98,372	505,447
1890.....	14,570	71,122	1901.....	14,621	58,283	1912.....	125,721	716,064
						1913.....	107,845	630,564

\*Spelter in blocks and pigs.

## Imports of Zinc, Manufactures of.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	8,327	1891.....	7,178	1902.....	6,683
1881.....	20,178	1892.....	7,563	1903.....	9,754
1882.....	15,526	1893.....	7,464	1904.....	12,682
1883.....	22,599	1894.....	6,193	1905.....	11,912
1884.....	11,952	1895.....	5,581	1906.....	12,917
1885.....	9,459	1896.....	6,290	1907 (9 mos.)	12,556
1886.....	7,345	1897.....	5,145	1908.....	19,240
1887.....	6,561	1898.....	10,503	1909.....	15,621
1888.....	7,402	1899.....	14,661	1910.....	15,495
1889.....	7,233	1900.....	11,475	1911.....	24,128
1890.....	6,472	1901.....	6,882	1912.....	34,010
				1913.....	54,616

## 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	14,066	18,602	21,609	23,856
Belgium.....	181,851	184,194	190,233	215,050	220,673	217,941
France and Spain.....	61,512	61,859	65,191	70,791	79,543	78,293
Germany.....	239,062	242,594	251,046	276,008	298,794	311,914
Great Britain.....	60,029	65,422	69,531	73,803	63,086	65,201
Holland.....	19,017	21,548	23,121	25,059	26,380	26,813
Poland.....	9,740	8,753	9,514	10,952	9,659	9,520
United States.....	210,424	255,760	269,184	286,526	338,806	346,676
Norway.....				7,363	8,959	19,040
Total.....	796,896	854,066	893,046	986,058	1,070,045	1,103,359

\*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.

## Average Price of Spelter in Cents per Pound at New York.\*

Month.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
January.....	4-865	4-863	6-190	6-487	6-732	4-513	5-141	6-101	5-452	6-442	6-931
February.....	5-043	4-916	6-139	6-075	6-814	4-785	4-889	5-569	5-518	6-499	6-239
March.....	5-349	5-057	6-067	6-209	6-837	4-665	4-767	5-637	5-563	6-626	6-078
April.....	5-550	5-219	5-817	6-087	6-687	4-645	4-965	5-439	5-399	6-633	5-641
May.....	5-639	5-031	5-434	5-997	6-441	4-608	5-124	5-191	5-348	6-679	5-406
June.....	5-697	4-760	5-190	6-096	6-419	4-543	5-402	5-128	5-520	6-877	5-124
July.....	5-662	4-873	5-396	6-006	6-072	4-485	5-402	5-152	5-695	7-116	5-278
August.....	5-725	4-866	5-706	6-027	5-701	4-702	5-729	5-279	5-953	7-028	5-658
September.....	5-686	5-046	5-887	6-216	5-236	4-709	5-796	5-514	5-869	7-454	5-694
October.....	5-510	5-181	6-087	6-222	5-430	4-801	6-199	5-628	6-102	7-426	5-340
November.....	5-038	5-513	6-145	6-375	4-925	5-059	6-381	5-976	6-380	7-371	5-220
December.....	4-731	5-872	6-522	6-595	4-254	5-137	6-249	5-624	6-301	7-162	5-154
Year.....	5-40	5-100	5-822	6-198	5-962	4-726	5-503	5-520	5-758	6-943	5-648

\*From the Engineering and Mining Journal, N. Y.

## Average Prices of Spelter, Ordinary Brands, in London.\*

Month.	1904.			1905.			1906.			1907.			1908.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	21	11	2	24	19	9	28	8	2	27	7	1	20	6	3
February.....	21	16	5	24	10	6	26	2	4	26	1	5	21	0	7
March.....	21	19	6	23	13	6	24	15	3	26	4	8	21	1	5
April.....	22	5	1	23	14	3	25	19	3	25	17	5	21	6	1
May.....	22	2	10	23	11	8	27	0	2	25	14	2	20	2	10
June.....	21	14	6	23	16	8	27	9	9	24	10	2	19	2	2
July.....	22	2	9	23	19	6	26	15	11	23	18	11	18	14	1
August.....	22	7	6	24	14	6	27	0	5	22	1	7	19	6	9
September.....	22	11	5	26	8	3	27	12	5	21	0	11	19	10	2
October.....	23	1	7	28	1	7	27	18	10	21	12	11	19	15	1
November.....	24	12	9	28	5	11	27	15	1	21	8	4	20	17	1
December.....	24	17	1	28	14	11	27	19	3	20	3	3	20	19	2
Year.....	22	11	10	25	7	7	27	1	5	23	16	9	20	3	5

Month.	1909.			1910.			1911.			1912.			1913.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	21	6	3	23	4	3	23	16	9	26	9	11	25	19	1
February.....	21	8	9	23	3	1	23	3	10	26	6	5	25	4	3
March.....	21	8	8	23	0	7	22	19	2	25	19	11	24	11	4
April.....	21	10	1	22	9	11	23	13	8	25	8	10½	25	2	4
May.....	21	19	..	22	1	1¼	24	6	1	25	11	2	24	10	3
June.....	21	19	11	22	3	2	24	9	7	25	11	11	21	19	10
July.....	21	18	9	22	5	6	24	13	10½	25	13	½	20	11	2
August.....	22	0	3	22	14	0	26	11	1½	26	1	2	20	14	—
September.....	22	17	1	23	2	7½	27	12	6½	26	17	..	21	3	10
October.....	22	3	4	23	16	6½	27	4	10	27	5	10	20	13	9
November.....	23	2	1	24	1	9	26	13	1½	26	14	3	20	14	4
December.....	23	1	3	23	17	7½	26	13	6½	26	..	4	21	6	8
Year.....	22	3	..	23	0	0	25	3	2	26	3	4	22	14	3

\* From the annual publication of the Metallgesellschaft, etc., of Frankfort-on-the-Main, Germany.

# NON-METALLIC PRODUCTS.

## ABRASIVE MATERIALS.

The abrasives produced in Canada comprise corundum, the various sandstone abrasives, such as grindstones, pulpstones, whetstones, etc., and tripolite, or infusorial earth.

### CORUNDUM.

The production of corundum in 1913 was adversely affected through the destruction by fire of the mill at Craigmont on February 3, 1913.

The total shipments of grain corundum from operating mills in 1913 were 2,353,845 pounds, valued at \$137,036, or an average price of 5.8 cents per pound, as compared with shipments of 3,919,525 pounds, valued at \$239,091, or an average of 6.1 cents per pound in 1912. Of the 1913 shipments, 45,140 pounds or 1.8 per cent of the total were sold for consumption in Canada, and 2,308,705 pounds or 98.2 per cent, were sold for export.

The quantity of rock milled was 12,290 tons from which 1,526,700 pounds were graded showing a recovery of 6.2 per cent of corundum from the rock. In 1912, 36,879 tons of rock were milled, with a recovery of 3,240,800 pounds or 4.4 per cent of grain corundum.

The annual production since 1900 is shown in the following table:—

ABRASIVE MATERIALS.—TABLE 1.

### Production of Corundum Ore and Corundum.

Cal- endar Year.	Corundum- bearing rock treated.	Grain corundum graded.	Grain. corundum sold in Canada.	Grain corundum exported.	Total of grain corundum.	Value.	Average price.
	Tons.	Tons.	Tons.	Tons.	Tons.	\$	Cts.
1900...		60	3		3	300	5.00
1901...	4,134	444	85	302	387	46,415	5.97
1902...	7,996	806	106	662	768	84,465	5.49
1903...	(a) 8,877	839	85	618	703	77,510	5.51
1904...	28,187	1,654	116	877	993	109,545	5.51
1905...	23,571	1,681	140	1,504	1,644	149,153	4.48
1906...	45,719	2,914	102	2,112	2,274	204,973	4.50
1907...	60,532	2,682	164	1,728	1,892	177,922	4.70
1908...	2,678	106	99	990	1,089	100,398	4.60
1909...	35,894	1,579	129	1,362	1,491	162,492	5.45
1910...	37,183	1,686	106	1,764	1,870	198,680	5.31
1911...	41,795	1,641	92	1,380	1,472	161,873	5.50
1912...	36,879	1,620	63	1,897	1,960	239,091	6.10
1913...	12,290	763	23	1,154	1,177	137,036	5.82

(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 Faraday, Dungannon, Monteagle, Carlow, Raglan, and adjacent townships, the operating mines being located in the last two. Mining operations have been in progress since 1900. In the earlier years of the industry, the amount of grain corundum graded averaged about 10 per cent of the rock treated. In more recent years, however, a much lower grade of rock has been milled, the recovery of corundum during the past few years varying between 3.9 and 6.2 per cent.

The Manufacturers Corundum Company, Limited, is the only operator at present, working the Craig mine at Craigmont, Renfrew county, and the Burgess mines in Hastings county.

The treatment of the ore consists in concentration, magnetic separation of the iron, air separation of mica, and sizing. The magnetic sand is now being sold as a by-product, and is used in the manufacture of school blackboards.

The corundum finds a market in Canada, the United States, England, France, Germany, and Belgium. Descriptions of mines and mills will be found in the Annual Report of the Ontario Bureau of Mines, and in Memoir No. 6, Geological Survey Publications.<sup>1</sup>

#### GRINDSTONES, PULPSTONES, ETC.

The annual production of grindstones which are obtained in Nova Scotia and New Brunswick has remained practically constant during the past twenty years.

The total production including pulpstones, etc., in 1913 was 4,837 tons, valued at \$51,325, as compared with 4,412 tons, valued at \$52,090 in 1912.

These abrasives are quarried from the Millstone Grit of the Carboniferous formation, which occupies a large portion of the surface of the eastern half of the Province of New Brunswick and the northern and northwestern parts of Nova Scotia.

The localities at which quarrying operations are chiefly carried on are at Lower Cove and Mic Mac Point, Nova Scotia, and in New Brunswick on Chaleur Bay, at Clifton, and at Woodpoint and Rockport on the Bay of Fundy.

The grindstones are all shipped in finished condition and are worth from \$10 to \$12 per ton.

About 100 tons of pulpstones, valued at \$3,400 were shipped in 1913 to Canadian pulp and paper mills. These stones weigh about 2½ tons each and are usually made about 27" face by 54" diameter. The production of scythestones was 1,226 gross, and about 20 tons of marble polishing grit were shipped.

<sup>1</sup> The Geology of the Haliburton and Bancroft Areas, Province of Ontario, by Frank D. Adams and Alfred E. Barlow.

Most of the pulpstones are made at Quarryville, New Brunswick, by the Miramichi Quarry Company. This quarry also produces an excellent building stone, which finds a market in Quebec, Montreal, and Toronto.

Statistics of the production of grindstones by Provinces since 1886 are given in the next table:—

ABRASIVE MATERIALS—TABLE 2.

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	38,988	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.....	561	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

The imports of grindstones into Canada, principally into the Provinces of Ontario and Quebec, reached a total value during the calendar year 1913 of \$145,247; the value of the other abrasives imported during the same period included: burrstones 1,176, valued at \$1,784; emery, valued at \$48,995; manufactures of emery, \$135,654; pumice stone, \$17,861; sandpaper, \$171,516; iron sand for glass or granite polishing or for sawing stone, 252,747 pounds, valued at \$10,168; a total value including grindstones of \$531,225.

In 1912 the value of the imports of grindstones was \$112,020, and the value of the other abrasives imported included: burrstones, 2,162, valued

at \$1,409; emery, valued at \$46,616; manufactures of emery, \$130,571; pumice stone, \$21,310; sandpaper, \$189,782; iron sand for glass or granite polishing or for sawing stone, 379,619 pounds, valued at \$13,347; a total value of \$515,055.

ABRASIVE MATERIALS.—TABLE 3.

**Exports of Grindstones.\***

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1884.....	28,186	1894.....	12,579	1904.....	35,612
1885.....	22,606	1895.....	16,723	1905.....	24,868
1886.....	24,185	1896.....	19,139	1906.....	31,978
1887.....	28,769	1897.....	18,807	1907.....	32,534
1888.....	28,176	1898.....	25,588	1908.....	19,721
1889.....	29,982	1899.....	23,288	1909.....	13,942
1890.....	18,564	1900.....	42,128	1910.....	23,502
1891.....	28,433	1901.....	29,130	1911.....	29,206
1892.....	23,567	1902.....	24,489	1912.....	26,535
1893.....	21,672	1903.....	27,659	1913.....	54,867

\*Including stone for the manufacture of grindstones.



ABRASIVE MATERIALS.—TABLE 4.

## Imports.

Fiscal Year.	GRINDSTONES.		Burrstones.	Emery.	Mfrs. of emery.	Pumice stone.
	Tons.	Value.	(c) Value.	(a) Value.	(b) Value.	(d) Value.
		\$	\$	\$	\$	\$
1880.....	1,044	11,714	12,049			
1881.....	1,359	16,895	6,337			
1882.....	2,098	30,654	15,143			
1883.....	2,108	31,456	13,242			
1884.....	2,074	30,471	5,365			
1885.....	1,148	16,065	4,517	5,066	4,920	9,384
1886.....	964	12,803	4,062	11,877	5,832	2,777
1887.....	1,309	14,815	3,545	12,023	4,598	3,504
1888.....	1,721	18,263	4,753	15,674	4,001	2,890
1889.....	2,116	25,564	5,465	13,565	3,948	3,232
1890.....	1,567	20,569	2,506	16,922	5,313	3,003
1891.....	1,381	16,991	2,089	16,179	6,665	3,696
1892.....	1,484	19,761	1,464	17,782	6,492	3,282
1893.....	1,682	20,987	3,552	17,762	5,606	3,798
1894.....	1,918	24,426	3,029	14,433	2,223	4,160
1895.....	1,770	22,834	2,172	14,599	7,775	3,609
1896.....	1,862	26,561	2,049	16,287	11,913	3,721
1897.....	1,521	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	5,746
1908.....		65,125	3,396	26,159	57,760	8,917
1909.....		56,692	1,141	25,931	47,700	8,117
1910.....		73,427	1,973	28,482	73,537	12,011
1911.....		64,439	880	42,188	95,982	16,284
1912.....		111,274	1,616	47,263	105,833	19,527
1913.....		129,007	1,425	48,469	141,017	20,693

(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.

Following is a list of producers of grindstones and pulpstones:—

Mohawk Grindstone Company, Woodburn, N.S.

The Read Stone Company, Sackville, N.B.

The Read Stone Company, Stonehaven, N.B.

J. L. Knowles, Clifton, N.B.

Miramichi Quarry Company, Limited, Montreal, 10 Richmond Square.

## TRIPOLITE.

The shipment of tripolite in 1913 totalled 620 tons valued at \$12,138 as compared with 38 tons, valued at \$230, shipped in 1912.

The operating companies were:—

The Premier Tripolite Company, St. Ann, Cape Breton, and New York.

The Oxford Tripoli Co., Oxford, N.S.

A record of shipments since 1896 is shown in the next table:—

ABRASIVE MATERIALS.—TABLE 5.

Annual Shipments of Tripolite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	644	9,900	1905.....	300	3,600
1897.....	15	150	1906.....	Nil.	Nil.
1898.....	1,017	16,660	1907.....	30	225
1899.....	1,000	15,000	1908.....	30	195
1900.....	336	1,950	1909.....	Nil.	Nil.
1901.....	850	15,300	1910.....	22	134
1902.....	1,052	16,470	1911.....	20	122
1903.....	835	16,700	1912.....	38	230
1904.....	320	6,400	1913.....	620	12,138

## ACTINOLITE.

Although no mining operations have been undertaken for several years, shipments have been made from the town of Actinolite in Ontario, of material remaining in stock from former operations by the Actinolite Mining Company, of Bloomfield, N.J.

Shipments in 1913 were 66 tons, valued at \$720, as against 92 tons, valued at \$1,000 in 1912, and 67 tons, valued at \$736 in 1911.

The following references to actinolite deposits, are quoted from a recent report of the Ontario Bureau of Mines:<sup>1</sup>

"Large bodies of actinolite occur in the townships of Elzevir and Kaladar in Hastings and Addington counties. Hundreds of tons of the material, with which is often associated serpentine or talc, have in past years been ground, and used for roofing purposes. Buildings in several cities of the United States are roofed with this material. None of the occurrences are at present being worked."

"The largest belt of actinolite occurs on lots 7 and 8 in the eleventh concession of Elzevir, crossing into lots 8 and 9 in the first concession of Kaladar."

"Some of the actinolite appears to be suitable for decorative purposes, as, for example, the lens which occurs on lot 12 in the second concession of Kaladar, four miles southwest of the village of Flinton. This occurrence is found at the contact of a mica and chlorite schist and granite. The actinolite here has a beautiful radiated texture and some large blocks have been quarried and shipped from Kaladar station."

"Actinolite was first ground in Ontario for roofing in 1883 at the village of Actinolite, which, at that time was called Bridgewater. The process consisted of crushing in a Blake crusher and grinding in attrition mills to 60 mesh without destroying the fibre, water power being obtained from the Skootamatta river. A proportion of mica was added to increase the bond. When applied to a roof, eleven gallons of coal tar, or its equivalent, were mixed with 100 pounds of the ground material and the mixture was spread on the roof while hot, the total thickness, including the felt on which it was spread, being half an inch. For six or seven years after operations began in 1883 the value of the output was \$6,000 per annum. Following this the mill was operated at intervals, but statistics regarding production are not available until the years 1901, 1902 and 1903, when the output was valued at \$3,126, \$6,150, and \$1,650 respectively. The industry was brought to a standstill in June, 1904, by the destruction of the mill dam."

"It may be added that a new mill, at Actinolite railway station, has recently been constructed, but the output to date has been very small."

<sup>1</sup> Report of the Ontario Bureau of Mines, Vol. XXII, Part II, p. 117.

## ARSENIC.

The only production of arsenic in Canada during the past two years was that recovered by the smelters at Copper Cliff, Deloro, Thorold and Orillia, in Ontario, from the ores of the Cobalt district treated at these plants.

The total production of arsenious oxide, or white arsenic, in 1913 was 1,692 tons, valued at \$101,463, as compared with 2,045 tons, valued at \$89,262, in 1912, and 2,097 tons, valued at \$76,237, in 1911. In 1910, in addition to a production of white arsenic of 1,502 tons, valued at \$75,328, there was also a shipment of 547 tons of arsenical ore concentrates, valued at \$5,716, from Goldboro, N.S.

The exports of white arsenic in 1913 were, according to Customs reports, 2,606,767 pounds (1,303 tons), valued at \$107,094, as compared with 3,847,906 pounds (1,924 tons), valued at \$101,310, exported in 1912.

The imports of arsenious oxide in 1913 were 18,788 pounds, valued at \$1,061 and of sulphide of arsenic 455,394 pounds, valued at \$17,759, as compared with imports in 1912 of 76,528 pounds of arsenious oxide, valued at \$1,722, and 451,928 pounds of sulphide of arsenic, valued at \$19,431. There was also an import during 1913 of arseniate, bi-arsenate and stannate of soda, amounting to 22,892 pounds, valued at \$987.

Under the terms of "An Act to encourage the refining of metals in Ontario," passed in 1907, and an amendment Act passed in 1912, a bounty of one-half cent per pound is offered by the Ontario Government on white arsenic, otherwise known as arsenious acid, produced from mispickel ores and not from ores carrying smaltite or niccolite or cobaltite, the total bounty paid not to exceed \$15,000 in any one year—this bounty is available until the year 1917. The full text of the Act will be found reproduced in the chapter on cobalt.

It will be observed that under the terms of this Act, the bounty is not payable on the present production of arsenic which is entirely from the Cobalt district.

In the following tables the production of arsenical ore and white arsenic, and the imports and exports of arsenic are shown.

## 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.....	983	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

## Exports of White Arsenic.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
		\$			\$
1902.....	547,698	16,192	1908.....	1,913,732	43,493
1903.....	395,573	10,583	1909.....	3,111,249	119,673
1904.....	146,000	6,900	1910.....	4,512,673	173,932
1905.....	108,000	5,400	1911.....	4,125,558	181,761
1906.....	271,063	5,981	1912.....	3,847,906	101,310
1907.....	613,504	10,850	1913.....	2,606,767	107,094

## 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.....	201,967	14,270
1881....	31,417	1,070	1890...	133,509	4,474	1899.....	532,383	24,203
1882....	138,920	3,962	1891...	115,248	4,027	1900.....	230,730	11,035
1883....	51,953	1,812	1892...	302,958	9,365	1901.....	159,263	8,361
1884....	10,337	773	1893...	447,070	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	1906Dutyfree	446,975	19,169

## Imports of Arsenious Oxide and Sulphide of Arsenic.

Fiscal Year.	ARSENIUS OXIDE.*		ARSENIC, SULPHIDE OF.*		Total.
	Pounds.	Value.	Pounds.	Value.	
		\$		\$	\$
1907 (9 mos.).....	252,473	16,011	95,843	6,116	22,127
1908.....	378,174	26,804	125,322	7,531	34,335
1909.....	128,612	4,064	389,815	14,575	18,639
1910.....	27,066	1,410	301,563	11,485	12,805
1911.....	254,347	6,605	257,996	8,093	14,698
1912.....	76,528	1,722	451,928	19,431	21,153
1913.....	14,923	563	555,931	26,601	27,164

\*Duty free.

## ASBESTOS.

Asbestos is mined or quarried in Canada in the Province of Quebec only, from deposits in the Eastern Townships, in the districts of Black Lake, Thetford, Robertsonville, East Broughton, and Danville. Other occurrences of the mineral have been noted and some shipments were at one time made from the township of Denholm, Ottawa county, north of the city of Ottawa.

The asbestos deposits and the asbestos industries have been described in a special report published by the Mines Branch.<sup>1</sup>

There was a very substantial increase in both the output and sales of asbestos during 1913. Returns show a total output for the year of 132,564 tons as compared with 102,759 tons in 1912, and 96,302 tons in 1911. The total sales (not including asbestic) in 1913 were 136,951 tons, valued at \$3,830,909, or an average of \$27.97 per ton, as compared with sales of 111,561 tons valued at \$3,117,572, or an average of \$27.95 per ton in 1912, and 101,393 tons, valued at \$2,922,062, or an average of \$28.82 per ton in 1911. Sales of asbestic in 1913 were 24,135 tons, valued at \$19,016, or an average of 79 cents per ton, and in 1912, 24,740 tons valued at \$19,707, or an average of 80 cents per ton. Stocks of asbestos on hand December 31, 1913, were reported as 20,787 tons, valued at \$939,720, or an average of \$45.21 per ton, as compared with stocks of 23,288 tons valued at \$1,083,202, or an average of \$46.51 per ton on December 31, 1912, and stocks of 34,567 tons, valued at \$1,509,101 on December 31, 1911.

The average number of men employed in mines and mills during 1913 was 2,951, at a wage cost of \$1,687,957, as compared with 2,955 men employed, and \$1,401,653 paid in wages in 1912.

The total quantity of asbestos rock sent to mills during 1913 is reported as 2,110,990 tons, which, with a mill production of 127,539 tons, shows an average estimated recovery of 6.04 per cent. In 1912, 1,630,743 tons of asbestos rock were sent to the mills, with a recovery of 98,010 tons, or an average of 6.01 per cent.

Statistics showing the output, sales, and stocks on hand on December 31, by grades, are given for the past three years in the next following tables.

In the absence of a uniform classification of asbestos of different grades, the divisions here shown have been adopted on a valuation basis: crude No. 1 comprising material valued at \$200 and upwards, and crude No. 2 under \$200; mill stock No. 1 includes stock valued at from \$30 to \$100; No. 2, from \$15 to \$30, and No. 3, under \$15.

<sup>1</sup> "Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling, and Uses," by Fritz Cirkel, Mines Branch, Dept. of Mines, Ottawa, 1910.

## Output, Sales, and Stocks of Asbestos in 1913.

	Output.		Sales.		Stock on hand, December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
			\$	\$ cts.		\$	\$ cts.
Crude, No. 1.....	2,015.4	1,853.3	531,200	286 62	880.5	247,877	281 52
“ No. 2.....	3,010	3,807	457,962	120 29	1,522	178,789	117 47
Mill stock, No. 1.....	23,444	26,198	1,229,908	46 95	6,755	350,165	51 84
“ No. 2.....	58,502	60,164	1,201,215	19 97	4,809	108,285	22 52
“ No. 3.....	45,503	44,929	410,624	9 14	6,820	54,604	8 01
Total, Asbestos.....	132,564.4	136,951.3	3,830,909	27 97	20,786.5	939,720	45 21
Asbestic.....		24,135	19,016	0 79			

## Output, Sales, and Stocks of Asbestos in 1912.

	Output.		Sales.		Stock on hand, December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
			\$	\$ cts.		\$	\$ cts.
Crude, No. 1.....	1,458½	1,937.9	510,154	263 25	866.8	221,289	255 29
“ No. 2.....	3,290	3,725	380,197	102 07	2,789	303,063	108 66
Mill stock, No. 1.....	21,522	21,679	945,904	43 64	8,059	379,904	47 14
“ No. 2.....	36,872	44,819	895,322	19 97	6,301	132,970	21 10
“ No. 3.....	39,616	39,400	385,905	9 79	5,272	45,976	8 72
Total, Asbestos.....	102,758½	111,560.9	3,117,572	27 95	23,287.8	1,083,202	46 51
Asbestic.....		24,740	19,707	0 80			

## Output, Sales, and Stocks of Asbestos in 1911.

	Output.		Sales.		Stock on hand, Dec. 31.	
	Tons.	Tons.	Value.	Per ton.	Tons.	Value
			\$	\$		\$
Crude, No. 1.....	1,467.9	1,301.4	342,855	203.45	1,256	327,508
“ No. 2.....	3,594.5	3,562.7	402,107	112.87	3,222.7	404,198
Mill stock, No. 1.....	20,379	18,315	916,678	50.05	8,471	380,570
“ No. 2.....	39,289	47,826	991,370	20.73	17,794	365,458
“ No. 3.....	31,572	30,388	269,052	8.85	3,823	31,367
Total asbestos.....	96,302.4	101,393.1	2,922,062	28.82	34,566.7	1,509,101
Asbestic.....		26,021	21,046	0.81		



The shipments of crude asbestos and mill stock since 1903 are separately shown in Table 2. The record indicates that during the past eleven years there has been a total increase of about 80 per cent in the quantity shipped as crude, the average price of which nearly doubled between 1903 and 1908, but has been variable during the past five years.

The shipments of mill stock, on the other hand, have been increased from 27,995 tons in 1903 to 131,291 tons in 1913. The average price per ton during that period having varied between the limits of \$19.79 and \$29.84.

ASBESTOS.—TABLE 2.

## Annual Shipments of Crude and Mill Stock, 1903-13.

Calendar Year.	CRUDE.			MILL STOCK.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
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

ASBESTOS.—TABLE 3.

## Annual Shipments of Asbestos and Asbestic.

Calendar Year.	ASBESTOS.			ASBESTIC.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
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

(a) Figures of export.

## EXPORTS AND IMPORTS.

A large proportion of the Canadian production of asbestos is exported. The exports in 1913 according to the report of the Customs Department, were 103,812 tons, valued at \$2,848,047, or an average of \$27.43 per ton, and include: 7,220 tons valued at \$211,861 exported to Great Britain; 78,157 tons, valued at \$2,120,314, to the United States; 840 tons, valued at \$36,491, to Germany; 9,254 tons, valued at \$227,549, to Belgium; 4,865 tons, valued at \$165,896, to France, and 3,476 tons, valued at \$85,936 to other countries. There was also an export of 24,766 tons of asbestic sand, valued at \$138,737.

The exports in 1912 were reported as 88,008 tons, valued at \$2,349,353, or an average of \$26.69 per ton, and include: 9,387 tons, valued at \$208,464

exported to Great Britain; 69,222 tons, valued at \$1,871,770, to the United States; 1,155 tons, valued at \$43,898, to Germany; 4,738 tons, valued at \$119,714, to Belgium; 2,073 tons, valued at \$71,963, to France; and 1,433 tons, valued at \$33,544, to other countries.

ASBESTOS.—TABLE 4.

## Exports of Canadian Asbestos by Countries, 1903-1913.

Calendar Year.	TO GREAT BRITAIN.		TO UNITED STATES.		TO GERMANY.		TO OTHER COUNTRIES.		TOTAL EXPORTS.		Average per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$		\$		\$	\$ cts.
1903	2,743	40,120	24,252	714,781	1,429	25,150	3,356	110,932	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	603	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

ASBESTOS.—TABLE 5.

## Annual Exports, Calendar Years 1892-1913.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1892	5,380	373,103	69 35	1903	31,780	891,033	28 04
1893	5,917	338,707	57 24	1904	37,272	1,160,887	31 14
1894	7,987	477,837	59 82	1905	47,031	1,386,115	29 47
1895	7,442	421,690	56 66	1906	59,854	1,689,257	28 22
1896	11,842	567,967	47 96	1907	56,753	1,669,299	29 41
1897	15,570	473,274	30 40	1908	61,210	1,842,763	30 11
1898	15,346	494,012	32 19	1909	56,971	1,729,857	30 36
1899	17,883	473,148	26 46	1910	71,485	2,108,632	29 50
1900	16,993	693,105	39 61	1911	75,120	2,067,259	27 52
1901	32,269	1,069,918	33 16	1912	88,008	2,349,353	26 69
1902	31,074	995,071	32 02	1913	103,812	2,848,047	27 43

Although the chief source for the raw material, Canada does not yet manufacture all the asbestos goods required for home consumption. There is, therefore, a considerable importation of asbestos goods under the import classification, "Asbestos in any form other than crude, and all manufactures of," the duty being 25 per cent.

The total value of these imports during the calendar year 1913, was \$520,082, as against \$461,449 in 1912, \$319,815 in 1911, and \$230,489 in 1910.

ASBESTOS.—TABLE 6.

## Imports, Fiscal Years 1885-1913.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1885.....	674	1895.....	26,094	1904.....	83,827
1886.....	6,831	1896.....	23,900	1905.....	116,836
1887.....	7,836	1897.....	19,032	1906.....	137,974
1888.....	8,793	1898.....	26,389	1907 (9 mos.).....	127,509
1889.....	9,943	1899.....	32,607	1908.....	190,980
1890.....	13,250	1900.....	43,455	1909.....	180,598
1891.....	13,298	1901.....	50,829	1910.....	198,710
1892.....	14,090	1902.....	52,464	1911.....	254,331
1893.....	19,181	1903.....	75,465	1912.....	349,538
1894.....	20,021			1913*.....	497,160

\*Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom will be of interest as indicating the market in that country and the sources from which it is supplied.

These imports and the sources of supply are shown as follows:—

## Imports of Raw Asbestos into the United Kingdom, 1911, 1912, and 1913.

Country.	1911.		1912.		1913.	
	Short tons	Value.	Short tons	Value.	Short tons	Value.
		\$		\$		\$
Russia.....	1,548	202,049	2,170	267,477	1,770	218,966
Germany.....	198	26,888	203	24,903	392	40,836
Portuguese East Africa.....	300	23,988	32	1,465	216	19,773
Italy.....	53	7,042	44	7,076	101	12,653
United States.....	565	17,948	1,201	30,100	1,239	27,599
Other foreign countries.....	123	14,036	117	7,762	174	11,992
Total foreign.....	2,787	291,951	3,767	338,783	3,892	331,819
Cape of Good Hope.....	1,187	83,307	692	47,596	635	41,148
Natal.....	67	4,395			5	453
Canada.....	3,683	169,539	4,146	195,426	8,443	350,943
Other British possessions.....	2	34	15	852	20	1,324
Total British possessions.....	4,939	257,325	4,853	243,874	9,103	402,868
Grand total.....	7,726	549,276	8,620	582,657	12,995	734,687

Following is a list of the principal asbestos companies, operating during 1913:—

Operator and head office address.	Name of mine.	LOCATION.		Mine office.
		Township.	Range and lot.	
Asbestos Corporation of Canada, Ltd., 283 St. James St., Montreal.	Kings.....	Thetford...	V, VI; 26...	Thetford Mines
	Beaver.....	Coleraine...	C, 31, 32...	" "
	British Canadian..	" .....	Black Lake.	Black Lake.
	*Standard.....	" .....	" .....	" .....
Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria, Toronto..	Union.....	Coleraine...	B W $\frac{1}{2}$ , 27...	Black Lake.
	Imperial.....	" .....	W $\frac{1}{2}$ , 28...	" .....
	Southwark.....	" .....	B E $\frac{1}{2}$ , 27... E $\frac{1}{2}$ , 28...	Black Lake.
Johnson's Asbestos Co., Ltd., Thetford Mines, Que.....	Johnson.....	Ireland....	VI, 27.....	Black Lake.
	Johnson.....	Coleraine...	B, 27.....	Thetford Mines.
Bell Asbestos Mines, Thetford Mines, Que.....	Bell.....	Thetford...	V, E $\frac{1}{2}$ , 27...	" "
The Martin-Bennett Asbestos Mine, Ltd., Thetford Mines, Que.....	.....	" .....	V, 27.....	" "
The Jacobs Asbestos Mining Co. of Thetford, Ltd., 282 St. Catherine W., Montreal, Que.....	Jacobs.....	" .....	VI, 28.....	" "
The Beaudoin and Audet Asbestos Co., Robertsonville, Que.....	B. & A.....	" .....	VI, 9.....	Robertsonville.
Asbestos and Asbestic Co., Ltd., Asbestos, Que.....	Jeffrey.....	Shipton....	III, 8, 9....	Asbestos.

\*Idle during 1913.

## CHROMITE.

Chromic iron ores are found in Canada in the Coleraine and Black Lake districts of the Eastern Townships, Province of Quebec.

No productive mining operations have been undertaken during the past four years, but small shipments were made from stock during 1910 and 1911.

The companies chiefly interested in the deposits are:—

The Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria, Toronto, Ont.

The Dominion Chrome Co., Ltd., 86 Notre Dame St. W., Montreal.

Statistics of production in past years are shown in Table 1. Imports of chrome into the United States from Canada in Table 2, and imports into the United States from all sources during 1912 and 1913 (fiscal years) in Table 3.

CHROMITE.—TABLE 1.

### Annual Production in Canada, 1886-1913.

Calendar Year.	HIGH GRADE.			LOW GRADE.			TOTAL.		
	Short tons.	Value.	Average price.	Short tons.	Value.	Average price.	Short tons.	Value.	Average price.
		\$	\$ cts.		\$	\$ cts.		\$	\$ cts.
1886.....							60	945	15 75
1887.....							38	570	15 00
1888 to ..							No output		
1893.....									
1894.....							1,000	20,000	20 00
1895.....							3,177	41,300	13 00
1896.....							2,342	27,004	11 53
1897.....							2,037	32,474	12 31
1898.....							2,021	24,252	12 00
1899.....							2,010	21,842	10 86
1900.....							2,335	27,000	11 56
1901.....							1,274	16,744	13 14
1902.....							900	13,000	14 44
1903.....	2,842	44,280	15 58	667	6,849	20 17	3,509	51,129	14 57
1904.....	4,650	53,976	16 08	1,424	13,170	9 25	6,074	67,146	11 05
1905.....				8,575	93,301	10 88	8,575	93,301	10 88
1906.....	4,975	57,484	11 55	4,060	34,375	8 47	9,035	91,859	10 17
1907.....	3,545	41,931	11 83	3,651	30,970	8 48	7,196	72,901	10 13
1908.....	3,472	45,300	13 05	3,753	36,708	9 78	7,225	82,008	11 35
1909.....	54	720	13 33	2,416	25,884	10 71	2,470	26,604	10 77
1910.....	25	430	17 20	274	3,304	12 06	299	3,734	12 49
1911.....	137	2,327	16 98	20	260	13 00	157	2,587	16 48
1912.....									
1913.....									

CHROMITE.—TABLE 2.

Imports of Chromite into the United States from Canada.<sup>1</sup>

Twelve months ending June 30.	Short tons.	Value.	Twelve months ending June 30.	Short tons.	Value.
1904.....	2,790	\$ 36,322	1909.....	4,455	\$ 50,042
1905.....	6,489	70,934	1910.....	269	2,892
1906.....	9,951	107,580	1911.....	17	150
1907.....	6,179	66,115	1912.....	14½	258
1908.....	6,505	69,009	1913.....	Nil.	.....

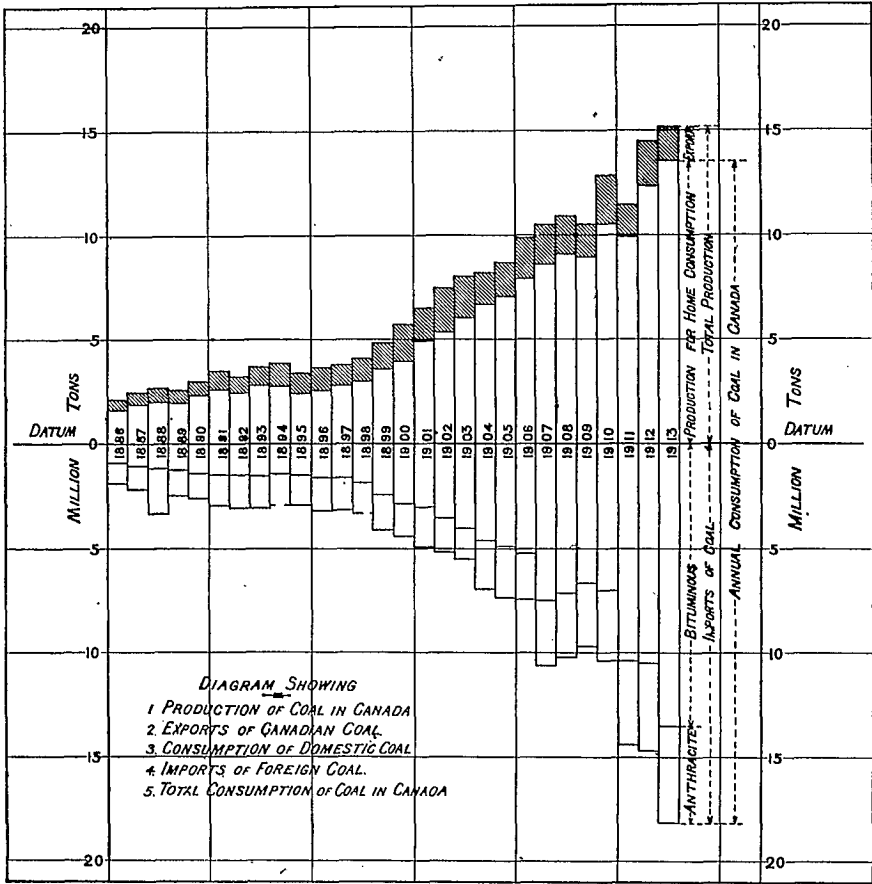
<sup>1</sup>The Foreign Commerce and Navigation of the United States, Washington, long ton in original changed to short ton.

CHROMITE.—TABLE 3.

Imports into the United States, Years Ending June 30, 1912 and 1913, in Tons of 2,240 Pounds.<sup>1</sup>

	1912.			1913.		
	Long tons.	Value.	Per ton.	Long tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Portugal.....	15,455	188,577	12 20	5,000	60,831	12 16
Canada.....	13	258	20 00	.....	.....	.....
French Oceania.....	6,600	41,399	6 27	6,620	47,913	7 24
Greece.....	7,540	70,595	9 36	.....	.....	.....
British India.....	1,000	6,600	6 60	.....	.....	.....
Japan.....	190	1,381	7 27	322	2,712	8 42
Netherlands.....	25	387	15 48	.....	.....	.....
Portuguese Africa...	5,100	62,048	12 17	24,000	291,981	12 12
Turkey in Asia.....	11,030	71,214	6 46	13,830	100,227	7 25
United Kingdom....	54	676	12 52	.....	.....	.....
Total.....	47,007	443,135	9 43	49,772	503,664	10 12

<sup>1</sup>The Foreign Commerce and Navigation of the United States.





## COAL.

Canada's coal-fields and coal deposits are probably the most extensive and best known of her mineral resources. The enormous extent of these coal resources is admirably shown in the monograph "Coal Resources of the World" published under the auspices of the Twelfth International Geological Congress of the World, which met in Canada in 1913. Notwithstanding the vastness of these deposits, however, the total amount of coal-annually mined in Canada at the present time is less than 50 per cent of the country's consumption, a condition which undoubtedly must continue for many years to come because of the geographical relationship of the coal-fields to the principal centres of population. The coal-fields are found principally in the coast provinces and in Alberta, while the great central Provinces of Ontario and Quebec in which the major portion of Canadian population is still concentrated and which are without coal-fields, are nearer to and thus find it more economical to utilize the coals of the States of Pennsylvania and Ohio. In addition to this, there is a large consumption of anthracite coal in eastern and central Canada, which cannot be obtained from Canadian sources, but is available from Pennsylvania.

The character of the coal mined in Canada is chiefly bituminous and lignite, although there is an output of anthracite not exceeding 200,000 tons per annum, from one mine at Bankhead in Alberta. The Saskatchewan production is entirely lignite, as is also a large portion of that of Alberta.

The term production in the text and tables of this report is used to represent the amount 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 in some cases includes coal lost or unsaleable, or coal carried into stock on hand at the end of the year.

The total production of coal in 1913 according to returns received was 15,012,178 short tons (13,403,730 long tons) valued at \$37,334,940 or an average of \$2.49 per ton. This production was obtained by about 227 operating companies employing an average of 27,917 men at a wage cost of approximately \$22,065,141. Compared with 1912, in which year the production was 14,512,829 short tons (12,957,883 long tons) valued at \$36,019,044, an increase is shown of 499,349 tons or 3.44 per cent in quantity. These values are partially estimated or assumed since complete returns have not been received with respect to the total value received for coal sold. In the case of Nova Scotia an average value of \$2.50 per long ton is placed upon the total production, while for British Columbia an average value of \$3.50 per long ton is used. The values placed upon the Alberta production are those furnished by the operating companies.

The total exports of domestic coal from Canada in 1913 were 1,562,020 tons valued at \$3,961,351 as compared with 2,127,133 tons valued at \$5,821,593 in 1912. There is also a small export of coal "not the produce of Canada."

The total imports of coal in 1913 were 18,201,953 tons valued at \$47,949,119, as compared with imports in 1912 of 14,595,810 tons valued at \$39,478,037.

The total consumption of coal in 1913 was 31,582,545 tons or 4.07 tons per capita, as compared with 26,934,800 tons or 3.59 tons per capita in 1912.

The principal restriction placed upon coal mining operations during the year was that caused by a general strike in the coal mines on Vancouver island ordered by the "United Mine Workers of America." While this strike was not altogether successful in closing up the mines it did result in a considerable restriction of the output.

The increased use of oil fuel for locomotives in British Columbia and for coast vessels has also in some slight measure reduced the market for coal in western Canada. According to statistics published by the Department of Railways and Canals, the total consumption of coal in locomotive boilers during the twelve months ending June 30, 1913, was 9,045,625 tons, which is equivalent to very nearly one-third the total consumption of coal in Canada. During the twelve months ending June, 1912, there was used for locomotives 1,729,577 gallons of oil, whereas during the twelve months ending June, 1913, the quantity so used was 31,087,252 gallons. This consumption of oil in 1913 would probably be equivalent to about 310,000 tons of Nanaimo coal and, taken in conjunction with the oil used on coast vessels indicates in some degree the extent to which coal has been displaced as a fuel in this market.

Statistics of the production of coal by provinces in 1913 and 1912, are given in accompanying tables.

COAL.—TABLE 1.

## Production of Coal by Provinces, 1913.

Province.	Average No. of men employed.	Wages paid.	PRODUCTION OF COAL.		Average value per ton.	Per cent of total quantity.
			Tons.	Value.		
		\$		\$	\$ cts.	
Nova Scotia.....	13,697	9,328,613	7,980,073	17,812,663	2 23	53.15
British Columbia...	6,162	5,587,145	2,714,420	8,482,562	3 12	18.08
Alberta.....	7,509	6,811,372	4,014,755	10,418,941	2 59	26.75
Saskatchewan.....	350	205,970	212,897	358,192	1 68	1.42
New Brunswick.....	160	95,000	70,311	166,637	2 37	0.47
Yukon Territory.....	39	37,041	19,722	95,945	4 86	0.13
	27,917	22,065,141	15,012,178	37,334,940	2 49	100.00

COAL.—TABLE 2.

## Production of Coal by Provinces, 1912.

Province.	Average No. of men employed.	Wages paid.	PRODUCTION OF COAL.		Average value per ton.	Per cent of total quantity.
			Tons.	Value.		
		\$		\$	\$ cts.	
Nova Scotia.....	13,736	8,893,697	7,783,888	17,374,750	2.233	53.63
British Columbia...	6,633	6,125,239	3,208,997	10,028,116	3.125	22.12
Alberta.....	6,648	5,474,192	3,240,577	8,113,525	2.503	22.33
Saskatchewan.....	374	215,690	225,342	368,135	1.633	1.55
New Brunswick.....	144	50,000	44,730	89,560	2.000	0.31
Yukon Territory....	46	28,025	9,245	44,953	4.863	0.06
	27,581	20,784,843	14,512,829	36,019,044	2.481	100.00

## Comparison of Production 1911 with 1912 and 1912 with 1913.

Province.	(i) INCREASE OR (d) DECREASE.			
	Years 1911 and 1912.		Years 1912 and 1913.	
	Tons.	Per cent.	Tons.	Per cent.
Nova Scotia.....	(i) 779,468	11.13	(i) 196,185	2.52
British Columbia.....	(i) 666,465	26.21	(d) 494,577	15.41
Alberta.....	(i) 1,729,541	114.46	(i) 774,178	23.89
Saskatchewan.....	(i) 18,563	8.98	(d) 12,445	5.52
New Brunswick.....	(d) 11,001	19.72	(i) 25,531	57.01
Yukon Territory.....	(i) 6,405	225.00	(i) 10,477	113.31
Total for Canada.....	(i) 3,189,441	28.04	(i) 499,349	3.44

It will be seen that there has been an increased production of coal in each of the provinces with the exception of Saskatchewan and British Columbia. The Province of Nova Scotia contributed over 53 per cent of the total production during the year, but the increased production over 1912 was only 196,185 tons, or 2.5 per cent. Alberta contributed 26.75 per cent of the total in 1913 with an increase of 774,178 tons or nearly 24 per cent over the 1912 production. During the past ten years coal mining has increased more rapidly in this Province than in any other, and during the past two years British Columbia has been displaced by Alberta as the second coal province in tonnage output. Alberta also produces the greatest variety of coals, ranging from lignites to anthracite. The production in Saskatchewan is entirely lignite and shows a slight falling-off of 12,445 tons or 5.5 per cent in 1913. In both New Brunswick and the Yukon the production is small but shows a high percentage of increase in 1913. The falling-off in British Columbia in 1913 was 494,577 tons or 15.4 per cent, so that this Province contributed only 18 per cent of the total production as against 22.1 per cent in 1912.

The relative importance of the different provinces as coal producers for a number of years past is indicated in the next table, in which is shown the proportional contributions of each province to the total tonnage of coal produced in Canada. The coal-fields on the Atlantic sea-board still continue to produce more than half the total, although in 1910 the combined output of the western provinces was only a little less than 50 per cent of the total.

Province.	1874.	1890.	1900.	1903.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	%	%	%	%	%	%	%	%	%	%	%	%	%
Nova Scotia.....	91	71	62.0	71.3	65.5	64.07	60.79	61.40	54.29	50.25	62.35	53.94	53.62
New Brunswick.....													
Saskatchewan*.....			0.7	1.5	1.2	1.11	1.44	1.37	1.83	1.40	1.83	1.55	1.42
Alberta*.....		4	5.4	6.2	10.8	12.77	15.14	15.42	18.09	22.42	13.34	22.33	26.75
British Columbia.....	8	25	31.0	21.0	22.4	21.98	22.50	21.77	24.82	25.80	22.45	22.12	18.08
Yukon Territory.....					0.1	0.07	0.13	0.04	0.07	0.13	0.03	0.06	0.13

\* 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.

Statistics of the distribution of the coal production of Canada in 1913, given in the following tables, show 11,381,960 tons reported as sold for consumption in Canada, 1,255,401 tons sold for export to the United States, and 263,189 tons sold for export to other countries, or total sales of 12,900,550 tons; 914,421 tons were used by colliery operators in the manufacture of coke, in steel plants and in brick plants, etc., while 1,197,207 tons were used in the operation of collieries and by workmen. In addition to the

coal thus disposed of 115,021 tons were mined and carried forward as stock.

Returns as to the amount of coal lost due to breakage, washing, unmarketable slack, etc., are far from complete, but 405,679 tons were thus reported bringing the total "output" of coal up to 15,532,878 tons.

The great distance of the coal-fields from the older and more populous Provinces of Ontario and Quebec and the economic necessity for the importation of coal, have already been mentioned. During 1913 the domestic production (including that exported) was equivalent to only about 47 per cent of the total consumption, there having been imported for home consumption during 1913, 18,201,953 tons. The total consumption of coal as shown in subsequent tables was 31,582,545 tons, or an average of about 4.071 tons per capita, while the production averaged about 1.936 tons per capita of population.

### Production and Distribution of Coal Mined, by Provinces, 1913.

	Nova Scotia.	New Brunswick.	Sas- katch- ewan.	Alberta.	Yukon.	British Columbia	Total.
Sales in Canada.....	6,269,722	68,311	195,954	3,527,772	8,558	1,311,643	11,331,960
Sales for export to U.S.....	417,035			139,536	10	698,820	1,255,401
Sales for export to other countries.....	263,189				0		263,189
Total sales.....	6,949,946	68,311	195,954	3,667,308	8,568	2,010,463	12,900,550
Used by producers in making coke, steel, brick, etc.....	307,060		7,742	104,077	10,271	485,271	914,421
Used by producers for colliery consump- tion and by workmen	723,067	2,000	9,201	243,370	383	218,686	1,197,207
Total used.....	1,030,127	2,000	16,943	347,447	11,154	703,957	2,111,628
Production*.....	7,930,073	70,311	212,897	4,014,755	10,722	2,714,420	15,012,178
Stock on hand Jan. 1	256,221			67,123	3,903	58,209	385,456
"    Dec. 31	352,308			127,456	4,623	16,090	500,477
Difference.....	96,087			+ 60,333 +	720	- 42,119	+ 115,021
Losses due to break- age or other causes	58,944		6,748	114,448	0	225,539	405,679
Total output.....	8,135,104		219,645	4,189,536	20,442	2,897,840	15,532,878

\*Production is obtained by adding coal sold and coal used.

## Production and Distribution of Coal Mined, by Provinces, 1912.

	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total.
Sales in Canada.....	6,123,348	42,780	215,790	2,772,374	8,053	1,410,014	10,572,365
Sales for export to U.S.....	482,597			93,126		961,862	1,537,585
Sales for export to other countries.....	193,274					121,136	314,410
Total sales.....	6,799,219	42,780	215,790	2,865,500	8,053	2,493,012	12,424,360
Used by producers in making coke, steel, brick, etc.....	253,354		2,048	170,818		444,665	870,885
Used by producers for colliery consumption and by workmen.....	731,315	2,000	7,498	204,259	1,192	271,320	1,217,584
Total used.....	984,669	2,000	9,546	375,077	1,192	715,985	2,088,469
Production*.....	7,783,888	44,780	225,342	3,240,577	9,245	3,208,997	14,512,829
Stock on hand Jan. 1.....	211,089			29,307		74,346	314,742
“ Dec. 31.....	176,509			51,060		54,500	282,069
Difference.....	- 34,580			+ 21,753		- 19,846	- 32,673
Losses due to breakage or other causes.....	85,416		6,892	63,908		11,075	167,291
Total output.....	7,834,724	44,780	232,234	3,326,238	9,245	3,200,226	14,647,447

\*Production is obtained by adding coal sold and coal used.

## Distribution of Coal Mined in Canada During the Years 1908-9-10-11.

	1908.	1909.	1910.	1911.
Sales in Canada.....	7,715,203	7,468,880	8,956,450	8,559,952
Sales for export to United States.....	1,218,656	1,173,772	1,847,943	1,068,572
“ other countries.....	297,291	171,388	291,273	280,235
Total sales.....	9,231,150	8,814,040	11,095,666	9,908,759
Used by producers for the manufacture of coke and colliery consumption and by workmen.....	708,674	752,976	759,703	452,354
“ by workmen.....	946,487	934,459	1,053,783	962,275
Production.....	10,886,311	10,501,475	12,909,152	11,323,388
Stock on hand Jan. 1.....	183,443	202,432	200,019	265,046
“ Dec. 31.....	230,335	219,569	263,666	307,755
Difference.....	+ 46,892	+ 17,137	+ 63,647	+ 42,709
Loss due to washing, breakage, or other causes.....	157,610	154,162	243,716	182,567
Total output.....	11,090,813	10,672,774	13,216,515	11,548,664

Statistics of the annual production of coal in Canada since 1785 are shown in Table 3. The total production from 1785 to 1913 has been 213,064,628 tons, of which 137,926,585 tons or 64.7 per cent are to be credited to Nova Scotia, 48,572,858 tons or 22.8 per cent to British Columbia, and 23,795,886 tons or 11.2 per cent to Alberta. The total production in Saskatchewan has been 2,070,420 tons; in New Brunswick, 598,053 tons; and in the Yukon, 100,826 tons.

COAL.—TABLE 3.

## Annual Production Showing the Increase or Decrease Each Year.

Year.	Tons.	Value.	Average value per ton.	Increase (i) or decrease (d) in tonnage.	Increase (i) or decrease (d) per cent.
		\$	\$		
1785 to 1873.....	*8,592,150				
1874.....	1,063,742	1,763,423	1 66		
1875.....	1,039,974	1,747,016	1 68	(d) 23,768	(d) 2.2
1876.....	994,762	1,729,546	1 74	(d) 45,212	(d) 4.3
1877.....	1,036,670	1,794,415	1 73	(i) 41,908	(i) 4.2
1878.....	1,089,744	1,941,285	1 78	(i) 53,074	(i) 5.1
1879.....	1,126,497	2,050,639	1 82	(i) 36,753	(i) 3.4
1880.....	1,482,714	2,657,194	1 79	(i) 356,217	(i) 31.6
1881.....	1,537,106	2,688,621	1 75	(i) 54,392	(i) 3.7
1882.....	1,848,148	3,248,446	1 76	(i) 311,042	(i) 0.2
1883.....	1,818,684	3,109,635	1 71	(d) 29,464	(d) 21.6
1884.....	1,984,959	3,593,831	1 81	(i) 166,275	(i) 9.1
1885.....	1,920,977	3,417,807	1 78	(d) 63,982	(d) 3.2
1886.....	2,116,653	3,739,840	1 77	(i) 195,676	(i) 10.2
1887.....	2,429,330	4,388,206	1 81	(i) 312,677	(i) 14.8
1888.....	2,602,552	4,674,140	1 80	(i) 173,222	(i) 7.1
1889.....	2,653,303	4,894,237	1 84	(i) 55,751	(i) 2.1
1890.....	3,084,682	5,676,247	1 84	(i) 426,379	(i) 16.0
1891.....	3,577,749	7,019,425	1 96	(i) 493,067	(i) 16.0
1892.....	3,287,745	6,363,757	1 94	(d) 290,004	(d) 8.1
1893.....	3,783,499	7,359,080	1 95	(i) 495,754	(i) 15.1
1894.....	3,847,070	7,429,468	1 93	(i) 63,571	(i) 1.7
1895.....	3,473,344	6,739,153	1 94	(d) 368,726	(d) 9.6
1896.....	3,745,716	7,226,462	1 93	(i) 267,372	(i) 7.7
1897.....	3,786,107	7,303,597	1 93	(i) 40,391	(i) 1.1
1898.....	4,173,108	8,224,288	1 97	(i) 387,001	(i) 10.2
1899.....	4,925,051	10,283,497	2 09	(i) 751,943	(i) 18.0
1900.....	5,777,319	13,742,178	2 38	(i) 852,268	(i) 17.3
1901.....	6,486,325	12,699,243	1 96	(i) 709,006	(i) 12.3
1902.....	7,466,681	15,210,877	2 04	(i) 780,356	(i) 15.1
1903.....	7,960,364	15,942,833	2 00	(i) 493,683	(i) 6.6
1904.....	8,254,595	16,592,231	2 01	(i) 294,231	(i) 3.7
1905.....	8,667,948	17,520,263	2 02	(i) 413,353	(i) 5.0
1906.....	9,762,601	19,732,019	2 02	(i) 1,094,653	(i) 12.6
1907.....	10,511,426	24,381,842	2 32	(i) 748,825	(i) 7.7
1908.....	10,886,311	25,194,573	2 31	(i) 374,885	(i) 3.5
1909.....	10,501,475	24,781,236	2 36	(d) 384,836	(d) 3.5
1910.....	12,909,152	30,909,779	2 39	(i) 2,407,677	(i) 22.93
1911.....	11,823,388	26,467,646	2 34	(d) 1,585,764	(d) 12.28
1912.....	14,512,829	36,019,044	2 43	(i) 3,189,441	(i) 28.04
1913.....	15,012,178	37,334,940	2 49	(i) 499,349	(i) 3.44

\*The total production for the years 1785 to 1873 is made up as follows:—

Nova Scotia (1785 to 1873)..... 8,053,670 tons of 2,000 pounds.

British Columbia (1836 to 1873)..... 538,480 “ 2,000 “

## EXPORTS AND IMPORTS.

The total exports during 1913 according to Customs Department reports were 1,562,020 tons valued at \$3,961,351, or an average of \$2.54 per ton, as compared with exports in 1912 of 2,127,133 tons valued at \$5,821,593 or \$2.74 per ton, and exports in 1911 of 1,500,639 tons valued at \$4,357,074 or \$2.90 per ton. The exports during 1911 and 1913 have been lower than the average for a number of years.

The total imports during 1913 were 18,201,953 tons valued at \$47,949,119, as compared with imports in 1912 of 14,595,810 tons valued at \$39,478,037, and imports in 1911 of 14,558,892 tons valued at \$39,292,591.

Statistics of exports during 1911-12-13 showing the principal countries of destination and of the annual exports since 1873 are given in accompanying tables.

COAL.—TABLE 4.

## Exports of Coal Produced in Canada During 1911-12-13.

Exported to	1911.		1912.			1913.		
	Tons.	Value.	Tons.	Per cent.	Value.	Tons.	Per cent.	Value.
		\$			\$			\$
Great Britain..	14,185	48,496	59,302	2.8	202,151	12,098	0.8	39,103
United States..	1,035,889	2,809,204	1,603,145	75.4	4,042,803	1,250,769	80.1	2,078,067
Newfoundland.	223,553	617,299	167,519	7.9	482,194	220,147	14.1	653,346
Other countries	227,012	882,075	297,167	13.9	1,094,445	79,006	5.0	290,835
Total.....	1,500,639	4,357,074	2,127,133	100.0	5,821,593	1,562,020	100.0	3,961,351

The United States is the principal market for Canadian coal exported, that country having taken 1,250,769 tons or 80.1 per cent of the total exports in 1913. There were exported to Newfoundland, 220,147 tons or 14.1 per cent of the total. Exports to Great Britain were only 12,098 tons. There were exported to Australia, 13,889 tons, and to other countries, 65,117 tons.



COAL.—TABLE 5.

## Annual Exports.

Calendar Year.	Produce of Canada.	Not the produce of Canada.	Calendar Year.	Produce of Canada.	Not the produce of Canada.
	Tons.	Tons.		Tons.	Tons.
1873.....	420,683	5,403	1893.....	960,312	102,827
1874.....	310,988	12,859	1894.....	1,103,694	89,786
1875.....	250,348	14,026	1895.....	1,011,235	96,836
1876.....	248,688	4,995	1896.....	1,106,661	116,774
1877.....	301,317	4,829	1897.....	986,130	101,848
1878.....	327,959	5,468	1898.....	1,150,029	99,189
1879.....	306,648	8,468	1899.....	1,293,169	101,004
1880.....	432,188	14,217	1900.....	1,787,777	62,776
1881.....	395,382	14,245	1901.....	1,573,661	53,894
1882.....	412,682	37,576	1902.....	2,090,268	23,453
1883.....	486,811	44,388	1903.....	1,954,629	27,138
1884.....	474,405	62,665	1904.....	1,557,412	27,308
1885.....	427,937	71,003	1905.....	1,635,287	80,792
1886.....	520,703	78,443	1906.....	1,835,041	44,758
1887.....	580,965	89,098	1907.....	1,894,074	101,778
1888.....	588,627	84,316	1908.....	1,729,833	102,071
1889.....	665,315	89,294	1909.....	1,588,099	161,098
1890.....	724,486	82,534	1910.....	2,377,049	159,859
1891.....	971,259	77,827	1911.....	1,500,639	133,943
1892.....	823,733	93,988	1912.....	2,127,133	46,706
			1913.....	1,562,020	69,566

Coal imported is entered in three classes, viz.: anthracite, including anthracite dust; bituminous round and run of mine; and bituminous slack such as will pass through a  $\frac{3}{4}$ " screen. The imports of anthracite in 1913 were 4,642,057 tons valued at \$22,034,839, an average of \$4.75 per ton, showing an increase of 458,040 tons over the 1912 imports. The imports of bituminous round and run of mine in 1913 were 10,743,473 tons valued at \$21,756,658, an average of \$2.03 per ton, showing an increase of 2,251,633 tons over the imports in 1912. The imports of bituminous slack in 1913 were 2,816,423 tons valued at \$4,157,622, or an average of \$1.48 per ton, and showing an increase of 896,470 tons over the 1912 imports. The imports of both anthracite and bituminous run of mine have more than doubled since 1906, while the imports of bituminous dust have increased over threefold during the same period.

COAL.—TABLE 6.

## Annual Imports of Coal into Canada.

Fiscal Year.	BITUMINOUS COAL.		ANTHRACITE COAL AND ANTHRACITE DUST.		BITUMINOUS COAL DUST.	
	Tons.	Value.	Tons.	Value.	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	489,543	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.				Bituminous slack such as will pass through a 3 <sup>rd</sup> screen.	
1907.....	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,121,949
1908.....	6,025,574	12,516,743	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.....	(a)10,748,473	21,756,658	(b) 4,642,057	22,034,839	(c) 2,816,423	4,157,622

(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.

The total consumption of coal in Canada during 1913 deduced from the records of production, exports, and imports, was 31,582,545 tons, as compared with 26,934,800 tons in 1912, an increase of 4,647,745 tons, or 17 per cent. Of the total consumption during the past year 13,450,158 tons, or 42.6 per cent was domestic coal and 18,132,387 tons, or 57.4 per cent, imported coal.

The per capita consumption in 1913, based on an estimate of the population made by the Census Office, was approximately 4.071 tons as compared with 3.596 tons per capita consumed in 1912.

### Consumption of Coal in Canada, 1912-1913.

	1912.		1913.	
	Tons.	Tons.	Tons.	Tons.
Production, Table 3.....	14,512,829		15,012,178	
Exports of Canada, Table 4.....	2,127,133		1,562,020	
Home consumption of Canadian coal.....		12,385,696		13,450,158
Imports, Table 6.....	14,595,810		18,201,953	
Exports not produce of Canada, Table 4.....	46,706		69,566	
Canadian consumption of imported coal.....		14,549,104		18,132,387
Total consumption of coal in Canada.....		26,934,800		31,582,545

COAL.—TABLE 7.

### Annual Consumption of Coal in Canada.

Calendar Year.	Can- adian.	Im- ported.	Total.	Per- centage Can- adian.	Per- centage im- ported.	Con- sumption per capita.
	Tons.	Tons.	Tons.	%	%	Tons.
1886.....	1,595,950	1,884,161	3,480,111	45.9	54.1	0.758
1887.....	1,848,365	2,192,260	4,040,625	45.7	54.3	0.871
1888.....	2,013,925	3,314,353	5,328,278	37.8	62.2	1.137
1889.....	1,992,988	2,490,931	4,483,919	44.4	55.6	0.946
1890.....	2,360,196	2,581,187	4,941,383	47.8	52.2	1.031
1891.....	2,606,400	2,980,222	5,586,712	46.7	53.3	1.153
1892.....	2,464,012	3,082,429	5,546,441	44.4	55.6	1.133
1893.....	2,823,187	3,110,462	5,933,649	47.6	52.4	1.198
1894.....	2,743,376	2,917,818	5,661,194	48.5	51.5	1.130
1895.....	2,467,109	2,933,752	5,400,861	45.7	54.3	1.066
1896.....	2,639,055	3,206,456	5,845,511	45.1	54.9	1.140
1897.....	2,799,977	3,124,485	5,924,462	47.3	52.7	1.143
1898.....	3,023,079	3,274,981	6,298,060	48.0	52.0	1.200
1899.....	3,631,882	4,092,361	7,724,243	47.0	53.0	1.454
1900.....	3,989,542	4,361,563	8,351,105	47.8	52.2	1.561
1901.....	4,912,664	4,810,213	9,722,877	50.5	49.5	1.810
1902.....	5,376,413	5,165,938	10,542,351	51.0	49.0	1.927
1903.....	6,005,735	5,491,870	11,507,605	52.2	47.8	2.055
1904.....	6,697,183	6,909,651	13,606,834	49.2	50.8	2.346
1905.....	7,032,661	7,343,880	14,376,541	48.9	51.1	2.362
1906.....	7,927,560	7,398,906	15,326,466	51.7	48.3	2.425
1907.....	8,617,352	10,549,503	19,166,855	45.0	55.0	2.947
1908.....	9,156,478	10,195,424	19,351,902	47.3	52.7	2.820
1909.....	8,913,376	9,711,826	18,625,202	47.9	52.1	2.682
1910.....	10,532,103	10,438,123	20,970,226	50.2	49.8	2.960
1911.....	9,822,749	14,424,949	24,247,698	40.5	59.5	3.384
1912.....	12,385,696	14,549,104	26,934,800	46.0	54.0	3.596
1913.....	13,450,158	18,132,387	31,582,545	42.6	57.4	4.071

### Nova Scotia.

The production of coal in Nova Scotia in 1913 was reported as 7,980,073 tons, as compared with a production of 7,783,888 tons in 1912, showing an increase of 196,185 tons or 2.52 per cent. Bituminous coal only is mined in this Province and the industry is concentrated in the hands of eleven operating companies, one of these alone, the Dominion Coal Company, being credited with 70 per cent of the output of the Province and 37 per cent of the total production in Canada.

Of the production in 1913 the quantity sold for consumption in Canada was 6,269,722 tons, while 417,035 tons were reported as sold for export to the United States, and 263,189 tons sold for export to other countries; 723,067 tons were used for colliery consumption and by workmen, and 307,060 tons were used by colliery operators in making coke and in steel making, etc. A considerable tonnage of coal sold for consumption in Canada was also used in making coke, the total tonnage used for coke-making in the Province being 1,109,629 tons. Of the total sales, about 37 per cent was for consumption within the Province; about 35 per cent was marketed in the Province of Québec. The adjacent Provinces of New Brunswick and Prince Edward Island, and the colony of Newfoundland took, in 1913, over 15 per cent. Only 6.7 per cent was marketed in the United States and 3.8 per cent was sold for bunker coal.

In 1912 the distribution of the production was as follows: sold for consumption in Canada, 6,123,348 tons; sold for export to the United States, 482,597 tons; sold for export to other countries, 193,274 tons; used for colliery consumption and by workmen, 731,315 tons; used by colliery operatives in making coke, and in steel making, etc., 253,354 tons.

There are five principal coal-fields in the Province, that affording the largest production being the Sydney coal-field in Cape Breton county. The production in Cape Breton county in 1913 was 6,164,036 tons or 77 per cent of the total; Pictou county produced 818,216 tons or 10 per cent of the total; Cumberland county produced 670,208 tons or 8 per cent, and Inverness 327,613 tons or 4 per cent of the total.

Annual statistics of the production of coal in Nova Scotia since 1872 in both long and short tons and the production by counties during the past eight years, covering the calendar year, are shown in accompanying tables. The statistics collected and published by the Provincial Department of Mines cover the fiscal year ending September 30, and the details of colliery output during the year ending September 30, 1913, the colliery output during the last three fiscal years, and the distribution of coal sold during the same periods, are also tabulated.

## Coal Production by Companies, Nova Scotia, 1913, in Tons of 2,000 Pounds.

	Total sales.	Used.			Production. <sup>2</sup>	Stocks.		Losses. <sup>3</sup>	Output.
		For coke. <sup>1</sup>	Colliery consumpt'n.	Workmen.		Jan. 1.	Dec. 31.		
Inverness Ry. and Coal Co.....	291,086	7,421	21,631	7,475	327,613	478	1,942	31	329,108
Sydney Coal Co., Ltd.....	5,950		50	50	6,050	10	30		6,070
Dominion Coal Co., Ltd.....	4,773,766		333,990	59,790	5,167,546	239,579	326,919	52,961	5,307,847
Nova Scotia Steel and Coal Co., Ltd..	572,835	282,176	30,733	19,277	905,021	8,960	15,120	1,481	912,662
The Colonial Coal Co., Ltd.....	71,943		4,863	1,207	78,013	1,238	486		77,261
Cape Breton Coal, Iron and Ry. Co...	3,325		3,680	401	7,406		2,029		9,435
Acadia Coal Co., Ltd.....	521,717		69,461	13,677	604,855	3,040	2,000		603,815
Intercolonial Coal Mining Co.....	155,479	17,463	33,385	7,034	213,861	784	785		213,362
Maritime Coal, Ry., and Power Co...	145,880		22,881	3,115	171,876				171,876
Dominion Coal Co., Ltd. (Springhill).	347,039		67,451	11,873	426,363	2,132	2,975		427,206
Minudie Coal Co., Ltd.....	58,099		8,983	1,865	68,947			4,471	73,418
Atlantic Grindstone, Coal and Ry. Co.	2,827		110	85	3,022		22		3,044
	6,949,946	307,060	597,218	125,849	7,980,073	256,221	352,308	58,944	8,135,104

<sup>1</sup> Includes also coal used by producers for steel making and other purposes, and for making briquettes.

<sup>2</sup> Production is obtained by adding sales and coal used.

<sup>3</sup> Complete records of losses are not furnished by all producers.

Coal Production by Companies, Nova Scotia, 1912, in Tons of 2,000 Pounds.

	Total Sales.	Used.			Production. <sup>2</sup>	Stocks.		Losses. <sup>3</sup>	Output.
		For Coke. <sup>1</sup>	Colliery consumpt'n.	Workmen.		Jan. 1.	Dec. 31.		
Inverness Ry. and Coal Co.....	280,811	3,967	21,677	6,974	313,431	2,426	478	1,353	312,836
Sydney Coal Co., Ltd.....	5,643	.....	106	123	5,872	.....	.....	.....	5,872
Dominion Coal Co., Ltd.....	4,617,274	.....	324,273	51,556	4,993,103	169,082	160,777	70,043	5,054,861
Nova Scotia Steel and Coal Co., Ltd..	643,572	226,294	41,405	18,404	934,675	1,583	8,960	459	942,511
The Colonial Coal Co., Ltd.....	31,242	1,741	1,655	634	35,272	255	397	636	36,050
Acadia Coal Co., Ltd.....	413,790	.....	84,913	12,782	511,485	26,593	3,041	.....	487,933
Intercolonial Coal Mining Co.....	206,750	21,350	38,314	7,648	274,062	3,893	784	6,793	277,746
Cumberland Ry. and Coal Co.....	389,194	.....	72,246	13,046	474,486	7,277	2,072	107	469,388
Maritime Coal, Ry., and Power Co...	149,066	.....	25,526	4,384	178,976	.....	.....	.....	178,976
Minudie Coal Co., Ltd.....	55,813	.....	4,305	1,344	61,462	.....	.....	6,025	67,487
Atlantic Grindstone, Coal and Ry. Co.	168	.....	.....	.....	168	.....	.....	.....	168
Riverside Mine (Eastern Coal Co., Ltd.)	896	.....	.....	.....	896	.....	.....	.....	896
	6,799,219	253,354	614,420	116,895	7,783,888	211,089	176,509	85,416	7,834,724

<sup>1</sup> Includes also coal used by producers for steel making and other purposes, and for making briquettes.

<sup>2</sup> Production is obtained by adding sales and coal used.

<sup>3</sup> Complete records of losses are not furnished by all producers.

COAL.—TABLE 8.

## Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, tons, 2,240 lbs.	Sold or used, tons, 2,240 lbs.	Colliery consump- tion, tons, 2,240 lbs.	Production, tons, 2,240 lbs.	Output, tons, 2,000 lbs.	Sold or used, tons, 2,000 lbs.	Colliery consump- tion, tons, 2,000 lbs.	Pro- duction,* tons, 2,000 lbs.	Price per ton, 2,240 lbs.	Value of production.
									\$ cts.	\$
1872.....	880,950	785,914	110,341	896,255	986,664	880,224	123,582	1,003,806	1 75	1,568,446
1873.....	1,051,467	881,106	108,398	989,504	1,177,643	986,839	121,406	1,108,245	1 75	1,731,632
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	1,099,218	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	111,331	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	125,333	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	142,930	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	1,989,269	1,765,895	176,336	1,942,261	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	2,181,035	1 75	3,407,864
1891.....	2,044,784	1,849,945	174,983	2,024,928	2,280,158	2,071,938	195,981	2,267,919	1 75	3,543,624
1892.....	1,942,780	1,752,334	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	2,439,807	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	196,639	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	3,919,355
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	3,806,170
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	138,775	2,148,822	2 00	5,622,808
1900.....	3,298,791	2,998,737	236,563	3,235,300	3,694,646	3,353,585	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	6,496,932
1902.....	4,725,480	4,229,120	379,195	4,608,318	5,292,538	4,736,614	424,702	5,161,316	2 00	9,216,656
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	9,933,288

COAL.—TABLE 8—Continued.

Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output tons, 2,240 lbs.	Sold or used, tons, 2,240 lbs.	Colliery consump- tion, tons, 2,240 lbs.	Production, tons, 2,240 lbs.	Output, tons, 2,000 lbs.	Sold or used, tons, 2,000 lbs.	Colliery consump- tion, tons, 2,000 lbs.	Production* tons, 2,000 lbs.	Price per ton, 2,240 lbs.	Value of production.
									\$ cts.	\$
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

\*This production is obtained by adding sales and colliery consumption.



COAL.—TABLE 9.

## Nova Scotia: Coal Trade by Counties, in Short Tons, Calendar Years Since 1906.

Calendar Year.	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		Total.	
	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.
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	743,860	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	284,730	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

Sales include coal used for making coke and steel.

COAL.

Production and Sales by Companies, Nova Scotia, Year Ending September 30, 1913, in Short Tons.

Name of company.	Output.	Sales.	Colliery consumption.	Supplied workmen.	Supplied locomotive.	Reported unsaleable.	On bank at close of year.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Dominion Coal Co., Ltd.....	5,285,968	4,823,057	328,718	57,782	79,104	2,580	.....
Nova Scotia Steel & Coal Co., Ltd.....	908,806	847,343	35,848	22,015	31,483	3,601	.....
Cumberland Railway & Coal Co., Ltd.....	438,964	361,862	69,188	12,333	2,563	.....	4,420
Acadia Coal Co.....	570,501	494,475	72,439	13,773	1,904	.....	10,186
Maritime Coal, Railway & Power Co.....	183,558	149,145	30,434	3,980	.....	.....	.....
Inverness Railway & Coal Co.....	318,387	280,535	29,739	7,610	1,328	.....	373
Intercolonial Coal Co.....	217,512	175,315	35,265	7,282	857	.....	350
Sydney Coal Co.....	6,089	5,845	105	155	9	.....	16
Colonial Mining Co.....	64,632	59,002	5,042	1,188	.....	.....	.....
Minudie Coal Co.....	70,926	56,737	7,534	1,616	.....	.....	.....
Atlantic Grindstone & Coal Co.....	3,040	2,789	117	78	56	56	.....
Total.....	8,068,383	7,256,155	614,429	127,812	117,304	6,237	15,345

## COAL.—TABLE 10.

**Nova Scotia: Output by Collieries During Fiscal Years Ending  
September 30, 1911-12-13.**

**CORRECTION.**

In Table showing production and sales of coal in Nova Scotia (page 220), the headings in the last three columns reading:

Supplied locomotive.	Reported unsaleable.	On bank at close of year.

should read as follows:

	On bank at close of year.	DIFFERENCE ON BANK AS COMPARED WITH 1912.	
		Increase.	Decrease.
<i>Inverness County:</i>			
Inverness Coal and Railway Co.....	326,577	324,469	318,387
Port Hood Coal Co.....	46,135		

(a) See Colonial Mining Co.

COAL.—TABLE 11.

Nova Scotia: Distribution of Coal Sold.

Markets.	FISCAL YEARS ENDING SEPTEMBER 30.									
	1909.		1910.		1911.		1912.		1913.	
	Tons of 2,000 lbs.	Per cent.	Tons of 2,000 lbs.	Per cent.	Tons of 2,000 lbs.	Per cent.	Tons of 2,000 lbs.	Per cent.	Tons of 2,000 lbs.	Per cent.
Nova Scotia—										
Transported by land.....	1,642,716	31.77	1,681,052	30.65	2,007,192	32.25	2,197,213	31.76	2,530,566	34.88
“    sea.....	339,462	6.57	342,787	6.25	354,514	5.70	373,594	5.40	380,363	5.24
Total Nova Scotia.....	1,982,178	38.34	2,023,839	36.90	2,361,706	37.95	2,570,807	37.16	2,910,929	40.12
New Brunswick.....	607,968	11.76	594,238	10.84	606,582	9.74	732,411	10.59	724,239	9.98
Prince Edward Island.....	88,365	1.71	89,031	1.62	90,314	1.45	103,373	1.49	107,612	1.48
Quebec Province.....	1,689,876	32.69	2,001,382	36.49	2,315,971	37.22	2,418,086	34.95	2,456,416	33.85
Newfoundland.....	174,998	3.39	19,224	3.62	206,299	3.32	224,719	3.25	235,810	3.25
United States.....	359,224	6.95	325,548	5.93	372,177	5.98	462,035	6.68	524,262	7.23
St. Pierre.....	11,463	0.22	3,405	0.15	10,107	0.16	10,535	0.15	7,449	0.10
Bunker coal.....	254,681	4.92	243,807	4.45	229,243	3.68	265,142	3.83	262,273	3.62
Other countries.....	846	0.02			(a) 30,841	0.50	(b) 131,816	1.90	(c) 27,160	0.37
Total.....	5,169,599	100.00	5,484,524	100.00	6,223,240	100.00	6,918,929	100.00	7,256,155	100.00

For time chartered boats.....	(a) Tons.	Per cent.	(b) Tons.	Per cent.	(c) Tons.	Per cent.
Other countries.....	28,610	0.46	28,972	0.42	23,958	0.33
	2,231	0.04	102,844	1.48	3,202	0.04
	30,841	0.50	131,816	1.90	27,160	0.37

**Number and Classes of Workmen Employed at Each Mine in Nova Scotia, Year  
Ending September 30, 1913.**

Company.	UNDERGROUND.				SURFACE.				CONSTRUCTION.				TOTALS.		HORSES.		DAYS.
	Skilled labour.	Labourers	Boys.	Days.	Skilled labour.	Labourers	Boys.	Days.	Skilled labour.	Labourers	Boys.	Days.	Persons.	Days.	Above.	Below.	
Dominion Coal Co.....	3,209	1,969	245	1,630,458	578	383	68	419,164	.....	.....	.....	.....	6,452	2,049,622	83	499	300
Nova Scotia Steel and Coal Co.....	1,148	950	193	594,326	157	259	23	127,720	.....	.....	.....	.....	2,730	722,046	5	90	289
Cumberland Railway and Coal Co.....	442	302	47	230,494	79	104	16	53,673	13	8	1	6,278	1,012	295,445	14	45	294
Acadia Coal Co.....	410	379	69	268,726	96	248	17	129,833	.....	.....	.....	.....	1,219	398,559	25	53	285
Intercolonial Coal Co.....	370	116	55	141,386	94	106	17	61,062	1	1	.....	210	760	202,658	15	29	275
Joggins Mines.....	290	71	4	114,342	25	37	8	21,765	.....	.....	.....	.....	435	136,107	5	11	298
Chignecto Mines.....	50	7	3	5,980	4	7	3	1,810	.....	.....	.....	.....	74	7,790	1	1	139
Inverness Railway and Coal Co.....	311	145	26	140,811	50	78	14	41,952	.....	.....	.....	.....	24	182,763	7	35	294
Sydney Coal Co.....	8	4	.....	2,691	2	1	.....	908	.....	.....	.....	.....	15	3,599	1	2	269
Minudie Coal Co.....	102	24	14	39,506	24	19	8	15,245	4	.....	.....	904	195	55,655	3	3	300
Colonial Coal Co.....	71	25	1	22,639	18	19	.....	8,139	4	.....	.....	908	138	.....	1	6	253
Atlantic Grindstones and Coal Co.....	7	.....	.....	1,904	1	2	.....	638	.....	.....	.....	.....	10	.....	.....	.....	273
Totals.....	6,418	3,992	657	3,193,263	1,128	1,263	174	885,909	22	9	1	8,300	13,664	4,088,472	160	774	.....

## New Brunswick.

The total shipments of coal from mines in this Province, as estimated by the Provincial Department of Public Works, were 68,311 tons, and adding 2,000 tons for colliery consumption and workmen, etc., the production is placed at 70,311 tons, which is the largest yearly production recorded for the Province.

Mining operations are carried on in the Grand Lake coal-field, in Queens county, in which a large number of very small mines or openings were at one time intermittently operated. In 1913, however, about 81 per cent was directly reported by three companies. The Minto Coal Co., Ltd., is the largest operator and produced, in 1913, 41,938 tons. The Rothwell Coal Co., Ltd., produced 9,408 tons.

## New Brunswick: Annual Production.

COAL.—TABLE 12.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$, cts.
1887.....	10,040	23,607	2 35	1900.....	10,000	15,000	1 50
1888.....	5,730	11,050	1 93	1901.....	17,630	51,857	2 94
1889.....	5,673	11,733	2 07	1902.....	18,795	39,680	2 11
1890.....	7,110	13,850	1 95	1903.....	16,000	40,000	2 50
1891.....	5,422	11,030	2 03	1904.....	9,112	18,224	2 00
1892.....	6,768	9,375	1 39	1905.....	29,400	58,800	2 00
1893.....	6,200	9,837	1 59	1906.....	34,076	68,152	2 00
1894.....	6,469	10,264	1 59	1907.....	34,584	77,814	2 25
1895.....	9,500	14,250	1 50	1908.....	60,000	135,000	2 25
1896.....	7,500	11,250	1 50	1909.....	49,029	98,496	2 25
1897.....	6,000	9,000	1 50	1910.....	55,455	110,910	2 00
1898.....	6,160	9,240	1 50	1911.....	55,781	111,562	2 00
1899.....	10,528	15,792	1 50	1912.....	44,780	89,560	2 00
				1913.....	70,311	166,637	2 37

## Saskatchewan.

Lignite coal only has been mined in Saskatchewan, and in this Province, as well as in Alberta, a large number of small openings have been made. The total production in 1913, as reported by 29 separate collieries, was 212,897 tons valued at \$358,192, a decrease of 12,445 tons or 5.5 per cent from the production in 1912. Of the 1913 production 195,954 tons were sold for consumption in Canada and 16,943 tons were used by the producers for colliery consumption, for workmen, and in brickmaking.

The output which has hitherto been obtained entirely from the Estevan and Souris fields in the southeastern portion of the Province is used mainly for domestic purposes within the Province and in Manitoba. During the

past three years, however, mining operations have been commenced in a district about 115 miles east of the Estevan field and 40 miles south of Moosejaw.

COAL.—TABLE 13.

## Saskatchewan: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	(a) 400	800	2 00	1902.....	70,400	112,640	1 52
1890.....	200	200	1 00	1903.....	116,703	169,618	1 45
1891.....				1904.....	124,885	187,021	1 50
1892.....	5,400	9,325	1 73	1905.....	107,596	152,334	1 42
1893.....	8,325	12,485	1 50	1906.....	108,393	164,146	1 51
1894.....	(b) 15,051	15,153	1 01	1907.....	151,232	252,437	1 67
1895.....	15,769	31,538	2 00	1908.....	150,556	253,790	1 69
1896.....	16,706	25,059	1 50	1909.....	192,125	296,339	1 54
1897.....	25,000	37,500	1 50	1910.....	181,156	293,923	1 62
1898.....	25,000	37,500	1 50	1911.....	206,779	347,248	1 68
1899.....	25,000	37,500	1 50	1912.....	225,342	368,135	1 63
1900.....	40,500	60,750	1 50	1913.....	212,897	358,192	1 68
1901.....	45,000	72,000	1 60				

(a) From Turtle Mountain district, Manitoba.

(b) Including a small quantity from the Turtle Mountain district, Manitoba.

## Alberta.

The total production of marketable coal in Alberta in 1913, including lignite, bituminous, and anthracite was, according to returns received by this Division, 4,014,755 tons valued at \$10,418,941 or an average of \$2.59 per ton, as compared with a production in 1912 of 3,240,577 tons valued at \$8,113,525 or an average of \$2.50 per ton, an increase of 774,178 tons or 23.9 per cent.

Many new collieries are opened each year and the production reported to the Provincial Department of Public Works, quoted below, is somewhat higher than the above figures.

Notwithstanding the large number of small collieries operated in this Province, over 96 per cent of the total production was obtained from thirty-nine collieries operated by thirty-five companies, each colliery having an output exceeding 10,000 tons. Thirteen of these collieries had each an output exceeding 100,000 tons.

Of the total production in 1913, 3,527,772 tons were sold for home consumption in Canada, and 139,536 tons for export to the United States; the producers used 243,370 tons for colliery consumption and for workmen, and 104,077 tons were used for making coke.

The production by collieries in 1913 and 1912, and the annual production since 1887 are shown in the following tables.

In the case of anthracite coal which is mined at Bankhead, a large portion of the output is briquetted because of the friable nature of the coal. The "production" or quantity marketed in 1913 was considerably larger than the mine output, owing to the manufacture of briquettes from the accumulated slack, or coal-dust

### Production of Coal in Alberta in 1913, by Principal Collieries, in Short Tons.

Name of company.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Alberta Coal Mining Co., Cardiff.....	227	55,000	3,000	58,000
Canada West Coal Co., Taber.....	264	106,571	10,041	116,556
Can. Coal & Coke Co., Beaver Mines.....	216	72,869	3,742	76,611
"          "          Lethbridge.....	252	117,995	29,278	147,273
"          "          Pacific Pass.....	285	36,432	10,101	46,533
Canmore Coal Co., Ltd., Canmore.....	227 } 297 }	242,662	11,516	254,178
Canadian Pacific Ry., Dept. Nat. Res., Bankhead	290	(a) 162,899	(b) 35,276	198,175
"          "          Lethbridge	255	364,600	3,933	368,533
Capital Coal Co., Cardiff.....	202	34,374	1,090	35,464
Cardiff Collieries, Ltd., Cardiff.....	256	120,000	4,900	124,900
Chinook Coal Co., Canmore.....	232	65,242	4,859	70,101
City of Lethbridge Coal Mine, Lethbridge.....	237	11,641	.....	11,641
Coalbeck C. & Clay Prod. Co., Castor.....	235	10,950	165	11,115
Davenport Coal Co., Burmis.....	255	71,374	2,970	74,344
Dawson Coal Co., Edmonton.....	267	12,860	600	13,460
Diamond Coal Co., Ltd., Diamond City.....	119	16,952	1,603	18,555
Dobell Coal Co., Tofield.....	290	18,717	1,595	20,312
Edmonton Standard Coal Co., Edmonton.....	237	19,500	1,400	20,900
Great West Coal Co., Clover Bar.....	238	46,335	5,121	51,956
Hillcrest Collieries, Ltd., Hillcrest.....	239	310,732	11,737	322,469
Humberstone Coal Co., Clover Bar.....	240	22,608	1,125	23,733
International Coal and Coke Co., Coleman.....	297	(c) 387,030	26,536	413,566
Jasper Park Collieries, Ltd., Pochontas.....	272	132,344	2,185	135,029
Keith & Fulton Coal Co., Clover Bar.....	249	10,239	25	10,264
Leitch Colliery, Ltd., Passburg.....	271	104,093	4,494	108,587
McGillivray Creek Coal and Coke Co., Coleman	236	189,091	6,158	195,249
Newcastle Coal Co., Drumbeller.....	.....	24,279	1,200	25,479
Ottewell Coal Co., Clover Bar.....	278	11,316	150	11,466
Pembina Coal Co., Ltd., Evansburgh.....	300	5,326	4,323	10,149
Rock Springs Coal and Brick Co., Elean.....	190	16,500	2,300	18,800
Tofield Coal Co., Tofield.....	223	15,120	1,150	16,270
Twin City Coal Co., Ltd., Edmonton.....	280	60,985	5,618	66,603
West Canadian Collieries, Bellevue.....	270	426,756	7,301	434,057
"          "          Blairmore.....	273	159,370	4,202	164,072
Yellowhead Pass Coal and Coke Co., Ltd., via Biekerdike.....	297	27,772	2,327	30,099
4 other companies, each producing over 10,000 tons.....	.....	70,653	17,995	88,648
All other companies, each producing under 10,000 tons.....	.....	3,563,137	230,016	3,793,153
.....	.....	203,248	13,354	221,602
Total production, Alberta.....	.....	3,771,385	243,370	4,014,755

\*Includes consumption under boilers, etc., and coal used by workmen.

(a) " 129,493 tons of briquettes.

(b) " 1,275 "

(c) " 104,012 tons for coke manufacturing.



## Production of Coal in Alberta in 1912, by Principal Collieries, in Short Tons.

Name of company.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Leitch Colliery, Ltd., Passburg.....	239	(a) 66,418	6,624	73,042
Davenport Coal Co., Burmis.....	207	37,986	495	38,481
Maple Leaf Coal Co., Bellevue.....	278	48,849	1,923	50,772
Hillcrest Coal and Coke Co., Hillcrest.....	281	173,478	10,806	184,284
West Canadian Collieries, Bellevue.....	262	317,725	6,508	324,233
“ “ Blairmore.....	266	80,858	4,936	85,794
“ “ Lille.....	122	(b) 38,177	6,919	45,096
Canadian Coal Consolidated Co., Frank.....	269	123,381	17,999	141,380
International Coal and Coke Co., Coleman.....	293	(c) 402,288	23,050	425,338
McGillivray Creek Coal and Coke Co., Coleman	255	119,342	4,056	123,398
Bankhead Mines, Ltd., Bankhead.....	256	(d) 124,589	(e) 36,000	160,589
Canmore Coal Co., Ltd., Canmore.....	236	142,231	9,931	152,162
“ “ “.....	299	97,527	1,742	99,269
Yellowhead Pass Coal and Coke Co., Ltd., via Bickerdike.....	313	11,207	2,075	13,282
Jasper Park Collieries, Ltd., Pochontas.....	300	111,231	1,270	112,501
Western Coal and Coke Co., Lethbridge.....	301	11,969	2,431	14,400
City of Lethbridge Coal Mine, Lethbridge.....	262	10,467	.....	10,467
Lethbridge Collieries, Lethbridge.....	249	58,419	9,895	68,314
Canada West Coal Co., Taber.....	265	69,436	8,684	78,120
C.P.R. Dept. of Natural Resources, Lethbridge..	220	311,259	4,293	315,552
Diamond Coal Co., Ltd., Diamond City.....	236	35,847	2,551	38,398
Battle River Collieries, Rosenroll.....	225	11,500	850	12,350
Round Hill Collieries, Round Hill.....	160	17,608	747	18,355
Tofield Coal Co., Tofield.....	302	17,458	2,100	19,558
The Clover Bar Coal Co., Ltd., Clover Bar.....	282	20,686	1,750	22,436
Edmonton Standard Coal Co., Edmonton.....	286	24,750	2,000	26,750
Twin City Coal Co., Ltd., Edmonton.....	269	32,800	1,280	34,080
Alberta Coal Mining Co., Cardiff.....	216	52,683	2,500	55,183
Cardiff Collieries, Ltd., Cardiff.....	280	92,161	2,985	95,146
5 other companies, each producing over 10,000 tons.....	.....	109,032	13,294	122,326
All other companies, each producing under 10,000 tons.....	.....	2,771,362	189,694	2,961,056
Total production, Alberta.....	.....	3,036,318	204,259	3,240,577

\* Includes consumption under boilers, etc., and coal used by workmen.

- (a) “ 17,923 tons for coke manufacturing.  
 (b) “ 27,177 “ “  
 (c) “ 125,718 “ “  
 (d) “ 90,000 tons of briquettes.  
 (e) “ 1,300 “

COAL.—TABLE 14.

## Alberta: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	74,152	157,577	2 13	1900.....	311,450	778,625	2 50
1888.....	115,124	183,354	1 59	1901.....	340,275	850,687	2 50
1889.....	97,364	179,640	1 85	1902.....	402,819	960,601	2 38
1890.....	128,753	193,298	1 54	1903.....	495,893	1,117,541	2 25
1891.....	174,131	437,243	2 51	1904.....	661,732	1,404,524	2 12
1892.....	178,970	460,605	2 57	1905.....	931,917	1,993,915	2 14
1893.....	230,070	586,260	2 55	1906.....	1,246,360	2,614,762	2 10
1894.....	184,940	473,327	2 56	1907.....	1,591,579	3,836,286	2 41
1895.....	169,885	382,526	2 25	1908.....	1,685,661	4,127,311	2 45
1896.....	209,162	581,832	2 78	1909.....	1,994,741	4,838,109	2 43
1897.....	242,163	630,408	2 60	1910.....	2,894,469	7,065,736	2 44
1898.....	315,088	783,720	2 50	1911.....	1,511,036	3,979,264	2 63
1899.....	309,600	774,000	2 50	1912.....	3,240,577	8,113,525	2 50
				1913.....	4,014,755	10,418,941	2 59

According to statistics published by the Coal Mines Branch of the Department of Public Works, Province of Alberta, the total output of coal in that Province in 1913, including a considerable tonnage of unmarketable slack, etc., was 4,306,346 tons. The total sales (not including briquettes) were 3,618,161 tons, and comprised 2,687,632 tons sold in Alberta, 792,328 tons sold in other provinces, and 138,201 tons sold for export to the United States. Of the output, 99,623 tons were used in the manufacture of briquettes and the sales of briquettes are reported as 130,768 tons. The quantity of slack put on the waste heaps is reported as 179,981 tons.

The following tables showing the total output, the output by districts during 1913, and the labour employed, have been kindly furnished by Mr. John T. Stirling, Provincial Inspector of Mines.

## Output of Coal: Alberta.

Tons of 2,000 lbs.	Crowsnest pass.	Calgary.	Lethbridge.	Edmonton.	Total.
Sold for consumption in Alberta..	1,441,327	364,350	251,402	630,553	2,687,632
Sold for consumption in other provinces.....	98,397	58,778	533,820	101,333	792,328
Sold for export to the United States.....	134,673	.....	3,528	.....	138,201
Total sales.....	1,674,397	423,128	788,750	731,886	3,618,161
Used in making briquettes.....	.....	99,623	.....	.....	99,623
Used in making coke.....	104,012	.....	.....	.....	104,012
Used under colliery boilers.....	71,693	50,909	112,528	41,817	276,947
Difference in stocks.....	- 842	+ 37,092	- 8,407	- 221	+ 27,622
Slack put on waste heap.....	175	16,709	73,149	89,948	179,981
Total output.....	1,849,435	627,461	966,020	863,430	4,306,346

## Output of Bituminous Coal.

Tons of 2,000 lbs.	Crowsnest pass.	Calgary.	Lethbridge.	Edmonton.	Total.
Sold for consumption in Alberta..	1,441,327	249,199	.....	198,712	1,889,238
Sold for consumption in other provinces.....	98,397	2,925	.....	9,866	111,188
Sold for export to the United States.....	134,673	.....	.....	.....	134,673
Total sales.....	1,674,397	252,124	.....	208,578	2,135,099
Used in making coke.....	104,012	.....	.....	.....	104,012
Used under colliery boilers.....	71,693	13,394	.....	6,691	91,778
Difference in stocks.....	- 842	+ 34,562	.....	- 560	+ 33,160
Slack put on waste heap.....	175	1,500	.....	8,677	10,352
Total.....	1,849,435	301,580	.....	223,386	2,374,401

## Output of Anthracite Coal.

Tons of 2,000 lbs.	CALGARY DISTRICT.	
	Coal.	Briquettes.
Sold for consumption in Alberta.....	21,721	81,472
Sold for consumption in other provinces.....	11,457	49,296
Sold for export to the United States.....	.....	.....
Total sales.....	33,178	130,768
Used under colliery boilers.....	33,869	.....
Used in making briquettes.....	99,623	.....
Difference in stock.....	+ 2,050	+ 93
Total.....	168,720	130,861

## Output of Lignite Coal.

Tons of 2,000 lbs.	Crowsnest pass.	Calgary.	Lethbridge.	Edmonton.	Total.
Sold for consumption in Alberta.....		93,430	251,402	431,841	776,673
Sold for consumption in other provinces.....		44,396	533,820	91,467	669,683
Sold for export to the United States.....			3,528		3,528
Total sales.....		137,826	788,750	523,308	1,449,884
Used under colliery boilers.....		3,646	112,528	35,126	151,300
Slack put on waste heap.....		15,209	73,149	81,271	169,629
Difference in stocks.....		+ 480	- 8,407	+ 339	- 7,588
Total output.....		157,161	966,020	640,044	1,763,225

## Output of Coal in Alberta by Districts.

District.	Number of persons employed	Lignite.	Bituminous.	Anthracite.
Crowsnest pass.....	2,331		1,772,575	
Pincher Creek.....	145		76,860	
Lethbridge.....	1,486	744,967		
Taber.....	506	205,953		
Bow Island.....	69	12,626		
Milk River.....	25	2,474		
Banff.....	1,108		270,220	168,720
Medicine Hat.....	93	38,451		
Okotoks.....	8	1,285		
Aldersyde.....	39	10,688		
Carstairs.....	94	1,240	31,360	
Carbon.....	26	5,758		
Trochu.....	3	1,453		
Drumheller.....	226	52,894		
Three Hills.....	43	7,200		
Lacombe.....	127	38,192		
Wetaskiwin.....	150	44,861		
Edmonton.....	542	255,620		
St. Albert.....	83	7,448		
Tofield.....	82	43,436		
Cardiff.....	262	247,201		
Pembina.....	130	41,478		
Yellowhead pass.....	314		88,357	
Jasper Park.....	176		135,029	
Total.....	8,068	1,763,225	2,374,401	168,720

## Average Number of Persons Employed.

Character of labour.	Bituminous.		Anthracite.		Lignite.		Total.	
	Above.	Below.	Above.	Below.	Above.	Below.	Above.	Below.
Supervision and clerical assistance.....	92	98	10	8	140	135	251	241
Miners and helpers.....		1,584		184		2,087		3,855
Mechanics or skilled labour.....	223	131	56	2	237	148	516	281
Other employees.....	602	332	160	69	702	559	1,464	1,460
Total.....	917	2,645	226	263	1,088	2,929	2,231	5,837

### British Columbia.

The total production of coal in British Columbia in 1913 from eighteen collieries operated by fourteen companies was 2,714,420 tons valued at \$8,482,562, as compared with a production of 3,208,997 tons valued at \$10,028,116 in 1912, showing a falling off of 494,577 tons or over 15 per cent.

The production in 1913 has been exceeded in only two previous years, 1912 and 1910.

With respect to conditions which have affected the output during 1913, the Provincial Mineralogist in his annual report states:—"Such a falling off in the output calls for an explanation, and it can be definitely stated that the shortage is in no way attributable to the mines themselves, nor to, at that time, any diminished market, but has been caused entirely by labour troubles, which, starting at the Canadian Collieries' Comox mines, spread to all the Vancouver Island collieries, and which during the whole year greatly retarded the production of all the collieries.

"While it is true that, at the time the strike began, there was an ample market for the output of all the Island collieries, such was not the case at the close of the year, for the shutting off of the coal supply by the strike, and the uncertainty regarding it in the future, drove the consumer to seek other sources for fuel, resulting in many important cases, in the substitution of California crude oil, so that, at the end of the year, while the strike is still theoretically on, the mines are operating with more than sufficient men to supply the remaining market, and these collieries are not working full time.

"The market having thus been alienated, it will be some time before it can be recovered, and the loss to employer and employee will continue long after the original cause of grievance may have been settled.

"While the Province as a whole shows a decrease, as already stated, it must be noted that this decrease is confined to Vancouver Island collieries and for the reasons given, whereas the other districts each show a material increase."

Of the total production in 1913, 1,311,643 tons or over 48 per cent were sold for consumption in Canada, 698,820 tons or 25.7 per cent were sold for export to the United States. The quantity used by producers in making coke was 485,271 tons or nearly 18 per cent of the production, and 218,686 tons or 8 per cent were used for colliery consumption and by workmen.

In 1912 the sales for consumption in Canada were 1,410,014 tons, while 1,082,998 tons were sold for export, 444,665 tons were used in making coke, and 271,320 tons for colliery consumption. The chief falling-off, therefore, was in coal sold for export.

The production of coal on Vancouver Island during 1913 was 927,880 tons, as compared with 1,571,683 tons in 1912 and 1,789,530 tons in 1911.

The production of the Crownsnest mines in 1913 was 1,492,109 tons, as compared with 1,413,583 tons in 1912 and 499,580 tons in 1911.

The production in the Nicola, Princeton, and other fields in 1913 was 294,431 tons, as compared with 223,731 tons in 1912 and 253,421 tons in 1911.

The Provincial Mineralogist further states:—

“These fields from their geographic positions—the one at the extreme eastern boundary of the Province, and the other at the extreme western edge—are in no way competitors in the market, their markets being quite separate and ruled by completely different conditions.

“The market of the East Kootenay field is provided primarily by the railways of the southeastern part of the Province and of the northern parts of the adjoining States of Montana and Washington, approximately two-thirds of the coal sold as such being exported to those States, while the other third went to supply the demands of the southeastern part of the Province—its domestic needs, its railways, steamboats, mines and smelters.

“Coke, a product of the coal mines, is sold in the same markets, with the difference that the local consumption—chiefly by the smelters of Trail and the Boundary district—takes over 80 per cent of the product, while 20 per cent is exported to the States mentioned.

“As regards the marketing conditions in this field, the East Kootenays are, however, brought into direct competition with the collieries of Alberta just over the Provincial boundary line, all these collieries being in the same coal-field, with practically the same grade of coal and working under similar conditions.

“This competition has kept the price obtainable for coal at from \$2.25 to \$2.50 a ton, with little probability of any material increase in price, owing to the facility with which new collieries can be opened up and the very large reserve areas of coal limits in that district; a description of these reserves was given in the report of this Bureau for the year 1909.

“The Coast district may be subdivided into two fields—the Nicola-Princeton field and the Vancouver Island field—in which the markets differ considerably.

“In the former field the consumption is chiefly by the local railways, while a small amount finds its way to Vancouver, even under the handicap of what seems to be an excessively high freight charge.

“The Vancouver Island coal market is provided by the domestic and manufacturing requirements of the Coast cities, and of the ocean-going steamers calling at these ports.

“The demand for coal from the larger coasting steamers and from the railways has in past years diminished, as the Canadian Pacific Railway

main line engines are nearly all burning California crude oil, and a large coasting steamer burning coal is now an exception.

"Owing to the strike conditions having curtailed the output of the Island collieries, prices have been maintained as high or higher than for preceding years; in fact, the high price of coal on the coast is one of the chief reasons for the marked increase in the use of California oil fuel. It does not seem at all likely, either, that the present price of coal on the sea-board, of from \$4 to \$4.50 a ton, f.o.b., will decrease for some time".

### Coal Production by Districts, British Columbia, 1913.

Coal.	Vancouver Island.	Nicola and Princeton.	Crowsnest and East Kootenay.	Total.
	Tons.	Tons.	Tons.	Tons
Sold for consumption in Canada.....	715,259	276,528	319,856	1,311,643
Sold for export to United States.....	107,885	.....	590,935	698,820
Sold for export to other countries.....	.....	.....	.....	.....
Total sales.....	823,144	276,528	910,791	2,010,463
Used for making coke or brick.....	.....	.....	485,271	485,271
Used for colliery consumption, etc.....	104,736	17,903	96,047	218,686
Production.....	927,880	294,431	1,492,109	2,714,420

### Coal Production by Districts, British Columbia, 1912.

Coal.	Vancouver Island.	Nicola and Princeton.	Crowsnest and East Kootenay.	Total.
	Tons.	Tons.	Tons.	Tons
Sold for consumption in Canada.....	1,947,631	204,018	258,365	1,410,014
Sold for export to United States.....	340,115	3,796	617,951	961,862
Sold for export to other countries.....	121,136	.....	.....	121,136
Total sales.....	1,408,882	207,814	876,316	2,493,012
Used for making coke or brick.....	.....	131	444,534	444,665
Used for colliery consumption, etc.....	162,801	15,786	92,733	271,320
Production.....	1,571,683	223,731	1,413,583	3,208,997

## Coal Production by Collieries in British Columbia, in 1913, in Short Tons.

Colliery.	SALES.				Used in making coke.	Used under colliery boilers, etc.	Production.	Lost in washing.	Stocks.		Output.
	In Canada.	To United States	To other countries.	Total.					First of year.	Last of year.	
1. Protection, No. 1.....	133,702	34,557		168,259		25,785	194,044		1,525	290	192,809
Northfield.....	17,909	22,390		40,299		13,388	53,687		56	294	53,925
2. New East Wellington.....	89,665	21,861		111,526		5,650	117,176	3,098	4,594	1,182	116,862
3. Ladysmith (Wellington).....	47,474	520		47,994		6,344	54,338		102	830	64,798
Cumberland (Comox).....	348,680	27,832		376,562		39,566	416,128	144,397	3,115	11,656	569,066
4. Fiddick and Richardson.....	75,197	675		75,872		13,279	89,151	43,102	46,132	650	86,721
Suquash.....	2,632			2,632		724	3,356		875		2,481
5. Michel.....	143,490	476,397		619,887	261,313	43,017	924,217		115	105	924,207
Coal Creek.....	50,703	55,737		106,440	113,299	22,547	242,286		115	0	242,171
6. Hosmer.....	106,162			106,162	110,659	27,260	244,081	21,856	778	330	265,489
7. Corbin.....	19,501	58,801		78,302		3,223	81,525				81,525
8. Diamond Vale.....	6,700			6,700		435	7,135				7,135
9. Middlesboro.....	114,221			114,221		12,878	127,099		483	622	127,238
10. Inland.....	127,040			127,040		1,769	128,809				128,809
11. Princeton.....	26,765			26,765		2,810	29,575	3,354	269	51	32,711
12. Other mines.....	1,802			1,802		11	1,813			80	1,893
Total.....	1,311,643	698,820		2,010,463	485,271	218,686	2,714,420	225,539	58,209	16,090	2,897,840

1. Western Fuel Co.
2. Vancouver-Nanaimo Coal Mining Co.
3. The Canadian Collieries (Dunsmuir), Ltd.
4. Pacific Coast Collieries, Ltd.
5. Crownsnest Pass Coal Co., Ltd.
6. The Hosmer Mines, Ltd.  
(Can. Pac. Railway, Dept. of Natural Resources.)

7. Corbin Coal and Coke Co., Ltd.
8. Diamond Vale Collieries, Ltd.
9. Nicola Valley Coal and Coke Co., Ltd.
10. Inland Coal and Coke Co., Ltd.
11. Princeton Coal and Land Co., Ltd.
12. { United Empire Coal Co., Ltd.  
{ Coalmount Collieries.  
{ Grand Trunk, B.C. Coal Co.



## Coal Production by Collieries in British Columbia, in 1912, in Short Tons.

Colliery.	SALES.				Used in making coke.	Used under colliery boilers etc.	Production.	Lost in washing.	STOCKS.		Output.
	In Canada.	To United States.	To other countries.	Total.					First of year.	Last of year.	
1. Protection, No. 1.....	251,540	112,447	82,192	446,179		44,495	490,674		5,535	1,525	486,664
Northfield.....	18,697	86,838	21,725	127,260		31,721	158,981		526	168	158,623
Douglas.....	54		70	124		712	836				836
2. New East Wellington.....	74,783	17,842		92,625		5,726	98,351		448	942	98,845
3. Ladysmith (Wellington).....	176,370	50,558		226,928		15,588	242,516		1,641	102	240,977
Cumberland (Comox).....	301,302	64,598	17,149	383,049		45,087	428,136		26,307	3,115	404,944
4. Fiddick and Richardson.....	121,497	7,831		129,328		18,704	148,032	7,703	37,167	46,182	164,750
Suquash.....	3,389			3,389		767	4,156			875	5,031
5. Coal Creek.....	61,929	430,817		492,746	248,058	39,801	780,605		124	115	780,596
Michel.....	12,603	138,943		146,546	115,316	22,368	284,230		20	115	284,325
6. Hosmer.....	103,956			103,956	81,291	26,696	211,943		1,889	778	210,832
7. Corbin.....	79,876	53,192		133,068		3,868	136,936				136,936
8. Diamond Vale.....	3,080			3,080		164	3,244				3,244
9. Middlesboro.....	150,283			150,283		10,052	160,335		689	483	160,129
10. Inland.....	30,000			30,000		1,299	31,299			100	31,399
11. Princeton.....	20,405	3,546		23,951		4,232	28,183	3,372			31,555
12. United Empire.....	250	250		500		40	540				540
Total.....	1,410,014	961,862	121,136	2,493,012	444,665	271,320	3,208,997	11,075	74,346	54,500	3,200,226

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| <ol style="list-style-type: none"> <li>1. Western Fuel Co.</li> <li>2. Vancouver-Nanaimo Coal Mining Co.</li> <li>3. The Canadian Collieries (Dunsmuir), Ltd.</li> <li>4. Pacific Coast Collieries, Ltd.</li> <li>5. Crowsnest Pass Coal Co., Ltd.</li> <li>6. The Hosmer Mines Ltd.<br/>(Can. Pac. Railway, Dept. of Natural Resources).</li> </ol> | <ol style="list-style-type: none"> <li>7. Corbin Coal and Coke Co., Ltd.</li> <li>8. Diamond Vale Collieries, Ltd.</li> <li>9. Nicola Valley Coal and Coke Co., Ltd.</li> <li>10. Inland Coal and Coke Co., Ltd.</li> <li>11. Princeton Coal and Land Co., Ltd.</li> <li>12. United Empire Coal Co., Ltd.</li> </ol> |
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COAL.—TABLE 15.

## British Columbia: Annual Production.

Calendar Year.	Output, tons, 2,240 lbs.	Home consumption, tons, 2,240 lbs.	Sold for export, tons, 2,240 lbs.	PRODUCTION*.		Price per ton, 2,240 lbs.	Value.
				Tons, 2,240 lbs.	Tons, 2,000 lbs.		
1836-52...	10,000				11,200	4 00	40,000
1852-59...	25,398				28,446	4 00	101,592
1859†...	1,989				2,228	4 00	7,956
1860.....	14,247				15,957	4 00	56,988
1861.....	13,774				15,427	4 00	55,096
1862.....	18,118				20,292	4 00	72,472
1863.....	21,345				23,906	4 00	85,380
1864.....	28,632				32,068	4 00	114,528
1865.....	32,819				36,757	4 00	131,276
1866.....	25,115				28,129	4 00	100,460
1867.....	31,239				34,938	4 00	124,956
1868.....	44,005				49,236	4 00	176,020
1869.....	35,030				40,098	4 00	143,208
1870.....	29,843				33,424	4 00	119,372
1871-2-3.....	148,459				166,274	4 00	593,836
1874.....	81,547	25,023	56,038	81,061	90,738	3 00	243,193
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.....	170,840	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	638,542
1882.....	232,139	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	443,075	568,249	636,439	3 00	1,704,747
1890.....	678,140	177,075	508,270	685,345	767,536	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	836,302	937,218	3 00	2,510,406
1893.....	978,294	207,851	768,917	976,768	1,093,930	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	138,349	756,334	944,633	1,058,045	3 00	2,834,049
1896.....	894,832	261,984	634,238	896,222	1,003,769	3 00	2,688,666
1897.....	802,296	200,310	619,860	910,170	1,019,390	3 00	2,730,510
1898.....	1,136,435	375,423	752,863	1,123,286	1,263,630	3 00	3,334,853
1899.....	1,306,324	526,053	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	1,614,630	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	1,663,053	1,862,625	3 00	4,989,174
1905.....	1,736,696	1,039,667	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	2,111,616	2,364,898	3 50	7,390,306
1908.....	2,111,931	1,436,511	597,157	2,083,668	2,333,708	3 50	7,292,833
1909.....	2,338,196	1,535,232	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	10,408,530
1911.....	2,304,794	1,657,422	612,696	2,270,118	2,542,532	3 50	7,945,522
1912.....	2,857,345	1,898,213	966,963	2,865,176	3,208,997	3 50	10,028,116
1913.....	2,537,357	1,799,643	623,946	2,423,589	2,714,420	3 50	8,432,562

\*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.'

†Two months only.

## Yukon.

Coal mining in the Yukon district in 1913 was confined to the operations of the Five Fingers Coal Company at Tantalus in the southern Yukon, and the Northern Light Power and Coal Co., Ltd., on Coal Creek, 40 miles northwest of Dawson. The total production in 1913 was 19,722 tons valued at \$95,945.

COAL.—TABLE 16.

## Yukon Territory: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.
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

\*Part of this production was mined in 1900.

## COKE.

The total quantity of coke made in Canadian coke oven plants during 1913 from both domestic and imported coals was 1,517,133 tons. The quantity of coal used for this production was 2,247,913 tons, of which 1,698,912 tons were domestic coal and 549,001 tons were imported. Of the total production during the year, 67 per cent, or 1,018,632 tons, was made in by-product ovens.

In 1912, 1,406,028 tons of coke were made from 2,053,807 tons of coal, of which 1,528,509 tons were mined in Canada and 525,298 tons imported.

The quantity of coke sold or used by the producers in 1913 was 1,530,499 tons as compared with 1,411,229 tons in 1912.

The consumption of coke in Canada is much in excess of the domestic production, there being a considerable importation of coke chiefly into Ontario and Quebec for use in the metallurgical industries.

The imports of coke during the calendar year 1913 were 723,906 tons, and the exports 68,235 tons. Adding the production, 1,530,499

tons, to the net imports, a consumption is shown of 2,186,170 tons. Similarly estimated, the consumption in 1912 was 1,981,659 tons, and in 1911, 1,677,188 tons.

### Coke Production, 1913.

Province.	Coal charged to ovens.	Output of coke.	STOCK ON HAND.		Coke sold or used.	Per cent of total prod.	Value of sales, etc.
			Jan. 1.	Dec. 31.			
	Tons.	Tons.	Tons.	Tons.	Tons.	%	\$
Nova Scotia.....	1,109,629	720,526	4,898	3,386	722,038	47.17	2,352,153
Ontario.....	(a) 549,001	411,643	19,397	11,753	419,287	27.40	1,991,613
Alberta.....	104,012	65,104	2,817	518	67,403	4.41	269,612
British Columbia.....	485,271	319,860	6,814	4,903	321,771	21.02	1,306,218
Total.....	2,247,913	1,517,133	33,926	20,560	1,530,499	100.00	5,919,596

(a) All imported coal.

### Coke Production, 1912.

Province.	Coal charged to ovens.	Output of coke.	STOCK ON HAND.		Coke sold or used.	Per cent.	Value. of sales, etc.
			Jan. 1.	Dec. 31.			
	Tons.	Tons.	Tons.	Tons.	Tons.		\$
Nova Scotia.....	(a) 935,784	624,762	7,097	5,941	625,918	44.4	1,840,129
Ontario.....	(b) 502,671	376,314	22,937	19,397	379,854	26.9	1,709,343
Alberta.....	170,818	108,900	628	3,844	105,684	7.5	424,027
British Columbia.....	444,534	296,052	8,411	4,690	299,773	21.2	1,190,832
Total.....	2,053,807	1,406,028	39,073	33,872	1,411,229	100.0	5,164,331

(a) Including 22,627 tons imported coal.

(b) All imported coal.

### Distribution of Coke Production, 1913.

	Nova Scotia.	Ontario.	Alberta.	British Columbia.	Total.
Sold in Canada.....	12,494	4,531	66,253	265,070	348,348
Sold for export.....	0	0	980	56,701	57,681
Total sales.....	12,494	4,531	67,233	321,771	406,029
Used by maker in blast furnace or otherwise.....	709,544	414,756	170	0	1,124,470
Total sold or used.....	722,038	419,287	67,403	321,771	1,530,499
Number of ovens in operation December 31.....	572	110	134	904	1,720
Number of ovens idle December 31.....	376	100	233	666	1,375
Number of ovens building December 31....	0	0	0	0	0

COKE.—TABLE 1.

## Annual Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	35,396	101,940	2 88	1900.....	157,134	649,140	4 13
1887.....	40,428	135,951	3 36	1901.....	365,531	1,228,225	3 36
1888.....	45,373	134,181	2 96	1902.....	502,043	1,519,185	3 03
1889.....	54,539	155,043	2 84	1903.....	561,318	1,734,404	3 09
1890.....	56,450	166,298	2 95	1904.....	554,083	2,032,048	3 66
1891.....	57,084	175,592	3 08	1905.....	700,488	2,436,211	3 48
1892.....	56,135	160,249	2 85	1906.....	782,055	2,863,503	3 66
1893.....	61,078	161,790	2 65	1907.....	842,003	3,583,468	4 26
1894.....	58,044	148,551	2 56	1908.....	853,257	3,449,361	4 02
1895.....	53,356	143,047	2 68	1909.....	862,011	3,484,393	4 04
1896.....	49,619	110,257	2 22	1910.....	902,715	3,462,872	3 84
1897.....	60,686	176,457	2 91	1911.....	935,651	3,630,410	3 88
1898.....	87,600	286,000	3 26	1912.....	1,411,229	5,164,331	3 66
1899.....	100,820	350,022	3 47	1913.....	1,530,499	5,919,596	3 87

COKE.—TABLE 2.

## Annual Production of Coke by Provinces.

Calendar Year.	NOVA SCOTIA.		ONTARIO.		BRITISH COLUMBIA.		ALBERTA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1897.....	41,532	90,950			19,154	85,507		
1898.....	48,400	111,000			39,200	175,000		
1899.....	62,459	178,767			38,361	171,255		
1900.....	61,767	223,395			95,367	425,745		
1901.....	222,694	590,560			142,837	637,665		
1902.....	363,350	899,930			138,713	619,255		
1903.....	371,745	888,094			189,573	846,310		
1904.....	275,927	808,022			257,172	1,148,090	20,984	78,936
1905.....	386,366	1,054,712			269,256	1,202,035	44,866	179,464
1906.....	476,364	1,540,976			236,205	1,054,435	69,486	268,042
1907.....	524,110	1,688,070			241,572	1,049,432	78,321	297,595
1908.....	505,929	1,658,151			276,633	1,482,191	75,645	309,019
1909.....	492,992	1,608,092			281,780	1,509,567	87,233	366,734
1910.....	508,058	1,655,775	24,085	148,110	248,394	1,172,675	121,578	486,312
1911.....	557,554	1,814,977	259,554	1,318,303	82,327	350,879	36,216	146,251
1912.....	625,018	1,840,129	379,854	1,709,343	299,773	1,190,832	105,684	424,027
1913.....	722,038	2,352,153	419,287	1,991,613	321,771	1,306,218	67,403	269,612

In Nova Scotia, coke was made at Sydney, Sydney Mines, and Westville, during 1913, but the ovens at Stellarton and Londonderry were idle. The output is used almost entirely in the manufacture of iron and steel. The Ontario production was all from the ovens of the Algoma

Steel Corporation, Ltd., at Sault Ste. Marie, the blast furnaces and coking ovens of the Atikokan Iron Company at Port Arthur being idle throughout the year. In Alberta, coke oven plants were operated at Coleman only, those at Lille and Passburg remaining idle throughout the year. In British Columbia, the ovens at Fernie, Michel, and Hosmer were active while those at Carbonado and Comox were out of commission. The coke output of these western Provinces is used chiefly by the copper and lead smelters, finding a market in the United States as well as in Canada.

The total number of ovens in active operation on December 31, 1913, was 1,720, while 1,375 were reported idle on the same date. In Nova Scotia the Dominion Iron and Steel Company has 620 finished ovens, all of the Otto Hoffman by-product type. The by-products from these ovens include tar, sulphate of ammonia, and gas. The tar is sold to the Dominion Tar and Chemical Company whose works are contiguous to the coke oven plant, and this product is treated for the manufacture of refined tar, pitch of various grades, benzole, creosote, carboic acid, and many other tar products. Sulphate of ammonia is produced in crystallized form for the trade, and the gas is used in the Company's furnace operations.

The Nova Scotia Steel and Coal Company has 30 ovens of the Bauer type and 120 Bernard ovens; the latter are situated near the blast furnaces, and the surplus gas is used for the production of steam for the electric power plant. The surplus gas from the Bauer ovens is used in generating steam for general colliery use.

The other ovens in Nova Scotia number 178, and are all of the Beehive type.

In Ontario, the Atikokan Iron Co., Ltd., has 100 Beehive ovens at Port Arthur, and the Algoma Steel Corporation, Ltd., 110 Koppers by-product regenerative ovens at Sault Ste. Marie; tar, sulphate of ammonia and gas are recovered as by-products.

In Alberta the International Coal and Coke Co. has 216 ovens of the Beehive type at Coleman. The West Canadian Collieries, Ltd., at Lille, has 50 ovens of the Bernard or Belgian type, and the Leitch Collieries, Ltd., has 101 Mitchell rectangular ovens at Passburg. The ovens of the latter two companies were idle during 1913.

The Crowsnest Pass Coal Company has 454 Beehive ovens at Fernie, 486 at Michel, and 240 at Carbonado, the latter having been idle for some years past. The Canadian Pacific Railway, Ltd. (Hosmer Mines) has 240 Beehive ovens at Hosmer, and the Canadian Collieries (Dunsmuir), Ltd., 150 ovens at Comox on Vancouver island.

The exports of coke during the calendar year 1913 were 68,235 tons as against 57,744 tons exported in 1912 and 9,852 tons in 1911. These exports are all from British Columbia and Alberta.

The imports of coke during the calendar year 1913 were 723,906 tons valued at \$2,180,830, as against imports of 628,174 tons valued at \$1,702,856 in 1912, and 751,389 tons valued at \$1,843,248 in 1911.

COKE.—TABLE 3.

## Annual Exports of Coke.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	2,987	6,078	1905.....	116,071	509,908
1898.....	3,774	8,394	1906.....	37,003	163,571
1899.....	5,557	13,726	1907.....	70,617	320,357
1900.....	41,529	131,278	1908.....	58,708	248,759
1901.....	57,505	176,990	1909.....	74,067	329,051
1902.....	62,568	180,920	1910.....	57,971	250,715
1903.....	32,608	135,957	1911.....	9,852	39,823
1904.....	102,463	345,031	1912.....	57,744	252,763
			1913.....	63,235	308,410

COKE.—TABLE 4.

## Annual Imports of Oven Coke.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1880.....	3,337	19,353	1897.....	83,330	267,540
1881.....	5,492	26,123	1898.....	135,060	347,040
1882.....	3,157	36,670	1899.....	141,284	362,826
1883.....	3,943	38,538	1900.....	187,873	506,839
1884.....	11,207	44,518	1901.....	303,786	630,133
1885.....	11,564	41,391	1902.....	267,142	842,815
1886.....	11,858	39,756	1903.....	256,723	1,222,756
1887.....	15,110	56,222	1904.....	221,050	765,123
1888.....	25,487	102,334	1905.....	371,593	807,842
1889.....	29,557	91,902	1906.....	480,222	1,311,375
1890.....	36,564	133,344	1907*.....	400,536	1,132,680
1891.....	38,533	177,605	1908.....	619,269	2,166,036
1892.....	43,499	194,429	1909.....	466,292	1,136,624
1893.....	41,821	156,277	1910.....	702,053	1,695,603
1894.....	42,864	176,996	1911.....	763,114	1,837,493
1895.....	43,235	149,434	1912.....	641,903	1,637,091
1896.....	61,612	203,826	1913†.....	710,109	2,023,253

\*For nine months only. †Duty free.

## Coke Oven By-Products.

The production of by-products from coke ovens in 1913 at Sydney and Sault Ste. Marie included 8,371,600 gallons of tar and 10,608 tons

of sulphate of ammonia. In 1912 the production was 8,428,896 gallons of tar and 11,289 tons of sulphate of ammonia.

### Annual Production of Coke Oven By-Products.

Year.	Tar.	Sulphate of ammonia.	Year.	Tar.	Sulphate of ammonia.
	Gals.	Tons of 2,000 lbs.		Gals.	Tons of 2,000 lbs.
1901.....	2,662,612	1,614	1908.....	4,450,166	3,342
1902.....	4,094,135	2,393	1909.....	4,016,824	3,416
1903.....	3,281,249	3,207	1910.....	3,963,591	3,491
1904.....	1,649,197	1,773	1911.....	6,464,155	7,124
1905.....	3,407,784	2,500	1912.....	8,428,896	11,289
1906.....	3,723,723	2,364	1913.....	8,371,000	10,608
1907.....	4,424,615	1,738			



## FELDSPAR.

The total shipments of feldspar in 1913 were reported as 16,790 tons, valued at \$60,795, or an average of \$3.62 per ton, as compared with shipments in 1912 of 13,733 tons, valued at \$30,916, or an average of \$2.25 per ton

The shipping firms were:—

The Kingston Feldspar and Mining Co., Kingston, Ont. Mines at Verona, Ont.

The Dominion Feldspar Co., Ltd., 425 Roxton Road, Toronto, Ont. Mines near Bobs lake, Frontenac county.

The Dominion Improvement and Development Co., Perth, Box 26, Ont.

Messrs. O'Brien and Fowler, Hope Building, Ottawa. Mines at Villeneuve, Que.

The greater part of the shipments are exported to the United States; the exports of feldspar in 1913 being reported as 15,966 tons, valued at \$62,767, or an average value of \$3.93 per ton.

Almost the entire production of Canadian feldspar is derived from the Province of Ontario, the principal mines being located in the county of Frontenac, about 20 miles north of the town of Kingston on the St. Lawrence river. A few small deposits, also, have been worked in the Parry Sound district, in the vicinity of the Muskoka lakes. Formerly, feldspar was mined to some extent also in the Province of Quebec, the deposits being located in Ottawa county. No development of these properties has taken place during recent years, the distance from the United States factories rendering mining unprofitable. One mine in this region yields a remarkably pure white feldspar, which is in demand for the manufacture of artificial teeth. During 1912 some development was undertaken on feldspar deposits at Manikuagan bay on the north shore of the gulf of St. Lawrence.

Statistics of the production and exports of feldspar are shown 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	15,066	62,767	3 93

\*Exports.

## FLUORSPAR.

No shipments of fluorspar were reported in 1913.

The occurrence of fluorspar has been noted at several points in the vicinity of Madoc, Hastings county, Ontario. In 1905, a deposit on lot 1, concession IV of Madoc township, was opened by Mr. S. Wellington, of Madoc, and a shipment of twelve tons made to Port Hope. In 1910, some development was made on a deposit on lot 10, concession XIV, of the township of Huntingdon, by Messrs. Gillespie and Wellington, and about 200 tons of mineral taken out, of which two tons, valued at \$15, were shipped during the year. Prospecting on this property has been continued during the past three years, and in 1911, 34 tons, valued at \$238, were shipped to metallurgical works at Deloro, and the Canadian steel foundries at Welland; in 1912, 40 tons, valued at \$240, were shipped to smelting works at Copper Cliff. While no shipments were made in 1913 development was continued by the sinking of a shaft, the property being now known as the Rogers fluorspar mine.

In addition to the above occurrences, fluorspar has also been noted on lot 2, concession III of Madoc township, and lot 11, concession XIII of Huntingdon township.

Imports of fluorspar are not separately shown in the reports of the Customs Department, but considerable quantities are used in steel furnaces, the quantity thus consumed in 1910 being reported as 7,461 tons, in 1911, 8,067 tons; in 1912, 9,709 tons, and in 1913, 10,687 tons.

Hydro-fluo-silicic acid is used in the lead refinery at Trail, B.C., and the imports during the last five years have been as follows:—

	Pounds.	\$
Fiscal year, 1910.....	433,680	22,622
" 1911.....	234,380	12,324
" 1912.....	167,112	9,137
" 1913.....	320,844	26,358
" 1914.....	1,552,391	55,140

## GRAPHITE.

The total shipments of graphite in 1913, were reported as 2,162 tons, valued at \$90,282, and included 400 tons of crude graphite, valued at \$2,400, and 1,762 tons of refined graphite, valued at \$87,882, or an average of \$49.88 per ton.

In 1912 the total shipments were 2,060 tons, valued at \$117,122, which included 210 tons of crude graphite, valued at \$1,365 and 1,850 tons of refined graphite, valued at \$115,757, or an average of \$62.57 per ton.

In 1911 the total shipments were 1,269 tons of refined or milled graphite, valued at \$69,576, or an average of \$54.83 per ton.

In 1910 the total shipments of graphite were 1,392 tons, valued at \$74,087, comprising 245 tons of crude graphite, valued at \$2,450, and 1,147 tons of refined graphite, valued at \$71,637, or an average of \$62.46 per ton.

Statistics of the annual production since 1886 are shown in the following table:—

GRAPHITE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	500	4,000	1900.....	1,922	31,040
1887.....	300	2,400	1901.....	2,210	38,780
1888.....	150	1,200	1902.....	1,095	28,300
1889.....	242	3,160	1903.....	728	23,745
1890.....	175	5,200	1904.....	452	11,760
1891.....	260	1,560	1905.....	541	16,735
1892.....	167	3,763	1906.....	387	18,300
1893.....	Nil.	Nil.	1907.....	579	16,000
1894*.....	3	223	1908.....	251½	5,565
1895.....	220	6,150	1909.....	864	47,800
1896.....	139	9,455	1910.....	1,392	74,087
1897.....	436	16,240	1911.....	1,269	69,576
1898.....	.....	13,698	1912.....	2,060	117,122
1899.....	1,130	24,179	1913.....	2,162	90,282

\*Exports.

The graphite shipments in 1913 comprised 103 tons, valued at \$9,620, from mills in the Buckingham district, Province of Quebec, and 2,059 tons, valued at \$80,662, from mines and mills at Calabogie, and Wilberforce, Ont.

In 1912 the shipments from the Province of Quebec, were 604 tons, valued at \$50,680, and from Ontario 1,456 tons, valued at \$66,442.

The total value of the exports of graphite in 1913, was \$109,652, being classified as crude ore and concentrates, and manufactures of plumbago. The ores and concentrates exported in 1913 are given as 1,642 tons, valued at \$85,368, and manufactures of plumbago, valued at \$24,284. Of the ore and concentrates exported, 19 tons, valued at \$1,700, were reported as shipped to Great Britain; 1,618 tons, valued at \$82,758, to United States, and 5 tons, valued at \$910 to other countries.

The manufactures of plumbago exported included \$3,278 to Great Britain, \$20,279 to United States, and \$727 to other countries.

GRAPHITE.—TABLE 2.

## 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.....	738	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

Statistics of the imports of graphite into Canada, are given in the next table, showing an importation principally of manufactured graphite products to the value of \$153,604 during the fiscal year 1913, as compared with a valuation of \$130,381, during the fiscal year 1912.

The imports of graphite during the calendar year 1913 were valued at \$156,233, and comprised: plumbago, not ground, \$9,375; black lead, \$8,633;

plumbago, ground, and manufactures, \$64,254; and crucibles of clay or plumbago \$73,971.

The imports of graphite during the calendar year 1912 were valued at \$155,484, and comprised: plumbago, not ground, \$7,249; black lead \$9,587; plumbago, ground, and manufactures, \$56,324; and crucibles of clay or plumbago, \$82,324.

GRAPHITE—TABLE 3.

## 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	8,292	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	13,434	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.....	2,409	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
1910.....	5,223	11,930	39,815	43,029	99,997
1911.....	4,300	10,728	43,733	53,108	111,869
1912.....	6,163	11,804	39,978	72,376	130,381
1913.....	6,105	9,448	57,780	80,271	153,604

The market for graphite in Great Britain is, to some extent, indicated by the imports into that country, which are shown as follows:—

### Imports of Plumbago into Great Britain,<sup>1</sup> 1912 and 1913.

	1912.			1913.		
	Tons. (short).	Value.	Value per ton.	Tons (short).	Value.	Per ton.
		\$	\$		\$	\$
Germany.....	3,362	128,212	38.1	3,376	133,196	39.5
France.....	185	8,230	44.5	199	10,541	52.9
Madagascar.....	2,025	208,240	102.8	4,519	449,578	99.5
Italy.....	1,136	22,737	20.0	1,400	26,942	19.2
Austria-Hungary.....	197	4,672	43.7	502	11,500	22.90
Japan.....	3,072	84,140	27.4	4,324	131,006	31.30
United States.....	355	34,281	96.6	421	36,495	86.69
Other foreign countries.....	764	23,160	30.3	1,016	36,315	35.74
British India.....	1,681	81,011	48.2	539	31,482	58.41
Ceylon and dependencies.....	5,880	618,918	105.3	6,707	793,816	118.36
Australia.....	6	122	20.3	88	1,801	20.46
Canada.....	39	3,484	89.3	64	5,840	91.25
Other British possessions.....						
Total.....	18,702	1,217,207	65.1	23,155	1,668,512	72.06

<sup>1</sup> British Trade Report.

Prices of refined graphite in London, England, as quoted in the Mining Journal of December 27, 1913, were as follows:—

#### PURIFIED, MILLED, AND GROUND.

Ceylon, 97 to 99 per cent	£59 to	£63 per ton	f.o.b. London.
“ 90 to 91 “	40 to	42 “	“
“ 80 to 81 “	30 to	32 “	“
“ 70 to 71 “	27 to	28 “	“
American, large flake	45 to	49 “	“
“ small	35 to	45 “	“

Following is a list of the principal firms operating graphite mines:—

Operator and Address.	LOCATION.			Mine office.
	County.	Township.	Range or concession and lot.	
<i>Quebec.</i>				
*The Canadian Graphite Co., Ltd., Montreal, 207 Coristine Building.	Argenteuil..	Wentworth..	III, 1A, 1B.....	Lachute.
Graphite Limited, Montreal, 220 Board of Trade Building.	Ottawa.....	Amherst....	VI and VII, 16....	St. Remi d'Amherst.
The Quebec Graphite Co., Ltd., Buckingham, Box 262.	"	{ Buckingham	IV, 1, E $\frac{1}{2}$ 2, 3, $\frac{3}{4}$ , 35	Buckingham.
*Buckingham Graphite Co., Ltd., Buckingham.	"	{ Lochaber...	IV, 28.....	"
*The Bell Graphite Co., Ltd., Buckingham, Box 185.	"	{ Buckingham	VI, 28.....	"
*Dominion Graphite Co., Toronto, 7 and 9 King East.	"	"	V, 2.....	"
*Peerless Graphite Co., Rochester, N.Y., 64 Clinton, North.	"	"	V, 28.....	In liquidation
	"	"	IX, 12; X, 13....	Buckingham.
<i>Ontario.</i>				
Black Donald Graphite Co., Calabogie.	Renfrew....	Brougham..	III, IV, Whitefish Lake.	Calabogie.
*The Globe Refining Co., Ltd., Ottawa 175 Cooper St.	{ Lanark....	Elmsley N..	VI, 23.....	Port Elmsley.
	{ " .....	Burgess N..	V, 21, VI, 22....	"
Tonkin-du Pont Graphite Co., Ltd., Wilberforce.	{ Hastings...}	Monteagle..	XIII, 23.....	Maynooth.
	{ Haliburton}	Monmouth..	XV, S $\frac{1}{2}$ 35.....	Wilberforce.
*New York Graphite Co., Harcourt..	"	Cardiff....	XXI.....	Harcourt.

\*Idle in 1913.

#### ARTIFICIAL GRAPHITE.

The manufacture of artificial graphite in electric furnaces has been carried on for some years at Niagara Falls, Ontario, by the International Acheson Graphite Company. The production has been as follows:—

	Pounds.
1906.....	445,047
1907.....	407,779
1908.....	428,540
1909.....	513,436
1910.....	2,442,166
1911.....	2,172,098
1912.....	2,302,625
1913.....	2,184,472



## GYPSUM.

Gypsum, has been extensively quarried or mined for many years in the Provinces of Nova Scotia and New Brunswick and, to a lesser extent, in the Province of Ontario. During the past twelve years the gypsum deposits north of Lake St. Martin, Manitoba, have been operated with a growing annual production. The existence of several gypsum deposits in British Columbia has been known for some years, and in 1911 some development work was done and the first shipments made.

The total shipments of gypsum products in 1913 including crude, ground, and calcined gypsum, were 636,370 tons, valued at \$1,447,739, as compared with 578,458 tons, valued at \$1,324,620 in 1912.

The total quantity of crude gypsum mined in 1913, was 684,726 tons, as compared with 549,856 tons in 1912. The quantity calcined in 1913 was reported as 147,532 tons, compared with 133,392 tons in 1912. The total shipments in 1913 included 499,460 tons of crude gypsum, valued at \$615,493, or an average value of \$1.23 per ton; 10,281 tons of ground gypsum valued at \$20,576, or an average value of \$2.00 per ton; and 126,629 tons of calcined gypsum, valued at \$811,670, or an average value of \$6.41 per ton. The total shipments in 1912 included: 453,577 tons of crude gypsum, valued at \$525,345, or an average value of \$1.16 per ton; 15,487 tons of ground gypsum, valued at \$29,244, or an average value of \$1.89; and 109,394 tons of calcined gypsum, valued at \$770,031, or an average value of \$7.04 per ton.

The total quantity of gypsum mined, and the total quantity calcined, during the past nine years are shown herewith.

### Gypsum Mined and Gypsum Calcined.

Year.	Total gypsum mined.	Gypsum calcined.
	Tons.	Tons.
1905.....	443,569	26,855
1906.....	492,759	28,831
1907.....	489,962	34,752
1908.....	375,444	48,727
1909.....	493,086	63,670
1910.....	548,019	69,889
1911.....	515,979	76,718
1912.....	549,856	133,392
1913.....	684,726	147,532

A very large part of the gypsum mined is shipped in the lump form, as quarried, to calcining mills in the United States. From 8,000 to 15,000

tons are ground for various uses, while the balance, nearly 22 per cent in 1913, is calcined in Canada for the manufacture of wall plaster, plaster of Paris, and other gypsum products. A considerable portion of the output of crude gypsum is used in the manufacture of Portland cement.

Detailed statistics of the production and sales of crude, crude ground, and calcined gypsum, during the past nine years, and the total annual sales of gypsum products since 1886, and the total sales by provinces, are shown in tables following.

GYPSUM--TABLE 1.

**Sales and Shipments of Crude, Ground, and Calcined Gypsum,  
1905-1913.**

Calendar Year.	CRUDE (LUMP).			CRUDE (GROUND).		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	412,155	409,146	0 99	3,255	8,779	2 70
1906.....	442,132	473,960	1 07	3,195	9,823	3 07
1907.....	454,668	473,831	1 04	6,732	16,268	2 42
1908.....	298,188	307,532	1 03	9,504	25,468	2 68
1909.....	423,474	457,038	1 08	8,814	26,159	2 97
1910.....	469,573	508,686	1 08	6,121	17,390	2 84
1911.....	449,823	481,077	1 07	7,149	23,125	3 23
1912.....	453,577	525,345	1 16	15,487	29,244	1 89
1913.....	499,460	615,493	1 23	10,281	20,576	2 00

Calendar Year.	CALCINED.			TOTAL SALES.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	26,748	168,243	6 29	442,158	586,168	1 32
1906.....	23,695	159,511	6 73	469,022	643,294	1 37
1907.....	24,521	156,815	6 40	485,921	646,914	1 33
1908.....	33,272	242,701	7 29	340,964	575,701	1 69
1909.....	40,841	326,435	7 99	473,129	809,632	1 71
1910.....	49,552	408,370	8 24	525,246	934,446	1 78
1911.....	61,411	489,192	7 97	518,383	993,394	1 92
1912.....	109,394	770,031	7 04	578,458	1,324,620	2 29
1913.....	126,629	811,670	6 41	636,370	1,447,739	2 27

GYPSUM—TABLE 2.

## Annual Production of Gypsum Products.

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year.	Tons.	Value.	Per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	162,000	178,742	1 10	1900.....	252,101	259,009	1 02
1887.....	154,008	157,277	1 02	1901.....	293,799	340,148	1 16
1888.....	175,887	179,393	1 01	1902.....	333,599	379,479	1 14
1889.....	213,273	205,103	0 96	1903.....	314,489	388,459	1 24
1890.....	226,509	194,033	0 86	1904.....	345,961	373,474	1 08
1891.....	203,605	206,251	1 01	1905.....	442,153	536,168	1 32
1892.....	241,048	241,127	1 00	1906.....	469,022	643,294	1 37
1893.....	192,568	196,150	1 02	1907.....	485,921	646,914	1 33
1894.....	223,631	202,031	0 90	1908.....	340,964	575,701	1 69
1895.....	226,173	202,608	0 89	1909.....	473,129	809,632	1 71
1896.....	207,032	178,061	0 86	1910.....	525,246	934,446	1 78
1897.....	239,691	244,531	1 02	1911.....	518,333	993,304	1 92
1898.....	219,256	232,515	1 06	1912.....	578,468	1,324,620	2 29
1899.....	244,566	257,329	1 05	1913.....	636,370	1,447,739	2 27

GYPSUM—TABLE 3.

## Annual Production by Provinces.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		MANITOBA.		BR. 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.....	156,309	133,029	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.....	132,036	106,610	86,083	121,704	1,087	4,201				
1899.....	126,754	102,055	116,792	151,296	1,020	3,973				
1900.....	133,712	103,328	112,294	145,350	1,095	4,331				
1901.....	170,100	136,947	121,595	139,709	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	173,831	119,182	172,080	2,720	21,983	3,160	20,510		
1904.....	213,580	153,800	190,991	187,524	2,390	18,350	4,000	14,000		
1905.....	272,252	293,248	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	93,716	226,975	11,731	43,278	17,000	170,000		
1910.....	400,455	453,638	90,236	213,379	15,055	67,229	19,500	195,000		
1911.....	353,999	406,457	93,205	115,044	27,399	98,013	43,000	372,000	780	1,875
1912.....	376,032	481,493	82,757	135,321	53,119	176,056	66,500	481,250		
1913.....	404,301	479,515	103,954	279,395	62,315	208,029	65,100	479,500	200	1,300

## 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 gypsum during the calendar year 1913, were 417,302 tons, valued at \$504,383, or an average of \$1.21 per ton, as compared with exports of 364,643 tons, valued at \$423,208, or an average of \$1.16 per ton in 1912.

There was also an export of ground gypsum in 1913, valued at \$5,975, as compared with an export valued at \$6,495, in 1912.

The imports during the calendar year 1913 reached a total value of \$188,252, and included: crude gypsum 4,522 tons, valued at \$21,763, or \$4.81 per ton; ground gypsum valued at \$11,770, and plaster of Paris 20,113 tons, valued at \$154,719, or an average of \$7.69 per ton.

The imports during the calendar year 1912 totalled 43,071 tons, valued at \$268,103, and included: crude gypsum 3,503 tons, valued at \$16,254, or \$4.64 per ton; ground gypsum, 7,072 tons, valued at \$19,651, or \$2.78, per ton; and plaster of Paris, 32,496 tons, valued at \$232,198, or \$7.15 per ton.

The imports previous to 1905 were comparatively small; since that year however, imports, particularly of plaster of Paris, have increased considerably. During the past seven years the imports of plaster of Paris have increased from 6,000 to over 20,113 tons in 1913, whereas formerly the imports ranged from 150 to 720 tons annually. The imports classed as 'crude' and 'ground' have varied considerably, both in quantity and apparently in average values.

GYPSUM—TABLE 4.

## Exports of Crude Gypsum.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1874.....	67,830	68,164					67,830	68,164
1875.....	86,065	86,193	5,420	5,420			91,485	91,613
1876.....	87,720	87,500	4,925	6,616	120	180	92,765	94,386
1877.....	106,950	93,867	5,030	5,030			111,980	98,897
1878.....	88,631	76,695	16,335	16,435	480	675	105,455	93,805
1879.....	95,623	71,353	8,791	8,791	579	720	104,993	80,864
1880.....	125,685	111,833	10,375	10,987	875	1,240	136,935	124,060
1881.....	110,303	100,284	10,310	15,025	657	1,040	121,270	116,349
1882.....	133,426	121,070	15,597	24,581	1,249	1,946	150,272	147,597
1883.....	145,448	132,834	20,242	35,557	462	837	166,152	169,228
1884.....	107,653	100,446	21,800	32,751	688	1,254	130,141	134,451
1885.....	81,887	77,898	15,140	27,730	525	787	97,552	106,415
1886.....	118,985	114,116	23,498	40,559	350	538	142,833	155,213
1887.....	112,557	106,910	19,942	39,295	225	337	132,724	146,542
1888.....	124,818	120,429	20	50	670	910	125,508	121,389
1889.....	146,204	142,850	31,495	50,862	483	692	178,182	194,404
1890.....	145,452	139,707	30,034	52,291	205	256	175,691	192,254
1891.....	143,770	140,438	27,536	41,350	5	7	171,311	181,795
1892.....	162,372	157,463	27,488	43,623			189,860	201,086
1893.....	132,131	122,556	30,061	36,706			162,192	159,262
1894.....	119,509	111,586	40,843	46,538			160,412	153,124
1895.....	133,369	125,651	56,117	67,593			189,486	193,244
1896.....	116,331	109,054	64,946	77,535			181,277	186,589
1897.....	122,984	116,665	66,222	80,485			189,206	197,150
1898.....	99,215	93,474	70,399	81,433			169,614	174,907
1899.....	104,795	99,984	96,831	108,094	* $\frac{3}{2}$	12	201,626	208,090
1900.....							188,262	201,912
1901.....							236,247	231,594
1902.....							289,600	295,215
1903.....							287,496	311,580
1904.....							298,211	316,436
1905.....							359,246	388,474
1906.....							404,464	462,814
1907.....							375,026	424,794
1908.....							280,091	324,574
1909.....							315,201	372,286
1910.....							346,081	416,725
1911.....							362,102	425,161
1912.....							364,643	423,208
1913.....							417,302	504,383

\*Exported from British Columbia.

GYPSUM.—TABLE 5.

## Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1890.....	105	1898.....	6,448	1906.....	2,934
1891.....	538	1899.....	8,123	1907.....	557
1892.....	20,255	1900.....	19,834	1908.....	9,765
1893.....	22,132	1901.....	15,337	1909.....	2,787
1894.....	20,054	1902.....	5,101	1910.....	12,306
1895.....	22,233	1903.....	12,457	1911.....	4,429
1896.....	21,267	1904.....	2,333	1912.....	6,495
1897.....	6,763	1905.....	2,673	1913.....	5,795

## GYPSUM—TABLE 6.

## 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	3,416	687,432	1,936	782,920	5,226
1885.....	1,353	2,354	461,400	1,177	639,521	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	999,900	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	1,731	15,020,000	51,328
1909.....	10,317	35,268	6,286,200	5,765	17,009,000	64,849
1910.....	3,790	12,137	21,417,000	17,402	42,095,700	123,965
1911.....	12,500	22,872	13,764,300	12,298	38,562,800	135,337
1912.....	2,147	12,263	1,965,300	3,939	60,803,100	205,676
1913.....	4,179	18,994	16,721,700	22,939	63,879,100	228,224

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c. per 100 lbs.

The Province of Nova Scotia is as usual the largest producer of gypsum. In both this Province and New Brunswick, the deposits are extensive, and the facilities for water shipment to the United States ports are unexcelled. The total quantity of gypsum mined in Nova Scotia in 1913 was 423,977 tons, as compared with 330,422 tons in 1912; and 337,605 tons in 1911. Of the total in 1913 about 88 per cent was mined from quarries in Hants county, at Windsor, Walton, Cheverie, Noel, etc., the balance being quarried at St. Ann and McKinnon Harbour, Victoria county. The greater part of the gypsum mined was shipped crude, chiefly to the United States. Two calcining mills have been constructed in the Province to calcine gypsum, one at Windsor, and the other at Eastern Harbour, Cape Breton.

In New Brunswick the principal operating quarries are located at Hillsborough, while some production was also made from the Tobique River deposits at Plaster Rock, in Victoria county. The total quantity of gypsum mined in the Province in 1913 was 112,739 tons, as against 82,348 tons in 1912, and 92,446 tons in 1911. About 66 per cent of the output was shipped crude, either in lump form, or ground, and the balance calcined, the calcined product finding a market throughout Canada.

In Ontario 71,310 tons were reported as having been mined during 1913, as compared with 57,086 tons in 1912, and 32,148 tons in 1911. The total sales in 1913, including crude, ground, and calcined gypsum, were 62,315 tons, valued at \$208,029, the sales including a quantity of alabastine manufactured by one firm and valued at about \$50 per ton.

The production of gypsum in Manitoba has continued to increase steadily each year, and in 1913 the value of the shipments was almost as high as those of Nova Scotia. Practically all of the gypsum mined in this Province is calcined in mills situated in Winnipeg. The total quantity of gypsum mined in 1913 was 76,500 tons, as compared with 80,000 tons in 1912, 53,000 in 1911, and 25,000 tons in 1910. The shipments in 1913 were 65,100 tons, chiefly calcined gypsum, valued at \$479,500, as compared with shipments in 1912 of 66,500 tons, valued at \$481,250, and 43,000 tons, valued at \$372,000, in 1911.

In 1913, there was a small production of gypsum in British Columbia at Waldo, in the Similkameen district, 200 tons having been shipped to the cement plant at East Princeton; while in 1911, 780 tons were mined.

The following is a list of the principal active operators:—

Location of Quarry.	Name of Operator.	Address.
Nappan, N.S.....	Maritime Gypsum Co., Ltd.....	New York, 381 Fourth Ave.
Avondale, N.S.....	Newport Plaster Mg. & Mfg. Co., Ltd.....	Windsor, N.S., Box 225.
Burtons, N.S.....	Windsor Plaster Co., Ltd.....	" " "
Walton, N.S.....	Albert Parsons.....	Walton, N.S.
Cheverie, N.S.....	Windsor Gypsum Co.....	Newburgh, N.Y.
Newport Station, N.S.....	Noel Plaster Co.....	Noel, N.S.
Noel, N.S.....	Wentworth Gypsum Co., Ltd...	Windsor, N.S.
Eagle Swamp, N.S.....	Cheticamp Gypsum & Plaster Co., Ltd.....	Montreal, Que. 137 McGill.
Eastern Harbour.....	Iona Gypsum Co., Ltd.....	Sydney, N.S., Box 362.
Iona, N.S.....	Newark Plaster Co.....	New York, 17 Battery Pl.
McKinnon Harbour, N.S.....	Victoria Gypsum & Mfg. Co.....	Quarry St. Anns, N.S.
Quarry St. Anns, N.S.....	The Albert Mfg. Co.....	Hillsborough, N.B.
Hillsborough, N.B.....	Hillsboro Plaster Co.....	"
".....	The New Brunswick Gypsum Co.	"
Plaster Rock, N.B.....	Stinson-Reeb Supply Co.....	Montreal, Que., E. T. Bk. Bldg.
".....	Jno. E. Stewart.....	Andover, N.B.
Caledonia, Ont.....	The Alabastine Co., (Paris) Ltd	Paris, Ont.
Lythmore, Ont.....	The Crown Gypsum Co., Ltd...	Buffalo, N.Y., 31 Main.
Gypsumville, Man.....	Manitoba Gypsum Co., Ltd.....	Winnipeg, Man.
".....	Dominion Gypsum Co., Ltd....	Box 537.
Coalmont, B.C.....	E. P. Gaillac.....	Princeton, B.C., Box 281.

## MAGNESITE.

The magnesite deposits in the township of Grenville, Argenteuil county, Quebec, were not actively operated in 1913. Shipments from stock were reported as 515 tons, valued at \$3,335. This deposit is situated about 12 miles from Calumet on the Canadian Pacific railway, and has for several years been operated by the Canadian Magnesite Company of Montreal, mining operations being carried on on the north half of lot 18, range XI, and the north half of lot 15, range IX. A calcining mill with a capacity of 15 tons per 24 hours, and a grinding plant of equal capacity have been constructed.

Shipments of magnesite in 1912 were reported as 1,714 tons, valued at \$9,645, the shipments in previous years being: 1911, 991 tons, valued at \$5,531; 1910, 323 tons, valued at \$2,160; 1909, 330 tons, valued at \$2,508; 1908, 120 tons, valued at \$840.

Magnesite has also been found in Canada in the Eastern Townships of the Province of Quebec, and at the town of Atlin, B.C.



## MANGANESE.

The manganese industry was at one time of considerable magnitude in the Provinces of Nova Scotia and New Brunswick, particularly during the decade between 1880 and 1890, the annual value of shipments ranging from \$30,000 to nearly \$50,000.

There was no production of manganese reported in 1913, although during the two previous years; the Nova Scotia Manganese Company had been opening up and developing their property at New Ross, N.S.

Exports of manganese in 1913 are reported by the Customs Department as 8 tons, valued at \$303, as compared with exports of 10 tons, valued at \$300, in 1912. The imports of manganese oxide during the calendar year 1913 were 5,175,195 pounds, or 2,588 tons, valued at \$46,990, or an average of \$18.16 per ton, as compared with imports in 1912 of 2,512,610 pounds, or 1,256 tons, valued at \$27,707, or an average of \$22.05 per ton.

Statistics of annual production, exports and imports, are shown in tables following.

MANGANESE.—TABLE I.

### Annual Production of Manganese.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	1,789	41,499	23 20	1900.....	30	1,800	60 00
1887.....	1,245	43,658	35 07	1901*.....	440	4,820	10 95
1888.....	1,801	47,944	26 62	1902*.....	172	4,062	23 62
1889.....	1,455	32,737	22 50	1903.....	91	2,775	30 49
1890.....	1,328	32,550	24 51	1904.....	66	2,740	41 51
1891.....	255	6,694	26 25	1905*.....	22	1,720	78 18
1892.....	115	10,250	89 13	1906*.....	93	925	9 95
1893.....	213	14,578	68 44	1907*.....	1	22	22 00
1894.....	74	4,180	56 49	1908.....	Nil.		
1895.....	125	8,464	67 71	1909.....	Nil.		
1896*.....	123½	3,975	32 19	1910.....	Nil.		
1897*.....	15½	1,166	76 46	1911.....	5½	300	54 55
1898.....	50	1,600	32 00	1912.....	75	1,875	25 00
1899.....	1,581	20,004	12 65	1913.....	Nil.	Nil.	

\*Exports.

MANGANESE.—TABLE 2.

## Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1873.....	1,031	20,192	1893.....	133	12,521
1874.....	782	16,973	1894.....	56	3,120
1875.....	203	5,514	1895.....	108.3	6,351
1876.....	412	8,039	1896.....	123.5	3,975
1877.....	891	15,909	1897.....	15.3	1,166
1878.....	626	10,860	1898.....	11	325
1879.....	1,886	27,436	1899.....	70	2,410
1880.....	2,179	34,797	1900.....	34	1,720
1881.....	1,704	40,554	1901.....	440	4,820
1882.....	894	25,747	1902.....	172	4,062
1883.....	1,326	25,343	1903.....	135	1,889
1884.....	603	20,089	1904.....	123	2,706
1885.....	1,684	34,649	1905.....	22	1,720
1886.....	(a) 1,813	53,338	1906.....	93	925
1887.....	1,415	34,802	1907.....	1	22
1888.....	1,181	21,832	1908.....		
1889.....	1,436	29,350	1909.....	3	434
1890.....	1,906	36,831	1910.....	4	160
1891.....	255	6,694	1911.....	4	225
1892.....	143	8,205	1912.....	10	300
			1913.....	8	303

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

MANGANESE.—TABLE 3.

## Imports: Oxide of Manganese.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1884.....	3,989	258	1899.....	141,356	5,539
1885.....	36,778	1,794	1900.....	126,725	4,155
1886.....	44,967	1,753	1901.....	272,134	8,176
1887.....	59,655	2,933	1902.....	476,331	5,360
1888.....	65,014	3,022	1903.....	279,611	8,051
1889.....	52,241	2,182	1904.....	275,696	7,051
1890.....	67,452	3,192	1905.....	235,289	6,832
1891.....	92,087	3,743	1906.....	244,620	5,508
1892.....	76,097	3,530	1907 (9 mos.).....	336,404	11,087
1893.....	94,116	3,696	1908.....	732,242	17,863
1894.....	101,863	4,522	1909.....	382,137	6,561
1895.....	64,151	2,781	1910.....	810,529	13,048
1896.....	103,590	4,075	1911.....	1,471,462	18,347
1897.....	70,663	2,741	1912.....	2,135,010	24,381
1898.....	130,456	5,047	1913.....	2,800,529	31,547

## MICA.

According to returns furnished by the producers, the total shipments of mica from Canadian mines in 1913 were 1,104 tons, valued at \$194,304, and included 626 tons, valued at \$125,488, from the Province of Quebec, and 478 tons, valued at \$68,816 from Ontario. The average value per ton of the Quebec shipments were \$200.46, and of the Ontario shipments \$143.97.

The total shipments in 1912 were reported as 580 tons, valued at \$143,976, and included 196 tons, valued at \$81,044, or an average value of \$413.48 from the Province of Quebec, and 384 tons, valued at \$62,932, or an average value per ton of \$163.89, from Ontario.

These statistics represent, as far as can be ascertained, the quantities and values of mica shipped from the mines. Much of this mica is shipped to trimming shops in Ottawa, Hull, Kingston, and other centres, where it is prepared for the market, and the value considerably increased, thus the mica is exported at a considerably higher value than that reported as production.

The exports in 1913 were reported as 409 tons, valued at \$240,775, as compared with exports in 1912 of 448 tons, valued at \$334,054.

Phlogopite, or amber mica, is the kind chiefly found and mined, although muscovite, or white mica, is also produced in small quantities.

The mica deposits of Canada have been the subject of a special monograph recently published by the Mines Branch.<sup>1</sup>

### Mica Reported as Shipped During 1912 and 1913.

Province.	1912.			1913.		
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.
		\$	\$ cts.		\$	\$ cts.
Quebec.....	196	81,044	413 48	626	125,488	200 46
Ontario.....	384	62,932	163 89	478	68,816	143 97
Total.....	580	143,976	243 23	1,104	194,304	176 00

<sup>1</sup>"Mica, Its Occurrences, Exploitation and Uses," by Hugh S. DeSchmid, M.E., Mines Branch, Department of Mines, 1912.

## Annual Production of Mica.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	29,008	1895.....	65,000	1904.....	160,777
1887.....	29,816	1896.....	60,000	1905.....	178,235
1888.....	30,207	1897.....	76,000	1906.....	303,913
1889.....	28,718	1898.....	118,375	1907.....	312,599
1890.....	68,074	1899.....	163,000	1908.....	139,871
1891.....	71,510	1900.....	166,000	1909.....	147,782
1892.....	104,745	1901.....	160,000	1910.....	190,385
1893.....	75,719	1902.....	135,904	1911.....	128,677
1894.....	45,581	1903.....	177,857	1912.....	143,976
				1913.....	194,304

## Annual Exports of Mica.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
	\$		\$			\$
1887.....	3,480	1896.....	47,756	1905.....		179,049
1888.....	23,563	1897.....	69,101	1906.....	912	581,919
1889.....	30,597	1898.....	110,507	1907.....	558	422,172
1890.....	22,468	1899.....	158,002	1908.....	200	198,839
1891.....	37,590	1900.....	146,750	1909.....	359	256,834
1892.....	86,562	1901.....	152,553	1910.....	469	330,903
1893.....	70,081	1902.....	391,812	1911.....	347	242,548
1894.....	38,971	1903.....	196,020	1912.....	448	334,054
1895.....	48,525	1904.....	198,482	1913.....	409	240,775

The destination of exports during the calendar years 1911, 1912, and 1913 is shown in the following table. United States continues to be the chief market for Canada's mica.

	1911.		1912.		1913.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
To Great Britain.....	67	53,203	68	35,959	71	33,273
To United States.....	278	188,201	379	297,345	333	202,155
To other countries.....	2	1,144	1	750	5	5,347
Total.....	347	242,548	448	334,054	409	240,775

The relative importance of the imports of Canadian mica into the United States, as compared with those of other countries, and a similar comparison of the imports of mica into Great Britain, is shown in tables following:—

### Imports of Mica into the United States.<sup>1</sup>

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	106,470	973	414,953
1904.....	287	137,191	693	306,937
1905.....	253	121,560	594	296,362
1906.....	539	323,991	1,206	731,484
1907.....	767	506,321	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

<sup>1</sup>The Foreign Commerce and Navigation of the United States.

### Imports of Mica into Great Britain.\*

	1911.		1912.		1913.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Germany.....	108,752	\$ 20,294	100,800	\$ 18,946	109,312	\$ 16,751
United States.....	183,456	8,658	113,680	6,035	99,568	4,983
Brazil.....			3,584	788		
Other foreign countries.....	141,904	25,501	149,520	27,263	144,032	14,240
British India.....	2,889,152	496,410	3,995,264	653,876	4,499,936	700,123
Canada.....	119,168	39,561	120,736	42,797	154,396	43,591
Other British possessions..	4,368	1,012	59,696	14,123	35,392	9,607
Total.....	3,446,800	591,436	4,543,280	763,828	5,043,136	789,295

\*British Trade Report.

The following is a list of the principal firms engaged in mining mica:—

Operator.	Location of mine.	Address.
<i>Ontario:—</i>		
*Brockville Mining Co.....	Leeds Co. Crosby Tp.....	Brockville.
John H. Adams.....	Lanark Co., N. Burgess Tp.....	Perth.
Jno. Mahon.....	" ".....	Rideau Ferry.
Dom. Imp. & Development Co.....	" ".....	Perth, Box 26.
Smith & Sewell.....	" ".....	" R. R. No. 3.
*J. H. Mendels.....	" ".....	"
*R. McConnell.....	" ".....	Ottawa, 175 Cooper.
W. L. McLaren.....	" ".....	Perth, Nevis Cottage.
*Watts & Noble.....	" ".....	Toronto, 19 Chestnut Park.
*P. J. McFarland.....	" ".....	Westport.
*Henry Burns.....	" ".....	Micaville.
*The Star Mica Mining Co., Ltd.....		Kingston.
*The Kingston Mica & Phosphate Co.....		"
*The Plevna Mica & Mg. Co.		"
Jas. Richardson & Sons.....	{Lanark Co., N. Burgess Tp..... Frontenac Co., Loughborough Tp.	"
*J. H. Roberts.....	" ".....	Perth Road.
The Loughboro Mining Co...	" ".....	Schenectady, N. Y.
*B. K. Soliday.....	" ".....	Jamestown, N. Y.
*Scriven & Whyte.....	" ".....	Sydenham.
Dom. Mineral Expl. Syndicate.	" ".....	" Box 148.
The Birch Lake Mining Co..	" ".....	Ottawa, 115 York.
T. W. Trousdale.....	" ".....	Sydenham.
*W. W. Lee.....	" ".....	"
*Henry Woodruff.....	" ".....	"
S. H. Orser.....	" ".....	Perth Road.
*Peters & Orser.....	" Bedford Tp.	"
J. B. Tett & Bros.....	" ".....	Bedford Mills.
Kent Bros. & J. Stoness.....	" ".....	Kingston.
Stoness, Anglin, Gilbert Mica Co.....	" ".....	" 1 Bay.
<i>Quebec:—</i>		
Thos. Argall.....	Argenteuil Co. (Harrington Tp. & Wentworth Tp.)	Laurel.
E. Rodier.....	" ".....	Montreal, Box 2415.
J. B. Gorman.....	Ottawa Co., Buckingham Tp....	Buckingham, Box 166.
H. F. Flynn.....	" ".....	Hull, 108 Montcalm.
Wm. Clelland.....	" Cameron Tp.....	Bouchette.
*Allan Gold Reefs Co., Ltd.	" Derry Tp.....	Ottawa, Victoria Chmbrs.
*E. M. Lapointe.....	" ".....	Notre Dame de la Salette.
W. L. Parker.....	" ".....	"
*The Laurentide Mica Co., Ltd.	{E. Portland Tp. .. Hull & Templeton Tp.	Ottawa.
The Capital Mica Co., Ltd.	" Wakefield Tp.....	"
*O'Brien & Fowler.....	{Portland E. Tp... Templeton Tp. Villeneuve Tp.	" Hope Bldg.
Brown Bros.....	" Hull Tp.....	Cantley.
*Fortin & Gravelle.....	" ".....	Hull.
*Fleury Bros.....	" ".....	Old Chelsea.
*Kent Bros.....	" ".....	Kingston.
*Wm. Lynott.....	" ".....	Ottawa, 122 Russell Ave.
Vavasour Mining Ass'n.....	Hull, Tp.....	Ottawa, 22 Metcalfe.
R. McConnell.....	" ".....	" 175 Cooper.
J. A. Wilson.....	" ".....	Cantley.
*Osborn Carman.....	" ".....	Farm Point.
Jno. Burns.....	Portland W.....	Buckingham.
Progressive Mining Co.....	" ".....	Ottawa, 124 Rideau.

Operator.	Location of mine.	Address.
<i>Quebec—Cont.</i>		
*Geo. W. McElroy.....	Ottawa Co. Templeton Tp.....	Davidsons Corners.
Wallingford Mica Mg. Co....	“ “ “ .....	Perkins, or Ottawa, 41 Vaughn.
*The Papineauville Lumber Co.....	“ “ “ .....	Papineauville.
Blackburn Bros.....	“ “ “ .....	Ottawa, 134 Wellington.
*Jno. Stewart.....	“ “ “ .....	East Templeton.
*T. G. McLaurin.....	“ “ “ .....	Ottawa, 42 Stanley A.
*The Canada Mica Mfg. Co....	Wakefield Tp.....	Hull, 200 Main.
Jos. Morris.....	“ “ .....	Wilson's Corners.
R. J. McGlashan.....	“ “ .....	“
Jos. Tomkiewicz.....	“ “ .....	Poltimore.
*F. A. Labelle.....	Wright Tp.....	Hull, 165 Main.
J. B. Gauthier.....	Villeneuve Tp.....	Buckingham, Box 226.
*The Mica Co. of Canada.....	Pontiac Co. Boisclerc Tp.....	Montreal, Box 2324.
*Calumet Mica Co.....	“ Huddersfield Tp.....	Bryson.
Wm. Baillie.....	“ Onslow Tp.....	Aylmer East.
Cross & Wilson.....	“ Thorne Tp.....	Cascades.
Geo. Nesbitt.....	“ “ .....	Wakefield.
Ernest Schock.....	“ “ .....	Schwartz.
<i>British Columbia:—</i>		
*Canadian Muscovite Mica Co., Ltd.....	Cariboo, Tete Jaune.....	Vancouver, 503 Bower Bldg.
*Big Bend Mica Mines, Ltd....	N. W. Kootenay, Donald.....	Calgary, 818 Seventh Ave. W.
*H. S. Richards.....	E. Kootenay.....	Canmore, Alberta., Box 246.
<i>New Brunswick:—</i>		
*Kouchilboughac Mica Mine.	Kent Co. near Claire Fontaine..	Richibucto.

\*No production reported in 1913.

## MINERAL PIGMENTS.

Under this heading is included a production of ochres and barytes.

### OCHRES.

The total production of ochres and iron oxide in 1913 was 5,987 tons, valued at \$41,774, as compared with a production in 1912 of 7,654 tons, valued at \$32,410. The 1913 production included 2,362 tons of ochres, valued at \$35,430, or an average of \$15 per ton, used for paint manufacture, and 3,625 tons, valued at \$6,344, shipped to gas works, while the 1912 production included 2,054 tons, valued at \$24,010, or an average of \$11.69 per ton, used for paint manufacture, and 5,600 tons, valued at \$8,400, shipped for use in gas works.

The ochre, or oxide, used for the manufacture of paints is calcined and ground at the place of production, while that used for the purification of illuminating gas is shipped crude to gas companies.

Statistics of production since 1886 are shown in the following table:—

**Annual Production of Ochres and Iron Oxides.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	350	2,350	1900.....	1,966	15,398
1887.....	485	3,733	1901.....	2,233	16,735
1888.....	397	7,900	1902.....	4,955	30,495
1889.....	794	15,280	1903.....	6,266	32,760
1890.....	275	5,125	1904.....	3,925	24,995
1891.....	900	17,750	1905.....	5,105	34,675
1892.....	390	5,800	1906.....	6,758	36,125
1893.....	1,070	17,710	1907.....	5,828	35,570
1894.....	611	8,690	1908.....	4,746	30,440
1895.....	1,339	14,600	1909.....	3,940	28,093
1896.....	2,362	16,045	1910.....	4,813	33,185
1897.....	3,905	23,500	1911.....	3,622	28,333
1898.....	2,226	17,450	1912.....	7,654	32,410
1899.....	3,919	20,000	1913.....	5,987	41,774

The working of ochre deposits in Canada has been chiefly confined to those deposits found between Champlain and Three Rivers, in the Province of Quebec, a short distance from the shore of the St. Lawrence river. In 1912 there was an additional production from St. Joseph de Nicolet in that Province, but this latter deposit was apparently not operated in 1913.

In Ontario small quantities of ochre have occasionally been obtained from a deposit near Campbellville. No production has been reported from this source during the past two years.



The following is a list of firms mining ochres:—

The Canada Paint Company, Ltd., Montreal, Que.

The Champlain Oxide Company, Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

\*François Ouellette, St. Joseph de Nicolet, Que.

\*Ontario Mineral Paint Company, Campbellville, Ont.

The exports of iron oxides, or mineral pigments, in 1913 are reported as 1,956 tons, valued at \$18,931, as against 3,016 tons, valued at \$34,513, in 1912. The imports of pigments during the calendar year 1913 were: ochres and ochrey earth, raw siennas, 1,663 tons, valued at \$43,119; oxides, dry fillers, fireproof umbers, and burnt siennas, 4,387 tons, valued at \$240,435, or a total value of \$283,554. During 1912 the imports of the above classes were respectively valued at \$40,165, and \$29,456, or a total of \$69,621.

### Imports of Ochres and Pigments.

Fiscal year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	571,454	6,544	1897.....	1,504,044	18,504
1881.....	677,115	8,972	1898.....	2,126,592	26,307
1882.....	731,526	8,202	1899.....	2,444,698	31,092
1883.....	898,376	10,375	1900.....	2,474,537	32,017
1884.....	533,416	6,398	1901.....	2,092,067	27,267
1885.....	1,119,177	12,782	1902.....	2,530,743	33,909
1886.....	1,100,243	12,267	1903.....	3,215,346	42,243
1887.....	1,460,128	17,067	1904.....	2,767,580	36,636
1888.....	1,725,460	17,664	1905.....	3,122,690	35,887
1889.....	1,342,733	12,994	1906.....	4,321,530	57,397
1890.....	1,394,811	14,066	1907 (9 mos.).....	2,926,528	39,675
1891.....	1,528,696	20,550	1908.....	3,749,132	39,923
1892.....	1,708,645	22,908	1909.....	2,122,781	27,540
1893.....	1,968,645	23,134	1910.....	3,683,344	44,190
1894.....	1,358,326	18,951	1911.....	4,160,769	54,022
1895.....	793,258	12,048	1912.....	4,469,929	56,257
1896.....	1,159,494	16,954	1913.....	5,503,959	71,697

	Duty.	1912.		1913.	
		Lbs.	\$	Lbs.	\$
Ochres and ochrey earths and raw siennas.	20%	2,940,260	31,909	3,636,320	44,051
Oxides, dry fillers, fireproofs, umbers and burnt siennas N.E.S.....	25%	1,529,669	24,348	1,867,639	27,646
Total.....		4,469,929	56,257	5,503,959	71,697

\*No production in 1913.

## Exports of Mineral Pigments, Iron Oxides, etc

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	512	7,706	1905.....	353	7,704
1898.....	233	4,227	1906.....	139	2,379
1899.....	308	5,408	1907.....	191	10,043
1900.....	651	7,154	1908.....	125	4,850
1901.....	401	8,233	1909.....	658	7,956
1902.....	352	6,132	1910.....	1,746	29,839
1903.....	676	12,770	1911.....	2,000	27,070
1904.....	416	7,260	1912.....	3,016	34,513
			1913.....	1,956	18,931

## BARYTES.

The only barytes deposits worked in Canada during 1913, were those at Lake Ainslie, C.B., operated by Barytes, Limited, head office address, Halifax, the shipments of ground barytes being reported as 641 tons, valued at \$6,410. The shipments in 1912 were 464 tons, valued at \$5,104.

Statistics of production, imports, and exports are shown in tables following. Statistics of imports of barytes have not been shown separately by the Customs Department since 1890 but the imports of blanc fixe (artificial sulphate of barium), and satin white during the calendar years 1912 and 1913, were respectively, 1,635 tons, valued at \$34,794, and 1,698 tons, valued at \$38,043.

## Annual Production of Barytes.

Calendar Year.	Tons.	Value.	Average Value.	Calendar Year.	Tons.	Value.	Average Value.
		\$	\$ cts.			\$	\$ cts.
1885.....	300	1,500	5 00	1899.....	720	4,402	6 11
1886.....	3,864	19,270	4 98	1900.....	1,337	7,605	5 69
1887.....	400	2,400	6 00	1901.....	653	3,842	5 89
1888.....	1,100	3,850	3 50	1902.....	1,096	3,957	3 61
1889.....				1903.....	1,163	3,931	3 38
1890.....	1,842	7,543	4 09	1904.....	1,382	3,702	2 68
1891.....				1905.....	3,360	7,500	2 23
1892.....	315	1,260	4 00	1906.....	4,000	12,000	3 00
1893.....				1907.....	1,344	3,000	2 23
1894.....	1,081	2,830	2 62	1908.....	4,312	19,021	4 41
1895.....				1909.....	179	1,120	6 26
1896.....	145	715	4 93	1910.....			
1897.....	571	3,060	5 36	1911.....	50	400	8 00
1898.....	1,125	5,533	4 92	1912.....	464	5,104	11 00
				1913.....	641	6,410	11 00

## 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			

## Exports of Barytes.

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
		\$			\$
1901.....	208	3,820	1907.....	550	2,750
1902.....			1908.....	3,509	13,690
1903.....	406	368	1909.....		
1904.....	13,080	5,178	1910.....	5	150
1905.....	34,488	14,343	1911.....		
1906.....	1,350	6,750	1912.....	68	114
			1913.....	Nil.	

## MINERAL WATER.

The statistics of production given herewith represent, as usual, as closely as can be obtained, the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate for the value of mineral water used at the spring 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 1913 was \$173,677 as compared with \$172,465 in 1912, and \$223,758 in 1911.

The imports of mineral and aerated waters during the calendar year 1913 were valued at \$257,153, as against a value of \$273,698 in 1912, and \$229,367 in 1911.

Statistics of production and imports are shown in tables following:—

### Annual Production of Mineral Water.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
		\$			\$			\$
1888.....	124,850	11,456	1896.....	706,372	111,736	1904.....		100,000
1889.....	424,600	37,360	1897.....	749,691	141,477	1905.....		100,000
1890.....	501,165	60,081	1898.....	555,000	100,000	1906.....		100,000
1891.....	427,485	54,268	1899.....		100,000	1907.....		136,020
1892.....	640,380	75,348	1900.....		75,000	1908.....		151,953
1893.....	725,096	108,347	1901.....		100,000	1909.....		175,173
1894.....	767,460	110,040	1902.....		100,000	1910.....		199,563
1895.....	730,382	126,048	1903.....		100,000	1911.....		223,758
						1912.....		172,465
						1913.....		173,677

### Annual Imports of Mineral Water.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	41,797	1891.....	15,721	1902.....	91,871
1881.....	55,763	1892.....	17,913	1903.....	108,130
1882.....	37,953	1893.....	27,909	1904.....	137,304
1883.....	49,546	1894.....	28,130	1905.....	161,790
1884.....	48,613	1895.....	27,879	1906.....	178,639
1885.....	55,864	1896.....	32,674	1907 (9 months)....	143,416
1886.....	47,000	1897.....	22,142	1908.....	153,831
1887.....	52,980	1898.....	33,314	1909.....	159,221
1888.....	54,891	1899.....	38,046	1910.....	188,559
1889.....	66,331	1900.....	30,343	1911.....	202,659
1890.....	71,521	1901.....	40,802	1912.....	231,515
				1913.....	273,751

The following is a list of the principal producers of mineral water:—

Operator.	Location of spring.	Address.
Havelock Min. Springs Co., Ltd	Kings Co., N.B.....	Moncton, N.B.
Radnor Water Co.....	Champlain Co., Que.....	Montreal, Mark Fisher Bldg.
*St. Leon Waters, Ltd.....	Maskinonge Co. Que.....	Toronto, 1 Toronto St.
Bedard, Dion & Cie.....	".....	Quebec, St. Agnes & Bigouette
The Abenakis Min. Springs Co., Ltd.....	Yamaska Co, Que.....	Abenakis Springs, Que.
Becker & Frank.....	Bruce Co., Ont.....	Southampton, Ont.
Thos. L. Boyd.....	Carleton Co., Ont.....	Carlsbad Springs, Ont.
*Dominion Springs Min. Water...	Lanark Co., Ont.....	Pakenham, Ont.
Sanitaris Limited.....	".....	Arnprior, Ont.
Arthur Belanger.....	Plantagenet, Ont.....	Papineauville, Que.
Robert Allan.....	Prescott Co., Ont.....	Montreal, 86 Dorchester.
Gurd & Co.....	".....	" 74 Bleury.
Lyall, Trenholme & Macdonell.	".....	" W. Box 73.
Caledonia Springs Co., Ltd....	Russell Co., Ont.....	" 591 St. Cath. W.
*Canada Mineral Waters, Ltd....	".....	Toronto, 65 Bellwood Ave.
Stanley Min. Springs Co., Ltd...	Thunder Bay Dist.....	Winnipeg, 410 Builders Ex- change.
*St. Davids Mountain Spring Water Co.....	Welland Co., Ont.....	Niagara Falls, Ont.
Halcyon Bottling Co.....	W. Kootenay, B.C.....	Halcyon, B.C.
*M. Grady.....	".....	St. Leon Hot Springs, B.C.
*F. F. Siemens.....	" (Renata) ".....	Rosthern, Sask.

\*Not in operation.

## NATURAL GAS.

The total value of the production of natural gas in Canada in 1913 was, according to returns received, \$3,309,381, as compared with a value of \$2,362,700 in 1912, and \$1,907,678 in 1911.

The quantity of gas produced in 1913 was about 20,477,835 M feet, as compared with 15,286,803 M feet in 1912, and 11,644,000 M feet in 1911.

The production in Ontario in 1913 was 12,474,745 M feet, valued at \$2,055,768; in Alberta 7,174,490 M feet, valued at \$1,079,466, and in New Brunswick 828,603 M feet, valued at \$174,147. In 1912 the Ontario production was 12,529,463 M feet, valued at \$2,036,245; Alberta 2,583,437 M feet, valued at \$289,906, and New Brunswick 173,903 M feet, valued at \$36,549.

The value of the gas, as reported by the producers, varies from 5 cents to 30 cents per M feet, but these prices do not represent what the consumer 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 re-sell 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.

Statistics of the production of natural gas in 1913, and of the annual production since 1892 are shown in the tables following:—

### Natural Gas Production, 1913.

Province.	No. men.	Wages.	No. WELLS, 1913.				PRODUCTION.		
			(a)	(b)	(c)	(d)	M cub. ft.	Value.	Average.
								\$	cts.
New Brunswick.	35	35,000	31	6	6	3	828,603	174,147	21
Ontario.....	336	237,600	*1,605	211	49	14	12,474,745	2,055,768	16½
Saskatchewan.....			1			2			
Alberta.....	176	341,825	49	20	3	3	7,174,490	1,079,466	15
Br. Columbia.....			0	0	0	2			
<b>Total.....</b>	<b>547</b>	<b>614,425</b>	<b>*1,686</b>	<b>237</b>	<b>58</b>	<b>24</b>	<b>20,477,838</b>	<b>3,309,381</b>	<b>16</b>

(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.

\*Includes 40 "shut in".

## Natural Gas Production, 1912.

Province.	No. men.	Wages.	No. WELLS, 1912.				PRODUCTION.		
			(a)	(b)	(c)	(d)	M cub. ft.	Value.	Average.
							\$	cts.	
New Brunswick.....			19	2	4	2	173,903	36,549	21
Ontario.....			1,478	247	67	16	12,529,463	2,036,245	16½
Saskatchewan.....						2			
Alberta.....			35	15	1	6	2,533,437	289,906	11½
Total.....	433	302,012	1,532	264	72	26	15,286,803	2,362,700	15½

- (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	1903.....	202,210
1893.....	376,233	1904.....	328,376
1894.....	313,754	1905.....	379,561
1895.....	423,032	1906.....	553,523
1896.....	276,301	1907.....	815,032
1897.....	325,873	1908.....	1,012,660
1898.....	322,123	1909.....	1,207,029
1899.....	337,271	1910.....	1,346,471
1900.....	417,094	1911.....	1,907,678
1901.....	339,476	1912.....	2,362,700
1902.....	195,992	1913.....	3,309,381

Returns received showed 1,686 producing wells in Canada, of which 237 were completed during the year. Fifty-eight non-producing wells were also drilled during 1913, while 24 were not completed at the end of the year.

In New Brunswick, the Maritime Oil Fields has about 31 producing wells in Albert county, and during the past two years has delivered gas to the Moncton Tramways Electricity and Gas Co., Limited, for distribution in Moncton and Hillsborough.

Returns received from Ontario natural gas producers showed 1,605 producing wells in that Province at the close of 1913, of which 211 were completed during the year. Forty-nine non-producing wells were also drilled, while 14 others were not completed at the end of the year.

In this Province the three principal producing fields are known as the Welland county, the Haldimand-Norfolk, and the Essex-Kent fields. During 1913 deep drilling disclosed the presence of natural gas under heavy pressure and apparently in large quantity below the oil producing strata of the Petrolia oil field. Under the provisions of Chapter 16, 6-7, Edward VII, entitled "An Act to regulate the exportation of electric power and certain liquids and gases," assented to April 27, 1907, the export of natural gas is prohibited except under special license issued by the Governor in Council. No natural gas is now exported from Ontario, although formerly there was a considerable exportation to Detroit and Buffalo, adjacent respectively to the Essex and Welland fields.

In order to conserve the supply of natural gas, and, as far as possible, prevent its waste, the Ontario Legislature, in 1908, passed an "Act to prevent the wasting of natural gas and to provide for the plugging of all abandoned wells," (Edward VII, Chapter 47), by which power was conferred upon inspectors appointed under the Act to enforce the stopping of waste. The Supplementary Revenue Act, 1907, (Ontario Statutes), also contained provisions which have been even more effective than those of the first-mentioned Act, and the enforcement of these laws has, according to the Bureau of Mines, reduced the waste of gas to a minimum.

In Alberta a great increase has been made in the marketing of natural gas from the Bow Island district, in Lethbridge, Calgary, and other towns of the district. The total production of natural gas in 1913 in this Province was reported as 7,174 million cubic feet, valued at \$1,079,466, as compared with a production in 1912 of 2,583 million cubic feet, valued at \$289,906.

The production of gas in the Province has been obtained altogether from the two fields known as Medicine Hat field, which has been producing since 1891, and the Bow Island district, the gas from which was first commercially utilized in 1912. There were forty-nine producing wells at the close of the year, of which twenty had been drilled during 1913, while three wells were in process of drilling on December 31.

Natural gas rights in Manitoba, Saskatchewan, Alberta, the North West Territories, the Yukon, etc., are the property of the Crown, and their disposal is now subject to the regulations approved by Order in Council dated the 19th day of January, 1914.

These regulations provide for a rental of 25 cents an acre for the first year and 50 cents an acre each subsequent year, lease to be for twenty-one years, renewable on conditions, and no applicant to be allowed to lease the gas rights under an area of more than 1,920 acres.

The full text of the regulations may be obtained on application to the Department of the Interior, at Ottawa.



Operator and address.	Location of wells.	No. of producing wells Dec. 31.
Maritime Oil Fields, Moncton, N.B., Box 196...	Albert Co., N.B., Stony Creek Dist....	31
The Canadian Natural Gas Co., St. Hyacinthe, Que.....		Drilling
The Provincial Natural Gas and Fuel Co., Ltd., Niagara Falls, Ont.....	Welland Co., Ont.....	212
Bertie Natural Gas Co., Ltd., Ridgeway.....	" " Bertie Tp.....	11
Empire Limestone Co., Buffalo, 4th and Virginia.....	" " Humberstone Tp.....	17
Niagara Natural Gas and Fuel Co., Ltd., Sherkston.....	" " ".....	3
Humberstone Mutual Natural Gas and Fuel Co., Humberstone.....	" " ".....	2
Miner & Mekelenbacker, Humberstone.....	" " ".....	1
Industrial Natural Gas Co., Port Robinson.....	" " Humberstone and Crowland Tps.....	43
The United Gas Companies, Ltd., St. Catharines, 45 King.....	" " Wainfleet Tp.....	(39)
J. A. Coleman, Wellandport.....	" " ".....	4
Welland Company Lime Works, Ltd., Port Colborne.....	" " Wainfleet and Humberstone Tps.....	32
Sterling Gas Co., Ltd., Port Colborne.....	{ " and Haldimand Co.....	45
The Dominion Natural Gas Co., Buffalo, 842 Marine Bk. Bldg.....	Haldimand, Norfolk, Elgin, Lincoln and Wentworth Co...	406
F. R. Lator, Dunnville.....	Haldimand Co., Moulton Tp.....	5
J. J. Lawson, Stromness.....	" " ".....	3
Buffalo and Dunnville Oil and Gas Co., Dunnville.....	" " ".....	5
Canboro Natural Gas Co., Ltd., Canboro.....	" Canboro Tp.....	1
Chippewa Oil and Gas Co., Tavistock.....	" " ".....	2
Moote, Melick & Lymburner, Canboro.....	" " ".....	10
Aikens & Kohler, Dunnville.....	" " ".....	17
Lint & Emmerson, Attercliffe Station.....	" " ".....	4
Melvin G. Hart & Co., Attercliffe Station.....	" " ".....	2
Aikens, Beck & Lator, Dunnville.....	" Cayuga South.....	21
F. L. Snively, Dunnville, Box 232.....	" Cayuga and Rainham..	27
The Waines & Root Gas Co., Ltd., Dunnville..	" Cayuga, Rainham, Dunn, Canboro, and Walpole Tps.....	71
The Midfield Natural Gas Co., Hamilton, 32 Stinson.....	" Cayuga North Tp.....	7
Canfield Natural Gas Co., Ltd., Canfield.....	" " ".....	3
Azoff Gas Co., Ltd., Canfield.....	" " ".....	1
Sundy Gas Well Co., Dunnville.....	" " ".....	2
Port Maitland Natural Gas Co., Port Maitland.	" Dunn Tp.....	1
The Dunn Natural Gas Co., Ltd., Dunnville..	" " ".....	16
The Eastside Gas Co., Port Maitland.....	" " ".....	4
Jas. S. Jones, Port Maitland.....	" " ".....	4
Lator, Aikens & Smith, Dunnville.....	" Dunn and Sherbrooke..	16
The Home Natural Gas Co., Ltd., Hamilton, 18 College Ave.....	" Oneida Tp.....	4
The Aldrich Gas and Oil Co., Ltd., Hamilton..	" Rainham Tp.....	10
David E. Hoover, Selkirk.....	" " ".....	8
D. E. & A. E. & M. Hoover, Rainham Centre..	" " ".....	7
D. Kindy & Sons, Selkirk.....	" " ".....	7
Kindy Gas Company, Rainham.....	" " ".....	3
North Shore Gas Co., Ltd., Hamilton, Bk. of Hamilton Bldg.....	" " ".....	14
Fisherville Gas Co., Fisherville.....	" " ".....	2
National Gas Co., Ltd., Rainham Centre.....	" Rainham and Seneca Tps...	72
The Producers Natural Gas Co., Ltd., Buffalo, 842 Marine Bk. Bldg.....	" " and Walpole Tps.	80
The Holmes Gas Co., Ltd., Selkirk.....	" " ".....	30

Operator and address.	Location of wells.	No. producing wells Dec. 31.
Port Colborne-Welland Natural Gas Co., Port Colborne.....	Haldimand Co., Seneca Tp.....	25
Lime and Cement Works, Hamilton.....	" " ".....	24
J. E. Hoover, Selkirk, Box 18.....	" " Walpole Tp.....	6
Lalor & Vokes, Dunnville.....	" " ".....	11
Nanticoke Natural Gas Co., Ltd., Cheapside...	" " ".....	2
M. Wederick, Cheapside.....	" " ".....	1
Regal Natural Gas Co., Hagersville.....	" " ".....	4
Cheapside Natural Gas Co., Ltd., Cheapside...	" " ".....	3
Alfred Lamb, Selkirk.....	" " ".....	14
Walter B. Lamb, Nanticoke.....	" " ".....	11
Enterprise Gas Co., Ltd., Buffalo, 842 Marine Bk. Bldg.....	Norfolk Co., Middleton Tp. (Delhi).....	9
The Norfolk Gas Co., Ltd., Buffalo, 842 Marine Bk. Bldg.....	" " Woodhouse Tp. (Pt. Dover).....	11
Port Rowan Natural Gas Co., Buffalo, 842 Marine Bk. Bldg.....	" " Walsingham Tp.....	10
North Western Gas Co., Ltd., Erie, Pa., 611 Masonic Temple.....	Brant Co.....	4
Standard Natural Gas Co., Ltd., Dunnville....	" " Onondaga Tp.....	30
The Onondaga Oil and Gas Co., Brantford.....	" " ".....	12
Telephone City Oil and Gas Co., Ltd., Brantford.....	" " ".....	4
Commonwealth Oil and Gas Co., Hamilton, 165 Bay N.....	" " ".....	2
The Crystal Oil and Gas Co., Ltd., Paris, River St.....	" " ".....	4
*Grand River Oil and Gas Co., Ltd., Brantford, 116 Dalhousie .....	" " ".....	5
D. Danskin, Cainsville.....	" " ".....	1
A. W. Vansickle, Onondaga.....	" " ".....	3
*Wentworth Natural Gas Co., Ltd., Hamilton.	" " ".....	2
Thomas Walker, Caledonia, R. R. No. 2.....	" " Tuscarora Tp.....	1
Oxford Oil and Gas Co., Ltd., Brantford, 17 Albion.....	Oxford Co., East Zorra Tp.....	3
The Medina Natural Gas Co., Ltd., Chatham, 40 Fifth St.....	Elgin Co., Bayham Tp.....	18
The Union Natural Gas Co. of Canada, Ltd., Niagara Falls.....	Kent Co., Romney, Raleigh and Tilbury Tps.....	88
The Canadian Gas Co., Ltd., Detroit, Mich., 1426 Dime Bk. Bldg.....	Kent and Essex Co., Romney, Mersea and Gosfield S. Tps.....	20
The Beaver Oil and Gas Co., Ltd., Brantford, 66½ Market.....	Kent Co., Romney Tp.....	14
The Maple City Oil and Gas Co., Ltd., Buffalo, 842 Marine Bk. Bldg.....	" " and Tilbury Tps....	3
*Glenwood Natural Gas Co., Ltd., Buffalo, 842 Marine Bk. Bldg.....	" " Raleigh Tp. (Ouvry).....	2
*Oil Springs Oil and Gas Co., Ltd., Oil Springs..	Lambton Co., Euphemia Tp.....	Drilling
*William Hawkin, Warwick.....	" " Warwick Tp.....	
Corporation City of Medicine Hat, Medicine Hat, Alberta.....	Medicine Hat, Alberta, Tp. 12.....	11
Canadian Pacific Railway, Medicine Hat, Alberta.....	" " (2), Carlstadt (1), Tp. 15... } " " Suffield (1), Tp. 14.... }	4
Medicine Hat Brick Co., Ltd., Medicine Hat, Alberta.....	" " ".....	1
The Alberta Rolling Mills Co., Ltd., Medicine Hat, Alberta.....	" " ".....	1
Redcliff Brick and Coal Co., Ltd., Redcliff, Alberta.....	Redcliff, Alberta, Tp. 13.....	2
Redcliff Light and Power Co., Ltd., Redcliff, Alberta.....	" " " 13.....	4
Dominion Glass Co., Ltd., Redcliff, Alberta...	" " " 13.....	1
Redcliff Rolling Mills and Bolt Co., Ltd., Redcliff, Alberta.....	" " " 13.....	1

Operator and address.	Location of wells.	No. of producing wells Dec. 31..
Canada Cement Co., Montreal, Herald Bldg.....	Medicine Hat, Tp. 12.....	Drilling
Dunmore Dev. Co., Ltd., Medicine Hat, Alberta.....	Dunmore, Alberta.....	1
The Canadian Western Natural Gas, Light, Heat and Power Co., Ltd., Calgary, Alberta	Bow Island (16), Tp. 10, Brooks (2), Tp.18 Dunmore (1), Tp. 12.....	19
Town of Bow Island, Bow Island, Alberta.....	Bow Island, Alberta.....	Drilling
Irvine Light and Power Co., Irvine.....	Irvine,..... Tp. 11, R. 2.....	"
High River Natural Gas Co., High River, Alberta.....	High River, Alberta., Tp. 19, R. 28.....	1
The Calgary Pet. Products Co., Ltd., Calgary, Alberta.....	Calgary.....	5
*Lacombe Brick and Tile Co., Lacombe, Alberta	Lacombe, Alberta, Tp. 40, R. 27.....	2
*City of Wetaskiwin, Wetaskiwin, Alberta, ..	Wetaskiwin, Alberta, Tp. 46, R. 24.....	1
Municipality of Castor, Castor, Alberta.....	Castor, Alberta, Tp. 37, R. 13.....	1
*Municipality of Tofield, Tofield, Alberta.....	Tofield, Alberta, Tp. 50, R. 19.....	Drilling
*Municipality of Vegreville, Vegreville, Alberta	Vegreville, Alberta, Tp. 52, R. 14.....	1
Athabaska Natural Gas Co., Ltd., Athabaska Landing, Alberta.....	Athabaska, Alberta, Tp. 66.....	Drilling

\*Not in operation.

## PEAT.

During 1913 operations for the production of peat fuel were carried on at two bogs, and consisted chiefly of experimental and development work.

The operating firms and bogs were:—

Peat Industries, Limited, operating a bog at St. Brigide, near Farnham, Qué.

The Canadian Peat Co., Toronto, Kent Bldg., operating a bog at Alfred, Ont.

In the absence of complete returns, the total shipments of peat fuel were estimated at 2,600 tons, valued at \$10,100, as compared with shipments in 1912 of 700 tons, valued at \$2,900.

The annual production of peat during the past fourteen years is shown below:—

**Annual Production of Peat.<sup>1</sup>**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1900.....	400	1,200	1907.....	50	200
1901.....	220	600	1908.....	60	180
1902.....	475	1,663	1909.....	60	240
1903.....	1,100	3,300	1910.....	841	2,604
1904.....	800	2,400	1911.....	1,463	3,817
1905.....	80	260	1912.....	700	2,900
1906.....	474	1,422	1913.....	2,600	10,100

<sup>1</sup> Results of the testing of this peat are shown in the 'Report on the Utilization of Peat Fuel for the Production of Power' by B. F. Haanel, B. Sc., Mines Branch publication, No. 154.

A number of publications on peat, issued by the Mines Branch, are out of print, but the following are still available:—

Report No. 30. Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908. Bulletin No. 1, by Erik Nystrom and A. Anrep.

Report No. 89. Reprint of Presidential address delivered before the American Peat Society, of Ottawa, July 25, 1910, by Dr. Haanel.

Report No. 151. Investigation of the Peat Bogs and Peat Industry of Canada, 1910-1911. Bulletin No. 3, 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.

## PETROLEUM.

The total production of crude petroleum in Canada in 1913 was 228,080 barrels of 35 imperial gallons each, valued at \$406,439, or an average of \$1.782 per barrel, as compared with a production of 243,336 barrels, valued at \$345,050, or an average price per barrel of \$1.418 in 1912, and 291,092 barrels, valued at \$357,073, or an average of \$1.22½ per barrel in 1911.

With the exception of 73,899 gallons in 1913, 93,765 gallons in 1912, 86,139 gallons in 1911, and 51,975 gallons in 1910, produced in New Brunswick, the output is entirely from Ontario oil fields. The production has steadily declined during the past six years, although in 1913 a decrease in the quantity of oil produced, was accompanied by an increase in the total valuation, because of an increased average price obtained for the oil.

The statistics of production as given herewith since 1904, are based on claims made for the bounty paid by the Dominion Government, which was first provided for in 1904, by an Act passed by the Dominion Government authorizing the payment of a bounty of 1½ cents per gallon on crude petroleum produced from wells in Canada. The bounty has been continued under the 'Petroleum Bounty Act, 1909,' which provides for the payment of bounty on crude petroleum produced from oil-shales mined in Canada, as well as on oil from wells in Canada. Payments are made on claims submitted by the producers of crude oil to the Minister of Trade and Commerce. These claims have to be substantiated as to quantity by the certificate of the receiving stations, tanking companies, refiners or other purchasers, as well as by the supervising officers of the Department of Trade and Commerce.

The bounty paid on the crude petroleum produced gives, therefore, as accurate a basis as is available for a reliable statement of the annual production.

Table 1 following, shows the production of crude oil in Canada since 1901, in barrels of 35 gallons, together with the total value and average price per barrel.

## PETROLEUM—TABLE 1.

## Annual Production of Crude Petroleum since 1901.

Year.	Barrels of 35 gallons.	Value.	Average price per barrel.
		\$	\$ cts.
1901.....	622,392	1,008,275	1 620
1902.....	530,624	951,190	1 792
1903.....	486,637	1,048,974	2 155
1904.....	503,474	935,395	1 858
1905.....	634,095	856,028	1 350
1906.....	569,753	761,760	1 337
1907.....	788,872	1,057,088	1 340
1908.....	527,987	747,102	1 415
1909.....	420,755	559,604	1 33
1910.....	315,895	388,550	1 23
1911.....	291,092	357,073	1 225
1912.....	243,336	345,050	1 418
1913.....	228,080	406,439	1 782

Statistics of the production of crude petroleum from 1901 to 1904 were based on direct returns received from refineries and producers. The record of production during these years is shown in the following table:—

## Production of Crude Oil, 1901 to 1904, Based on Direct Returns.

Crude oil.	1901.	1902.	1903.	1904.
	Bls.	Bls.	Bls.	Bls.
Received at refineries.....	508,677	443,333	410,280	455,074
Direct sales for industrial purposes.....	113,715	87,291	76,357	48,400
Total sales of crude oil.....	622,392	530,624	486,637	503,474
Total sales in gallons.....	21,783,720	18,571,840	17,032,295	17,621,590

## Production of Crude Petroleum Estimated on the Basis of the Bounty of 1½ Cents per Gallon Paid by the Dominion Government, 1905 to 1913.

Year.	Bounty paid.	Production of crude oil represented.	
		In gallons.	In barrels.
	\$		
1905.....	332,900	22,193,336	634,095
1906.....	299,120	19,941,357	569,753
1907.....	414,158	27,610,526	788,872
1908.....	277,193	18,479,547	527,987
1909.....	220,897	14,726,433	420,755
1910.....	165,845	11,056,337	315,895
1911.....	152,823	10,188,219	291,092
1912.....	127,751	8,516,762	243,336
1913.....	119,742	7,982,798	228,080

The record of production of crude oil for the years previous to 1901, as shown in Table 2, was deduced from Government inspection returns by assuming a ratio of crude to refined oil.

PETROLEUM—TABLE 2.

### Canadian Oils and Naphtha Inspected, and Corresponding Quantities of Crude Oil.

Calendar Year.	Refined oils inspected.	Crude equivalent calculated.	Ratio of crude to refined.	Equivalent in barrels of 35 gallons.	Average price per barrel of crude.	Value of crude oil.
	Gals.	Gals.			\$ cts.	\$
1881.....	6,457,270	12,914,540	100:50	368,987		
1882.....	6,135,782	13,635,071	100:45	389,573		
1883.....	7,447,648	16,550,328	100:45	472,866		
1884.....	7,993,995	19,984,987	100:40	571,000		
1885.....	8,225,882	20,564,705	100:40	587,563		
1886.....	7,768,006	20,442,121	100:38	584,061	0 90	525,655
1887.....	9,492,588	24,980,494	100:38	713,728	0 78	556,708
1888.....	9,246,176	24,332,042	100:38	695,203	1 02 $\frac{3}{4}$	713,695
1889.....	9,472,476	24,664,144	100:38	704,690	0 92 $\frac{3}{4}$	653,600
1890.....	10,174,894	26,776,037	100:38	795,030	1 18	902,734
1891.....	10,065,463	26,435,430	100:38	755,298	1 33 $\frac{3}{4}$	1,010,211
1892.....	10,370,707	27,291,334	100:38	779,753	1 26 $\frac{1}{2}$	984,438
1893.....	10,618,804	27,944,221	100:38	798,406	1 09 $\frac{1}{2}$	874,255
1894.....	11,027,082	29,018,637	100:38	829,104	1 00 $\frac{3}{4}$	835,322
1895.....	10,674,232	25,414,838	100:42	726,138	1 49 $\frac{3}{4}$	1,086,738
1896.....	10,684,234	25,438,771	100:42	726,822	1 59	1,155,647
1897.....	10,434,878	24,844,995	100:42	709,857	1 42 $\frac{1}{2}$	1,011,546
1898.....	11,148,348	26,543,685	100:42	758,391	1 40	1,061,747
1899.....	11,927,981	28,309,955	100:42	808,570	1 48 $\frac{3}{4}$	1,202,020
1900.....	13,428,422	24,867,449	100:54	710,498	1 62	1,191,007

The production of crude oil in the Province of Ontario, by districts, since 1909, is shown in the following table. The record has been furnished by the Supervisor of Petroleum Bounties and agrees very closely, although not identically, with the statistics used in compiling the record of production for the whole of Canada.

### Production by Districts.

Field.	1909.	1910.	1911.	1912.	1913.
	Bls.	Bls.	Bls.	Bls.	Bls.
Lambton.....	243,123	205,456	184,450	150,272	155,747
Tilbury and Romney.....	124,003	63,058	48,707	44,727	26,824
Bothwell.....	33,092	36,998	35,244	34,436	34,348
Leamington.....	5,929	141			
Dutton.....	9,513	7,752	6,732	4,335	4,610
Onondaga (Brant county).....		1,005	13,501	7,115	4,172
Belle River.....					464
Total.....	420,660	314,410	288,634	240,935	226,165

The oil refineries of Canada, of which there are four, viz.: the Imperial Oil Company, with works and chief office at Sarnia, Ont.; the Canadian Oil Company, works at Petrolia, head office, Toronto; the British American Oil Company, works and office at Toronto; the Empire Refining Company, Ltd., works at Wallaceburg, used considerable quantities of imported crude oils. There is also a rapidly increasing use of imported crude fuel oils on the Pacific coast. The imports of crude oil in 1913 were 162,061,926 gallons, valued at \$5,250,835, against 120,082,405 gallons, valued at \$3,996,842, in 1912, and 71,637,533 gallons, valued at \$2,187,952 in 1911.

All refined illuminating oils and naphtha manufactured and shipped from Canadian refineries are inspected by the Inland Revenue Department. The total quantities of these oils inspected during the fiscal year ending March 31, 1914, were: 33,602,017·27 gallons, as compared with 29,366,199·19 gallons inspected during the previous fiscal year. There are three inspection districts, known respectively as the London, Toronto, and Windsor districts, the first mentioned covering the refinery plants at Sarnia and Petrolia, the second the Toronto refinery, the third the Wallaceburg refinery.

The following tables showing the quantities of refined illuminating oils and naphtha inspection in the several districts are quoted from the annual report of the Department of Inland Revenue.

## INSPECTION OF PETROLEUM.

**Return of Inspected Petroleum and Naphtha Shipped from Refineries During the Fiscal Year Ending March 31, 1914.**

Divisions.	Petroleum.	Naphtha.	Total.
	Gals.	Gals.	Gals.
London, Ont.....	21,197,049·55	8,104,519·40	29,301,568·95
Toronto, Ont.....	1,558,852·71	2,456,718·41	4,015,571·12
Windsor, Ont.....	230,426·40	54,450·80	284,877·20
	22,986,328·66	10,615,688·61	33,602,017·27

**Comparative Statement of Inspected Petroleum and Naphtha Shipped from Ontario Refineries During the Fiscal Years Ending March 31, 1910-1914.**

	Petroleum.	Naphtha.	Total.
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



The exports of oil from Canada are comparatively small, the available statistics being shown in Table 3. During 1913 the exports as published by the Customs Department, included: crude oil 3,650 gallons, valued at \$379; refined oils 24,273 gallons, valued at \$3,183; naphtha and gasoline 17,875 gallons, valued at \$4,284, or a total of 45,798 gallons, valued at \$7,851. There was also an export of 634,861 gallons, valued at \$171,663 of 'other oils N.E.S.' which probably included products of petroleum.

PETROLEUM.—TABLE 3.

## 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	2,996
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	3,904	62,736	10,408	81,236	14,372
1913*.....	3,650	379	42,148	7,472	45,798	7,851

\*Includes naphtha and gasoline.

The imports of petroleum and petroleum products into Canada have been rapidly increasing, while the domestic production has been decreasing. The imports during the calendar year 1913 totalled 222,779,028 gallons of petroleum oil, crude and refined, valued at \$13,238,429 in addition to 1,628,837 pounds of wax and wax candles, valued at \$109,897. The oil

imports included: crude oil 162,061,926 gallons, valued at \$5,250,835; refined and illuminating oils 19,393,627 gallons, valued at \$1,394,440; gasoline 29,525,180 gallons, valued at \$4,822,941; lubricating oils 6,789,451 gallons, valued at \$1,172,986, and other petroleum products 5,008,844 gallons, valued at \$597,227.

The total imports in 1912 were 186,787,484 gallons of petroleum oil, crude and refined, valued at \$11,858,533, and 2,144,006 pounds of wax and wax candles, valued at \$119,520.

There was an increase in the imports of crude oil in 1913 of 41,979,521 gallons, or about 35 per cent, an increase in the imports of refined illuminating oils of 4,645,409 gallons, or about 31½ per cent, a slight increase in lubricating oils, of 25,651 gallons, and a large decrease in the imports of gasoline amounting to 11,379,418 gallons, or nearly 28 per cent.

Details of the imports of oils during 1913 and 1914 are shown in Table 4.

PETROLEUM.—TABLE 4.

**Imports of Petroleum and Petroleum Products During the Calendar Years 1912 and 1913.**

Products.	1912.		1913.	
	Gals.	Value.	Gals.	Value.
(a) Petroleum crude, fuel and gas oils (0.8235 specific gravity or heavier).....	120,064,953	3,995,502	162,023,842	5,246,526
(b) Crude petroleum, gas oils (other than benzene, naphtha and gasoline).....	17,452	1,340	38,084	4,309
(c) Coal and kerosene, distilled, purified, or refined.....	14,543,186	933,513	19,225,528	1,327,647
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale, or lignite, costing more than 30 cents per gallon.....	205,032	79,222	168,009	66,793
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon.....	5,654,773	723,574	5,620,697	779,789
(f) Products of petroleum, n.o.p.....	4,288,463	423,477	5,008,844	597,227
(g) Lubricating oils, n.o.p.....	1,109,027	354,138	1,168,754	393,197
(h) Gasoline.....	40,904,598	5,347,767	29,525,180	4,822,941
Total.....	186,787,484	11,858,533	222,779,028	13,238,429

(a) Free. (b) Duty 1½c. per gal. (c), (e), and (f) Duty 2½c. per gal. (d) Duty 20 per cent. (g) Duty 20 per cent. (h) Free.

The total annual imports during the fiscal years, of petroleum oils and petroleum products, including the imports of paraffin wax and candles, are shown in Table 5. The imports of paraffin wax are shown in Table 7 and of wax candles in Table 8, while the total imports of crude and manufactured oils other than illuminating, are shown in Table 6.

PETROLEUM.—TABLE 5.

## Imports of Petroleum and Petroleum Products.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
		\$			\$
1880.....	687,641	131,359	1897.....	8,415,302	697,169
1881.....	1,437,475	262,168	1898.....	9,074,311	724,519
1882.....	3,007,702	398,031	1899.....	10,394,208	763,303
1883.....	3,086,316	358,546	1900.....	9,633,647	864,833
1884.....	3,160,282	380,082	1901.....	11,082,822	982,640
1885.....	3,767,441	415,195	1902.....	13,220,005	1,107,207
1886.....	3,819,146	421,836	1903.....	18,799,312	1,643,371
1887.....	4,290,003	467,003	1904.....	24,521,115	2,152,623
1888.....	4,523,056	408,025	1905.....	35,296,332	2,151,514
1889.....	4,650,274	484,462	1906.....	32,624,410	1,908,177
1890.....	5,075,650	515,852	1907 (9 mos).....	23,645,861	1,480,261
1891.....	5,071,386	498,330	1908.....	40,213,542	2,577,059
1892.....	5,649,145	475,732	1909.....	51,700,476	3,219,243
1893.....	6,002,141	446,389	1910.....	60,017,066	3,442,604
1894.....	6,597,108	499,988	1911.....	87,245,133	4,901,608
1895.....	7,577,674	525,372	1912.....	117,784,092	6,104,428
1896.....	8,005,891	735,913	1913.....	214,940,645	13,218,986

PETROLEUM.—TABLE 6.

## Imports of Crude and Manufactured Oils, other than Illuminating.

Fiscal Year.	Gals.	Fiscal Year.	Gals.
1881.....	960,691	1897.....	802,286
1882.....	1,656,290	1898.....	1,047,026
1883.....	1,895,488	1899.....	1,017,278
1884.....	2,017,707	1900.....	1,406,700
1885.....	2,489,326	1901.....	1,838,966
1886.....	2,491,530	1902.....	2,296,353
1887.....	2,624,399	1903.....	4,316,010
1888.....	2,701,714	1904.....	7,141,109
1889.....	2,882,462	1905.....	25,002,047
1890.....	3,054,908	1906.....	23,365,674
1891.....	3,049,384	1907 (9 mos.).....	16,761,713
1892.....	3,047,199	1908.....	33,915,853
1893.....	1,481,749	1909.....	41,085,997
1894.....	1,860,829	1910.....	51,354,396
1895.....	1,106,993	1911.....	77,966,543
1896.....	1,079,965	1912.....	104,329,688
		1913.....	198,180,460

PETROLEUM.—TABLE 7.  
Imports of Paraffin Wax.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1883.....	43,716	5,166	1898.....	103,570	5,987
1884.....	39,010	6,079	1899.....	92,242	4,025
1885.....	59,967	8,123	1900.....	47,400	3,529
1886.....	62,035	7,953	1901.....	118,848	9,639
1887.....	61,132	6,796	1902.....	225,885	12,750
1888.....	53,862	4,930	1903.....	502,642	28,674
1889.....	63,229	5,250	1904.....	418,967	18,440
1890.....	239,229	15,844	1905.....	81,992	7,795
1891.....	753,854	50,275	1906.....	112,612	9,721
1892.....	733,873	48,776	1907 (9 mos.).....	55,021	5,922
1893.....	452,916	38,935	1908.....	62,308	8,041
1894.....	208,090	15,704	1909.....	129,631	12,795
1895.....	163,817	11,579	1910.....	429,801	27,296
1896.....	150,287	10,042	1911.....	1,856,049	81,139
1897.....	138,703	7,945	1912.....	1,482,465	67,065
			1913.....	1,689,750	83,801

PETROLEUM.—TABLE 8.  
Imports of Paraffin Wax Candles.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	10,445	2,269	1897.....	25,114	2,929
1881.....	7,494	1,683	1898.....	60,802	4,427
1882.....	5,818	1,428	1899.....	62,331	5,856
1883.....	7,140	1,734	1900.....	27,663	3,671
1884.....	8,755	2,220	1901.....	44,562	3,538
1885.....	9,247	2,449	1902.....	51,120	5,752
1886.....	12,242	2,587	1903.....	33,377	9,025
1887.....	21,304	3,611	1904.....	83,471	9,078
1888.....	22,054	2,829	1905.....	137,353	15,293
1889.....	8,033	1,337	1906.....	148,808	15,804
1890.....	7,233	1,186	1907 (9 mos.).....	38,900	5,088
1891.....	10,598	2,116	1908.....	156,934	20,035
1892.....	9,259	1,952	1909.....	110,848	14,806
1893.....	8,351	1,735	1910.....	164,822	20,342
1894.....	10,818	1,685	1911.....	181,541	22,426
1895.....	19,448	2,541	1912.....	290,505	35,074
1896.....	25,787	4,072	1913.....	277,130	34,816

#### PETROLEUM REGULATIONS.

The regulations under which petroleum and natural gas rights on Dominion lands may be secured were revised in January of 1914. The full text of the regulations which are briefly outlined herewith may be obtained from the Mining Lands and Yukon Branch of the Department of the Interior.

'Regulations for the disposal of petroleum and natural gas rights, the property of the Crown in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, the Railway Belt in the Province

of British Columbia, and within the tract containing three and one-half ( $3\frac{1}{2}$ ) million acres of land acquired by the Dominion Government from the Province of British Columbia, and referred to in subsection (b) of section 3 of the Dominion Lands Act.' Approved by Order in Council, dated the 19th day of January 1914.

These regulations provide for the leasing of petroleum and gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the Minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within fifteen months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

The lessee is required to prevent the injurious access of water to the oil bearing formation and should gas be discovered, must take all reasonable and proper precautions to prevent the waste of natural gas.

Any company acquiring, by assignment or otherwise a lease shall at all times be and remain a British company registered in Great Britain or Canada.

#### PROSPECTING FOR OIL IN ALBERTA.

A boring for oil has been in progress on section 6, township 20, range 2, west of the 5th Mer. The location being near Black Diamond P.O., and approximately 30 miles southwest of Calgary. The district is referred to in a recent report of the Geological Survey (Memoir 52) entitled "Geological Notes to accompany Map of Sheep River gas and oil field, Alberta." The author, Mr. D. B. Dowling, states on page 1:—

"Recent boring operations in this vicinity disclosed the presence of gas in the upper beds of the Belly River formation and, at a depth of a little over 1,550 feet a small amount of light oil (about 90 per cent gasoline) was found. This stimulated the belief that oil was to be found in commercial quantities in this region and many companies were formed with the object of drilling for oil."

After this first strike which was made in October 1913, drilling was continued, and on May 14, 1914, a second strike was made of an apparently similar grade of oil at a depth of about 2,700 feet but in larger quantities than the first strike.

The strikes that were made caused a mad rush for oil leases. Within a few months hundreds of companies were formed to prospect for oil. Drilling is in progress on some six or eight other wells in the district and many others have been planned.

The gas obtained from the first well, "The Dingman Well," is high in gasoline and preparations have been made to recover this product from the gas.

## 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 1913 were 385 tons, valued at \$3,643, shipped chiefly from the Little Rapids mine, township of Portland East, with a small quantity from Davidson Corners, Que.

Phosphate is used at Buckingham, Que., in the manufacture of ferro-phosphorus, phosphorus, and fertilizers, 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.

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.
		\$	\$ cts.			\$	\$ cts.
1886.....	20,495	304,338	14 85	1900.....	1,415	7,105	5 02
1887.....	23,600	319,815	13 50	1901.....	1,033	6,280	6 07
1888.....	22,485	242,285	10 77	1902.....	856	4,953	5 79
1889.....	30,938	316,662	10 21	1903.....	1,329	8,214	6 13
1890.....	31,753	361,045	11 37	1904.....	817	4,590	5 62
1891.....	23,538	241,603	10 24	1905.....	1,300	8,425	6 43
1892.....	11,932	157,424	13 20	1906.....	850	6,375	7 50
1893.....	8,198	70,942	8 65	1907.....	824	6,018	7 30
1894.....	6,861	41,166	6 00	1908.....	1,596	14,794	9 26
1895.....	1,822	9,565	5 25	1909.....	998	8,054	8 07
1896.....	570	3,420	6 00	1910.....	1,478	12,578	8 51
1897.....	908	3,934	4 39	1911.....	621	5,206	8 33
1898.....	733	3,665	5 00	1912.....	164	1,640	10 00
1899.....	3,000	18,000	6 00	1913.....	385	3,643	9 46

## Exports of Phosphate.

Calendar Year.	ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	*Value.	Tons.	*Value.	Tons.	*Value.
		\$		\$		\$
1878.....	824	12,278	9,919	195,831	10,743	208,109
1879.....	1,842	20,565	6,604	101,470	8,446	122,035
1880.....	1,387	14,422	11,673	175,664	13,060	190,086
1881.....	2,471	36,117	9,497	182,339	11,968	218,456
1882.....	568	6,338	16,585	302,019	17,153	308,357
1883.....	50	500	19,666	427,168	19,716	427,668
1884.....	763	8,890	20,946	415,350	21,709	424,240
1885.....	434	5,962	28,535	490,331	28,969	496,293
1886.....	644	5,816	19,796	337,191	20,440	343,007
1887.....	705	8,277	22,447	424,940	23,152	433,217
1888.....	2,643	30,247	16,133	268,362	18,776	298,609
1889.....	3,547	38,833	26,440	355,935	29,987	394,768
1890.....	1,860	21,329	26,591	478,040	28,457	499,369
1891.....	1,551	16,646	15,720	368,015	17,271	384,661
1892.....	1,501	12,544	9,981	141,221	11,432	153,765
1893.....	1,990	11,550	5,748	56,402	7,738	67,952
1894.....	1,980	10,560	3,470	29,610	5,450	40,170
1895.....			250	2,500	250	2,500
1896.....	1	5	299	2,990	300	2,995
1897.....	70	450	165	400	235	850
1898.....	21	240	702	8,000	723	8,240
1899.....	215	1,850	93	1,725	308	3,575
1900.....					Nil.	Nil.
1901.....					6	120
1902.....					70	1,880
1903.....					1	20
1904.....					191	5,348
1905.....					40	1,253
1906.....						
1907.....						
1908.....					1	30
1909.....					895	15,735
1910.....						
1911.....					3	100
1912.....						
1913.....						

\*These values do not compare with those in Table 1; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

The imports of phosphate rock (fertilizer) for 1913 were valued at \$16,070; phosphorus, 17,600 pounds, valued at \$5,856; and manufactured fertilizers, valued at \$505,904. The imports in 1912 included phosphate rock (fertilizer), valued at \$24,586; phosphorus 13,807 pounds, valued at \$4,012; and manufactured fertilizers, valued at \$580,351.

Phosphorus is manufactured at Buckingham by the Electric Reduction Company. The exports of phosphorus during the twelve months ending December 31, 1913, were 534,340 pounds, valued at \$73,395, as compared with 543,620 pounds, valued at \$66,806 in 1912, and 524,370 pounds, valued at \$76,608 in 1911.

## PYRITES.

The total shipments in 1913 was reported as 158,566 tons, valued at \$521,181. The shipments include: 87,314 tons of copper pyrites from Quebec mines, valued at \$349,256, and 71,252 tons of iron pyrites, valued at \$171,925 from Ontario properties. In 1912 the shipments were reported as 81,526 tons, valued at \$314,085, comprising 60,849 tons of copper pyrites from mines in Quebec, and 20,677 tons of iron pyrites from Ontario mines.

In publishing statistics of exports of pyrites as compiled by the Department of Customs, attention is called to the fact that apparently the record is incomplete. It is possible that the copper pyrites exported from Quebec province may be entered as a copper ore, and not as pyrites in the export tables.

The exports of pyrites from Canada in 1913, as reported by the Customs Department, were 46,066 tons, valued at \$211,640, as compared with exports in 1912 of 5,938 tons, valued at \$11,935 and exports in 1911, 32,102 tons, valued at \$120,585.

The imports of brimstone and crude sulphur during the calendar year 1913 were: 30,433 tons, valued at \$633,114, as against 38,647 tons, valued at \$806,690 in 1912, and 21,831 tons, valued at \$446,491, in 1911.

No record is available of the quantity of sulphuric acid manufactured in Canadian plants. The imports of sulphuric acid during the calendar year 1913, according to Customs returns, were 145,074 pounds, valued at \$4,054, as compared with imports in 1912 of 4,971,446 pounds, valued at \$35,325, and 1,031,803 pounds, valued at \$9,281 imported in 1911.

Statistics of production and exports of pyrites, of imports of brimstone and crude sulphur, and of imports of sulphuric acid, are shown in the following tables:—

### Annual Production of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	42,906	193,077	1900.....	40,031	155,164
1887.....	38,043	171,194	1901.....	35,261	130,544
1888.....	63,479	285,656	1902.....	35,616	138,939
1889.....	72,225	307,292	1903.....	33,982	127,713
1890.....	49,227	123,067	1904.....	37,180	134,033
1891.....	67,731	203,193	1905.....	33,339	125,486
1892.....	59,770	179,310	1906.....	42,743	169,990
1893.....	58,542	175,626	1907.....	46,243	212,491
1894.....	40,527	121,531	1908.....	47,336	224,324
1895.....	34,198	102,594	1909.....	64,644	222,812
1896.....	33,715	101,155	1910.....	53,870	187,064
1897.....	33,910	116,730	1911.....	32,666	365,820
1898.....	32,218	128,872	1912.....	81,526	314,081
1899.....	27,687	110,748	1913.....	158,566	521,185



## Imports:—Brimstone\* and Crude Sulphur.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1880.....	1,775,489	27,401	1897.....	8,672,751	87,719
1881.....	2,118,720	36,956	1898.....	38,026,798	373,786
1882.....	2,375,821	40,329	1899.....	24,517,026	265,799
1883.....	2,336,085	36,737	1900.....	21,128,656	215,433
1884.....	2,195,735	37,463	1901.....	23,856,651	270,608
1885.....	2,248,986	35,043	1902.....	24,640,735	325,307
1886.....	2,922,043	43,651	1903.....	24,412,737	259,123
1887.....	3,103,644	38,750	1904.....	19,364,730	204,663
1888.....	2,048,812	25,318	1905.....	23,435,140	242,251
1889.....	2,427,510	34,006	1906.....	43,047,672	436,156
1890.....	4,440,799	44,276	1907 (9 mos.).....	25,854,615	277,439
1891.....	3,601,748	46,351	1908.....	51,806,739	517,249
1892.....	4,769,759	67,095	1909.....	44,049,172	426,569
1893.....	6,381,203	77,216	1910.....	42,943,340	430,632
1894.....	5,845,463	61,558	1911.....	50,562,547	524,473
1895.....	4,900,225	56,965	1912.....	45,039,790	465,926
1896.....	6,934,190	63,973	1913.....	72,716,339	759,585

\*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	1904.....	18,279	49,911
1895.....	7,705	38,298	1905.....	19,755	55,767
1896.....	15,002	33,837	1906.....	26,050	65,349
1897.....	15,096	30,812	1907.....	25,056	30,139
1898.....	9,804	26,387	1908.....	17,283	96,600
1899.....	15,599	34,084	1909.....	35,798	156,644
1900.....	17,620	41,182	1910.....	30,434	110,071
1901.....	24,971	57,263	1911.....	32,102	120,585
1902.....	18,584	50,178	1912.....	5,938	11,935
1903.....	21,067	59,604	1913.....	46,066	211,640

## Imports of Sulphuric Acid.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1885.....	774,764	10,791	1899.....	165,637	2,427
1886.....	507,927	7,930	1900.....	740,858	7,066
1887.....	678,603	8,468	1901.....	448,608	5,272
1888.....	2,494,648	35,415	1902.....	420,731	4,626
1889.....	181,652	2,606	1903.....	102,314	2,332
1890.....	211,871	2,927	1904.....	113,407	2,563
1891.....	177,627	2,466	1905.....	920,804	8,227
1892.....	222,628	2,837	1906.....	822,585	8,553
1893.....	172,422	2,367	1907.....	733,151	6,901
1894.....	107,520	1,648	1908.....	650,095	7,582
1895.....	174,605	2,481	1909.....	241,388	3,293
1896.....	114,137	1,430	1910.....	914,058	8,466
1897.....	977,446	8,033	1911.....	2,486,992	21,855
1898.....	665,344	5,536	1912.....	1,615,180	15,027
			1913.....	4,393,873	29,884

The following is a list of operating pyrites mines, in Canada:—

The Eustis Mining Company, Eustis, Que.

East Canada Smelting Co., Limited, Weedon, Que., and 49 Wall St.,  
New York.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont.,  
and 25 Broad St., New York.

The Canadian Sulphur Ore Co., Limited, Madoc, Ont.

The Northern Pyrites Company, Graham, Ont., and 25 Broad St.,  
New York.

Algoma Steel Corporation, Limited, Sault Ste. Marie, Ont.

## QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel 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 1913 are reported as 78,261 tons, valued at \$169,842, as compared with shipments of 100,242 tons, valued at \$195,216, in 1912, and 60,526 tons, valued at \$83,865, in 1911.

Imports of silex, or crystallized quartz, in 1913 were: 690 tons, valued at \$13,811, and the imports of flint during the same year were 6,708 tons, valued at \$60,718. In 1912 the imports of silex were 629 tons, valued at \$10,680, and of flint 2,802 tons, valued at \$39,891.

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	1906.....	48,376	65,765
1891-2.....			1907.....	56,585	124,148
1893.....	100	500	1908.....	44,741	52,830
1894-5-6.....	10	50	1909.....	56,924	71,285
1897.....			1910.....	88,205	91,951
1898.....	284	570	1911.....	60,526	83,865
1899.....	600	1,260	1912.....	100,242	195,216
1900-1905.....			1913.....	78,261	169,842

### Imports of Silex:—Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880.....	5,252	2,200	1897.....	2,564	3,415
1881.....	3,251	1,659	1898.....	3,104	2,773
1882.....	3,283	1,678	1899.....	3,951	2,595
1883.....	3,543	2,058	1900.....	4,021	2,876
1884.....	3,259	1,709	1901.....	3,562	2,106
1885.....	3,527	1,443	1902.....	4,388	3,858
1886.....	2,520	1,313	1903.....	3,514	2,762
1887.....	14,533	5,073	1904.....	5,547	4,409
1888.....	4,808	2,335	1905.....	8,931	4,475
1889.....	5,130	1,211	1906.....	7,465	8,347
1890.....	1,768	2,617	1907 (9 mos.).....	11,964	12,969
1891.....	3,674	1,929	1908.....	24,938	19,166
1892.....	1,429	1,244	1909.....	6,206	6,909
1893.....	2,447	1,301	1910.....	11,460	9,531
1894.....	2,451	1,521	1911.....	11,348	10,634
1895.....	2,882	1,881	1912.....	7,445	7,314
1896.....	3,289	2,174	1913 Duty free.....	14,497	12,898

## SALT.

The production of salt in Canada has for a number of years been 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 1913, including salt used in the manufacture of caustic soda, were 100,791 tons, valued at \$491,280, exclusive of packages, as compared with sales of 95,053 tons, valued at \$459,582, in 1912, showing a continued increase in production.

The average number of men employed during the year was reported as 251, and the amount of wages paid \$178,386. The value of the packages used during the year was \$262,479, and stock of salt in manufacturers' hands at the close of the year was reported as 4,066 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 each year, number of men employed, wages paid, and the total annual production since 1886 are given in the following tables.

**Detailed Statistics of Production of Salt, 1908-1913.**

—	1908.	1909.	1910.	1911.	1912.	1913.
Sales of salt..... Tons	79,975	84,037	84,092	91,582	95,053	100,791
Value of salt (exclusive of packages)..... \$	378,798	415,219	409,624	443,004	459,582	491,280
Value of packages..... \$	168,019	175,612	173,446	198,789	224,696	262,479
Stock in manufacturers' hands at end of year..... Tons	5,631	2,671	2,474	1,422	3,256	4,066
Men employed..... No.	207	185	208	225	231	251
Wages paid..... \$	95,575	96,116	112,909	123,040	155,648	178,386

**Annual Production of Salt.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	62,359	227,195	1900.....	62,055	279,458
1887.....	60,173	166,394	1901.....	59,428	262,328
1888.....	59,070	185,460	1902.....	64,456	292,581
1889.....	32,832	129,547	1903.....	62,452	297,517
1890.....	43,754	198,857	1904.....	69,477	321,778
1891.....	45,021	161,179	1905.....	67,340	320,858
1892.....	45,486	162,041	1906.....	76,720	329,130
1893.....	62,324	195,926	1907.....	72,697	342,315
1894.....	57,199	170,687	1908.....	70,975	378,798
1895.....	52,376	160,455	1909.....	84,037	415,219
1896.....	43,960	169,693	1910.....	84,092	409,624
1897.....	51,348	225,730	1911.....	91,582	443,004
1898.....	57,142	248,639	1912.....	95,053	459,582
1899.....	59,339	254,390	1913.....	100,791	491,280

The salt fields of western Ontario are very extensive. The salt beds form part of the Onondaga formation, of Silurian age, and the saliferous horizons underlie a territory extending from Kincardine to Lake Erie, bordering Lake Huron and the Detroit river. This basin measures an extreme length of 150 miles, with a maximum width of 40 miles at the centre, and tapering towards the ends. This would cover an area of 2,500 square miles. An idea of the immense deposits of salt contained in this area may be gathered from the fact that a bore hole sunk at Goderich, in Huron county, to a depth of 1,517 feet, went through six beds of salt, ranging in thickness from 6 feet to 35 feet, whereas, at Windsor, in a well 1,672 feet deep, four beds were traversed, one of which is said to measure 250 feet in thickness.

Previous to 1911 the salt industry of western Ontario was confined to the production of salt, but in that year, 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. This plant has been in operation during the past two years, and is reported to have a capacity of 350 barrels of grainer salt, 1,400 barrels of vacuum salt,  $2\frac{1}{2}$  tons of caustic soda, and 9 tons of bleaching powder per day.

The imports of some of the soda products during the calendar years 1912 and 1913, as compiled from Customs reports, are shown in the accompanying table:—

	1912.		1913.	
	Lbs. imported.	Value.	Lbs. imported	Value.
		\$		\$
Soda, ash, or barilla.....	52,167,811	421,959	66,323,869	492,115
Soda dichromate.....	584,424	33,744	674,456	33,767
Caustic soda in packages, 25 lbs. or more.....	14,544,545	278,579	15,896,076	286,432
Sal soda.....	9,996,562	64,020	8,688,607	53,649
Sulphate of soda.....	19,243,823	97,768	25,902,190	133,030
		896,070		998,993

With a view to encouraging the manufacture of caustic soda in Canadian plants, the Dominion Government early in 1914 increased the duty on caustic soda. Caustic soda, when in packages of not less than 25 pounds each, was formerly imported free, but is now dutiable at the rate of  $\frac{1}{5}$  cents per pound, British Preferential Tariff;  $\frac{3}{10}$  cents per pound Intermediate tariff, and  $\frac{3}{10}$  cents per pound General tariff. Caustic soda, when imported in packages of less than 25 pounds each, is now dutiable at  $17\frac{1}{2}$  per cent, British Preferential tariff; 25 per cent Intermediate and General tariff. The former rates were: 10 per cent, British Preferential tariff;  $12\frac{1}{2}$  per cent Intermediate tariff, 15 per cent General tariff.

As at present carried on in western Ontario, the salt industry consists essentially in the production of table, dairy, and coarse salt, and a small quantity of land salt. These are manufactured by forcing water down bore-holes sunk to the rock salt bed, through a casing inside of which is a pipe of smaller diameter. A powerful pump forces water down the outer tube; this dissolves the salt, eventually forming large cavities at the bottom of the well, which offer a great surface of salt to the action of the water.

The water forced downwards is charged to saturation in the salt cavity, and, as the rock is not fissured or porous, this brine is forced upwards through the inner tube. After a process of purification and settling, this brine is evaporated either in vacuum pans or in large open air vats, and after passing through mechanical dryers or over drying floors, the salt is ready for the market.

#### EXPORTS AND IMPORTS.

Comparatively small quantities of salt are now exported from Canada, the exports in 1913 being 460,900 pounds, valued at \$3,047, as compared with exports of 289,150 pounds, valued at \$3,723 in 1912.

The imports of salt on the other hand are quite considerable, and in total value greatly exceed the domestic production.

For the calendar year 1913 the imports of salt subject to duty included: salt in bulk dutiable at 5 cents per 100 pounds, 22,787 tons, valued at \$73,115, and salt in bags, barrels, or other packages dutiable at  $7\frac{1}{2}$  cents per 100 pounds, 8,720 tons, valued at \$74,660. 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 112,939 tons, valued at \$417,508, giving total imports of 144,446 tons, valued at \$565,283.

The statistics of exports and imports 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	1898.....	5,202	1,252
1881.....	343,208	44,627	1899.....	11,205	2,773
1882.....	181,758	18,350	1900.....	37,653	8,997
1883.....	199,733	19,492	1901.....	39,224	6,510
1884.....	167,029	15,291	1902.....	9,331	3,798
1885.....	246,794	18,756		Lbs.	
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			

### Imports:—Salt Paying Duty.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1880.....	726,640	3,916	1897.....	11,911,766	33,470
1881.....	2,588,465	6,355	1898.....	11,068,785	32,792
1882.....	3,679,415	12,318	1899.....	11,781,453	32,839
1883.....	12,136,968	36,223	1900.....	11,028,337	30,180
1884.....	12,770,950	38,949	1901.....	11,625,688	34,087
1885.....	10,397,761	31,726	1902.....	13,892,849	39,605
1886.....	12,266,021	39,181	1903.....	14,554,693	41,785
1887.....	10,413,253	35,670	1904.....	29,779,133	73,826
1888.....	10,509,799	32,136	1905.....	18,473,868	58,056
1889.....	11,190,983	38,968	1906.....	21,366,064	59,305
1890.....	15,135,109	57,549	1907 (9 mos.).....	21,834,435	58,553
1891.....	15,140,827	59,311	1908.....	31,019,400	79,341
1892.....	18,648,191	65,963	1909.....	31,653,900	83,660
1893.....	21,377,339	79,838	1910.....	35,230,000	83,043
1894.....	15,867,825	53,336	1911.....	39,251,300	94,461
1895.....	8,498,404	29,881	1912.....	50,038,300	116,097
1896.....	7,665,257	24,550	1913.....	60,874,900	137,340

	1912.		1913.	
	Pounds.	Value.	Pounds.	Value.
Salt, fine, in bulk, N.E.S. (a).....	35,436,700	\$ 55,089	42,990,700	\$ 63,848
Salt, N.E.S., in bags, barrels or other packages (b)	14,601,600	61,008	17,884,200	73,492
Total.....	50,038,300	116,097	60,874,900	137,340

(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	1897.....	215,844,484	312,117
1881.....	231,640,610	488,278	1898.....	202,634,927	293,410
1882.....	166,183,962	311,489	1899.....	183,046,365	267,520
1883.....	246,747,113	386,144	1900.....	193,554,550	295,253
1884.....	225,390,121	321,243	1901.....	216,271,603	339,887
1885.....	171,571,209	255,719	1902.....	238,648,737	385,629
1886.....	180,205,949	255,359	1903.....	232,708,675	361,185
1887.....	203,042,332	285,455	1904.....	198,634,047	338,082
1888.....	184,166,986	220,975	1905.....	196,907,500	340,954
1889.....	180,847,800	253,009	1906.....	203,080,000	352,214
1890.....	153,490,075	252,291	1907 (9 mos.).....	139,459,900	240,841
1891.....	195,491,410	321,239	1908.....	200,944,800	350,878
1892.....	201,831,217	314,995	1909.....	232,237,700	376,961
1893.....	191,595,530	281,462	1910.....	232,559,900	382,210
1894.....	196,668,730	328,300	1911.....	205,784,700	330,251
1895.....	201,691,248	332,711	1912.....	212,552,200	332,534
1896.....	205,005,100	338,888	1913*.....	218,852,300	362,755

\* 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 1912 and 1913.

	1912.		1913.	
	Pounds.	Value.	Pounds.	Value.
		\$		\$
Canadian salt production.....	190,106,000	459,582	201,582,000	491,280
Less exports.....	289,150	3,723	460,900	3,047
Imports of salt paying duty.....	189,816,850	455,859	201,121,100	488,133
Imports of salt free of duty.....	60,134,500	133,869	63,015,000	147,775
	219,278,900	352,081	225,877,200	417,508
	469,230,250	941,809	490,013,300	1,053,416



The following is a list of operators:—

Operator.	Address.	Location.	No. of Wells.	Depth. Ft.
*New Brunswick Salt Works.....	Plumweseep, N.B.....	Plumweseep.....		
The Canadian Salt Co., Ltd.....	Windsor, Ont.....	Windsor.....	5	1200 to 1700
The Western Salt Co., Ltd.....	Courtwright.....	Courtwright.....	1	1200 & 1700
		Mooretown.....	1	1800
Stapleton Salt Works.....	Clinton, Ont, Box 29....	Stapleton.....	1	1700
North American Chem. Co.....	" " " "	Goderich.....	1	1300
*Jas. H. Kittermaster.....	Sarnia, Ont., 175 Christie S.	Mooretown.....	1	1200
The Dominion Salt Co., Ltd.....	Sarnia, Ont.....	" " " "	2	1700 & 2100
*The Sarnia Salt Works Co., Ltd.	Windsor, Ont., 36 Elliott			
The Elarton Salt Works Co., Ltd.	Hyde Part Corner.....	Warwick.....	1	1397
Parkhill Salt Co.....	Parkhill, Ont.....	Parkhill.....		
Exeter Salt Works Co., Ltd.....	Exeter, Ont.....	Exeter.....	1	1225
*Hensall Salt Works.....	Hensall, Ont.....			
Western Can. Flour Mills Co., Ltd.	Goderich.....	Goderich.....	1	1100
*Goderich Salt Works (P. McEwan Est.)	" " " "	" " " "	1	1050
Ontario Peoples Salt & Soda Co., Ltd.	Kincardine, Ont.....	Kincardine.....	1	981
Gray, Young & Sparling Co., Ltd.	Wingham, Ont.....	Wingham.....	1	1116
*Prairie Lime & Salt Co., Ltd....	Edmonton, 949 Fraser Ave.	Mafeking, Man.....		
B. C. Salt Works, Ltd.....	Prince Rupert, B.C.....	Kwinitsa.....	1	300

\*Not in operation.

## TALC.

Talc is being mined in the Province of Ontario only, two mines being operated during 1913 in the county of Hastings, at Madoc and Eldorado, respectively.

The total quantity of shipments by the operators of the mines in 1913, were 12,250 tons, valued at \$45,980, as compared with 8,270 tons, valued at \$23,132 in 1912.

The operators are:—

Messrs. Cross & Wellington, Madoc, operating the Henderson mine on lot 14, concession XIV, Huntingdon township.

The Canadian Talc and Silica Co., Eldorado, operating a mine and small mill near Eldorado, lot 20, concession V, Madoc.

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 1913, 2,750 tons were shipped crude to the United States, the balance being sent to Canadian grinding mills. In 1912, 1,542 tons were shipped crude to the United States. The crude talc is valued at about \$2 per ton at the mine, and the ground or refined talc at an average of about \$8 per ton.

The imports of talc during the calendar year 1913, according to Customs Department returns, were 402 tons, valued at \$10,706, or an average value per ton of \$26.63.

### Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	50	400	1900.....	1,420	6,365
1887.....	100	800	1901.....	259	842
1888.....	140	280	1902.....	689	1,804
1889.....	195	1,170	1903.....	990	2,739
1890.....	917	1,239	1904.....	840	1,875
1891.....	Nil	Nil	1905.....	500	1,800
1892.....	1,374	6,240	1906.....	1,234	3,030
1893.....	717	1,920	1907.....	1,534	4,602
1894.....	916	1,640	1908.....	1,016	3,048
1895.....	475	2,138	1909.....	4,350	10,300
1896.....	410	1,230	1910.....	7,112	22,308
1897.....	157	350	1911.....	7,300	22,100
1898.....	405	1,000	1912.....	8,270	23,132
1899.....	450	1,960	1913.....	12,250	45,980

The following notes with respect to the talc deposits at Madoc are taken from a recent report of the Ontario Bureau of Mines.<sup>1</sup>

"A large body of talc, known as the Henderson talc mine is located on the southern outskirts of the town of Madoc. The existence of the deposit has been known for fifteen years or more, but it is only within the last five years that it has developed into a large producer."

"The material of which there is little or no waste, is drawn in wagons to the talc mill at the railway station in the village of Madoc, where it is ground and separated into various grades. The talc is the massive variety, with a prevailing white color."

"The deposit occurs in a brown, quartzose, crystalline limestone of the Grenville series, an analysis of which shows it to have the following composition: CaO 29.29 per cent, MgO 15.52 per cent, CO<sub>2</sub> 43.67 per cent, insoluble 4.62 per cent. The talc has a width which varies from 25 feet or less to 40 feet, and it has been mined a distance of about 500 feet horizontally, but the extent of the body has not yet been determined in the underground workings. The surface on every side of the hill on which the property is located is covered with drift. The crystalline limestone on both sides of the deposit contains bands of white quartz several feet or more wide, often having the eozoon structure. A horizontal plan shows the talc to occur in the form of a horseshoe, or the letter "V", due to the strata having been sharply folded."

"The Connolly talc property, owned by the Canadian Talc and Silica Company, occurs a few hundred feet to the northeast of the Henderson talc mine, on an adjacent lot. Very little work has been done on this deposit, but, although the intervening area is drift-covered, it would appear that the two deposits may be continuous."

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<sup>1</sup>Ontario Bureau of Mines, Vol. XXII, Part 2, page 113.

## 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; sands and gravels; slate, and stone for building and other purposes, including granite, marble, limestone, sandstone, etc. Previous to 1912 no attempt had been 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., but at the time of closing the statistics several important and comprehensive returns had not been received. 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 these structural products in 1913, according to the record obtained, was \$30,809,752, as compared with a value of \$28,794,869 in 1912, an increase of \$2,014,883, or nearly 7 per cent. The total production in 1911 was valued at \$22,709,611, compared with which the 1912 production showed an increase of \$6,085,258, or 26.8 per cent. The total production in 1910 was valued at \$19,627,592, and in 1909 \$16,533,349.

For several years previous to 1913 the aggregate imports of structural material had been increasing at a more rapid rate than the domestic production. In 1913 however the exports were larger than the exports in 1912, and the imports showed a falling off of over 10 per cent. The apparent total consumption of products of this class based upon the statistics of production in conjunction with the records of exports and imports was in 1913 valued at \$39,916,642, as compared with a value of \$39,128,509 in 1912. The approximate consumption in 1911 was slightly less than \$30,000,000, and about \$25,250,000 in 1910, and \$20,350,000 in 1909. The increase in consumption in 1913 was a little less than 2 per cent, as against 30 per cent in 1912, 18 per cent in 1911, and 24 per cent in 1910.

A summary of the production, imports, exports, and consumption of structural materials and clay products in 1913, and in 1912, and the annual production from 1907 to 1911, are shown in tables herewith.

## Structural Materials, Calendar Year, 1913.

	Production.	Imports.	Exports.	Con- sumption.
	\$	\$	\$	\$
Cement, Portland.....	11,019,418	409,303	1,739	11,426,982
Clay products.....	9,504,314	6,760,752	52,333	16,212,733
Lime.....	1,609,308	238,271	20,234	1,818,435
Sand-lime brick.....	906,665			906,665
Sand and gravels.....	2,253,874	440,343	440,956	2,258,261
Slate.....	6,444	235,474		241,918
Stone.....	5,504,639	1,640,849	93,840	7,051,648
	30,809,752	9,724,992	618,102	39,916,642

## Structural Materials, Calendar Year, 1912.

	Production.	Imports.	Exports.	Con- sumption.
	\$	\$	\$	\$
Cement, Portland.....	9,106,556	1,969,529	2,436	11,073,649
Clay products.....	10,575,869	6,592,540	18,750	17,149,659
Lime.....	1,844,849	207,481	35,097	2,017,233
Sand-lime brick.....	1,020,386			1,020,386
Sand and gravels.....	1,512,099	445,781	459,952	1,497,928
Slate.....	8,939	200,643		209,582
Stone.....	4,726,171	1,467,143	33,242	6,160,072
	28,794,869	10,883,117	549,477	39,128,509

## Production of Structural Materials, 1907-1911.

	1907.	1908.	1909.	1910.	1911.
	\$	\$	\$	\$	\$
Cement.....	3,781,371	3,709,954	5,345,802	6,412,215	7,644,537
Clay products.....	5,772,117	4,500,702	6,450,840	7,629,956	8,359,933
Lime.....	974,595	712,947	1,132,756	1,137,079	1,517,599
Sand-lime brick.....	167,795	152,856	201,650	371,857	442,427
Sand and gravels (exports).....	119,853	161,387	256,166	407,974	408,110
Slate.....	20,056	13,496	19,000	18,492	8,248
Stone.....	2,027,262	2,088,613	3,127,135	3,650,019	4,328,757
Total.....	12,863,049	11,339,955	16,533,349	19,627,592	22,709,611

It will be noted that while there was an increased production of cement, sands and gravels, and stone, there was a falling off in the production of clay products, lime, sand-lime brick and slate. In the case of sands and gravels the increase shown in 1913 is probably chiefly due to the greater completeness of the record covering the past year. The financial stringency experienced during 1913 placed a check upon the development of Canada's structural material resources which has been a feature of the country's growth during the past ten years.

According to apparently reliable records, the total value of the building permits in twenty-five eastern cities in Canada increased from a little over \$26,000,000, in 1908 to over \$78,000,000 in 1912, and nearly \$90,000,000 in 1913. The aggregate value of building permits in fifteen western cities increased from about \$18,000,000 in 1908 to nearly \$117,000,000 in 1912, but fell off in 1913 to \$72,000,000. Thus, while structural activity increased more rapidly in western Canada, this section was the first to feel the effects of the set back. This would appear to be confirmed by the statistics of production of clay products which show an increase in eastern provinces but a very great decrease in all provinces west of the Great Lakes.

## CEMENT.

The total quantity of cement made in 1913, according to returns received from the manufacturers, was 8,886,333 barrels of 350 pounds net each (1,555,108 tons) as compared with 7,141,004 barrels (1,249,676 tons) made in 1912, an increase of 1,745,329 barrels (305,432 tons), or 24.4 per cent.

The total quantity of Canadian Portland cement sold in 1913 was 8,658,805 barrels (1,515,291 tons), as compared with 7,132,732 barrels (1,248,228 tons) in 1912, an increase of 1,526,073 barrels (267,063 tons), or 21.4 per cent.

The total consumption of cement in 1913 including Canadian and imported cement was 8,912,898 barrels of 350 pounds net each (1,559,757 tons), as compared with 8,567,145 barrels (1,499,250 tons) in 1912, an increase of 345,753 barrels (60,507 tons) or over 4 per cent.

The production of cement in Canada during the past few years, though all classed as Portland, has included an output of Puzzolán cement, made from blast furnace slag at Sydney, N.S., and a small production of "natural Portland", made at Babcock, Manitoba, 75 miles southwest of Winnipeg, on the Canadian Northern railway.

Notwithstanding the restriction of building operations during 1913 the consumption of cement shows a small increase of 4 per cent. A very substantial increase in the output of Canadian mills however is shown amounting to over 24 per cent and this increase served to displace imported material, so that in 1913 Canadian cement plants supplied over 97 per cent of the consumption as against 83 per cent of the consumption in 1912.

The industry has been marked during the year by the extension of old, and the completion of new plants, the latter west of the Great Lakes where a cement shortage was experienced during the summer of 1912. The total capacity of completed plants at the end of the year was over 50,000 barrels, as compared with 36,515 barrels at the end of 1912.

The market prices of cement according to quotations published in trade journals, showed practically no variation during the year and little change from the prices during 1912. Prices at Halifax are reported as \$2 per barrel; at Montreal for large lots \$1.35 to \$1.40, bags 40 cents extra; at Toronto in large quantities \$1.50, car lots \$1.55, small city dealers \$1.80 to \$1.85, bags 40 cents extra; at Winnipeg \$2.40 to \$2.50 per barrel in bags.

The average price at cement mills as returned by producers was: for Quebec \$1.16; Ontario \$1.08; Alberta \$2.04, and British Columbia \$1.71 per barrel.

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.			Totals.	
	Barrels.	Value.	Average value.	Barrels.	Value.	Average value.	Barrels.	Value.
		\$	\$ cts.		\$	\$ cts.		\$
1887.....							60,843	81,000
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	69,765	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	366,753	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	74,655	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	0.....	4,067,709	5,345,802	1 31	4,067,709	5,345,802
1910.....	0	0	0.....	4,753,975	6,412,215	1 35	4,753,975	6,412,215
1911.....	0	0	0.....	5,692,915	7,644,537	1 34	5,692,915	7,644,537
1912.....	0	0	0.....	7,132,732	9,106,556	1 28	7,132,732	9,106,556
1913.....	0	0	0.....	8,658,805	11,019,418	1 27	8,658,805	11,019,418

\*Quantities sold or used.

The production of cement in 1913 was derived from twenty-seven operating plants, in addition to which sales were made from stock at one plant not producing during the year. The total daily capacity of the operating plants was 50,540 barrels, while three other plants in Ontario, not operated during the year, are equipped for a daily capacity of 2,350 barrels.

The producing plants were distributed as follows: one in Nova Scotia, using blast furnace slag; three in Quebec, using limestone and clay; fourteen in Ontario, of which nine used marl and five limestone; two rock plants in Manitoba, one of which makes a "natural Portland"; four in Alberta including one marl plant and three limestone plants; and three rock plants in British Columbia.

The average number of men employed in Canadian cement plants during 1913 was 4,276, and the total wages paid \$3,466,451. In 1912 the average number of men employed was 3,461 and wages paid \$2,623,902.



A comparison of the principal statistics of 1912 and 1913 showing the increase or decrease, as the case may be, is given in the next table:—

### Comparison of Production, Sales, and Imports of Portland Cement in 1912 and 1913.

	1912.	1913.	Increase.	Per cent	Decrease.	Per cent
Cement sold or used..... Bls.	7, 132, 732	8, 658, 805	1, 526, 073	21.40		
Cement manufactured.... "	7, 141, 004	8, 886, 333	1, 745, 329	24.44		
Stock on hand Jan. 1..... "	894, 822	862, 067			32, 755	3.66
Stock on hand Dec. 31..... "	903, 094	1, 089, 595	186, 501	20.65		
Value of cement sold or used. \$	9, 106, 556	11, 019, 418	1, 912, 862	21.01		
Average price per barrel.... "	1.28	1.27			0.01	0.78
Wages paid..... "	2, 623, 902	3, 466, 451	842, 549	32.11		
Men employed..... No.	3, 461	4, 276	815	23.55		
Imports of Portland cement. Bls.	1, 434, 413	254, 093			1, 180, 320	82.8
Value of cement..... \$	1, 969, 529	409, 303			1, 560, 226	79.1
Average price per barrel... "	1.37	1.61	0.24	17.5		
Total consumption of cement in Canada..... Bls.	8, 567, 145	8, 912, 898	345, 753	4.04		
No. of completed plants operated.....	24	27	3	12.5		
Total daily capacity of operating plants as on Dec. 31..... Bls.	36, 515	50, 540	14, 025	38.4		

The output exceeded the sales by about 227,000 barrels and consequently stocks were increased during the year by about this amount. The average price per barrel at the mill for all plants was \$1.27 in 1913, as compared with \$1.27 $\frac{3}{4}$  in 1912, and \$1.34 in 1911. The increased production in 1913 was accompanied by an increase of 23.5 per cent in the number of men employed, and an increase of 32 per cent in amount of wages paid.

The imports of cement in 1913 show a falling off of nearly 83 per cent from those of 1912, while the average price of imported cement increased from \$1.37 in 1912 to \$1.61 in 1913.

Of the total cement made in 1913, 1,467,058 barrels were made from marl, and 7,419,275 barrels from limestone and slag. In 1912, 1,420,155 barrels were made from marl, and 5,720,849 barrels from limestone and slag; while in 1911, 1,626,857 barrels were made from marl and 4,050,682 barrels were made from limestone and slag. With the exception of the new plant at Marlboro, Alberta, practically all of the newer plants erected dur-

ing the past few years have been limestone plants. The proportion of cement made from marl in 1908 was about 45 per cent of the total output as compared with 28 per cent in 1911, 20 per cent in 1912, and 16.5 per cent in 1913.

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.

Year.	Number of operating plants.	Quantity made.	Quantity sold.	On hand Dec. 31.	Value of sales.	Average per barrel.	Daily capacity.
		Barrels.	Barrels.	Barrels.	\$	\$ cts.	Barrels.
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	908,090	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	1,777,233	5,345,802	1 31	23,050
1910.....	22	4,896,282	4,753,975	892,083	6,412,215	1 35	25,835
1911.....	24	5,677,539	5,692,915	903,589	7,644,537	1 34	23,310
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	1,030,595	11,019,418	1 27	50,540

*Imports and Exports*.—The quantity of cement exported is not recorded but the value in 1913 is reported as only \$1,739 as against a value of exports in 1912 of \$2,436, and \$4,067 in 1911.

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 this year the duty was, on account of the scarcity in western Canada, reduced by one-half from June 12 to October 31, 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 in 1913 however have fallen to 254,093 barrels.

The United States has been the principal source of imports during the past few years and supplied about 68 per cent of the imports in 1913, as compared with 30 per cent from Great Britain. In 1912 about 89 per

cent of the imports were from the United States, and 9 per cent from Great Britain. The imports of cement during 1912 and 1913 by countries, are shown in the next table.

### Imports of Cement, 1912 and 1913.

	1912.				1913.			
	Cwt.	Per cent.	Value.	Average value.	Cwt.	Per cent.	Value.	Average value.
			\$	Cts.			\$	Cts.
Great Britain..	457,031	9.1	147,831	32	270,747	30.4	94,844	35
United States..	4,483,353	89.3	1,789,621	40	603,044	67.8	305,165	51
Belgium.....	21,375	0.4	7,175	34	.....	.....	.....	.....
Other countries	3,187	0.1	1,423	45	3,483	0.4	3,307	.95
Hong Kong....	55,500	1.1	23,479	42	12,050	1.4	5,987	49
Totals.....	5,020,446	100.0	1,969,529	39	889,324	100.0	409,303	46
Equivalent in barrels of 350 lbs.....	1,434,413	.....	.....	.....	254,093	.....	.....	.....

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	1899.....	2,733	1906.....	7,551
1892.....	938	1900.....	3,296	1907.....	9,618
1893.....	1,172	1901.....	1,514	1908.....	34,591
1894.....	482	1902.....	2,267	1909.....	113,362
1895.....	937	1903.....	2,851	1910.....	12,914
1896.....	1,328	1904.....	5,494	1911.....	4,067
1897.....	644	1905.....	3,143	1912.....	2,436
1898.....	2,117			1913.....	1,739

## 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.	\$	\$ cts.	Barrels.	\$	\$ cts.
1880.....	28	10,034	10,306	1 03		55,774	
1881.....	208	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		120,393	
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	220,492	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
1907.....	16,201	1,192	685	0 57	1,551,493	523,120	0 34
1908.....	12,418	18,860	6,710	0 36	2,427,381	852,041	0 35
1909.....	5,733	438	466	1 06	1,460,850	475,676	0 33
1910.....	7,678	538	553	0 94	490,309	153,487	0 32
1911.....	6,275	389	365	0 94	1,283,121	494,081	0 39
1912.....	7,821	901	579	0 64	2,592,025	936,425	0 36
1913.....	10,680				4,958,814	1,955,177	0 39

\*Cement not elsewhere specified and manufactures of 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 con-

sumption of cement in Canada in 1913 was 8,912,898 barrels (1,559,757 tons) made up of 8,658,805 barrels (1,515,291 tons) of Canadian cement, and 254,093 barrels (44,466 tons) of imported cement, the Canadian cement representing 97.1 per cent and the imported cement 2.9 per cent of the total.

In 1912 the total consumption of cement was 8,567,145 barrels (1,499,250 tons), made up of 7,132,732 barrels (1,248,228 tons) of Canadian cement, and 1,434,413 barrels (251,022 tons) of imported cement, the Canadian cement representing 83.3 per cent, and the imported cement 16.7 per cent of the total.

In 1911 the total consumption of cement was 6,354,831 barrels (1,112,095 tons), made up of 5,692,915 barrels (996,260 tons) of Canadian cement, and 661,916 barrels (115,835 tons) of imported cement, the Canadian cement representing 90 per cent, and the imported cement 10 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

*Nova Scotia.*—There is but one cement plant in Nova Scotia located at Sydney and operated by the Sydney Cement Company, Limited. Puz-zolan cement is made from blast furnace slag and lime.

*Quebec.*—This Province has three completed cement mills all operated by the Canada Cement Company, Limited; two situated near Montreal at Longue Pointe and Pointe aux Trembles, and the third in Hull. The Montreal mills have now a combined capacity of 13,800 barrels per day and the Hull mill 2,800 barrels per day. The total quantity of cement sold or used by producers during 1913 in this Province was 2,940,211 barrels valued at \$3,430,023.

*Ontario.*—Ontario continues as the most important cement producing province in Canada having fourteen mills in operation during 1913 of which six with a total daily capacity of 11,100 barrels are operated by the Canada Cement Company, and eight mills, having a total daily capacity of 6,650 barrels, by independent companies. Five plants are operated on limestone and have a total daily capacity of 9,500 barrels, while nine plants, with an aggregate daily capacity of 8,250 barrels, utilize marl deposits. Three plants, one limestone and two marl, formerly producing cement were idle during 1913. 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 1913, were 3,992,988 barrels valued at \$4,311,183, as compared with 3,044,713 barrels valued at \$3,372,897 in 1912. There was thus an increase in sales of 948,275 barrels or over 31 per cent.

The detailed statistics of production during 1912 and 1913 are shown in the next table.

#### Cement Production in Ontario, 1912 and 1913.

	1912.	1913.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used....Bls.	3,044,713	3,992,988	948,275	31.1		
Cement manufactured... "	2,961,185	4,007,202	1,046,017	35.3		
Stock on hand Jan. 1.... "	563,066	439,010			124,056	22.0
Stock on hand Dec. 31... "	479,538	453,224			26,214	5.5
Value of cement sold.... \$	3,372,897	4,311,183	938,286	27.8		
Wages paid..... "	921,553	1,098,197	176,644	19.2		
Men employed.....No.	1,559	1,539			20	1.3
Total daily capacity of operating plants.....Bls.	19,900	17,750			2,150	10.8

*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 175 barrels per day. The Canada Cement Company completed and placed in operation its new plant near Winnipeg. This plant which was originally constructed as a clinker grinding mill was completed by the addition of a burning department. During 1913 all the cement produced at this plant was ground from clinker shipped from the Company's mill at Belleville, Ont. In the month of December, however, a commencement was made in the manufacture of clinker from raw materials obtained in the Province of Manitoba. The mill has a daily capacity of 3,500 barrels. Limestone is obtained from a property in township 28, range 10, west of the first meridian, and about 130 miles north of Winnipeg, on the Oak Point branch of the Canadian Northern railway.

*Alberta.*—Four cement plants were operated in this Province during 1913, located respectively at Exshaw, Calgary, Blairmore, and Marlboro, the

first three being limestone plants and the last mentioned using marl. The mills at Exshaw and Calgary are operated by the Canada Cement Company and have a daily capacity now increased to 4,500 barrels. The capacity of the mill at Blairmore, operated by the Rocky Mountains Cement Company, has been increased to 1,000 barrels.

The new plant at Marlboro, 140 miles west of Edmonton, constructed to utilize the local marl deposits, was completed during the year and operated for a period of four months; the daily capacity of this plant is 1,500 barrels. The total quantity of cement marketed by producers in 1913 was 956,169 barrels valued at \$1,947,933.

In addition to the completed plants, two others are in course of construction, one at Blairmore by the Keystone Portland Cement Company, and one at Dauntless, near Medicine Hat, by the Canada Cement Company, the latter plant is being planned for a capacity of 1,000,000 barrels per annum.

*British Columbia.*—Two new plants were completed during the year, making three plants in operation in this Province in 1913. At Tod Inlet the Vancouver Portland Cement Company increased the capacity of its plant to about 3,000 barrels per day. The Associated Cement Company (Canada) Ltd., successors to the Portland Cement Construction Company, Ltd., operated the new plant at Bamberton, also on Tod Inlet for a period of seven months, the daily capacity of this plant being about 2,000 barrels. In both cases the limestone, clay and shale are obtained in the vicinity of the works.

The plant at Princeton constructed by the British Columbia Portland Cement Co., Ltd., capacity 500 to 700 barrels per day, did not begin active production until late in the year and was operated for about four weeks only.

The total sales of cement from British Columbia mills in 1913 were 574,258 barrels valued at \$980,560.

The production of cement in Ontario has already been shown separately and the aggregate production in all other provinces during 1912 and 1913 is given in the next table.

#### Cement Production in Other Provinces, 1912 and 1913.

	1912.	1913.	Increase.	Percent.	Decrease.	Percent.
Cement sold or used.... Bls.	4,088,019	4,665,817	577,798	14.1	.....	.....
Cement manufactured.... "	4,179,819	4,879,131	699,312	16.7	.....	.....
Stock on hand Jan. 1.... "	331,756	423,067	91,311	27.5	.....	.....
Stock on hand Dec. 31.... "	423,556	636,371	212,815	50.2	.....	.....
Value of cement sold.... \$	5,733,659	6,708,235	964,576	16.8	.....	.....
Wages paid..... "	1,702,349	2,368,254	665,905	39.1	.....	.....
Men employed..... No.	1,902	2,737	835	43.9	.....	.....
Total daily capacity of operating plants..... Bls.	18,115	32,790	14,675	81.0	.....	.....

Following is a list of cement manufacturing companies:—

Name.	Location of Plant.	Head Office.
Sydney Cement Company, Ltd.....	Sydney, N.S.....	Sydney, N.S.
Canada Cement Company, Ltd.....		Montreal, Que.
Montreal Mill, No. 1.....	Longue Pointe, Que.....	
Montreal Mill, No. 2.....	Pointe Aux Trembles, Q.	
International Mill, No. 3.....	Hull, Que.....	
Owen Sound Mill, No. 9.....	Shallow Lake, Ont.....	
Belleville Mill, No. 4.....	Belleville, O. (Point Ann)	
Lehigh Mill, No. 5.....	"	
Lakefield Mill, No. 7.....	Lakefield, Ont.....	
Marlbank Mill, No. 6.....	Marlbank, Ont.....	
Port Colborne Mill, No. 8.....	Port Colborne, Ont.....	
Alberta Mill, No. 10.....	Calgary, Alberta.....	
†Dauntless Mill.....	Dauntless, Alberta.....	
Exshaw Mill, No. 12.....	Exshaw, Alberta.....	
Winnipeg Mill, No. 13.....	Winnipeg, Man.....	
The Doric Portland Cement Co., Ltd.....	Owen Sound, Ont.....	Owen Sound, Ont.
*The Imperial Cement Co., Ltd.....	"	"
Hanover Portland Cement Co., Ltd.....	Hanover, Ont.....	Hanover, Ont.
The Ontario Portland Cement Co., Ltd.....	Blue Lake, Ont.....	Brantford, Ont.
The National Portland Cement Co., Ltd.....	Durham, Ont.....	Durham, Ont.
Kirkfield Portland Cement Co., Ltd.....	Raven Lake, Ont.....	Toronto, Ont.
Superior Portland Cement Co., Ltd.....	Orangeville, Ont.....	Orangeville, Ont.
The Maple Leaf Portland Cement Co., Ltd.....	Atwood, Ont.....	Listowel, Ont.
*The Crown Portland Cement Co., Ltd.....	Warton, Ont.....	Warton, Ont.
St. Mary's Portland Cement Co., Ltd.....	St. Marys, Ont.....	Toronto, Ont.
The Commercial Cement Co., Ltd.....	Babcock, Man.....	Winnipeg, Man.
The Rocky Mountains Cement Co.....	Blairmore, Alberta.....	Calgary, Alberta.
†The Keystone Portland Cement Co.....	"	"
The Edmonton Portland Cement Co., Ltd.....	Marlboro, Alberta.....	Edmonton, Alberta.
Vancouver Portland Cement Co.....	Tod Inlet, B.C.....	Victoria, B.C.
British Columbia Portland Cement Co., Ltd...	Princeton, East.....	Vancouver, B.C.
The Associated Cement Co. (Canada), Ltd....	Bamberton.....	Victoria, B.C.

†Mill not yet completed. \*Idle.



## CLAYS AND CLAY PRODUCTS<sup>1</sup>.

For a number of years a small quantity of fireclay has been produced and sold as such, and during the past two years there has been a small 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 is manufactured by the producer, and this report, therefore, treats 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 1913 was \$9,504,314 as compared with a value of \$10,575,869 in 1912, showing a decrease of \$1,071,555 or a little over 10 per cent. During the five years preceding 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. Other clay products including ornamental brick, firebrick and fireclay, terra cotta fireproofing, pottery, sewerpipe, drain tiles and kaolin showed substantial increases in the quantity and value of products marketed. The average number of men employed and the total wages paid were greater in 1913 than in 1912. The average number of men employed in 1913 was 11,193 as compared with 10,415 in 1912, and 9,131 in

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<sup>1</sup>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).

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.

1911. The total wages paid in 1913 were \$4,682,801 as against \$4,488,957 in 1912, and \$3,524,058 in 1911.

A significant feature of the clay industry in 1913 was that the falling off in sales was almost entirely confined to the western provinces. There was an increase in the value of the sales of clay products in Nova Scotia, New Brunswick, and in Ontario. In the Province of Quebec the falling off was less than 5 per cent but the decrease in each of the four western provinces was very marked, ranging from 30 to 50 per cent.

Largely because of her preponderance of population and older development, Ontario is by far the largest producer of clay products, having contributed in 1913 nearly 55 per cent of the total values marketed, as compared with 46 per cent in 1912. Quebec contributed 17 per cent in 1913 as against 16 per cent the preceding year; Alberta 9.4 per cent in 1913, as compared with 12.5 per cent in 1912; Manitoba 5 per cent in 1913 as against 10 per cent in 1912, and British Columbia 7 per cent in 1913 as compared with 8 per cent in the previous year.

Of the total value of the production in 1913, building and paving brick, including fire proofing, contributed \$7,928,585 or about 75 per cent, as against \$9,163,666 or 86 per cent of the total in 1912. Sewerpipe and tile production in 1913 were valued at \$1,374,458 or 13 per cent of the total, as against \$1,242,503 or 11.7 per cent of the total in 1912. The total value of the production of pottery in 1913 was reported as \$368,916 of which \$53,533 only, is estimated as attributable to Canadian clays, and the balance to imported clays. The value of the production of fireclay and fire brick from domestic clays was reported as \$142,738. Compared with the previous year the production of building, paving, and fireproofing brick shows a decrease of about 13 per cent, whereas the production of sewerpipe shows an increase of nearly 11 per cent.

The average price of common and building brick for the whole of Canada in 1913 was \$8.85 as compared with \$9.11 in 1912; \$8.37 in 1911, \$8.13 in 1910, and \$7.81 in 1909. The average price of pressed or front brick for the same years was respectively \$12.49, \$12.86, \$12.53, \$11.89, and \$11.01, thus showing a general increase in the cost of building brick until 1912, with a slight falling off in 1913.

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 1913 was \$6,760,752 (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 \$16,212,733 is shown of which about 58.6 per cent was of domestic production.

In 1912 the approximate consumption was valued at \$17,149,659, of which about 62 per cent was of domestic production. In 1911 the con-

sumption was valued at \$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 are more than double and those of firebrick about eight times the Canadian production. The imports of drain tile and sewerpipe were about one-third the Canadian production.

Statistics of production in 1913 and 1912 of the several classes of clay products by provinces are shown in the following tables:—

### Production of Clay Products by Provinces, 1913

Province.	No. of active firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			
				No. manu- factured.	No. sold.	Value of sales.	Per M.	No. manu- factured.	No. sold.	Value of sales.	Per M.
			\$			\$	\$ cts.			\$	\$ cts
Nova Scotia.....	12	395	123,554	25,052,866	21,923,573	171,418	7 82	175,186	162,192	2,606	16 06
New Brunswick.....	8	173	34,540	7,158,240	6,139,152	61,369	10 00	50,000	50,000	600	12 00
Quebec.....	76	2,055	721,435	180,063,371	145,972,957	1,152,444	7 89	10,338,313	7,723,285	98,321	12 73
Ontario.....	271	5,260	2,393,357	401,055,851	349,846,487	3,105,256	8 88	89,494,500	80,133,044	920,773	11 48
Manitoba.....	17	1,134	233,143	67,078,850	39,559,320	443,498	11 21	6,031,079	4,101,000	70,860	17 28
Saskatchewan.....	14	379	116,312	23,169,000	16,475,000	162,370	9 86	2,750,000	1,700,000	27,450	16 15
Alberta.....	30	991	592,709	65,091,783	52,378,283	477,998	9 13	25,016,515	19,618,060	254,410	12 97
British Columbia.....	27	806	417,751	43,919,240	36,131,903	343,020	9 49	5,728,907	3,264,472	83,713	25 65
Totals.....	455	11,193	4,682,801	812,589,201	668,426,675	5,917,373	8 85	139,584,500	116,802,053	1,458,733	12 49

Province.	Paving brick.		Ornamental.		Firebrick and fireclay shapes. Value.	Fireproof- ing and terra-cotta, etc. Value.	Pottery. Value.	Sewerpipe. Value.	Tiles, drain. Value.	Kaolin. Value.	Total value. Clay products.
	No. sold.	Value.	No. sold.	Value.							
		\$		\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....					17,173			138,209	2,866		332,272
New Brunswick.....									300		62,269
Quebec.....			195,000	4,875	29,528	122,000	1,800	184,248	8,600	5,000	1,606,816
Ontario.....	3,995,180	69,840	635,855	9,810		150,268	48,864	600,797	314,859		5,220,467
Manitoba.....											514,358
Saskatchewan.....											189,820
Alberta.....	100,000	3,000	44,500	738		146,200	2,869	7,219	974		893,408
British Columbia.....	113,115	2,829			96,037	42,919		105,433	10,953		684,904
Totals.....	4,208,295	75,669	875,355	15,423	(b) 142,738	461,387	(a) 53,533	1,035,906	338,552	5,000	9,504,314

(a) There was also a production of \$315,383 from imported clays.

(b) There was also a production of \$22,925 from imported clays.

## Production of Clay Products by Provinces, 1912.

Province.	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.
			\$			\$	\$ cts.			\$	\$
Nova Scotia.....	11	316	98,939	20,095,202	18,722,960	128,508	6 86	220,000	100,000	1,600	16 00
New Brunswick.....	7	148	45,536	6,179,000	5,730,000	52,850	9 22	50,000	50,000	500	10 00
Quebec.....	74	1,917	645,221	181,219,323	161,836,557	1,308,380	8 08	10,386,454	11,500,000	138,500	12 04
Ontario.....	271	4,696	2,060,542	356,964,931	350,461,874	3,045,840	8 69	75,231,791	73,208,310	761,355	10 40
Manitoba.....	21	1,088	405,926	83,556,437	83,681,237	959,854	11 47	3,450,000	3,497,700	52,947	15 13
Saskatchewan.....	14	383	152,654	24,603,771	25,338,771	246,443	9 73	5,950,000	5,200,000	86,500	16 63
Alberta.....	33	1,053	587,223	73,394,693	70,074,568	755,986	10 69	25,798,410	23,685,412	349,926	14 77
British Columbia.....	28	814	492,916	56,569,470	53,345,565	512,514	9 61	8,210,800	7,939,000	218,526	27 53
<b>Totals.....</b>	<b>459</b>	<b>10,415</b>	<b>4,488,957</b>	<b>802,582,827</b>	<b>769,191,532</b>	<b>7,010,375</b>	<b>9 11</b>	<b>129,297,455</b>	<b>125,180,422</b>	<b>1,609,854</b>	<b>12 86</b>

Province	Paving brick.		Ornamental.		Firebrick and fireclay shapes. Value.	Fireproofing and terra-cotta, etc. Value.	Pottery. Value.	Sewerpipe Value.	Tiles, drain. Value.	Kaolin. Value.	Total value. Clay products.
	No. sold.	Value.	No. sold.	Value.							
		\$		\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....					15,375	1,270		115,000	10,300		272,053
New Brunswick.....								1,560			54,910
Quebec.....					25,000	42,530	500	165,000	390	160	1,680,460
Ontario.....	4,554,500	85,589	352,816	7,168		135,087	43,455	478,156	308,050		4,864,700
Manitoba.....									5,250		1,018,051
Saskatchewan.....											332,943
Alberta.....			10,000	1,000		248,712			500		1,356,184
British Columbia.....	25,000	400	8,540	427	85,210	21,254		126,485	31,752		996,568
<b>Totals.....</b>	<b>4,579,500</b>	<b>85,989</b>	<b>371,356</b>	<b>8,595</b>	<b>(b) 125,585</b>	<b>448,853</b>	<b>(a) 43,955</b>	<b>884,641</b>	<b>357,862</b>	<b>160</b>	<b>10,575,869</b>

(a) There was also a production of \$383,134 from imported clays.

(b) Also a production of \$25,000 from imported clays.

## Production of Clay Products, 1910 and 1911.

	1910.			1911.		
	Quantity.	Value.	Per M.	Quantity.	Value.	Per M.
		\$	\$ cts.		\$	\$ cts.
Bricks—						
Common.....No.	627,715,319	5,105,354	8 13	645,550,517	5,420,890	8 37
Pressed.....“	67,895,034	807,294	11 89	87,350,539	1,094,532	12 53
Paving.....“	4,214,917	78,980	18 74	5,220,400	79,444	15 22
Ornamental.....“	703,345	16,092	22 89	605,643	11,281	18 63
Firebrick and fireclay shapes, etc.....		50,215			80,130	
Fireproofing, and architectural terra-cotta, etc.....		176,979			409,585	
Pottery.....		250,924			102,493	
Sewerpipe.....		774,110			812,716	
Tiles, drain.....	24,562,648	370,008			339,812	
Totals.....		7,629,956			8,359,933	

## Production of Clay Products by Provinces, 1908-1913.

Province.	1908.	1909	1910.	1911.	1912.	1913.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	117,833	188,185	204,782	274,249	272,053	332,272
New Brunswick.....	75,513	65,570	56,475	38,000	54,910	62,269
Quebec.....	893,717	1,153,832	1,442,842	1,341,467	1,680,460	1,606,816
Ontario.....	2,476,152	3,425,841	3,667,810	3,916,575	4,864,700	5,220,467
Manitoba.....	265,091	559,008	781,605	834,428	1,018,051	514,353
Saskatchewan.....	87,566	145,516	160,850	226,958	332,943	189,820
Alberta.....	240,384	442,486	753,232	1,052,751	1,356,184	893,408
British Columbia.....	344,446	470,402	562,360	675,505	996,568	684,904
	4,500,702	6,450,840	7,629,956	8,359,933	10,575,869	9,504,314

## Annual Value of Production of Clay Products, 1899-1913.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1899.....	2,983,099	1904.....	3,841,560	1909.....	6,450,840
1900.....	3,195,105	1905.....	4,709,842	1910.....	7,629,956
1901.....	3,382,706	1906.....	5,072,635	1911.....	8,359,933
1902.....	3,625,489	1907.....	5,772,117	1912.....	10,575,869
1903.....	4,034,289	1908.....	4,500,702	1913.....	9,504,314

*Exports and Imports.*—The total value of the exports of clay products in 1913 was \$52,333 and included 977,000 building brick valued at \$8,579, manufactures of clay valued at \$27,201, and earthenware valued at \$16,553.

In 1912 the total value of the exports was \$18,750, which included 694,000 building brick valued at \$8,493, manufactures of clay valued at \$256 and earthenware valued at \$10,001.

The imports of clays and clay products reached a total value during the calendar year 1913 of \$6,760,752, or equivalent to about 71 per cent of the domestic production. The total imports in 1912 were valued at \$6,592,540 showing an increase in 1913 of \$168,212 or less than 3 per cent, as against an increase in 1912 over 1911 of nearly 28 per cent in imports. Not only have the imports during the past few years been increasing at a more rapid rate than the home production, but in 1913 there was an increase in imports notwithstanding a decrease in the value of domestic clay products marketed.

Clay imports are classified by the Department of Customs under three main subdivisions, including: brick and tile; earthenware and chinaware, and clays. The imports of clays in 1913 were valued at \$324,290 and included chiefly china-clay and fireclay with a small quantity of pipeclay and other clays not classified. The value of china-clay imported was \$149,337 and of fireclay \$143,399, in both cases an increase over the imports of the previous year. In 1912 the total value of the imports of clays was \$288,394 and included china-clay valued at \$127,402 and fireclay at \$140,500. The imports of these clays have varied considerably from year to year. The present imports of china-clay are the highest recorded but the imports of fireclay in 1908 exceeded the 1913 imports.

The imports classified under brick and tile were valued in 1913 at \$3,121,592 a slightly lower value than the imports in 1912 which were \$3,209,190. A large portion of these imports are made up of firebrick, nearly 40 per cent in 1913. There is also a considerable import of building and paving brick, of sewerpipe 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 1913 at \$3,314,870 as against \$3,094,956 in 1912, an increase of about 4 per cent. 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 since 1907 is shown in the next table, the figures for the years 1907 to 1909 covering the fiscal year; for the last five years the calendar year is used.

## Imports of Clay Products, 1907 to 1913.

Imports.	9 months ending March, 1907.	12 months ending March, 1908.	12 months ending March, 1909.	Calendar year 1909.	Calendar year 1910.	Calendar year 1911.	Calendar year 1912.	Calendar year 1913.
Brick and tile—	\$	\$	\$	\$	\$	\$	\$	\$
Bath brick.....	1,076	1,834	4,432	1,495	2,290	2,623	1,927	2,690
Building brick.....	88,144	139,105	108,773	195,360	274,482	475,865	763,470	575,269
Paving brick.....	23,256	61,346	101,187	139,366	124,994	164,292	160,663	176,497
Firebrick, of a class or kind not made in Canada.....	*506,801	639,347	350,457	485,994	811,927	814,414	953,621	976,097
Drain tile, not glazed.....	12,106	2,080	2,394	2,785	4,465	5,640	4,018	12,156
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	93,458	125,747	106,399	170,280	175,599	332,929	507,024	465,997
Manufactures of clay, n.o.p.....	45,845	110,997	141,391	254,170	361,996	523,998	818,467	(a)912,886
Total.....	770,686	1,079,556	815,033	1,249,450	1,755,773	2,369,761	3,209,190	3,121,592
Earthenware and chinaware—								
Brown or coloured earthenware and stoneware, and Rockingham ware.....	9,625	22,847	28,273	36,673	53,413	52,100	62,161	70,632
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....	154,879	239,513	197,623	219,936	202,475	184,291	291,804	264,090
Demijohns, churns, or crocks.....	9,342	17,836	10,571	8,888	6,607	4,933	18,404	32,599
Tableware of china, porcelain, white granite or iron-stoneware..	902,798	1,555,517	1,202,537	1,212,365	1,545,538	1,718,582	2,068,362	2,185,601
China and porcelain ware, n.o.p.....	134,675	109,446	87,798	87,467	95,509	62,025	71,751	43,696
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	62,547	45,836	43,299	56,974	90,524	123,203	160,082	173,445
Earthenware tiles, n.o.p.....	67,027	116,480	79,854	81,393	125,772	154,351	239,391	296,791
Manufactures of earthenware, n.o.p.....	81,987	83,309	66,932	78,063	163,278	217,051	133,001	248,016
Total.....	1,422,880	2,190,784	1,716,887	1,781,759	2,283,116	2,516,536	3,094,956	3,314,870
Clays:—								
China-clay ground, or unground.....	78,772	97,236	90,922	100,066	142,125	125,768	127,402	149,337
Fireclay, ground or unground.....	85,044	155,873	77,146	86,161	124,293	125,199	140,500	143,399
Pipeclay, ground or unground.....	307	319	887	310	114	1,786	234	385
Clays, all other, n.o.p.....	14,117	14,292	21,280	29,793	25,976	17,494	20,258	31,169
Totals.....	178,240	267,720	190,235	216,330	292,508	270,247	288,394	324,290
Grand total.....	2,371,806	3,538,060	2,722,155	3,247,539	4,331,397	5,156,544	6,592,540	6,760,752
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material.....	62,547	234,505	157,881	211,837	262,667	235,847	382,920	477,133
Chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground.....	7,376	72,467	81,675	96,747	121,959	147,640	167,990	164,879

\*Includes stove linings, n.e.s.

(z) Includes Building Blocks (9 mos.) \$356,366; Firebrick, n.o.p. (9 mos.) \$216,760; and manufactures of clay n.o.p. \$339,760.



In addition to the imports of clay products there is also shown in the preceding table a considerable annual importation of 'chalk, china or corn-wall 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 1913 was \$164,879; of which \$138,524 was from the United States, \$21,860 from Great Britain, and \$4,495 from other countries. The value of the imports under this item during the calendar year 1912 was \$167,990. 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 1913 being \$477,133 as compared with \$382,920 during the year 1912.

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 Germany, France, Austria-Hungary, and Japan. The imports during the fiscal year, showing the country of origin, are shown in the next table. Of the brick and tile imported 86.5 per cent was from the United States and 13.2 per cent from Great Britain; and only \$5,727 worth from other countries. Of the earthenware and chinaware, 59 per cent was imported from Great Britain; 18 per cent from the United States; 11 per cent from Germany; 6 per cent from France, and considerable values also from Japan, Austria-Hungary, and other countries. The crude clays were imported principally from Great Britain and the United States.

## Imports of Clay Products During the Twelve Months Ending March 1913, Showing Countries of Origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other countries.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
Brick and tile:—								
Bath brick.....	1,454	196						1,650
Building brick.....	31,812	777,556						809,368
Paving brick.....	63,171	96,005		678				159,854
Fire brick, of a class or kind not made in Canada.....	114,201	882,569		8	250		3,488	1,000,516
Drain tile, not glazed.....	1,199	2,873		381				4,453
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	81,029	432,491						513,520
Manufactures of clay, n.o.p.....	145,403	663,432	270	449	66		137	814,757
<b>Total.....</b>	<b>433,269</b>	<b>2,860,122</b>	<b>270</b>	<b>1,516</b>	<b>316</b>		<b>3,625</b>	<b>3,304,118</b>
Earthenware and chinaware:—								
Brown or coloured earthenware and stoneware, and Rockingham ware.....	22,131	40,112	202		7	22	17	62,491
C. C. or cream coloured ware, decorated printed or sponged, and all earthenware, n.o.p.....	192,367	58,916	21,814	3,475	1,652	10,768	7,646	296,633
Demijohns, churns, or crocks.....	2,454	22,843	12	83			94	25,486
Tableware of china, porcelain, white granite or iron-stoneware..	1,470,349	36,326	303,325	174,431	76,168	89,088	15,976	2,166,163
Chinaware, to be silver mounted, imported by manufacturers of silverware.....	125	232	45					402
China and porcelain ware, n.o.p.....	33,061	17,322	9,344	908	1,792	3,512	987	66,926
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	29,709	142,713	1,093	3,174		11	108	176,803
Earthenware tiles, n.o.p.....	127,715	147,049	148	1,162			839	276,918
Manufactures of earthenware, n.o.p.....	54,507	118,346	7,898	1,412	813	6,194	4,133	193,353
<b>Total.....</b>	<b>1,932,418</b>	<b>584,359</b>	<b>343,881</b>	<b>184,645</b>	<b>80,432</b>	<b>109,595</b>	<b>29,850</b>	<b>3,265,180</b>
Clays:—								
China-clay, ground or unground.....	95,147	49,980			298			145,425
Fire-clay, ground or unground.....	23,388	134,048	1,233		40			158,759
Pipe-clay, ground or unground.....	98	210						308
Clays, all other, n.o.p.....	478	21,888	512					22,878
<b>Total.....</b>	<b>119,111</b>	<b>206,126</b>	<b>1,795</b>		<b>338</b>			<b>327,370</b>
<b>Grand Total.....</b>	<b>2,489,798</b>	<b>3,650,607</b>	<b>345,946</b>	<b>186,161</b>	<b>81,086</b>	<b>109,595</b>	<b>33,475</b>	<b>6,896,663</b>
Per cent of total.....	36.10	52.93	5.02	2.70	1.18	1.59	0.48	
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material.....	128,911	294,057	381					423,349
Chalk, china or cornwall stone, cliff stone, and feldspar, fluorspar, magnesite, ground or unground.....	35,136	134,276	98	9	164		1,293	170,976

A record of the total annual value of the imports of clay products since 1900 by fiscal years, is shown in the following table. In fourteen years Canada has imported clay products to the value of \$42,293,374. The increase in imports has been most pronounced in the case of brick and tile, the imports of which in 1900 amounted to \$145,914 as compared with \$3,304,118 in the fiscal year 1913, an increase of over twenty-fold. The imports of earthenware and chinaware have more than trebled, and the imports of clays have almost trebled in the same period.

### Imports of Clay Products (total value) 1900-13.

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
1909.....	815,033	1,716,887	190,235	2,722,155
1910.....	1,341,310	1,859,302	218,232	3,418,844
1911.....	1,895,201	2,398,416	299,533	4,593,150
1912.....	2,462,181	2,582,966	257,671	5,302,818
1913.....	3,304,118	3,265,180	327,370	6,896,668
	14,298,955	25,132,250	2,862,169	42,293,374

\*9 months ending March 1907.

\*\*Includes fireclay classified as "for use in process of manufactures."

The Canadian Customs duties affecting clays and clay products are shown as follows:—

### Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910.)

Item.		British Preferential tariff.	Inter-mediate 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, fireclay and pipe-clay, 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 the common and pressed brick, but excluding ornamental, paving, firebrick, and fireproofing brick, are shown by provinces, for the past four years, in the following tables.—

In 1913 the total sales were 785,228,728 brick valued at \$7,376,106, made up of 668,426,675 common, valued at \$5,917,373 or an average value per thousand of \$3.85; and 116,802,053 pressed brick, valued at \$1,458,733 or an average value per thousand of \$12.49. In addition to the common and pressed brick there were sales of ornamental brick of 875,355 valued at \$15,423, and of fireproofing brick and architectural terra cotta valued at \$461,387.

In 1912 the total sales were 894,371,954, valued at \$8,620,229, made up of 769,191,532 common, valued at \$7,010,375, or an average value per thousand of \$9.11; and 125,180,422 pressed brick, valued at \$1,609,854, or an average value per thousand of \$12.86. In addition to the common and pressed brick, there was a production of ornamental brick of 371,356 valued at \$8,595, and a production of fireproofing brick and architectural terra-cotta valued at \$448,853.

In 1911 the total sales were 732,901,056, valued at \$6,515,472, made up of 645,550,517 common, valued at \$5,420,890, or an average value per thousand of \$8.37; and 87,350,539 pressed brick, valued at \$1,094,582, or an average value per thousand of \$12.53. In addition to the common and pressed brick there was a production of ornamental brick of 605,643, valued at \$11,281, and a production of fireproofing brick and architectural terra-cotta valued at \$409,585.

**Production of Clay Building Brick (Common and Pressed) 1912 and 1913.**

Province.	1912.				1913.			
	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.
			\$				\$	
Nova Scotia.....	11	18,822,960	130,108	1.5	12	22,085,765	174,024	2.3
New Brunswick..	7	5,780,000	53,350	0.6	8	6,189,152	61,969	0.8
Quebec.....	74	173,336,557	1,446,880	16.8	76	153,696,242	1,250,765	17.0
Ontario.....	271	423,670,184	3,807,195	44.2	271	430,029,531	4,026,029	54.6
Manitoba.....	21	87,178,937	1,012,801	11.7	17	43,660,320	514,358	7.0
Saskatchewan...	14	30,538,771	332,943	3.9	14	18,175,000	189,820	2.6
Alberta.....	33	93,759,980	1,105,912	12.8	30	71,996,343	732,408	9.9
British Columbia	28	61,284,565	731,040	8.5	27	30,396,375	426,733	5.8
Totals.....	450	894,371,954	8,620,229	100.0	455	785,228,728	7,376,106	100.0

### Production of Clay Building Brick (Common and Pressed) 1910 and 1911.

Province.	1910.			1911.		
	No. sold.	Value.	Per cent of total value.	No. sold.	Value.	Per cent of total value.
		\$			\$	
Nova Scotia.....	18,730,000	113,436	1.92	23,530,000	141,640	2.17
New Brunswick.....	3,950,000	31,350	0.53	4,400,000	38,000	0.58
Quebec.....	130,278,310	929,492	15.72	122,041,580	1,033,270	15.86
Ontario.....	342,119,078	2,785,361	47.11	369,004,371	3,028,046	46.48
Manitoba.....	75,834,550	746,704	12.63	81,400,000	826,928	12.69
Saskatchewan.....	14,733,340	160,850	2.72	21,071,660	224,758	3.45
Alberta ..	73,639,771	750,982	12.70	71,772,930	779,001	11.96
British Columbia.....	36,316,304	394,473	6.67	39,680,515	443,829	6.81
Totals.....	695,610,353	5,912,648	100.00	732,901,056	6,515,472	100.00

The exports of building brick since 1891 and the imports since 1880 are shown in the two 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 \$8,579 in 1913.

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 1913 the imports were 56,846,000 brick valued at \$575,269 of which 2,427,000 valued at \$28,645 or an average of \$11.80 per thousand were imported from Great Britain, and 54,419,000 valued at \$546,624 or an average of \$10.04 per thousand, from the United States. The imports during the calendar year 1912 were 81,425,000 brick valued at \$763,470, of which 3,071,000 valued at \$32,731, or an average of \$10.66 per thousand were imported from Great Britain, and 78,350,000 valued at \$730,739, or an average of \$9.33 per thousand from the United States.

It will be noted that in 1913 there was a considerable falling off in the imports of brick, both from Great Britain and the United States, and an increase in the average price of the brick imported.

## Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
		\$			\$			\$
1891.....	246	1,163	1899.....	172	1,351	1907.....	802	6,193
1892.....	1,963	12,192	1900.....	546	4,528	1908.....	2,344	9,047
1893.....	6,073	44,110	1901.....	646	5,189	1909.....	365	2,255
1894.....	1,095	7,405	1902.....	2,110	12,786	1910.....	390	2,762
1895.....	1,655	8,665	1903.....	891	5,699	1911.....	394	3,977
1896.....	983	5,678	1904.....	696	5,357	1912.....	694	8,493
1897.....	573	2,679	1905.....	754	5,888	1913.....	977	8,579
1898.....	65	442	1906.....	697	6,541			

## Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		\$			\$			\$
1880.....	340	2,067	1891.....	589	9,744	1902.....	4,087	33,802
1881.....	415	4,281	1892.....	621	5,075	1903.....	2,881	28,493
1882.....	3,500	24,572	1893.....	1,489	14,108	1904.....	13,455	117,468
1883.....	1,448	14,234	1894.....	2,220	18,320	1905.....	25,515	168,122
1884.....	3,263	20,258	1895.....	575	4,705	1906.....	21,934	194,897
1885.....	3,108	14,632	1896.....	1,057	23,189	1907 (9 mos.)	8,495	88,144
1886.....	983	5,929	1897.....	2,094	10,336	1908.....	13,790	139,105
1887.....	276	2,440	1898.....	639	6,652	1909.....	10,894	103,773
1888.....	2,483	20,720	1899.....	2,611	21,306	1910.....	30,444	218,175
1889.....	2,590	24,585	1900.....	1,792	19,305	1911.....	32,748	309,553
1890.....	1,933	12,500	1901.....	2,800	20,677	1912.....	51,073	465,997
						1913.....	85,943	809,368

*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 1913 according to these returns was \$8.85, as compared with \$9.11 in 1912, and \$8.37 in 1911; and of pressed brick \$12.49 in 1913, as compared with \$12.86 in 1912, and \$12.53 in 1911.

In the Maritime Provinces during 1913 the price of common brick varied from \$7.00 to \$12.00, averaging for Nova Scotia \$7.82, and for New Brunswick \$10.00.

In Quebec the price of common brick varied between \$5 and \$10, averaging \$7.89, while the price of pressed brick averaged \$12.73. The average price of common brick in Ontario was \$8.88, the limits of variation being \$6.00 and \$11.00; while for pressed brick the average was \$11.48 and the variation from \$10.00 to \$17.00.

In all the western provinces common brick ranged from about \$8.00 to \$13.00, averaging \$11.21 in Manitoba, \$9.86 in Saskatchewan, \$9.13 in Alberta, and \$9.49 in British Columbia. Pressed brick ranged from \$11.00 to \$27.00 in individual yards, averaging \$17.28 in Manitoba, \$16.15 in Saskatchewan, \$12.97 in Alberta, and \$25.65 in British Columbia.

The following table shows the average values at the kilns, of common and pressed brick, during 1911, 1912, and 1913, as furnished by the producers.

### Average Prices per Thousand of Common and Pressed Brick.

	Common brick.			Pressed brick.		
	1911.	1912.	1913.	1911.	1912.	1913.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	5 88	6 86	7 82	9 52	16 00	16 06
New Brunswick.....	5 55	9 22	10 00	12 00	10 00	12 00
Quebec.....	7 67	8 08	7 89	16 20	12 04	12 73
Ontario.....	7 89	8 69	8 88	10 21	10 40	11 48
Manitoba.....	10 11	11 47	11 21	12 08	15 13	17 28
Saskatchewan.....	9 49	9 73	9 86	15 31	16 63	16 15
Alberta.....	10 10	10 69	9 13	13 81	14 77	12 97
British Columbia.....	9 70	9 61	9 49	24 94	27 53	25 65
Canada.....	8 37	9 11	8 85	12 53	12 86	12 49

According to trade journals, the following retail prices were quoted during the year:—

*Toronto*:—Grey stock brick were quoted uniformly throughout the year at \$11.50 per M and red stock bricks at \$12; Don Valley No. 1 dry pressed and buff brick \$17 at the yard; Port Credit brick, f.o.b. Port Credit, wire cut, \$10 per M, and pressed brick \$12 to \$15 according to grade.

*Winnipeg*:—Kiln run brick were quoted throughout the year at \$13, sewer and chimney brick at \$14 and veneer brick at \$15. Pressed brick were quoted at from \$25 to \$50.

### Production of Brick by Provinces.

*Nova Scotia and New Brunswick*:—There was an increase in the production of brick in both these Provinces in 1913. The total sales in Nova Scotia were 22,085,765 brick valued at \$174,024, as compared with sales of 18,822,960 brick valued at \$130,108 in 1912. The chief sources of production were: Annapolis Royal, Middleton, Pugwash, Elmsdale, Amherst, Mira Gut, River Denys, Pictou, and New Glasgow.

The total sales in New Brunswick were 6,189,152 brick valued at \$61,969 as compared with 5,780,000 brick valued at \$53,350 in 1912, and the principal sources of production were Fredericton, St. John, Chatham, and Moncton.

*Quebec*:—The total sales of brick in Quebec in 1913 were 153,696,242 valued at \$1,250,765, comprising 145,972,957 common brick valued at \$1,152,444 or \$7.89 per thousand, and 7,723,285 pressed brick valued at \$98,321 or \$12.73 per thousand.

The sales in 1912 were 173,336,557 brick valued at \$1,446,880, comprising 161,836,557 common brick valued at \$1,308,380 or \$8.08 per thousand, and 11,500,000 pressed brick valued at \$138,500 or \$12.04 per thousand.

While brick-making is carried on at many places in the Province, the principal plants are located at Laprairie, Sherbrooke, Quebec, and Deschailions.

*Ontario*:—This Province is credited in 1913 with over 54 per cent of the brick production of Canada, the total sales as reported by 271 firms being 430,029,531 brick valued at \$4,026,029, and including 349,846,487 common brick valued at \$3,105,256 or an average of \$8.88 per thousand, and 80,183,044 pressed brick valued at \$920,773 or an average of \$11.48 per thousand.

The total sales in 1912 were 423,670,184 valued at \$3,807,195, and comprised 350,461,874 common brick, valued at \$3,045,840 or an average of \$8.69 per thousand, and 73,208,310 pressed brick valued at \$761,355 or an average of \$10.40 per thousand.

The city of Toronto and vicinity, including the counties of York and Halton, is the principal brick making section and in 1913 produced about 50 per cent of the Ontario production, or about 27 per cent of the total Canadian production of brick.

The district next in importance is the county of Wentworth, comprising the city of Hamilton and vicinity, producing over 11 per cent of the Ontario production. The county of Peel produced over 6 per cent and the Ottawa district, including the counties of Russell and Carleton, a little less than 6 per cent.

The greater part of the pressed brick reported as such was made in Toronto and Hamilton districts.

The production by principal counties in 1913 and 1912 is shown in the accompanying tables.



### Sales of Common and Pressed Brick in Ontario by Principal Counties, 1913.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M	No.	Value.	Per M		
		\$	\$ cts.		\$	\$ cts.	\$	
York.....	155,311,199	1,376,191	8 86	5,641,285	84,619	15 00	1,460,810	36.28
Halton.....				48,703,150	553,926	11 37	553,926	13.76
Wentworth.....	37,414,652	320,400	8 56	12,633,406	127,523	10 09	447,923	11.13
Peel.....	20,206,400	163,688	8 10	9,861,341	109,097	11 06	272,785	6.78
Algoma.....	15,105,673	149,058	9 87	1,294,878	21,015	16 23	170,073	4.22
Carleton.....	13,765,000	138,740	10 08				138,740	3.45
Russell.....	11,653,000	80,849	6 94	848,000	10,176	12 00	91,025	2.26
Kent.....	9,762,500	76,943	7 88				76,943	1.91
Grey.....	8,860,556	69,573	7 85				69,573	1.73
Waterloo.....	7,255,672	67,330	9 28				67,330	1.67
Middlesex.....	6,802,197	64,042	9 42				64,042	1.59
Nipissing.....	6,273,000	64,030	10 21				64,030	1.59
Lincoln.....	4,998,893	45,882	9 18	1,200,984	14,412	12 00	60,294	1.50
Simcoe.....	4,846,000	40,600	8 38				40,600	1.01
Renfrew.....	4,226,000	38,134	9 02				38,134	0.95
Essex.....	4,649,775	37,515	8 07				37,515	0.93
Brant.....	2,993,200	35,213	11 77				35,213	0.87
Total, 17 counties....	314,123,717	2,768,188	8 81	80,183,044	920,773	11 48	3,688,961	91.63
Total, other counties	35,722,770	337,068	9 44				337,068	8.37
Total, Ontario.....	349,846,487	3,105,256	8 88	80,183,044	920,773	11 48	4,026,029	100.00

### Sale of Common and Pressed Brick in Ontario by Principal Counties, 1912.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M	No.	Value.	Per M		
	No.	\$	\$ cts.		\$	\$ cts.	\$	
York.....	159,650,579	1,453,741	9 14	8,813,700	108,855	12 35	1,567,596	41.17
Halton.....				41,507,692	420,967	10 14	420,967	11.06
Wentworth.....	34,661,376	286,268	8 26	12,667,803	129,273	10 20	415,541	10.91
Peel.....	12,123,100	90,588	7 47	9,582,680	95,008	9 91	185,596	4.88
Carleton.....	17,810,000	170,150	9 55				170,150	4.47
Algoma.....	11,900,000	114,875	9 65				114,875	3.02
Russell.....	15,125,000	103,150	6 82				103,150	2.71
Middlesex.....	8,002,000	66,766	8 34				66,766	1.75
Nipissing.....	6,115,800	65,058	10 64				65,058	1.71
Waterloo.....	7,666,778	59,107	7 71				59,107	1.55
Simcoe.....	6,329,000	53,271	8 42				53,271	1.40
Grey.....	6,090,000	47,540	7 81				47,540	1.25
Kent.....	5,442,250	38,524	7 08				38,524	1.02
Lincoln.....	3,209,200	27,345	8 52	598,935	6,915	11 54	34,260	0.90
Renfrew.....	4,110,000	33,615	8 18				33,615	0.88
Peterborough.....	3,700,000	33,300	9 00				33,300	0.87
Essex.....	4,502,587	32,690	7 26				32,690	0.86
Total, 17 counties....	306,437,670	2,680,988	8 75	73,170,810	761,018	10 40	3,442,006	90.41
Total, other counties.	44,024,204	364,852	8 29	37,500	337	9 00	365,189	9.59
Total, Ontario.....	350,461,874	3,045,840	8 69	73,208,310	761,355	10 40	3,807,195	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.

	Common brick.			Pressed brick.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
		\$	\$ cts.		\$	\$ cts.
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	19,765	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

In addition to the ordinary clay building brick, there was produced in this Province in 1913, ornamental brick valued at \$9,810 and fireproofing and terra-cotta valued at \$150,268. In 1912 the production of ornamental brick was valued at \$7,168 and of fireproofing and terra-cotta \$135,087.

*Manitoba.*—Throughout all of the western provinces there was a large falling off in the demand for brick in 1913. In Manitoba the total sales were 43,660,320 valued at \$514,358, comprising 39,559,320 common brick valued at \$443,498 or an average of \$11.21 per thousand and 4,101,000 pressed brick valued at \$70,860 or \$17.28 per thousand.

The sales in 1912 were 87,178,937, valued at \$1,012,801 comprising 83,681,237 common brick, valued at \$957,854 or an average of \$11.47 per thousand, and 3,497,700 pressed brick valued at \$52,947 or \$15.13 per thousand. There was thus a falling off in total sales of nearly 50 per cent.

In each of the provinces the number of brick burned was considerably in excess of the number marketed and this excess was more especially evident in the western provinces as shown in the table on page 318. The number of brick made in Manitoba exceeded the number sold by nearly 30,000,000. The principal brick-making plants are located at Winnipeg,

St. Boniface, Lac du Bonnet, Portage la Prairie, Sidney, Gilbert Plains, Virden, Balmoral, Lavenham, and Neepawa.

*Saskatchewan.*—The total sales of clay building brick in Saskatchewan in 1913 were 18,175,000, valued at \$189,820, which includes 16,475,000 common brick, valued at \$162,370, or an average of \$9.86 per thousand, and 1,700,000 pressed brick valued at \$27,450, or an average of \$16.15 per thousand. The total sales in 1912 were 30,538,771 brick valued at \$332,943 which included 25,338,771 common brick valued at \$246,443 or an average of \$9.73 per thousand, and 5,200,000 pressed brick valued at \$86,500, or an average of \$16.63 per thousand. The falling off in value of sales in 1913 was over 43 per cent and the excess in number of brick made during the year over the number sold was 7,744,000.

The principal clay plants are located at Estevan, Prince Albert, Saskatoon, Rosthern, Verigin, and Broadview.

*Alberta.*—The total sales of clay building brick in 1913 were 71,996,343, valued at \$732,408, comprising 52,378,283 common brick valued at \$477,998 or an average of \$9.13 per thousand, and 19,618,060 pressed brick valued at \$254,410 or an average of \$12.97 per thousand.

The total sales in 1912 were 93,759,980 brick valued at \$1,105,912, which comprised 70,074,568 common brick valued at \$775,986 or an average of \$10.69 per thousand, and 23,685,412 pressed brick valued at \$349,926, or an average of \$14.77 per thousand.

The decrease in the value of sales in 1913 was over 33 per cent, and the excess in number of brick made during the year over the number sold was over 18,000,000.

The principal centres of production are: Edmonton, Cochrane, Calgary, Medicine Hat, Redcliff, Lethbridge, Red Deer, Sandstone, Brickburn, and Innisfail.

There was also a production during 1913 of ornamental brick valued at \$738, and fireproofing and terra-cotta valued at \$146,200, as compared with ornamental brick valued at \$1,000, and fireproofing, etc., valued at \$248,712 in 1912.

*British Columbia.*—The total sales of brick in this Province in 1913 were reported as 39,396,375 valued at \$426,733 which included 36,131,903 common brick valued at \$343,020 or an average of \$9.49 per thousand, and 3,264,472 pressed brick, valued at \$83,713 or an average of \$25.65 per thousand.

The total sales in 1912 were 61,284,565 valued at \$731,040, comprising 53,345,565 common brick valued at \$512,514 or an average value of \$9.61 per thousand, and 7,939,000 pressed brick valued at \$218,526 or an average of \$27.53 per thousand. The decrease in the value of the sales in 1913 was over 41 per cent, and the excess in the number of brick made during the year over the number sold, was over 10,000,000 brick.

In addition to the building brick there was also a production of fireproofing brick valued at \$42,919 as against a value of \$21,254 in 1912.

The principal centres of manufacture are: Vancouver, New Westminster, Clayburn, Cloverdale, Port Haney and vicinity, Gabriola Island, Victoria, Sydney, and Kelowna.

### CLAY PAVING BRICK.

The total production of paving brick and paving blocks in Canada in 1913 was reported as 4,208,295 valued at \$75,669, or an average value per thousand of \$17.98, as compared with a production of 4,579,500 valued at \$85,989, or an average value of \$18.78 per thousand in 1912.

This paving brick is made chiefly at West Toronto, Ontario, from shale obtained from the banks of the Humber river, although during the past two years there has also been a small production reported from Edmonton, Alberta, and 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 1887 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 1913, the imports were 13,035,000 valued at \$176,497, or an average value, per thousand, of \$13.54, and included 7,779,000 valued at \$103,572, or an average of \$13.31 from the United States, and 5,256,000 valued at \$72,925, or an average of \$13.87 from Great Britain. The total imports during the calendar year 1912 were 11,793,000 valued at \$160,663 or an average of \$13.62 per thousand and included 6,709,000 valued at \$95,610 or an average of \$14.25, from the United States, 5,044,000 valued at \$64,375 or an average of \$12.76 per thousand, from Great Britain; and 40,000 valued at \$678 or \$16.95 per thousand, from other countries.

### Annual Production of Paving Brick.\*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1897.....	4,568	45,670	10 00	1905.....	4,500	54,000	12 00
1898.....				1906.....	3,000	45,000	15 00
1899.....	5,300	42,550	8 03	1907.....	3,618	72,354	20 00
1900.....	2,710	26,950	9 94	1908.....	3,720	59,456	15 98
1901.....	3,689	37,000	10 03	1909.....	3,760	67,408	17 93
1902.....	4,211	42,000	9 97	1910.....	4,215	78,980	18 74
1903.....	3,789	45,288	11 95	1911.....	5,220	79,444	15 22
1904.....	4,436	55,450	12 50	1912.....	4,580	85,989	18 78
				1913.....	4,208	75,669	17 98

\*Figures previous to 1907 compiled from Ontario Bureau of Mines.

## Imports of Paving Brick.\*

Fiscal Year.	M.	Value.	Average per M.	Fiscal Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1895.....	275	5,006	18 20	1904.....	1,986	29,753	14 98
1896.....	918	10,132	11 04	1905.....	3,350	32,578	13 86
1897.....	52	719	13 83	1906.....	4,104	46,008	11 21
1898.....	367	2,337	6 37	1907 (9 mos.).....	2,132	23,256	10 66
1899.....	1,583	23,648	14 94	1908.....	5,340	61,346	11 49
1900.....	2,175	35,644	16 39	1909.....		101,187	†
1901.....	900	10,414	11 57	1910.....		138,763	
1902.....	1,030	16,788	16 30	1911.....	10,836	130,861	12 08
1903.....	1,337	18,811	14 07	1912.....	11,538	165,650	14 36
				1913.....	12,043	159,854	13 27

\*Duty 20 per cent.

†The imports during July, 1908, under the general tariff, are reported as 6,581 M, value \$7,317, an apparent error. There appears also to be an error in the entries for August and September of the same year. Similar errors were apparently made in the figures for the fiscal year 1910, and the total number has, therefore, been omitted for these years. The actual value of the imported brick varies from \$10 to \$12 per M.

## FIRECLAY AND FIRECLAY PRODUCTS.

There are a number of clays from different localities in 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, Nova Scotia, and at Comox, Vancouver island, also clays found south of Moosejaw, 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 1913, was \$142,738 as compared with a valuation of \$125,585 in 1912, and \$89,130 in 1911. There was in addition in 1913, a production of fireclay products valued at \$22,925 reported as being made from imported clays.

The production in 1913 included fireclay or refractory clay sold as such to the extent of 3,345 tons valued at \$14,018; firebrick 3,667,276 valued at \$86,164 or an average of \$23.50 per thousand; and other fireclay products valued at \$42,556.

In 1912 the production comprised 6,307 tons of fireclay and refractory clay sold as such valued at \$24,343; firebrick 3,429,594 valued at \$67,192 or an average of \$19.59 per thousand; and other fireclay products valued at \$34,050.

The imports of firebrick during the calendar year 1913 were valued at \$1,192,857 of which \$952,667 were imported from the United States; \$230,500 from Great Britain, and \$9,690 from other countries. The

imports in 1912 were valued at \$953,621 of which \$860,587 was from the United States, \$91,236 from Great Britain, and \$1,798 from other countries. Fireclay was imported during the calendar year 1913 to the value of \$143,399 as compared with a value of \$140,500 in 1912, and \$125,199 in 1911.

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 table:—

### Production of Fireclay and Fireclay Products.

Year.	Firebrick.			Fireclay.			Other fireclay products	Total value.
	No. sold.	Value.	Per M.	Tons.	Value.	Per Ton.	Value.	
		\$	\$ cts.		\$	\$ cts.	\$	\$
1907.....	4,323,179	113,322	26 21				18,000	131,322
1908.....	2,415,371	70,429	29 10	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	21,852	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

### Imports of Firebrick and Fireclay, 1900-13.

Fiscal Year.	Fireclay.	Firebrick	Fiscal Year.	Fireclay.	Firebrick.
	\$	\$		\$	\$
1900.....	59,291	39,535	1907*.....	85,044	349,185
1901.....	79,530	32,831	1908.....	155,373	639,347
1902.....	64,541	45,608	1909.....	77,146	350,457
1903.....	94,509	34,522	1910.....	80,151	519,454
1904.....	52,710	38,335	1911.....	129,728	864,465
1905.....	73,837	44,746	1912.....	118,863	860,763
1906.....	131,130	51,892	1913.....	158,759	1,000,516

\*9 months ending March.

### SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1913 was 1,035,906, as compared with a value of \$884,641 in 1912, and \$812,716 in 1911. About 58 per cent of the production in 1913 was made in Ontario.

Following is a list of firms reporting production of sewerpipe in 1913:—

Standard Clay Products, Limited, St. Johns, Que., and New Glasgow, N.S.

Ontario Sewerpipe Company, Mimico, Ont.

Dominion Sewerpipe Company, Swansea, Ont.

Hamilton & Toronto Sewerpipe Company, Hamilton, Ont.

Alberta Clay Products Company, Medicine Hat, Alberta.

Kilgard Fireclay Company, Kilgard, B.C.

The Clayburn Company, Limited, Clayburn, B.C.

British Columbia Pottery Company, Victoria, B.C.

The imports of drain pipe and sewerpipe during 1913 were valued at \$465,997 of which \$396,641 were imported from the United States, and \$69,356 from Great Britain. The total imports during 1912 were valued at \$507,024 and included \$431,600 from the United States, \$75,394 from Great Britain, and \$30 from other countries.

The total sales of drain tile in Canada in 1913 as reported to this Branch were valued at \$338,552 as compared with sales of \$357,862 in 1912, and \$339,812 in 1911. The greater part of this production is in the Province of Ontario; the sales in this Province in 1913 as reported to this Branch were 19,210,748 valued at \$314,859, as against a value of \$308,050 in 1912, and \$300,029 in 1911.

The Ontario Bureau of Mines reports the total number of drain tile made in that Province during 1913 as 16,935,000 valued at \$292,767 or an average of \$17.28 per thousand, as compared with 16,463,000 valued at \$279,579 or an average of \$16.98 per thousand in 1912.

The imports of unglazed tile are comparatively small, the value during the calendar year 1913 being \$12,156, as compared with \$4,018 in 1912, and \$5,640 in 1911.

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	1897.....	164,250	1906.....	350,045
1889.....	Not available	1898.....	181,717	1907.....	667,100
1890.....	348,000	1899.....	161,546	1908.....	514,362
1891.....	227,300	1900.....	231,525	1909.....	645,722
1892.....	367,660	1901.....	248,115	1910.....	774,110
1893.....	350,000	1902.....	301,965	1911.....	812,716
1894.....	250,325	1903.....	317,970	1912.....	884,641
1895.....	257,045	1904.....	440,894	1913.....	1,035,906
1896.....	153,875	1905.....	332,000		

## 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	1899...	21,027,400	240,246	1906...	17,700,000	252,500
1892....	10,000,000	100,000	1900....	19,544,000	209,738	1907...	15,578,000	250,122
1893....	17,300,000	190,000	1901....	21,592,000	231,374	1908...	24,800,000	338,658
1894....	25,000,000	280,000	1902....	17,510,000	199,000	1909...	27,418,000	363,550
1895....	14,330,000	157,000	1903....	18,200,000	227,000	1910...	21,028,000	318,456
1896....	13,200,000	144,000	1904....	16,000,000	210,000	1911...	21,630,000	349,545
1897....	*	*	1905....	15,000,000	220,000	1912...	16,463,000	279,579
1898....	22,668,000	225,000				1913...	16,935,000	292,767

\*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	1897.....	416	33,370
1881.....		37,368	1898.....	157	29,454
1882.....		70,061	1899.....	1,817	32,071
1883.....		70,699	1900.....	1,383	37,766
1884.....	5,585	66,170	1901.....	1,264	54,819
1885.....	2,911	66,678	1902.....	269	55,261
1886.....	1,905	56,048	1903.....	252	57,100
1887.....	2,183	69,020	1904.....	1,637	53,958
1888.....	4,290	96,967	1905.....	1,229	101,166
1889.....	2,346	80,869	1906.....	4,727	131,353
1890.....	3,730	73,654	1907 (9 mos.).....	12,106	93,458
1891.....	673	86,522	1908.....	2,080	125,747
1892.....	473	59,064	1909.....	2,394	106,399
1893.....	110	38,891	1910.....	2,739	196,002
1894.....	53	24,572	1911.....	4,378	174,653
1895.....	695	20,353	1912.....	5,773	405,998
1896.....	339	18,957	1913.....	4,453	513,520

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipes, 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 flowerpots, jardinières, crocks, jars, churns, etc. A number of potters make a higher grade product of stoneware, but the majority of these use imported clays. Sanitaryware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.



The total value of the production of pottery and clay sanitaryware in 1913, according to returns received, was \$368,916 of which it is estimated that the value of \$315,383 is attributable to imported clays. The total value of the production in 1912 was \$427,089 of which a value of \$383,134 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	1897.....	129,629	1905.....	120,000
1889.....	Not available	1898.....	214,675	1906.....	150,000
1890.....	195,242	1899.....	185,000	1907.....	253,809
1891.....	258,844	1900.....	200,000	1908.....	200,541
1892.....	265,811	1901.....	200,000	1909.....	235,285
1893.....	213,186	1902.....	200,000	1910.....	250,924
1894.....	162,144	1903.....	200,000	1911.....	102,493
1895.....	151,588	1904.....	140,000	1912.....	43,955
1896.....	163,427			1913.....	53,533

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 1913 were valued at \$3,314,870, as compared with a value of \$3,094,956 in 1912, and \$2,516,536 in 1911. These imports are subdivided into eight classes, and in 1913 include: brown or coloured earthenware, etc., \$70,632; C.C. or cream coloured ware, decorated, printed, or sponged, etc., \$264,090; demijohns, churns or crocks, \$32,599; tableware of china, porcelain, white granite, etc., \$2,185,601; china and porcelain ware, n.o.p., \$43,696; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$173,445; earthenware tiles, n.o.p., \$296,791; manufactures of earthenware, n.o.p., \$248,016.

The imports in 1912 comprised: brown or coloured earthenware, etc., \$62,161; C.C. or cream coloured ware, decorated, printed, sponged, etc., \$291,804; demijohns, churns or crocks, \$18,404; tableware of china, porcelain, white granite, etc., \$2,068,362; china and porcelain ware, n.o.p., \$71,751; tiles or blocks of earthenware, or stone prepared for mosaic flooring, \$160,082; earthenware tiles, n.o.p., \$239,391; manufactures of earthenware, n.o.p., \$183,001.

It will be observed that there has been a general increase in almost all classes of earthenware and chinaware imported. 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, Germany, France, Austria-Hungary, Japan, Belgium, and other countries.

## Imports of Earthenware and Chinaware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	322,333	1891.....	634,907	1902.....	1,275,093
1881.....	439,029	1892.....	748,810	1903.....	1,406,610
1882.....	646,734	1893.....	709,737	1904.....	1,611,356
1883.....	657,886	1894.....	695,514	1905.....	1,636,214
1884.....	544,586	1895.....	547,935	1906.....	1,692,359
1885.....	511,853	1896.....	575,493	1907 (9 mos.).....	1,422,880
1886.....	599,269	1897.....	595,822	1908.....	2,190,784
1887.....	750,691	1898.....	675,874	1909.....	1,716,887
1888.....	697,082	1899.....	916,727	1910.....	1,859,302
1889.....	697,949	1900.....	959,526	1911.....	2,398,416
1890.....	695,206	1901.....	1,114,677	1912.....	2,582,966
				1913.....	3,265,180

## KAOLIN.

About 500 tons of kaolin valued at \$5,000 were shipped in 1913, as compared with 20 tons valued at \$160 in 1912. The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, which were opened up by the Canadian China Clay Company of Montreal.

The plant for refining the clay is situated 2 miles from St. Remi d'Amherst, and 7 miles from Huberdeau, the terminus of the Canadian Northern Quebec railway—94 miles northwest of Montreal.

The clay is mined by digging, no drilling or blasting being necessary, trammed 600 feet to the plant, washed free from grit and allowed to settle. After the filter presses have extracted the surplus moisture, it is dried in the open air in stacks. Dry kilns have been built for winter drying. After drying the clay is pulverized and bagged for shipment, chiefly to papermills.

The imports of china-clay ground and unground, into Canada during the twelve months ending December 1913, were 21,164 tons valued at \$149,337 or \$7.06 per ton, as against imports of 18,332 tons valued at \$127,402 or \$6.95 per ton in 1912, and 18,819 tons valued at \$125,768 or an average of \$6.68 in 1911. These figures indicate to some extent at least the present actual demand for this product.

The imports of earthenware and chinaware were, however, valued at \$3,314,870 in 1913, and were comprised chiefly of tableware of china, porcelain, etc., showing the possibilities for the development of industries utilizing china-clays.

Kaolin or china-clay is also in considerable demand in the United States, the imports into that country in 1913 being 240,120 gross tons, valued at \$1,625,451.

## LIME.

The lime industry in common with other materials of construction, was affected by the financial depression during the latter part of the year, and a falling off in production is shown. According to returns received from the producers, the total production in 1913 was 7,558,484 bushels, this being the amount sold or used (equivalent to about 264,547 tons) valued at \$1,609,398, or an average of 21 cents per bushel, or about \$6.08 per ton.

The production in 1912 was reported as 8,475,839 bushels, (296,654 tons) valued at \$1,844,849, or an average of 22 cents per bushel, or \$6.25 per ton. The decrease in production in 1913 was therefore 117,355 bushels, or slightly over 10 per cent.

Returns were received from 77 active firms in 1913, as compared with 78 firms in 1912. The average number of men employed in 1913 was 1,076, and wages paid \$577,841, as against 1,103 men employed and \$576,217 paid in wages in 1912. 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 record 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 1913 varied from a minimum of 18 cents in Ontario, to a maximum of 32 cents in British Columbia. In 1912 the range was from a minimum of 17 cents in Ontario to a maximum of 36 cents in Saskatchewan.

Sales of hydrated lime were reported by two firms only; the Standard Lime Company, Limited, Joliette, Quebec, and the Standard White Lime Company of Guelph, Ontario. The quantity of production is not completely reported but will probably not exceed 5,000 tons. Hydrators are also reported as being installed at Orangeville, Ontario, by the Contractors Supply Company, and at Blubber Bay, B.C., by the Pacific Lime Company, Limited.

A small quantity of lime is annually made in Prince Edward Island. The production is shown separately in 1911, 1912, and 1913, and for the previous years is included in the Nova Scotia figures.

## Lime Production by Provinces, 1913.

Province.	No. of active firms reporting.	Men employed	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent. of total value.
			\$		\$	cts.	%
P. E. Island.....	1	2	130	3,762	1,129	30	10.65
Nova Scotia.....	1	10	5,199	851,050	170,210	20	
New Brunswick..	5	93	50,180	392,985	98,841	25	6.14
Quebec.....	17	321	162,422	1,616,446	418,008	26	25.97
Ontario.....	39	410	239,143	3,254,482	573,209	18	35.62
Manitoba.....	5	42	21,640	576,938	107,281	19	6.66
Saskatchewan....	1	8	3,000	35,000	10,000	29	0.62
Alberta.....	6	70	50,127	465,250	115,355	25	7.17
British Columbia	2	120	46,000	362,571	115,365	32	7.17
Total.....	77	1,076	577,841	7,558,484	1,609,398	21	100.00

## Lime Production by Provinces, 1912.

Province.	No. of active firms reporting	Men employed	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent. of total value.
			\$		\$	cts.	%
P. E. Island.....	4	10	844	24,971	8,191	33	0.44
Nova Scotia.....	1	8	5,510	684,625	136,930	20	7.42
New Brunswick..	5	96	53,536	616,835	133,742	22	7.25
Quebec.....	21	334	157,909	1,729,614	474,595	27	25.73
Ontario.....	32	470	242,196	3,376,193	573,269	17	31.07
Manitoba.....	5	10	2,656	818,237	168,257	21	9.12
Saskatchewan....	1	6	450	4,000	1,440	36	0.08
Alberta.....	4	76	52,272	704,035	166,520	24	9.03
British Columbia	5	93	60,844	517,329	181,905	35	9.86
Total.....	78	1,103	576,217	8,475,839	1,844,849	22	100.00

## Lime Production by Provinces, 1911.

Province.	No. of active firms reporting	Men employed	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent. of total value.
			\$		\$	cts.	%
P. E. Island*.....	3	8	852	20,250	6,765	33	0.44
Nova Scotia.....	1	10	3,964	618,950	123,790	20	8.16
New Brunswick..	5	100	41,378	613,728	132,897	22	8.76
Quebec.....	22	307	139,466	1,423,392	356,453	25	23.49
Ontario.....	31	423	205,618	3,360,265	538,902	16	35.51
Manitoba.....	5	89	44,379	706,888	140,629	20	9.27
Alberta.....	4	33	33,960	434,038	100,407	23	6.61
British Columbia	4	86	53,901	351,014	117,756	34	7.76
Total.....	75	1,056	523,518	7,533,525	1,517,599	20	100.00

\*Production in previous years included in Nova Scotia figures.

## Lime Production by Provinces, 1909 and 1910.

Province.	1909.				1910.			
	Bushels.	Value.	Average per bushel.	Per cent of total value.	Bushels.	Value.	Average per bushel.	Per cent of total value.
		\$	cts.	%		\$	cts.	%
Nova Scotia.....	57,730	16,729	29	1.5	55,750	13,490	24	1.2
New Brunswick...	697,466	154,151	22	13.6	470,050	105,593	22	9.3
Quebec.....	1,281,827	315,633	25	27.9	1,227,555	299,126	23	26.3
Ontario.....	2,619,553	434,147	17	38.3	2,988,020	476,137	16	41.9
Manitoba.....	423,954	69,670	16	6.2	606,679	100,808	17	8.8
Alberta.....	281,125	67,350	24	5.9	303,214	69,268	23	6.1
British Columbia.	231,269	75,076	32	6.6	196,878	72,657	37	6.4
	5,592,924	1,132,756	20	100.00	5,848,146	1,137,079	19	100.0

*Exports and Imports.*—The value of the lime exported during the calendar year 1913, was \$29,234, the destination being mainly the United States. In 1912 the exports were valued at \$35,097. The imports of lime during the calendar year 1913, were 386,693 barrels, (38,669 tons) valued at \$238,271, or an average of 62 cents per barrel, or \$6.16 per ton, and were derived chiefly from the United States. The imports during 1912 were 329,925 barrels (32,992 tons) valued at \$207,481 or an average of 63 cents per barrel, or \$6.29 per ton.

Annual statistics of imports and exports are given in the next two tables:—

## Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	119,853	1899.....	73,565	1906.....	57,072
1892.....	121,535	1900.....	80,852	1907.....	55,903
1893.....	86,623	1901.....	99,194	1908.....	43,316
1894.....	83,670	1902.....	116,009	1909.....	48,821
1895.....	71,697	1903.....	131,412	1910.....	44,762
1896.....	70,820	1904.....	73,838	1911.....	39,536
1897.....	53,177	1905.....	85,723	1912.....	35,097
1898.....	49,594			1913.....	29,234

## Imports of Lime.

Fiscal Year.	Barrels.	Value.	Average value.	Fiscal Year.	Barrels.	Value.	Average value.
		\$	\$ cts.			\$	\$ cts.
1880.....	6,100	6,013	0 99	1897.....	16,108	10,529	0 65
1881.....	5,796	4,177	0 72	1898.....	12,850	9,002	0 70
1882.....	5,064	5,365	1 06	1899.....	15,720	11,124	0 71
1883.....	7,623	9,224	1 21	1900.....	12,865	11,211	0 87
1884.....	10,804	11,200	1 04	1901.....	19,657	14,534	0 74
1885.....	12,072	11,503	0 95	1902.....	24,602	17,584	0 71
1886.....	11,021	9,347	0 85	1903.....	31,108	22,470	0 72
1887.....	10,835	8,524	0 79	1904.....	54,359	39,639	0 73
1888.....	10,142	7,537	0 74	1905.....	98,676	71,588	0 73
1889.....	13,079	9,363	0 72	1906.....	134,334	93,630	0 70
1890.....	8,149	5,360	0 66	1907 (9 mos.)....	88,919	67,573	0 76
1891.....	6,250	4,273	0 68	1908.....	129,379	99,611	0 77
1892.....	6,132	4,241	0 69	1909.....	153,934	106,263	0 69
1893.....	6,879	4,917	0 71	1910.....	191,537	116,904	0 61
1894.....	6,766	4,907	0 73	1911.....	194,809	143,338	0 74
1895.....	12,008	5,743	0 48	1912.....	230,013	162,593	0 71
1896.....	10,239	7,331	0 72	1913—Duty 20 per cent.....	360,243	225,444	0 62

It will be observed that the Provinces of Ontario and Quebec, being the chief centres of population in Canada, are the largest producers of lime, the former producing in 1913, 36 per cent of the total value, and the latter 26 per cent. The western provinces accounted for nearly 22 per cent of the total in 1913, as against 28 per cent in 1912, and 14 per cent in 1908.

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.	Cents per bushel.	Calendar Year.	Bushels.	Value.	Cents per bushel.
		\$				\$	
1896.....	1,800,000	222,000	12	1905.....	3,100,000	424,700	14
1897.....	2,020,000	308,000	12	1906.....	2,885,000	496,785	17
1898.....	4,342,500	535,000	12	1907.....	2,650,000	418,700	17
1899.....	3,893,000	544,000	14	1908.....	2,442,331	448,596	18
1900.....	4,100,000	550,000	13	1909.....	2,633,500	470,858	18
1901.....	4,300,000	617,000	14	1910.....	2,889,235	474,531	16
1902.....	3,400,000	520,000	15	1911.....	2,469,773	402,340	16
1903.....	2,600,000	406,800	16	1912.....	2,297,525	381,672	17
1904.....				1913.....	2,300,991	390,600	17

According to trade papers, quotations on lime in Toronto, during 1913 were as follows: in the city per 100 lbs. f.o.b cars, 30 cents; at kilns outside the city, f.o.b. cars, 25 cents per 100 lbs.; hydrated lime (imported) at warehouses, \$10 per ton.

The duty on lime is provided under item 711 of the Customs tariff and is 20 per cent under the general tariff,  $17\frac{1}{2}$  per cent under the Intermediate tariff, and 15 per cent under the British Preferential tariff.

## SAND-LIME BRICK.

The manufacture of sand-lime brick in Canada, is a comparatively new industry, and the first returns of production were obtained for the year 1907, when there was a production by ten firms amounting to 16,492,971 brick, valued at \$167,795. In 1913 the total sales were reported as 92,586,676 brick, valued at \$906,665, or an average of \$9.79 per M, as against sales in 1912 of 96,448,402 brick, valued at \$1,020,386 or an average of \$10.58 per M.

Annual statistics of production since 1907 are shown below:—

### Annual Production of Sand-Lime Brick.

Calendar Year.	No. of firms reporting.	Number sold.	Value.	Per M.
			\$	\$ cts.
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



## SAND AND GRAVEL.

The record of production of sand and gravel in 1913, while more complete than that obtained for 1912, is still only a partial and very incomplete record.

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, comprising \$243,126 from Quebec; \$363,668 from Ontario; \$101,653 from Manitoba; \$255,453 from Saskatchewan; \$148,704 from Alberta; \$385,946 from British Columbia, and \$13,549 from the Maritime Provinces.

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.

According to the return received, the total value of the production of sand and gravel in 1913 was \$2,258,874, to which the various provinces contributed as follows:—Maritime Provinces, \$101,201; Quebec, \$638,778; Ontario, \$638,771; Manitoba, \$197,719; Saskatchewan, \$236,377; Alberta, \$265,165; and British Columbia, \$180,863.

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 record since 1893.

During 1913 there were exported from Canada 644,633 tons of sand and gravel, valued at \$440,956; while during the same year there were imported 439,673 tons, valued at \$440,343.

### Annual Exports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Average value.	Calendar Year.	Tons.	Value.	Average value.
		\$	Cents.			\$	Cents.
1893.....	329,116	121,795	37	1903.....	355,792	124,006	35
1894.....	324,656	86,940	27	1904.....	399,809	129,803	32
1895.....	277,162	118,359	43	1905.....	306,935	152,805	50
1896.....	224,769	80,110	36	1906.....	336,550	139,712	41
1897.....	152,963	76,729	50	1907.....	298,095	119,853	40
1898.....	165,954	90,498	55	1908.....	298,954	161,387	54
1899.....	242,450	101,640	42	1909.....	481,584	256,166	53
1900.....	197,558	101,666	51	1910.....	624,824	407,974	65
1901.....	197,302	117,465	60	1911.....	573,494	408,110	71
1902.....	159,793	119,120	75	1912.....	660,090	459,952	70
				1913.....	644,633	440,956	68

## Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Average value.	Fiscal Year.	Tons.	Value.	Average value.
		\$	\$ cts.			\$	\$ cts.
1893.....	26,065	31,739	1 22	1903.....	91,518	95,647	1 05
1894.....	41,573	33,506	0 81	1904.....	110,634	107,547	0 97
1895.....	19,609	24,779	1 26	1905.....	85,339	92,722	1 09
1896.....	18,953	24,604	1 30	1906.....	116,500	173,727	1 49
1897.....	21,308	25,222	1 18	1907 (9 mos.)...	171,700	177,412	1 03
1898.....	32,148	43,287	1 35	1908.....	266,704	223,043	0 84
1899.....	30,288	42,209	1 39	1909.....	132,158	136,011	1 03
1900.....	35,713	41,280	1 16	1910.....	151,982	155,012	1 02
1901.....	35,749	42,891	1 20	1911.....	241,375	246,613	1 02
1902.....	47,381	58,668	1 24	1912.....	263,971	258,438	0 98
				1913.....	542,927	465,263	0 86

## SLATE.

There is a small annual production of slate in Canada obtained from the New Rockland quarries, Melbourne township, Richmond county, Quebec, operated by Messrs. Fraser & Davies. During the past two years this firm has also opened up and operated a quarry at Botsford, in Temiscouata county. The production in 1913 is reported as 1,432 squares, valued at \$6,444, as compared with a production in 1912 of 1,894 squares valued at \$8,939.

The quarries in Richmond county have been operated for many years and at one time there was a production valued at upwards of \$100,000 per year.

Statistics of the annual production are shown herewith.

### Annual Production of Slate.

Calendar Year.	Quantity*	Value.	Calendar Year.	Quantity*	Value.
	Tons.	\$		Squares.	\$
1886.....	5,345	64,675	1900.....		12,100
1887.....	7,357	89,000	1901.....		9,980
1888.....	5,314	90,639	1902.....		19,200
1889.....	6,935	119,160	1903.....	5,510	22,040
1890.....	6,368	100,250	1904.....	5,277	23,247
1891.....	5,000	65,000	1905.....		21,568
1892.....	5,180	69,070	1906.....		24,446
1893.....	7,112	90,825	1907.....	4,335	20,056
1894.....		75,550	1908.....	2,950	13,498
1895.....		58,900	1909.....	4,000	19,000
1896.....		53,370	1910.....	3,959	18,492
1897.....		42,800	1911.....	1,833	8,248
1898.....		40,791	1912.....	1,894	8,939
1899.....		33,406	1913.....	1,432	6,444

\*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 have during the past eight years ranged from \$100,000 to over \$200,000 per annum. The total value of the imports during the calendar year 1913 was \$235,474, comprising: roofing slate, \$97,730; school writing slate, \$51,953; slate pencils, \$9,166; and other slates and manufactures of, \$76,625. The total value of the imports during the calendar year 1912 was \$200,643 and included: roofing slate, \$88,911; school writing slate, \$39,858; slate pencils, \$6,978; and other slates and manufactures of, \$65,896. 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 Germany and the United States.

Statistics of imports and exports are shown in the following tables —

### Imports of Slate During the Years 1911, 1912, and 1913.

Slate and manufactures of.	Calendar year 1911.	Calendar year 1912.	Calendar year 1913.
Roofing slate.....	\$ 83,075	\$ 88,911	\$ 97,730
School writing slate.....	35,049	39,858	51,953
Slate pencils.....	6,036	6,978	9,166
Slate of all kinds and manufactures of.....	45,525	65,806	76,625
	169,685	200,643	235,474

### 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 1913.....	Nil.	Nil.
1892.....	87	2,038			

### Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$ 21,431	1891.....	\$ 46,104	1902.....	\$ 72,601
1881.....	22,184	1892.....	50,441	1903.....	84,437
1882.....	24,543	1893.....	51,179	1904.....	86,057
1883.....	24,968	1894.....	29,267	1905.....	93,228
1884.....	28,816	1895.....	19,471	1906.....	112,941
1885.....	28,169	1896.....	24,176	1907 (9 mos.).....	95,520
1886.....	27,852	1897.....	21,615	1908.....	131,069
1887.....	27,845	1898.....	24,907	1909.....	124,065
1888.....	23,151	1899.....	33,100	1910.....	136,401
1889.....	41,370	1900.....	53,707	1911.....	147,172
1890.....	22,871	1901.....	72,187	1912.....	173,566
				1913.....	219,834

## STONE.<sup>1</sup>

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, rip-rap, and crushed stone, limestone, for furnace flux, sugar factories, etc.; but stone used for burning lime or the manufacture of 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 the production of sawn or polished stone when these operations are carried on by the 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.

It is impossible, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the production of stone in 1913, according to returns received, was \$5,504,639, as compared with a value of \$4,726,171 in 1912, showing an increased production of \$778,468, or 16.5 per cent.

The number of active firms reporting in 1913 was 218, the total number of men employed 6,131, and the total wages paid \$3,219,465; in 1912 the number of active firms reporting was 192, the number of men employed 5,710, and wages paid \$2,918,116.

Of the total value of the 1913 production, limestone contributed \$3,204,091, or 58.2 per cent; granite, \$1,653,791, or 30 per cent; sandstone, \$396,782, or 7.2 per cent, and marble \$249,975, or 4.6 per cent.

Stone was used for building purposes to the value of \$1,686,806, or 30.7 per cent of the total; monumental and ornamental to the value of \$288,144, or 5.2 per cent; curb, paving and flagstone \$262,955, or 4.8 per cent; rubble \$563,907, or 10.2 per cent; crushed stone \$2,250,533, or 40.9 per cent, and furnace flux 862,744 tons, valued at \$452,294, or 8.2 per cent.

By provinces, Quebec again shows the largest output, having a value of \$2,329,461, or 42.3 per cent of the total; being made up of limestone

<sup>1</sup> 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 two reports of this series have already 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."

to the value of \$1,307,428; granite valued at \$790,896, marble \$231,137. Ontario takes second place with a production of \$1,593,168, or 29 per cent of the total, of which limestone is credited with \$1,196,130; granite \$324,062; sandstone \$54,738, and marble \$18,238. British Columbia ranks third in order of importance with a total of \$580,879, including granite \$469,666; sandstone \$71,783; limestone \$38,830, and marble \$600. The production in Manitoba was valued at \$389,904, made up of limestone \$382,984 and granite \$6,920. The Nova Scotia production was valued at \$350,511, comprising: limestone \$258,719; granite, \$29,302; and sandstone, \$62,490. The Alberta production was reported as \$156,984, of which limestone was valued at \$20,000, the balance \$136,984 consisting of sandstone. New Brunswick is credited with \$103,732, made up chiefly of sandstone and granite.

### Production of Stone by Provinces, 1913.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%	Labour.	
							No. men em- ployed.	Wages.
	\$	\$	\$	\$	\$			\$
Nova Scotia.....	29,302	258,719	.....	62,490	350,511	6.3	733	200,598
New Brunswick.	32,945	.....	.....	70,787	103,732	1.9	285	104,828
Quebec.....	790,896	1,307,428	231,137	.....	2,329,461	42.3	2,208	1,316,306
Ontario.....	324,062	1,196,130	18,238	54,738	1,593,168	29.0	1,621	812,137
Manitoba.....	6,920	382,984	.....	.....	389,904	7.0	558	280,224
Alberta.....	.....	20,000	.....	136,984	156,984	2.9	116	113,468
British Columbia	469,666	38,830	600	71,783	580,879	10.6	610	391,904
Total.....	1,653,791	3,204,091	249,975	396,782	5,504,639	.....	6,131	3,219,465
Per cent.....	30.0	58.2	4.6	7.2	.....	100.00	.....	.....

### Production of Stone by Provinces, 1912.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%	Labour.	
							No. men em- ployed.	Wages.
	\$	\$	\$	\$	\$			\$
Nova Scotia.....	28,041	275,944	.....	20,645	324,630	6.9	788	220,501
New Brunswick.	22,317	.....	.....	68,260	90,577	1.9	210	65,807
Quebec.....	522,114	1,187,751	247,838	.....	1,957,703	41.4	2,216	1,140,715
Ontario.....	174,946	862,052	12,926	59,240	1,109,164	23.5	1,281	614,171
Manitoba.....	1,523	381,572	.....	.....	383,095	8.1	544	274,548
Alberta.....	.....	.....	.....	81,391	81,391	1.7	107	70,276
British Columbia	624,178	55,617	.....	99,816	779,611	16.5	564	532,098
Total.....	1,373,119	2,762,936	260,764	329,352	4,726,171	.....	5,710	2,918,116
Per cent.....	29.0	58.5	5.5	7.0	.....	100.00	.....	.....

## Value of Stone Sold for Various Purposes in 1913.

Kind.	Building	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	554,505	47,377	243,534	266,442	541,933		1,653,791
Limestone.....	790,795	8,676	14,073	257,419	1,680,834	452,294	3,204,091
Marble.....	18,838	230,739	398				249,975
Sandstone.....	322,668	1,352	4,950	40,046	27,766		396,782
Total.....	1,686,806	283,144	262,955	563,907	2,250,533	452,294	5,504,639

## Value of Stone Sold for Various Purposes in 1912.

Kind.	Building.	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	296,715	101,837	227,071	59,824	687,672		1,373,119
Limestone.....	671,383	72,296	13,561	256,798	1,274,577	474,321	2,762,936
Marble.....	237,415	2,641	6,535		14,173		260,764
Sandstone.....	246,644	12,585	21,223	37,249	10,651		329,352
Total.....	1,452,157	190,359	268,390	353,871	1,987,073	474,321	4,726,171

## Production of Stone by Provinces and for Purposes Used, 1913.

Province.	Building.	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	67,576	8,822	7,244	5,502	12,900	248,467	350,511
New Brunswick....	68,647	126	10,843	21,403	2,713		103,732
Quebec.....	900,478	270,304	97,884	60,784	999,046	965	2,329,461
Ontario.....	241,928	7,222	139,920	119,487	920,579	164,032	1,593,168
Manitoba.....	162,384	450		94,270	132,800		389,904
Alberta.....	133,030	386		23,568			156,984
British Columbia.	112,763	834	7,064	238,893	182,495	38,830	580,879
Total.....	1,686,806	283,144	262,955	563,907	2,250,533	452,294	5,504,639
Per cent.....	30.7	5.2	4.8	10.2	40.9	8.2	100.0

### Production of Stone by Provinces and for Purposes Used, 1912.

Province.	Building.	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	24,150	15,911	8,625	.....	.....	275,944	324,630
New Brunswick....	73,759	4,602	8,928	3,288	.....	.....	90,577
Quebec.....	814,380	149,584	97,749	95,170	800,026	794	1,957,703
Ontario.....	185,969	6,848	56,543	107,300	610,561	141,943	1,109,164
Manitoba.....	97,096	.....	.....	119,142	166,834	23	383,095
Alberta.....	52,771	13,414	5,145	10,061	.....	.....	81,391
British Columbia.	204,032	.....	91,400	18,910	409,652	55,617	779,611
Total.....	1,452,157	190,359	268,390	353,871	1,987,073	474,321	4,726,171
Per cent.....	30.7	4.0	5.7	7.5	42.1	10.0	100.0

*Exports and Imports:*—The exports of stone from Canada in 1913 were valued at \$93,840, as against \$33,242 in 1912, and \$28,335 in 1911. The principal item in the export of stone during the past three years has been building stone unwrought, of which the exports in 1913 were, 191,981 tons, valued at \$82,646. The exports of dressed stone in 1913 including both ornamental and building stone, were valued at \$7,381.

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 1911, 1912, 1913.

	1911.		1912.		1913.	
	Tons.	Value. \$	Tons.	Value. \$	Tons.	Value. \$
Stone—						
Crushed.....	.....	.....	.....	.....	4,814	3,126
Ornamental, granite, marble, etc., unwrought.....	168	1,796	2,339	1,826	1,942	687
Building, freestone, limestone, etc., unwrought.....	83,767	25,103	108,516	28,795	191,981	82,646
Ornamental, granite, marble, etc., dressed.....	.....	980	.....	2,458	.....	7,381
Building, freestone, limestone, etc., dressed.....	.....	456	.....	163	.....	0
.....	.....	28,335	.....	33,242	.....	93,840



The annual exports of stone since 1890, are shown in the next table:—

### Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought	Calendar Year.	Wrought.	Unwrought
	\$	\$		\$	\$
1890.....	21,725	43,611	1902.....	8,632	124,820
1891.....	13,398	46,162	1903.....	7,684	46,295
1892.....	7,698	47,424	1904.....	4,760	17,802
1893.....	9,102	12,532	1905.....	3,545	13,089
1894.....	22,576	34,130	1906.....	23,097	4,675
1895.....	8,587	51,616	1907.....	4,233	3,087
1896.....	4,934	32,897	1908.....	15,194	36,820
1897.....	9,415	42,034	1909.....	33,598	24,087
1898.....	2,526	65,370	1910.....	5,352	22,219
1899.....	5,092	101,931	1911.....	1,436	26,899
1900.....	5,933	115,711	1912.....	2,621	30,621
1901.....	5,917	157,739	1913.....	7,381	86,459

The imports of stone are classified as: building stone of all kinds, except marble; manufactures of granite and other stone, and marble and its manufactures. The total value of the imports during the calendar year 1913, was \$1,640,849, as compared with a value of \$1,467,143 in 1912, showing an increase of \$173,706 or about 12 per cent. Of the total imports in 1913, \$570,116 in value was classed as building stone, and included \$105,576 worth of rough stone, and \$464,540 worth of dressed stone. The imports of sawn granite, manufactures of granite, and manufactures of stone n.o.p. were valued at \$250,077, paving blocks, \$52,321; marble and manufactures of, \$577,028. There was also an importation of refuse stone amounting to 356,073 tons, valued at \$191,307.

The total value of the imports from the United States in 1913 was \$1,287,440; Great Britain, \$185,531; from Italy, \$40,335; and from other countries, \$127,543.

The total value of the imports of stone during the calendar year 1912 was \$1,467,143, and included: building stone valued at \$568,672; manufactures of granite, \$245,333; paving blocks, \$64,053; marble, \$475,926; and refuse stone, 265,270 tons, valued at \$113,159. Of the total value \$1,240,264 was imported from the United States; \$182,496 from Great Britain; \$18,616, from Italy; and \$25,767, from other countries. During both years the imports were derived chiefly from the United States and Great Britain, the United States supplying building stone, paving blocks, and marble principally; and Great Britain mainly manufactures of granite. Marble is obtained also in some quantity from Italy and other countries.

A slight upward revision of the tariff on building stone was put into effect April 7, 1914.

## Old and Revised Tariffs on Building Stone.

Item.	Old Tariff.			*New Tariff.		
	A.	B.	C.	A.	B.	C.
305. Flagstone, sandstone and all building stone, not hammered, sawn or chiselled, and marble and granite, rough, not hammered or chiselled..	10 p.c.	12½ p.c.	15 p.c.	10 p.c.	12½ p.c.	15 p.c.
306. Marble, sawn or sand rubbed, not polished; granite, sawn; flagstone and all other building stone, sawn or dressed; and paving blocks of stone.				15 p.c.	20 p.c.	20 p.c.
306a. Building stone other than marble or granite, sawn on more than two sides, but not sawn on more than four sides, per hundred pounds.....	15 p.c.	17½ p.c.	20 p.c.	10c.	15c.	15c.
306b. Building stone other than marble or granite, planed, turned, cut or further manufactured than sawn on four sides, per one hundred pounds..				30c.	45c.	45c.
307. Marble and granite, n.o.p., and all manufactures of marble or granite, n.o.p.....	30 p.c.	32½ p.c.	35 p.c.	30 p.c.	32½ p.c.	35 p.c.
308. Manufactures of stone, n.o.p.....	20 p.c.	27½ p.c.	30 p.c.	20 p.c.	27½ p.c.	30 p.c.

A. British Preferential Tariff. \*In effect from April 7, 1914.  
 B. Intermediate Tariff.  
 C. General Tariff.

## Total Imports of Stone During the Calendar Years 1912 and 1913.

Imports.	1912.		1913.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough <sup>1</sup> .....		117,037		105,576
Building stone, dressed <sup>2</sup> .....		451,635		464,540
Refuse stone <sup>3</sup> .....	265,270	113,159	356,073	191,307
Granite, sawn only.....		20,706		14,979
Granite, manufactures of.....		180,346		174,155
Paving blocks.....		64,053		72,321
Manufactures of stone, n.o.p.....		44,281		60,943
Marble and manufactures of:—				
Marble, sawn or sand rubbed, not polished.....		209,990		258,225
Marble, rough, not hammered or chiselled.....		49,626		128,475
Marble, manufactures of, n.o.p.....		216,310		190,328
		1,467,143		1,640,849

<sup>1</sup> Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

<sup>2</sup> Flagstone and all other building stone, sawn or dressed.

<sup>3</sup> Stone refuse not sawn, hammered, or chiselled, not fit for flagstone, building stone, or paving.

## Imports of Stone, Showing Country of Origin, Calendar Year 1913.

Imports.	Great Britain.		United States		Italy.	Other countries.
	Tons.	Value.	Tons.	Value.	Value.	Value.
		\$		\$	\$	\$
Building stone, rough <sup>1</sup> .....	4,619		98,802			2,155
Building stone, dressed <sup>2</sup> .....	3,161		400,424			955
Refuse stone.....			100,327			90,980
Granite, sawn only.....	735		14,244			
Granite, manufactures of.....	160,720		13,432			3
Paving blocks.....			52,321			
Manufactures of stone, n.o.p.....	3,753		49,490			7,700
Marble and manufactures of:—						
Marble, sawn or sand rubbed, not polished.....	7,708		207,028	40,335		3,154
Marble, rough, not hammered or chiselled.....	1,510		112,170			14,795
Marble, manufactures of n.o.p.....	3,325		179,202			7,801
.....	185,531		1,287,440	40,335		127,543

<sup>1</sup> Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

<sup>2</sup> Flagstone; all other building stone, sawn or dressed.

## Imports of Stone, Fiscal Years 1912 and 1913.

Imports.	1912.		1913.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough <sup>1</sup> .....	20,185	81,260		123,691
Building stone, dressed <sup>2</sup> .....	51,775	300,378		488,066
Refuse.....	258,731	108,281	249,307	103,947
Granite, sawn only.....	712	5,417		24,636
Granite, manufactures of.....		161,652		135,531
Paving blocks.....		64,737		63,949
Manufactures of stone, n.o.p.....		37,899		51,238
Marble, and manufactures of:—				
Marble, sawn or sand rubbed, not polished.....		175,177		239,678
Marble, rough, not hammered or chiselled.....		56,336		61,009
Marble, manufactures of, n.o.p.....		169,222		210,222
.....	1,160,359		1,551,967	

<sup>1</sup> Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

<sup>2</sup> Flagstone; all other building stone, sawn or dressed.

## Annual Imports of Stone.

Fiscal Year.	BUILDING STONE.		Manufactures of granite, etc. and refuse stone.	Marble.	Flagstone	Total value.
	Rough.	Dressed.				
	\$	\$	\$	\$	\$	\$
1880.....	32,824	3,146	29,408	63,015	.....	128,393
1881.....	7,823	60,326	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	4,866	45,290	108,771	1,158	206,307
1885.....	28,433	2,058	39,867	102,835	1,756	174,949
1886.....	30,776	4,899	41,984	117,752	9,443	210,854
1887.....	47,810	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.....	47,600	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.....	45,639	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	78,229	153,481	Nil	319,976
1904.....	59,864	33,914	141,165	181,511	Nil	416,454
1905.....	49,004	53,813	150,160	145,466	Nil	398,443
1906.....	66,994	65,134	178,435	189,589	Nil	500,152
1907*.....	58,398	78,967	136,779	176,450	Nil	450,594
1908.....	80,950	90,740	192,248	287,587	Nil	651,525
1909.....	63,984	72,961	193,949	200,928	Nil	531,822
1910.....	110,997	184,020	223,402	184,798	Nil	703,877
1911.....	126,386	206,224	271,594	307,428	Nil	911,632
1912.....	81,260	300,378	377,986	400,735	Nil	1,160,359
1913.....	123,691	488,066	429,301	510,909	.....	1,551,967

\*9 months ending March 1907.

## GRANITE.

The production of granite including trap-rock, syenite, etc., in 1913, according to returns received from 65 active firms reporting, was valued at \$1,653,791 as compared with a production in 1912 by 57 firms, valued at \$1,373,119, showing an increased production in 1913 of \$280,672 or 20.4 per cent.

The largest production is reported from Quebec in 1913, the value being \$790,896, as against \$522,114 in 1912. The value of the production in British Columbia was \$469,666, as against \$624,178 in 1912. Ontario produced granite to the value of \$324,062 in 1913, as compared with \$174,946 in 1912. There was comparatively little change in the production

of the Maritime Provinces. Much of the rough stone quarried in New Brunswick, as well as stone imported from Redbeach, Maine, and Mt. Johnson, Que., is worked up into finished ornamental and monumental stone in mills at St. George, N.B. The value of the finished stone produced at St. George in 1913 was \$85,803, as against a value of \$82,935 produced in 1912.

### Value of Granite Production by Provinces, 1913.

Province.	Building.	Monu- mental or orna- mental.	Curb, or paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	11,176	7,982	7,244	.....	2,900	29,302
New Brunswick.....	22,102	(a)	10,843	.....	.....	32,945
Quebec.....	454,105	37,481	83,838	27,549	187,923	790,896
Ontario.....	26,742	1,080	134,545	.....	161,695	324,062
Manitoba.....	.....	.....	.....	.....	6,920	6,920
British Columbia.....	40,380	834	7,064	238,893	182,495	469,666
Total.....	554,505	47,377	243,534	266,442	541,933	1,653,791

(a) The production of rough granite for ornamental or monumental purposes is included under building stone. Finished stone was produced at St. George to the value of \$85,803.

### Value of Granite Production by Provinces, 1912.

Province.	Building.	Monu- mental or orna- mental.	Curb, or paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	3,601	15,815	8,625	.....	.....	28,041
New Brunswick.....	8,862	*4,527	8,928	.....	.....	22,317
Quebec.....	180,036	81,180	79,368	13,912	167,618	522,114
Ontario.....	.....	315	38,750	27,002	108,879	174,946
Manitoba.....	.....	.....	.....	.....	1,523	1,523
British Columbia.....	104,216	.....	91,400	18,910	409,652	624,178
Total.....	296,715	101,837	227,071	59,824	687,672	1,373,119

\*"Finished" stone in 1912 was valued at \$82,935.

## Annual Production of Granite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	6,062	63,309	1900.....		80,000
1887.....	21,217	142,506	1901.....		155,000
1888.....	21,352	147,305	1902.....		210,000
1889.....	10,197	79,624	1903.....		200,000
1890.....	13,307	65,985	1904.....		150,000
1891.....	13,637	70,056	1905.....		226,305
1892.....	24,302	89,326	1906.....		278,419
1893.....	22,521	94,393	1907.....	15,136	194,712
1894.....	16,392	109,936	1908.....		282,320
1895.....	19,238	84,838	1909.....		454,824
1896.....	18,717	106,709	1910.....		739,519
1897.....	19,345	61,934	1911.....		1,119,865
1898.....	23,897	81,073	1912.....		1,373,119
1899.....	13,418	90,542	1913.....		1,653,791

## 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 this exception the total value of limestone produced in Canada in 1913 was \$3,204,091, as compared with a value of \$2,762,936 in 1912, or an increase of about 16 per cent.

There was an increase in the production of building and paving stone, crushed stone and rubble, and a slight falling off in the production of furnace flux.

The production during 1913 of limestone for building purposes, was valued at \$799,471, as against \$743,679 in 1912. The value of crushed stone in 1913 was \$1,680,834, as against \$1,274,577 in the previous year. Curbstone and paving stone were produced to the value of \$14,073 in 1913, as against \$13,561 in 1912. The value of rubble in 1913 was \$257,419, as against \$256,798 in 1912. The production of furnace flux was 862,774 tons, valued at \$452,294 as compared with 904,528 tons valued at \$474,321 in 1912.

## Value of Limestone Production by Provinces, 1913.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
	\$				Tons.	\$	
Nova Scotia.....		\$ 10,000		\$ 252	489,516	248,467	\$ 258,719
Quebec.....	448,457	811,123	13,648	33,235	643	965	1,307,428
Ontario.....	188,180	733,831	425	109,662	281,246	164,032	1,196,130
Manitoba.....	162,834	125,880		94,270			382,984
Alberta.....				20,000			20,000
British Columbia.....					91,369	38,830	38,830
Total.....	799,471	1,680,834	14,073	257,419	862,774	452,294	3,204,091

### Value of Limestone Production by Provinces, 1912.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
					Tons.	\$	
	\$	\$	\$	\$			\$
Nova Scotia.....					538,730	275,944	275,944
Quebec.....	472,192	621,661	11,846	81,258	529	794	1,187,751
Ontario.....	174,391	487,605	1,715	56,398	272,544	141,943	862,052
Manitoba.....	97,096	165,311		119,142	30	23	381,572
British Columbia.....					92,695	55,617	55,617
Total.....	743,679	1,274,577	13,561	256,798	904,528	474,321	2,762,936

### Value of Limestone Production by Provinces, 1911.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
					Tons.	\$	
	\$	\$	\$	\$			\$
Nova Scotia.....		2,122		1,577	483,035	241,517	245,216
New Brunswick.....	80				60	30	110
Quebec.....	462,944	597,811	34,936	200,243	659	593	1,296,577
Ontario.....	126,700	332,050	1,916	65,725	295,837	154,070	680,461
Manitoba.....	74,424	134,576		106,782			315,782
British Columbia.....					94,633	56,780	56,780
Total.....	664,148	1,066,559	36,902	374,327	874,224	452,990	2,594,926

### 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 six years. The total value of the production in 1913 was returned as \$249,975, as compared with \$260,764 in 1912, and \$162,783 in 1911.

Marble quarries were operated during 1913 at Philipsburg and South Stukely, Que., Dungannon and Faraday townships in Ontario, and at Marble Head, B.C.

The value of the Quebec production was \$231,137, as compared with \$247,838 in 1912 and \$135,187 in 1911. Ontario produced marble to the value of \$18,238 as against \$12,926 in 1912, and \$25,996 in 1911. There was a small production only in British Columbia, development work being chiefly in progress.

## Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	501	9,900	1895.....	200	2,000
1887.....	242	6,224	1896.....	224	2,405
1888.....	191	3,100	1897 to 1907 inclusive....	Nil	Nil
1889.....	83	980	1908.....		125,000
1890.....	780	10,776	1909.....		158,441
1891.....	240	1,752	1910.....		158,779
1892.....	340	3,600	1911.....		162,783
1893.....	590	5,100	1912.....		260,764
1894.....	Nil	Nil	1913.....		249,975

The imports of marble during the calendar year 1913 were valued at \$577,028 as compared with \$475,976 in 1912, and \$384,252 in 1911.

The annual imports of marble since 1880 are shown in the general table of imports covering the fiscal years, page 358.

## SANDSTONE.

The value of the production of sandstone in 1913 is reported as \$396,782 as compared with a value of \$329,352, reported for 1912. The greater part of the sandstone is quarried for building purposes, though some quantities are used for rubble and paving purposes.

Of the production in 1913, building and ornamental stone was sold to the value of \$324,020, or 82 per cent of the total value of production. There was included in this amount, rough stone valued at \$142,895 and dressed stone valued at \$181,125.

Of the 1912 production the value of \$260,229 was credited to building and ornamental stone, and included \$96,877 in rough stone, and \$163,352 in dressed stone.

## Value of Sandstone Production by Provinces, 1913.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	57,240			5,250	62,490
New Brunswick.....	46,671	2,713		21,403	70,787
Ontario.....	14,910	25,053	4,950	9,825	54,738
Alberta.....	133,416			3,568	136,984
British Columbia.....	71,783				71,783
Total.....	324,020	27,766	4,950	40,046	396,782



## Value of Sandstone Production by Provinces, 1912.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	20,645				20,645
New Brunswick.....	64,972			3,288	68,260
Ontario.....	8,611	10,651	16,078	23,900	59,240
Alberta.....	66,185		5,145	10,061	81,391
British Columbia.....	99,816				99,816
Total.....	260,229	10,651	21,223	37,249	329,352

## Value of Sandstone Production by Provinces, 1911.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	21,140	300		2,000	23,440
New Brunswick.....	30,260			5,077	35,337
Quebec.....	450				450
Ontario.....	8,567		24,575	20,890	54,032
Alberta.....	151,787			6,557	158,344
British Columbia.....	179,580				179,580
Total.....	391,784	300	24,575	34,524	451,183