

CANADA
DEPARTMENT OF MINES
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MINES BRANCH
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THE
Production of Cement, Lime, Clay Products,
Stone, and other Structural Materials

IN

CANADA

During the Calendar Year

1914

MINES BRANCH LIBRARY

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**ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE
MINERAL PRODUCTION OF CANADA DURING THE
CALENDAR YEAR, 1914.**

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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. 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 1914, according to the record obtained, was \$26,009,227 as compared with a value of \$30,809,752 in 1913, a decrease of \$4,800,525 or over 15.5 per cent.

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 and 1914, however, the exports continued to increase, while the imports fell off very materially, the decrease being 10 per cent in 1913 and 33 per cent in 1914.

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 1914 valued at \$31,596,404 as compared with \$39,916,642 in 1913, and \$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 decrease in consumption in 1914 was nearly 21 per cent as against increases of nearly 2 per cent in 1913, 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 1914, and in 1913, and the annual production from 1908 to 1912, are shown in tables herewith.

Structural Materials, Calendar Year, 1914.

	Production.	Imports.	Exports.	Consumption.
	\$	\$	\$	\$
Cement, Portland.....	9,187,924	159,691	2,223	9,345,392
Clay products.....	6,871,957	4,467,140	48,073	11,291,024
Lime.....	1,360,628	211,123	16,927	1,554,824
Sand-lime brick.....	609,515			609,515
Sand and gravels.....	2,505,310	224,759	802,358	1,927,711
Slate.....	4,837	213,256		218,093
Stone.....	5,469,056	1,252,869	72,080	6,649,845
	26,009,227	6,528,838	941,661	31,596,404

Structural Materials, Calendar Year, 1913.

	Production.	Imports.	Exports.	Consumption.
	\$	\$	\$	\$
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.....	1,609,398	238,271	29,234	1,818,435
Sand-lime brick.....	906,665			906,665
Sand and gravels.....	2,258,874	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

Production of Structural Materials, 1908-1912.

	1908.	1909.	1910.	1911.	1912.
	\$	\$	\$	\$	\$
Cement.....	3,709,954	5,345,802	6,412,215	7,644,537	9,106,556
Clay products.....	4,500,702	6,450,840	7,629,956	8,359,933	10,575,869
Lime.....	712,947	1,132,756	1,137,079	1,517,599	1,844,849
Sand-lime brick.....	152,856	201,650	371,857	442,427	1,020,386
Sand and gravels (exports).....	161,387	256,166	407,974	408,110	1,512,099
Slate.....	13,496	19,000	18,492	8,248	8,939
Stone.....	2,088,613	3,127,135	3,650,019	4,328,757	4,726,171
Total.....	11,339,955	16,533,349	19,627,592	22,709,611	28,794,869

It will be noted that there was a falling off in the production of all products except sand and gravel, the increase in which, as in 1913, is probably chiefly due to the greater completeness of the record covering the past year. The financial stringency, the effects of which had already begun to be experienced in 1913 together with the conditions arising out of the war, caused a great falling off in building activities of all kinds, resulting in the decreased production shown.

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 15 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 in 1913, which showed an increase in eastern provinces but a very great decrease in all provinces west of the Great Lakes.

The total value of building permits in 40 cities in Canada during 1913, according to the above record was thus about \$160,000,000.

Statistics of the value of building permits issued in 1913 and 1914 as published in the Labour Gazette of April 1913, show the total value of permits in 86 localities in 1913 as about \$171,000,000, and as about \$107,000,000 in 1914, or a falling off of over 37 per cent during the past year. The same record shows building permits in 50 eastern cities in 1914 valued at \$70,000,000, as against \$97,000,000 in 1913, and permits in 36 western localities in 1914, valued at \$36,000,000, as against \$74,000,000 in 1913, a falling off of nearly 30 per cent in eastern Canada, as against over 50 per cent in western Canada.

CEMENT.

The total quantity of cement made in 1914, according to returns received from the manufacturers, was 8,727,269 barrels of 350 pounds net each (1,527,272 tons), as compared with 8,886,333 barrels made in 1913, a decrease of 159,064 barrels (27,836 tons), or nearly 2 per cent.

The total quantity of Canadian Portland cement sold in 1914 was 7,172,480 barrels (1,255,184 tons), as compared with 8,658,805 barrels (1,515,291 tons) in 1913, a decrease of 1,486,325 barrels (260,107 tons), or 17.2 per cent.

The total consumption of cement in 1914 including Canadian and imported cement was 7,270,502 barrels of 350 pounds net each (1,272,338 tons), as compared with 8,912,898 barrels (1,559,757 tons) in 1913, a decrease of 1,642,396 barrels (287,419 tons), or over 18 per cent.

The production of cement in Canada during the past few years, though all classed as Portland, has included an output of Puzzolan cement, made from blast furnace slag at Sydney, N.S., and a small production of "natural Portland," made at Babcock, Manitoba, 75 miles southwest of Winnipeg, on the Canadian Northern railway.

The production of cement in 1914 was derived from 25 operating plants, but of these three were in commission for a few days only, and of the others, seven were in operation less than five months. Five plants were idle throughout the year. The total daily capacity of 30 completed plants was 51,415 barrels, while of these the five plants idle throughout the year had a total daily capacity of 3,600 barrels.

The completed plants were distributed as follows: one in Nova Scotia, using blast furnace slag; three in Quebec, using limestone and clay; sixteen in Ontario, of which ten used marl and six 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 1914 was 2,977 and the total wages paid \$2,271,006. In 1913 the average number of men employed was 4,276 and wages paid \$3,466,451.

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.....							69,843	81,909
1888.....							50,668	35,593
1889.....	90,474	69,790	0 77	Nil.	Nil.		90,474	69,790
1890.....	87,521	74,822	0 85	14,695	17,583	1 20	102,216	92,405
1891.....	90,846	103,479	1 14	2,633	5,082	1 93	93,479	108,561
1892.....	88,187	94,912	1 08	29,221	52,751	1 81	117,408	147,663
1893.....	126,673	130,167	1 03	31,924	63,848	2 00	158,597	194,015
1894.....	72,965	74,842	1 03	35,177	69,795	1 98	108,142	144,637
1895.....	66,219	60,795	0 92	62,075	112,880	1 82	128,294	173,675
1896.....	70,705	60,500	0 86	78,385	141,151	1 80	149,090	201,651
1897.....	85,450	65,893	0 77	119,763	209,380	1 75	205,213	275,273
1898.....	87,125	73,412	0 84	163,084	324,168	1 99	250,209	397,580
1899.....	147,387	119,308	0 81	255,366	513,983	2 01	396,753	633,291
1900.....	125,428	99,994	0 80	292,124	562,916	1 93	417,552	662,910
1901.....	133,328	94,415	0 71	317,066	565,615	1 78	450,394	660,030
1902.....	127,931	98,932	0 77	594,594	1,028,618	1 73	722,525	1,127,550
1903.....	92,252	74,655	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
1914.....	0	0	0.....	7,172,480	9,187,924	1 28	7,172,480	9,187,924

* Quantities sold or used.

A comparison of the principal statistics of 1913 and 1914 showing the increase or decrease, as the case may be, is given in the next table:—

It will be noted that the output exceeded the sales by about 1,554,000 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 \$1.28 in 1914 as compared with \$1.27 in 1913, \$1.27 $\frac{3}{4}$ in 1912, and \$1.34 in 1911. The average price at the mill in the several provinces was: Quebec \$1.17 in 1914 and \$1.16 in 1913; Ontario \$1.10 in 1914 and \$1.08 in 1913; Manitoba \$1.83 in 1914; Alberta \$1.89 in 1914 and \$2.04 in 1913, and British Columbia \$1.67 in 1914, as against \$1.71 in 1913.

The imports of cement in 1914 again show a falling off amounting to nearly 62 per cent from those of 1913, while the average price of imported cement decreased from \$1.61 in 1913 to \$1.50 in 1914.

Comparison of Production, Sales, and Imports of Portland Cement in 1913 and 1914.

	1913.	1914.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used..... Bls.	8,658,805	7,172,480			1,486,325	17.2
Cement manufactured..... "	8,886,333	8,727,269			159,064	1.8
Stock on hand Jan. 1..... "	862,067	1,073,328	211,261	24.5		
Stock on hand Dec. 31..... "	1,089,595	2,628,117	1,538,522	141.2		
Value of cement sold or used..... \$	11,019,418	9,187,924			1,831,494	16.6
Average price per barrel..... "	1.27	1.28	0.01	0.8		
Wages paid..... "	3,466,451	2,271,006			1,195,445	34.5
Men employed..... No.	4,276	2,977			1,299	30.4
Imports of Portland cement..... Bls.	254,093	98,022			156,071	61.4
Value of cement..... \$	409,303	147,158			262,145	64.0
Average price per barrel..... "	1.61	1.50			11 cents	6.83
Total consumption of cement in Canada..... Bls.	8,912,898	7,270,502			1,642,396	18.4

Of the total cement made in 1914, 641,869 barrels were made from marl, and 8,085,400 barrels from limestone and slag. In 1913, 1,491,131 barrels were made from marl and 7,395,202 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 during 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, 16.8 per cent in 1913, and 7.3 per cent in 1914.

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	908,990	910,358	112,051	1,287,992	1 41	
1905.....	13	1,541,568	1,346,548	306,466	1,913,740	1 42	8,000
1906.....	15	2,152,562	2,119,764	302,356	3,164,807	1 49	10,500
1907.....	17	2,491,513	2,436,093	354,435	3,777,328	1 55	14,400
1908.....	23	3,495,961	2,665,289	1,214,021	3,709,139	1 39	27,500
1909.....	22	4,146,708	4,067,709	1,777,238	5,345,802	1 31	23,050
1910.....	22	4,396,282	4,753,975	832,038	6,412,215	1 35	25,835
1911.....	24	5,677,539	5,692,915	903,589	7,644,537	1 34	28,810
1912.....	24	7,141,004	7,132,732	903,094	9,106,556	1 28	36,515
1913.....	27	8,886,333	8,658,805	1,089,595	11,019,418	1 27	50,540
1914.....		8,727,269	7,172,480	2,628,117	9,187,924	1 28	

Imports and Exports:—The quantity of cement exported is not recorded but the value in 1914 is reported as \$2,223 as against a value of exports in 1913 of \$1,739 and \$2,436 in 1912.

The imports of cement previous to 1901 were larger than the Canadian production, but gave way steadily to the increasing domestic output until 1909, during which year the imports amounted to 142,194 barrels, or about 3 per cent of the Canadian consumption. From 1910 to 1912 inclusive there was a steady increase in the importation of cement, the imports in 1912 being 1,434,413 barrels. During four and a half months of this year the duty was, on account of the scarcity in western Canada, reduced by one-half, and on May 31, 1913, a permanent reduction was made in the general tariff from 12½ cents to 10 cents per hundred pounds. The imports however, have fallen to 254,093 barrels in 1913 and 98,022 barrels in 1914.

The United States has been the principal source of imports during the past few years and supplied about 71 per cent of the imports in 1914, as compared with 27 per cent from Great Britain. In 1913 about 68 per cent of the imports were from the United States, and 30 per cent from Great Britain. The imports of cement during 1913 and 1914 by countries, are shown in the next table.

Imports of Cement, 1913 and 1914.

	1913.				1914.			
	Cwt.	Per cent.	Value.	Average value.	Cwt.	Per cent.	Value.	Average value.
Great Britain.....	270,747	30.4	\$ 94,844	Cts. 35	93,709	27.3	\$ 35,517	Cts. 38
United States....	603,044	67.8	305,165	51	241,910	70.5	108,487	45
Belgium.....	.....	.....	.....	.....	.....	.....	.....	.....
Other countries....	3,483	0.4	3,307	95	7,457	2.2	3,154	43
Hong Kong.....	12,050	1.4	5,987	49	.....	.....	.....	.....
Totals.....	889,324	100.0	409,303	46	343,076	100.0	147,158	43
Equivalent in barrels of 350 lbs..	254,093				98,022			

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	1907.....	\$ 9,618
1892.....	938	1900.....	3,296	1908.....	34,591
1893.....	1,172	1901.....	1,514	1909.....	113,362
1894.....	482	1902.....	2,267	1910.....	12,914
1895.....	937	1903.....	2,851	1911.....	4,067
1896.....	1,328	1904.....	5,494	1912.....	2,436
1897.....	644	1905.....	3,143	1913.....	1,739
1898.....	2,117	1906.....	7,551	1914.....	2,223

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.....	298	7,812	7,821	1 00	.....	45,646	.....
1882.....	86	11,945	13,410	1 12	.....	66,579	.....
1883.....	548	11,659	13,755	1 18	.....	102,537	.....
1884.....	1,236	8,606	9,514	1 11	.....	102,857	.....
1885.....	1,315	5,613	5,396	0 96	.....	111,521	.....
1886.....	1,851	6,164	6,028	0 98	.....	120,398	.....
1887.....	1,419	6,160	8,784	1 43	102,750	148,054	1 44
1888.....	5,787	5,636	7,522	1 33	122,402	177,158	1 45
1889.....	10,668	5,835	7,467	1 28	122,273	179,406	1 47
1890.....	5,443	5,440	9,048	1 66	192,322	313,572	1 63
1891.....	2,890	3,515	6,152	1 75	183,728	304,648	1 66
1892.....	3,394	2,214	2,782	1 26	187,233	281,553	1 50
1893.....	2,909	4,896	8,060	1 65	229,492	316,179	1 38
1894.....	2,618	1,054	985	0 93	224,150	280,841	1 25
1895.....	2,112	5,333	7,001	1 31	196,281	242,813	1 24
1896.....	3,672	5,688	8,948	1 57	204,407	242,409	1 19
1897.....	4,318	2,494	3,937	1 58	210,871	252,587	1 20
		Cwt.			Cwt.		
1898.....	3,263	16,033	7,097	0 44	1,073,058	355,264	0 33
1899.....	8,929	1,678	694	0 41	1,300,424	467,994	0 36
1900.....	10,452	10,418	4,711	0 45	1,301,361	498,607	0 38
1901.....	4,890	17,784	6,865	0 39	1,612,432	654,395	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
Calendar Year.							
1910.....	7,718	365	349	0 96	1,222,586	468,046	0 38
1911.....	7,430	26,655	6,107	0 23	2,316,707	834,879	0 36
1912.....	9,698	†	.....	.....	5,020,446	1,969,529	0 39
1913.....	17,729	†	.....	.....	889,324	409,303	0 46
1914.....	12,533	†	.....	.....	343,076	147,158	0 43

*Cement not elsewhere specified and manufactures of cement.

†From 1912 included in Portland cement.

Consumption of Cement:—The consumption of cement is represented practically by the domestic production together with the imports, the exports being so comparatively small as to be negligible. The total con-

sumption of cement in Canada in 1914 was 7,270,502 barrels (1,272,338 tons), made up of 7,172,480 barrels (1,255,184 tons) of Canadian cement, and 98,022 barrels (17,154 tons) of imported cement, the Canadian cement representing 98·7 per cent and the imported cement 1·3 per cent of the total.

In 1913 the total consumption of cement 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.

Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total. Barrels.
	Barrels.	Per cent.	Barrels.	Per cent.	
1901.....	317,066	36	555,900	64	872,966
1902.....	594,594	52	544,954	48	1,139,548
1903.....	627,741	45	773,678	55	1,401,419
1904.....	910,358	54	784,630	46	1,694,988
1905.....	1,346,548	59	918,701	41	2,265,249
1906.....	2,119,764	76	665,845	24	2,785,609
1907.....	2,436,093	78	672,630	22	3,108,723
1908.....	2,665,289	85	469,049	15	3,134,338
1909.....	4,067,709	97	142,194	3	4,209,903
1910.....	4,753,975	93	349,310	7	5,103,285
1911.....	5,692,915	90	661,916	10	6,354,831
1912.....	7,132,732	83·3	1,434,413	16·7	8,567,145
1913.....	8,658,805	97·1	254,093	2·9	8,912,898
1914.....	7,172,480	98·7	98,022	1·3	7,270,502

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 1914 in this Province was 2,846,061 barrels valued at \$3,331,601.

Ontario:—Ontario continues as the most important cement producing province in Canada having sixteen completed plants with a total daily capacity of 18,700 barrels at the end of 1914 of which twelve were operated during the year, three of these for a few days only. Of the twelve plants operated five used limestone and seven marl. The four idle mills included one lime-

stone and three marl plants. The names of the operating companies and location of plants are shown in an accompanying list of producers.

The total sales of cement in Ontario during 1914 were 2,775,142 barrels valued \$3,062,129, as compared with 3,992,988 barrels valued at \$4,311,183 in 1913. There was thus a decrease in sales of 1,217,846 barrels or about 31 per cent.

The detailed statistics of production during 1913 and 1914 are shown in the next table.

Cement Production in Ontario, 1913 and 1914.

	1913.	1914.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.....Bls.	3,992,988	2,775,142			1,217,846	30.5
Cement manufactured....."	4,007,202	3,183,053			824,149	20.6
Stock on hand Jan. 1....."	439,010	439,113	103			
Stock on hand Dec. 31....."	453,224	847,024	393,800	86.9		
Value of cement sold.....\$	4,311,183	3,062,129			1,249,054	28.9
Wages paid....."	1,098,197	721,287			376,910	34.3
Men employed.....No.	1,539	1,088			451	29.3
Total daily capacity of operating plants.....Bls.	17,750					

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 1914, 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 of 4,500 barrels. The capacity of the mill at Blairmore, operated by the Rocky Mountains Cement Company is reported as having a daily capacity of 800 barrels. The new plant at Marlboro, 140 miles west of Edmonton, constructed to utilize the local marl deposits, has a daily capacity of 1,500 barrels. The total quantity of cement marketed by producers in 1914 was 641,395 barrels valued at \$1,212,342.

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 plants were in operation in this Province in 1913. At Tod Inlet the Vancouver Portland Cement Company's mill has a capacity of from 2,500 to 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 during five 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, was idle throughout 1914.

The total sales of cement from British Columbia mills in 1914 were 499,151 barrels valued at \$833,606.

The production of cement in Ontario has already been shown separately and the aggregate production in all other provinces during 1913 and 1914 is given in the next table.

Cement Production in Other Provinces, 1913 and 1914.

	1913.	1914.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.....Bls.	4,665,817	4,397,338			268,479	5-75
Cement manufactured..... "	4,879,131	5,544,216	665,085	13-6		
Stock on hand Jan. 1..... "	423,067	634,215	211,148	49-9		
Stock on hand Dec. 31..... "	636,371	1,781,093	1,144,722	179-9		
Value of cement sold..... \$	6,708,235	6,125,795			582,440	8-7
Wages paid.....	2,368,254	1,549,719			818,535	34-6
Men employed.....No.	2,737	1,889			848	31-0
Total daily capacity of operating plants.....Bls.	32,790	32,115			675	2-1

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.....	Pt. aux Trembles, Que... ..	
International Mill, No. 3.....	Hull, Que.....	
Owen Sound Mill, No. 9.....	Shallow Lake, Ont.....	
Belleville Mill, No. 4.....	Belleville, O. (Pt. 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 Union 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.....	Toronto, Ont.
St. Marys Portland Cement Co., Ltd.....	St. Marys, Ont.....	
The Commercial Cement Co., Ltd.....	Babcock, Man.....	Winnipeg, Man.
The Rocky Mountains Cement Co.....	Blairmore, Alberta.....	Calgary, Alberta.
†The Keystone Portland Cement Co.....	Marlboro, ".....	Edmonton, Alberta
The Edmonton Portland Cement Co., Ltd.....	Tod Inlet, B.C.....	Victoria, B.C.
Vancouver Portland Cement Co.....	Princeton, East, B.C.....	Vancouver, B.C.
*British Columbia Portland Cement Co., Ltd.....	Bamberton, B.C.....	Victoria, B.C.
The Associated Cement Co. (Canada) Ltd.....		

† Mill not yet completed. *Idle.

CLAYS AND CLAY PRODUCTS.¹

For a number of years a small quantity of fireclay has been produced and sold as such, and during the past 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 1914 was \$6,871,957, as compared with a value of \$9,504,314, in 1913, showing a decrease of \$2,632,357, or nearly 28 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 that year, but a large falling off in sales, so that large stocks of brick must have remained in manufacturers' hands at the close of the year. In 1914 there was a large falling off both in quantities of brick made and in quantities sold, and the stocks of common and pressed brick on hand at the end of the year were reported as 242,206,000, or about 44 per cent of the number sold during the year. There was an increase in the value of the sales of ornamental brick, sewerpipe, tiles, and also of kaolin, but a falling off in all other products including paving brick, firebrick, terra cotta, fireproofing, and pottery. The average number of

¹ Special investigations of the clay resources of Canada have been undertaken by the Department of Mines for a number of years and several special reports have been published thereon. The first work was undertaken by J. Walter Wells in 1905, under the direction of Dr. Haanel. In 1909, Dr. Heinrich Ries, Professor of Economic Geology in Cornell University, was engaged by the Geological Survey to carry on a general investigation of Canadian clays. Mr. Joseph Keele of the Geological Survey was associated with Dr. Ries in the work which has been continued during the past five years.

The following reports have been published dealing with clays.

Mines Branch, Department of Mines:

"Clays and Shales of Manitoba: Their Industrial Value," Report on. By J. Walter Wells, 1905. (Out of print).

Geological Survey Branch, Department of Mines:—

"The Clay and Shale Deposits of Nova Scotia and Portions of New Brunswick." By H. Ries and

J. Keele, 1911.

"Preliminary Report on the Clay and Shale Deposits of the Western Provinces." By H. Ries and

J. Keele, 1912.

"The Clay and Shale Deposits of the Western Provinces, Part II." By H. Ries and J. Keele, 1913.

"Clay and Shale Deposits of New Brunswick." By J. Keele, 1914.

"Clay and Shale Deposits of the Western Provinces, Part III." By Heinrich Ries, 1914.

Preliminary Report on the Clay and Shale Deposits of the Province of Quebec. By J. Keele, 1915. Memoir No. 64.

Clay and Shale Deposits of the Western Provinces, Part IV, by H. Ries, 1915, Memoir No. 65.

Clay and Shale Deposits of the Western Provinces, Part V, by J. Keele, 1915, Memoir No. 66.

men employed in 1914 was 8,339, as compared with 11,193 in 1913, and 10,415 in 1912. The total wages paid in 1914 were \$3,201,380, as against \$4,682,801 in 1913, and \$4,488,957 in 1912.

Of the total value of the production in 1914, building and paving brick, including fireproofing, contributed \$5,258,179, or about 76.5 per cent, as against \$7,928,585 or 75 per cent of the total in 1913.

Sewerpipe and tile production in 1914 were valued at \$1,470,839, or 21 per cent of the total, as against \$1,374,458, or 13 per cent of the total in 1913. The total value of the production of pottery in 1914 was reported as \$312,846 of which \$35,371 only, is estimated as attributable to Canadian clays, and the balance to imported clays.

The value of the production of fireclays and fire brick from domestic clays was reported as 107,568. Compared with the previous year the production of building, paving and fireproofing brick shows a further decrease of about 33.7 per cent, whereas the production of sewerpipe shows an increase of nearly 7 per cent.

The average price of common and building brick for the whole of Canada in 1914 was \$7.99 as compared with \$8.85 in 1913; \$9.11 in 1912; \$8.37 in 1911, and \$8.13 in 1910. The average prices of pressed or front brick for the same years were respectively \$11.99; \$12.49; \$12.86; \$12.53, and \$11.89, thus showing a general increase in the cost of building brick until 1912, falling off again in 1913 and 1914.

Ontario is by far the largest producer of clay products, having contributed in 1914 nearly 58 per cent of the total values marketed, as compared with 55 per cent in 1913.

Quebec contributed 18.5 per cent in 1914, as against 17 per cent the preceding year; Alberta 6.7 per cent in 1914, as compared with 9.4 per cent in 1913; Manitoba 4.6 per cent in 1914, as against 5 per cent in 1913, and British Columbia 6 per cent in 1914 as compared with 7 per cent in the previous year.

There was a falling off in the total sales of clay products in every province except New Brunswick in which a small increase was shown. As in the previous year, the falling off was most pronounced in the western provinces. The total decrease in the eastern provinces, including Ontario, amounted to 22.7 per cent while in the western provinces, including Manitoba, it was 43 per cent.

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 1914 was \$4,467,140 (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 \$11,291,024 is shown of which about 61 per cent was of domestic production.

In 1913 the approximate consumption was valued at \$16,212,733 of which 58.6 per cent was of domestic production.

In 1912 the consumption was valued at \$17,149,659; in 1911, \$13,516,477; in 1910, \$11,958,591; and in 1909, \$9,696,324. In 1909 about 70 per cent of the consumption was of domestic production.

In the case of building brick the imports are small, compared with the home production, amounting to not much more than 5 per cent of the latter. The imports of paving brick are more than double, and those of firebrick about seven times, the Canadian production. The imports of drain tile and sewerpipe were about one-fourth the Canadian production.

Statistics of production in 1913 and 1914 of the several classes of clay products by provinces are shown in the following tables:—

Production of Clay Products by Provinces, 1914.

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.
Nova Scotia.....	11	337	\$ 109,174	14,579,936	12,574,546	97,510	\$ cts.	148,280	98,200	1,502	\$ cts.
New Brunswick.....	8	107	26,977	5,584,000	6,033,528	64,042	7 75	200,000	100,000	2,250	15 32
Quebec.....	45	1,371	524,189	132,711,357	118,278,889	874,961	10 61	10,568,446	8,540,060	135,900	22 50
Ontario.....	282	4,727	1,946,581	300,721,629	249,896,642	1,963,921	7 40	90,003,675	72,153,067	777,199	15 91
Manitoba.....	13	464	119,838	21,072,050	26,777,950	289,060	7 86	1,603,000	2,258,000	28,428	10 77
Saskatchewan.....	14	370	72,152	11,485,600	6,865,000	61,669	10 79	2,235,000	1,850,000	32,030	12 59
Alberta.....	26	507	211,592	20,298,000	23,190,257	183,696	8 98	6,918,100	6,979,500	94,358	17 31
British Columbia.....	20	456	190,877	19,385,000	13,896,950	119,002	7 92	1,539,000	1,655,951	43,889	13 52
Totals.....	419	8,339	3,201,380	525,837,572	457,513,762	3,653,861	8 56	113,215,501	93,634,858	1,115,556	26 50

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.....		\$		\$	\$ 13,204	\$ 484	\$	\$ 149,420	\$ 4,084	\$	\$ 266,204
New Brunswick.....									210		66,502
Quebec.....			160,960	4,824	15,978	45,753	2,395	176,629	1,260	10,000	1,267,700
Ontario.....	2,566,000	47,534	1,121,236	15,504		205,204	32,976	593,606	343,662		3,979,606
Manitoba.....											317,488
Saskatchewan.....					4,650						98,349
Alberta.....	7,000	245	272,300	3,264		96,025		83,036	1,575		462,199
British Columbia.....	134,000	1,848			73,736	58,077		101,808	15,549		413,909
Totals.....	2,707,000	49,627	1,554,496	23,592	(b)107,568	405,543	(a)35,371	1,104,499	366,340	10,000	6,871,957

(a) There was also a production of \$315,383 from imported clays in 1913; and \$277,475 in 1914.
 (b) There was also a production of \$22,925 from imported clays in 1913; and \$30,264 in 1914.

Production of Clay Products by Provinces, 1913.

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.
Nova Scotia.....	12	395	\$ 123,554	25,052,866	21,923,573	\$ 171,418	\$ cts. 7 82	175,186	162,192	\$ 2,606	\$ cts. 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	80,183,044	920,773	11 48
Manitoba.....	17	1,134	283,143	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.	Fireproofing and terra-cotta, etc. Value.	Pottery. Value.	Sewerpipe. Value.	Tiles, drain.	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	633,855	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, 1911, and 1912.

	1911.			1912.		
	Quantity.	Value.	Per M.	Quantity.	Value.	Per M.
		\$	\$ cts.		\$	\$ cts.
Bricks—						
Common.....No.	645,550,517	5,420,890	8 37	769,191,532	7,010,375	9 11
Pressed....."	87,350,539	1,094,582	12 53	125,180,422	1,609,854	12 86
Paving....."	5,220,400	79,444	15 22	4,579,500	85,989	18 78
Ornamental....."	605,643	11,281	18 63	371,356	8,595	23 15
Firebrick and fireclay shapes, etc.....		89,130			125,585	
Fireproofing, and architectural terra-cotta, etc.....		409,585			448,853	
Pottery.....		102,493			43,955	
Sewerpipe.....		812,716			884,641	
Tiles, drain.....		339,812			357,862	
Totals.....		8,359,933			10,575,709	

Production of Clay Products by Provinces, 1909-1914.

Province.	1909.	1910.	1911.	1912.	1913.	1914.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	188,185	204,782	274,249	272,053	332,272	266,204
New Brunswick.....	65,570	56,475	38,000	54,910	62,269	66,502
Quebec.....	1,153,832	1,442,842	1,341,467	1,680,460	1,606,816	1,267,700
Ontario.....	3,425,841	3,667,810	3,916,575	4,864,700	5,220,467	3,979,606
Manitoba.....	559,008	781,605	834,428	1,018,051	514,358	317,488
Saskatchewan.....	145,516	160,850	226,958	332,943	189,820	98,349
Alberta.....	442,486	753,232	1,052,751	1,356,184	893,408	462,199
British Columbia.....	470,402	562,360	675,505	996,568	684,904	413,909
	6,450,840	7,629,956	8,359,933	10,575,869	9,504,314	6,871,957

Annual Value of Production of Clay Products, 1899-1914.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1899.....	2,988,099	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
				1914.....	6,871,957

Exports and Imports:—The total value of the exports of clay products in 1914 was \$48,073 and included 1,486,000 building brick valued at \$11,871, manufactures of clay valued at \$26,860, and earthenware valued at \$9,336.

In 1913 the total value of the exports was \$52,333, which included 977,000 building brick valued at \$8,579, manufactures of clay valued at \$27,201 and earthenware valued at \$16,553.

Exports of Clay Products.

Calendar Year.	Building brick.		Manu- factures.	Earthen- ware.	Total.
	M.	Value.			
		\$	\$	\$	\$
1910.....	390	2,762	9,061	9,240	21,063
1911.....	394	3,977	2,071	6,101	12,149
1912.....	694	8,493	256	10,001	18,750
1913.....	977	8,579	27,201	16,553	52,333
1914.....	1,486	11,871	26,866	9,336	48,073

The imports of clays and clay products reached a total value, during the calendar year 1914, of \$4,467,140, or equivalent to about 66 per cent of the domestic production. The total imports in 1913 were valued at \$6,760,752 or about 71 per cent of the domestic production. The decrease in value of imports in 1914 was \$2,293,612, or nearly 34 per cent.

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 1914 were valued at \$288,128 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 \$150,881 and of fireclay \$90,233, in both cases an increase over the imports of the previous year. In 1913 the total value of the imports of clays was \$324,290 and included china-clay valued at \$149,337 and fireclay at \$143,399. The imports of these clays have varied considerably from year to year and the present imports of china-clay are the highest record while the imports of fireclay were the lowest since 1909.

The imports classified under brick and tile were valued in 1914 at \$1,986,790 as compared with a value of \$3,121,592 in 1913. A large portion of these imports are made up of firebrick, nearly 35 per cent in 1914. 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 1914 at \$2,192,222, as against \$3,314,870 in 1913. These imports are chiefly of a class of goods not manufactured in Canada and for which the raw materials are not as yet obtainable from Canadian sources.

The detailed record of imports during the calendar years 1909 to 1914 is shown in the next table.

Imports of Clay Products, Calendar Years 1909 to 1914.

Imports.	1909.	1910.	1911.	1912.	1913.	1914.
	\$	\$	\$	\$	\$	\$
Brick and tile:—						
Bath brick.....	1,495	2,290	2,623	1,927	2,690	1,894
Building brick.....	195,360	274,482	475,865	763,470	575,269	353,353
Paving brick.....	139,366	124,994	164,292	160,663	176,497	145,063
Firebrick, of a class or kind not made in Canada.....	485,994	811,927	814,414	953,621	976,097	535,712
Drain tile, not glazed.....	2,785	4,485	5,640	4,018	12,156	2,941
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	170,280	175,599	382,929	507,024	465,997	338,533
Manufactures of clay, n.o.p.....	254,170	361,996	523,998	818,467	(a)912,886	(b)609,294
Total.....	1,249,450	1,755,773	2,369,761	3,209,190	3,121,592	1,986,790
Earthenware and chinaware:—						
Brown or coloured earthenware and stoneware, and Rockingham ware.....	36,673	53,413	52,100	62,161	70,632	71,083
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....	219,936	202,475	184,291	291,804	264,090	163,431
Demijohns, churns, or crocks.....	8,888	6,607	4,933	18,404	32,599	25,935
Tableware of china, porcelain, white granite or iron-stoneware.....	1,212,365	1,545,538	1,718,582	2,068,362	2,185,601	1,437,175
China and porcelain ware, n.o.p.....	87,467	95,509	62,025	71,751	43,696	30,006
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	56,974	90,524	123,203	160,082	173,445	104,285
Earthenware tiles, n.o.p.....	81,393	125,772	154,351	239,391	296,791	186,161
Manufactures of earthenware, n.o.p.....	78,063	163,278	217,051	183,001	248,016	174,146
Total.....	1,781,759	2,283,116	2,516,536	3,094,956	3,314,870	2,192,222
Clays:—						
China-clay ground, or unground.....	100,066	142,125	125,768	127,402	149,337	150,881
Fireclay, ground or unground.....	86,161	124,293	125,199	140,500	143,399	90,233
Pipeclay, ground or unground.....	310	114	1,786	234	385	829
Clays, all other, n.o.p.....	29,793	25,976	17,494	20,258	31,169	46,185
Totals.....	216,330	292,508	270,247	288,394	324,290	288,128
Grand total.....	3,247,539	4,331,397	5,156,544	6,592,540	6,760,752	4,467,140
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material....	211,837	262,667	285,847	382,920	477,133	359,288
Chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground	96,747	121,959	147,640	167,990	164,879	113,211

(a) Includes Building Blocks (9 mos.) \$356,366; Firebrick, n.o.p. (9 mos.) \$216,760; and manufactures of clay n.o.p. \$339,760.
 (b) Includes Building Blocks (12 mos.) \$276,817; Firebrick, n.o.p. (12 mos.) \$154,421; and manufactures of clay n.o.p. \$178,056.

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 1914 was \$113,211; of which \$104,212 was from the United States, \$5,396 from Great Britain, and \$3,603 from other countries. The value of the imports under this item during the calendar year 1913 was \$164,879. There is also shown an annual importation of 'baths, bath-tubs, basins, closets, lavatories, urināls, sinks, and laundry tubs of any material,' the value of such imports during 1914 being \$359,288, as compared with \$477,133 during the year 1913.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and poreclain 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 84 per cent was from the United States and 15.6 per cent from Great Britain; and only \$11,079 worth from other countries. Of the earthenware and chinaware, 60 per cent was imported from Great Britain; 18 per cent from the United States; 10 per cent from Germany; 6 per cent from France; 3 per cent from Japan, and considerable values also from 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 1914, Showing Countries of Origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other countries.	Total.
Brick and tile:—	\$	\$	\$	\$	\$	\$	\$	\$
Bath brick.....	2,598	226						2,824
Building brick.....	28,067	499,596						527,663
Building blocks.....	50,930	375,796		194				426,920
Paving brick.....	73,146	98,471						171,617
Fire brick, of a class or kind not made in Canada.....	130,179	743,860	2,106	2,947			1,626	850,718
Fire brick, n.o.p.....	82,094	176,286		965			98	259,443
Drain tile, not glazed.....	3,186	6,937		1,053				11,176
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	54,696	399,830						454,526
Manufactures of clay, n.o.p.....	34,646	206,539	1,502	312	242		34	243,275
Total.....	459,542	2,477,541	3,608	5,471	242		1,758	2,948,162
Earthenware and chinaware:—								
Brown or coloured earthenware and stoneware, and Rockingham ware.....	21,501	51,585	364	169	634	42	195	74,490
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....	174,499	46,444	23,333	2,646	2,318	11,214	4,065	264,519
Demijohns, churns, or crocks.....	2,127	27,993	30	8	57			30,215
Tableware of china, porcelain, white granite or iron-stoneware.....	1,425,593	40,871	258,702	180,199	71,060	82,712	11,868	2,071,007
China, to be silver mounted, imported by manufacturers of silverware.....	1,217	357						1,589
China and porcelain ware, n.o.p.....	15,949	11,592	7,184	1,142	449	2,956		40,160
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	31,196	125,409	637	2,410			226	159,878
Earthenware tiles, n.o.p.....	145,012	124,464	318	814	149		455	271,212
Manufactures of earthenware, n.o.p.....	56,505	142,597	9,394	2,184	283	5,507	1,767	218,237
Total.....	1,873,599	571,312	299,962	189,587	74,950	102,431	19,464	3,131,305
Clays:—								
China-clay, ground or unground.....	66,211	96,251						162,462
Fireclay, ground or unground.....	24,136	100,676	622				223	125,657
Pipeclay, ground or unground.....	252	237					60	549
Clays, all other, n.o.p.....	1,589	29,721	7					31,317
Total.....	92,188	226,885	629				283	319,985
Grand total.....	2,425,329	3,275,738	304,199	195,058	75,192	102,431	21,505	6,399,452
Per cent of total.....	37.90	51.19	4.75	3.05	1.17	1.60	0.34	100.00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material.....	163,089	288,714	37	815			93	452,748
Chalk, china or cornwall stone, cliff stone, and feldspar, fluorspar, magnesite, ground or unground.....	21,322	149,963	1,337	326	80		2,982	176,010

A record of the total annual value of the imports of clay products since 1900 is shown in the following table.

Imports of Clay Products (total value) 1900-14.

Fiscal Year.	Brick and tile.**	Earthenware and chinaware.	Clays.	Totals.
	\$	\$	\$	\$
1900.....	145,914	959,526	122,965	1,228,405
1901.....	133,343	1,114,677	141,251	1,389,271
1902.....	172,281	1,275,093	140,521	1,587,895
1903.....	157,783	1,406,610	176,416	1,740,809
1904.....	259,421	1,611,356	144,706	2,015,483
1905.....	761,756	1,636,214	176,805	2,574,775
1906.....	1,000,372	1,692,359	220,504	2,913,235
1907*.....	770,686	1,422,880	178,240	2,371,806
1908.....	1,079,556	2,190,784	267,720	3,538,060
Calendar Year.				
1909.....	1,249,450	1,781,759	216,330	3,247,539
1910.....	1,755,773	2,283,116	292,508	4,331,397
1911.....	2,369,761	2,516,536	270,247	5,156,544
1912.....	3,209,190	3,094,956	288,394	6,592,540
1913.....	3,121,592	3,314,870	324,290	6,760,752
1914.....	1,986,790	2,192,222	288,128	4,467,140

* 9 months ending March, 1907.

** Includes fireclay classified as "for use in process of manufactures."

The Canadian Customs duties affecting clays and clay products, in force during 1914, are shown as follows:—

Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910).

Item.	British Preferential tariff.	Intermediate tariff.	General tariff.
281 Firebrick of a class or kind not made in Canada.....	Free.	Free.	Free.
282 Building brick, paving brick, and mfgs. of clay or cement (n.o.p.).....	12½ %	20 %	22½ %
283 Drain tiles not glazed.....	15	17½	20
284 Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks glazed or unglazed, earthenware tiles (n.o.p.).....	25	32½	35
285 Tiles or blocks of earthenware or of stone prepared for mosaic flooring.....	20	27½	30
286 Earthenware and stoneware, viz., demijohns, churns, or crocks.....	20	27½	30
287 Tableware of china, porcelain, white granite or ironstone.....	15	27½	27½
288 Earthenware and stoneware, brown or coloured and Rockingham ware "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware (n.o.p.).....	20	27½	30
289 Closets, urinals, basins, lavatories, baths, bath-tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material.....	20	30	35
295 Clays, including china-clays, 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 1914 the total sales were 551,148,620, valued at \$4,769,417, made up of 457,513,762 common, valued at \$3,653,861, or an average value per thousand of \$7.99; and 93,634,858 pressed brick, valued at \$1,115,556, or an average value per thousand of \$11.91. In addition to the common and pressed brick there was a production of ornamental brick of 1,554,496, valued at \$23,592, and a production of fireproofing brick and architectural terra-cotta valued at \$405,543.

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 \$8.85; 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.

Production of Clay Building Brick (Common and Pressed) 1913 and 1914.

Province.	1913.				1914.			
	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.....	12	22,085,765	174,024	2.3	11	12,672,826	99,012	2.1
New Brunswick..	8	6,189,152	61,969	0.8	8	6,133,528	66,292	1.4
Quebec.....	76	153,696,242	1,250,765	17.0	45	126,818,949	1,010,861	21.2
Ontario.....	271	430,029,531	4,026,029	54.6	282	322,049,709	2,741,120	57.5
Manitoba.....	17	43,660,320	514,358	7.0	13	29,035,950	317,488	6.7
Saskatchewan....	14	18,175,000	189,820	2.6	14	8,715,000	93,699	1.9
Alberta.....	30	71,996,343	732,408	9.9	26	30,169,757	278,054	5.8
British Columbia.	27	39,396,375	426,733	5.8	20	15,552,901	162,891	3.4
Totals.....	455	785,228,728	7,376,106	100.0	419	551,148,620	4,769,417	100.0

Production of Clay Building Brick (Common and Pressed) 1911 and 1912.

Province.	1911.			1912.		
	No. sold.	Value.	Per cent of total value.	No. sold.	Value.	Per cent of total value.
		\$			\$	
Nova Scotia.....	23,530,000	141,640	2-17	18,822,960	130,108	1-5
New Brunswick.....	4,400,000	38,000	0-58	5,780,000	53,350	0-6
Quebec.....	122,041,580	1,033,270	15-86	173,336,557	1,446,880	16-8
Ontario.....	369,004,371	3,028,046	46-48	423,670,184	3,807,195	44-2
Manitoba.....	81,400,000	826,928	12-69	87,178,937	1,012,801	11-7
Saskatchewan.....	21,071,660	224,758	3-45	30,538,771	332,943	3-9
Alberta.....	71,772,930	779,001	11-96	93,759,980	1,105,912	12-8
British Columbia.....	39,680,515	443,829	6-81	61,284,565	731,040	8-5
Totals.....	732,901,056	6,515,472	100-00	894,371,954	8,620,229	100-0

Very large stocks of brick were reported as being in manufacturers' hands at the close of 1914, the total number being 242,206,000 brick or equivalent to about 44 per cent of the year's sales.

The record of stocks on hand by provinces is shown in the following table:—

Common and Pressed Brick held in Stock by Manufacturers, December 31, 1914.

Province.	Common brick.	Pressed brick.	Total.
	No.	No.	No.
Nova Scotia.....	4,690,000	50,000	4,740,000
New Brunswick.....	2,830,000	100,000	2,930,000
Quebec.....	42,494,000	2,851,000	45,345,000
Ontario.....	107,325,000	23,369,000	130,694,000
Manitoba.....	20,140,000	760,000	21,000,000
Saskatchewan.....	7,503,000	1,140,000	8,643,000
Alberta.....	10,483,000	8,549,000	19,032,000
British Columbia.....	8,264,000	1,558,000	9,822,000
Total.....	203,729,000	38,377,000	242,206,000

The exports of building brick since 1891 and the imports since 1880 are shown in the following tables. The exports have never been large, averaging for a number of years about \$6,000 per annum. The exports fell off somewhat from 1909 to 1911, but increased again to a value of \$11,871 in 1914.

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 1914 the imports were 30,022,000 brick, valued at \$353,353, of which 1,794,000 valued at \$20,505, or an average of \$11.43 per thousand, were imported from Great Britain, and 28,228,000 valued at \$332,848 or an average of \$11.79 per thousand, from the United States. The imports during the year 1913 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 54,409,000 valued at \$546,624, or an average of \$10.04 per thousand, from the United States. In both 1913 and 1914 there was a considerable falling off in the imports of brick 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	7,465	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	1914.....	1,486	11,871

Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		\$			\$			\$
1880.....	340	2,067	1892.....	621	5,075	1904.....	13,455	117,468
1881.....	415	4,281	1893.....	1,489	14,108	1905.....	25,515	168,122
1882.....	3,500	24,572	1894.....	2,220	18,320	1906.....	21,934	194,897
1883.....	1,448	14,234	1895.....	575	4,705	1907 (9 mos.)	8,495	88,144
1884.....	3,263	20,258	1896.....	1,057	23,189	1908.....	13,790	139,105
1885.....	3,108	14,632	1897.....	2,094	10,336	1909.....	10,894	103,773
1886.....	983	5,929	1898.....	639	6,652	Calendar Year.		
1887.....	276	2,440	1899.....	2,611	21,306	1910.....	29,049	274,482
1888.....	2,483	20,720	1900.....	1,792	19,305	1911.....	51,102	475,865
1889.....	2,590	24,585	1901.....	2,800	20,677	1912.....	81,425	763,470
1890.....	1,933	12,500	1902.....	4,087	33,802	1913.....	56,846	575,269
1891.....	589	9,744	1903.....	2,881	28,493	1914.....	30,022	353,353

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 1914 according to these returns was \$7.99, as compared with \$8.85 in 1913 and \$9.11 in 1912; and of pressed brick \$11.91 in 1914; as compared with \$12.49 in 1913, and \$12.86 in 1912.

In the Maritime Provinces during 1914 the price of common brick varied from \$7.50 to \$11.00, averaging for Nova Scotia \$7.75 and for New Brunswick \$10.61.

In Quebec the price of common brick varied between \$5 and \$8.50, averaging \$7.40 while the price of pressed brick averaged \$15.91. The average price of common brick in Ontario was \$7.86, the limits of variation being \$6.00 and \$10.50; while for pressed brick the average was \$10.77 and the variation from \$10.00 to \$15.00.

In all the western provinces common brick ranged from about \$8.00 to \$11.50, averaging \$10.79 in Manitoba, \$8.98 in Saskatchewan, \$7.92 in Alberta, and \$8.56 in British Columbia. Pressed brick ranged from \$11.00 to \$27.00 in individual yards, averaging \$12.59 in Manitoba, \$17.31 in Saskatchewan, \$13.52 in Alberta, and \$26.50 in British Columbia.

The following table shows the average values at the kilns, of common and pressed brick, during 1912, 1913, and 1914, as furnished by the producers.

Average Prices per Thousand of Common and Pressed Brick.

	Common brick.			Pressed brick.		
	1912.	1913.	1914.	1912.	1913.	1914.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	6 86	7 82	7 75	16 00	16 06	15 32
New Brunswick.....	9 22	10 00	10 61	10 00	12 00	22 50
Quebec.....	8 08	7 89	7 40	12 04	12 73	15 91
Ontario.....	8 69	8 88	7 86	10 40	11 48	10 77
Manitoba.....	11 47	11 21	10 79	15 13	17 28	12 59
Saskatchewan.....	9 73	9 86	8 98	16 63	16 15	17 31
Alberta.....	10 69	9 13	7 92	14 77	12 97	13 52
British Columbia.....	9 61	9 49	8 56	27 53	25 65	26 50
Canada.....	9 11	8 85	7 99	12 86	12 49	11 91

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 brick 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:—The total sales in Nova Scotia were 12,672,826 brick, valued at \$99,012, as compared with sales of 22,085,765 brick, valued at \$174,024 in 1913. The chief sources of production were: Annapolis Royal, Pugwash, Elmsdale, Amherst, Orangedale, and New Glasgow.

The total sales in New Brunswick were 6,133,528 brick, valued at \$66,292, as compared with 6,189,152 brick, valued at \$61,969 in 1913; and the principal sources of production were Fredericton, St. John, Chatham, and Lewisville.

Quebec:—The total sales of brick in Quebec in 1914 were 126,818,949, valued at \$1,010,861, comprising 118,278,889 common brick, valued at \$874,961, or \$7.40 per thousand, and 8,540,060 pressed brick, valued at \$135,900, or \$15.91 per thousand.

The sales 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.

While brick-making is carried on at many places in the Province, the principal plants are located at Montreal, Laprairie, Sherbrooke, Quebec, and Deschailions.

Ontario:—This Province is credited in 1914 with over 57 per cent of the brick production of Canada, the total sales as reported by 282 firms being 322,049,709 brick, valued at \$2,741,120, and including 249,896,642 common brick, valued at \$1,963,921 or an average of \$7.86 per thousand, and 72,153,067 pressed brick, valued at \$777,199 or an average of \$10.77 per thousand.

The total sales in 1913 were 430,029,531 brick, valued at \$4,026,029, and comprised 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 city of Toronto and vicinity, including the counties of York, Peel, and Halton, is the principal brick-making section, and in 1914 produced about 63 per cent of the Ontario production, or about 36 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 nearly 6 per cent of the Ontario production. The Ottawa district, including the counties of Russell and Carleton produced about 7 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 1914 and 1913 is shown in the accompanying tables.

Sale of Common and Pressed Brick in Ontario by Principal Counties, 1914.

County.	Common.			Pressed.			Total value.	Per cent
	No.	Value.	Per M.	No.	Value.	Per M.		
York.....	100,565,314	\$ 807,673	8 03	4,979,600	\$ 72,192	14 50	\$ 879,865	32-10
Peel.....	39,981,156	278,242	6 96	14,566,450	152,435	10 47	430,677	15-71
Halton.....	.....	.....	.....	40,404,037	424,627	10 51	424,627	15-49
Wentworth.....	18,846,955	117,896	6 26	4,329,240	39,059	9 02	156,955	5-73
Carleton.....	10,027,000	95,908	9 56	.....	.....	.....	95,908	3-50
Russell.....	11,574	79,295	6 85	1,355,079	15,702	11 59	94,997	3-47
Thunder Bay District...	5,049,176	46,696	9 25	2,395,873	31,056	12 96	77,752	2-84
Middlesex.....	6,678,511	56,743	8 50	1,750,000	19,800	11 31	76,543	2-79
Kent.....	6,498,600	51,074	7 86	.....	.....	.....	51,074	1-86
Waterloo.....	5,340,321	37,719	7 06	.....	.....	.....	37,719	1-38
Lincoln.....	2,522,325	22,956	9 10	734,788	8,450	11 50	31,406	1-14
Peterboro.....	3,000,000	30,000	10 00	.....	.....	.....	30,000	1-09
Simcoe.....	3,150,000	26,313	8 35	.....	.....	.....	26,313	0-86
Renfrew.....	2,503,775	22,595	9 02	.....	.....	.....	22,595	0-92
Essex.....	2,688,000	18,863	7 02	.....	.....	.....	18,863	0-69
Nipissing.....	2,050,000	18,850	9 20	.....	.....	.....	18,850	0-69
Grey.....	2,094,283	16,748	8 00	.....	.....	.....	16,748	0-61
Total, 17 counties.....	222,569,416	1,727,571	7 76	70,515,067	763,321	10 82	2,490,892	90-87
Total, other counties....	27,327,226	236,350	8 65	1,638,000	13,878	8 47	250,228	9-13
Total, Ontario.....	249,896,642	1,963,921	7 86	72,153,067	777,199	10 77	2,741,120	100-00

Sale 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.		
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	127,528	10 09	447,928	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

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	19,755	144,171	7-298
1903.....	230,000	1,561,700	6-790	23,703	218,550	9-220
1904.....	200,000	1,430,000	7-150	26,857	226,750	8-443
1905.....	250,000	1,937,500	7-750	26,000	234,000	9-000
1906.....	300,000	2,157,000	7-190	39,860	337,795	8-475
1907.....	273,882	2,109,978	7-704	69,763	648,683	9-298
1908.....	222,361	1,575,875	7-087	56,167	485,819	8-649
1909.....	246,308	1,916,147	7-779	53,167	490,571	9-227
1910.....	304,988	2,374,287	7-785	44,204	458,596	10-375
1911.....	354,546	2,801,971	7-903	52,764	564,630	10-701
1912.....	385,000	3,178,250	8-255	65,598	634,169	9-667
1913.....	408,808	3,452,352	8-445	81,238	919,741	11-321
1914*.....	294,400	2,336,207	7-935	60,620	646,604	10-67

* Preliminary.

In addition to the ordinary clay building brick, there was produced in this Province in 1914, ornamental brick valued at \$15,504, and fireproofing and terra-cotta valued at \$205,204. In 1913 the production of ornamental brick was valued at \$9,810 and of fireproofing and terra-cotta \$150,268.

Manitoba:—Throughout all of the western provinces there was again a large falling off in the demand for brick. In Manitoba the total sales were 29,035,950, valued at \$317,488, comprising 26,777,950 common brick, valued at \$289,060, or an average of \$10.79 per thousand, and 2,258,000 pressed brick, valued at \$28,428, or \$12.59 per thousand. The sales in 1913 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 principal brick-making plants operated were at Winnipeg, St. Boniface, Lac du Bonnet, Portage la Prairie, Sidney, Gilbert Plains, Balmoral, and Neepawa.

Saskatchewan:—The total sales of clay building brick in Saskatchewan in 1914 were 8,715,000 valued at \$93,699 which includes 6,865,000 common brick, valued at \$61,669 or an average of \$8.98 per thousand, and 1,850,000 pressed brick, valued at \$32,030 or an average of \$17.31 per thousand. The total sales in 1913 were 18,175,000, valued at \$189,820, which included 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 falling off in sales was over 50 per cent and stocks on hand at the end of the year were almost equal to the year's sales.

The principal clay plants are located at Estevan, Prince Albert, Bruno, Weyburn, Saskatoon, Rosthern, Verigin, and Broadview.

Alberta:—The total sales of clay building brick in 1914 were 30,169,757, valued at \$278,054, comprising 23,190,257 common brick, valued at \$183,696 or an average of \$7.92 per thousand, and 6,979,500 pressed brick, valued at \$94,358 or an average of \$13.52 per thousand.

The total sales in 1913 were 71,996,343 brick, 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 decrease in the value of sales in 1914 was over 58 per cent, and stocks on hand at the end of the year were equivalent to nearly 65 per cent of the year's sales.

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 1914 of ornamental brick, valued at \$3,264, and fireproofing and terra-cotta, valued at \$96,025, as compared with ornamental brick valued at \$738, and fireproofing, etc., valued at \$146,200 in 1913.

British Columbia:—The total sales of brick in this Province in 1914 were reported as 15,552,901, valued at \$162,891 which included 13,896,950 common brick, valued at \$119,002 or an average of \$8.56 per thousand, and 1,655,951 pressed brick, valued at \$43,889 or an average of \$26.50 per thousand.

The total sales in 1913 were 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 decrease in the value of the sales in 1914 was over 61 per cent and the stocks on hand at the end of the year amounted to more than 60 per cent of the year's sales.

In addition to the building brick there was also a production of fireproofing brick valued at \$58,077, as against a value of \$42,919 in 1913.

The principal centres of manufacture are: Vancouver, New Westminster, Clayburn, 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 1914 was reported as 2,707,000, valued at \$49,627, or an average value per thousand of \$18.33, as compared with a production of 4,208,295, valued at \$75,669, or an average value of \$17.98 per thousand in 1913.

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 1914 the imports were 9,069,000, valued at \$145,063 or an average value per thousand of \$16.00, and included 6,395,000, valued at \$103,900 or an average of \$16.25 from the United States, and 2,674,000, valued at \$41,163 or an average of \$15.21 from Great Britain. The total imports during the calendar year 1913 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.

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	1906.....	3,000	45,000	15 00
1898.....				1907.....	3,618	72,354	20 00
1899.....	5,300	42,550	8 03	1908.....	3,720	59,456	15 98
1900.....	2,710	26,950	9 94	1909.....	3,760	67,408	17 93
1901.....	3,689	37,000	10 03	1910.....	4,215	78,980	18 74
1902.....	4,211	42,000	9 97	1911.....	5,220	79,444	15 22
1903.....	3,789	45,288	11 95	1912.....	4,580	85,989	18 78
1904.....	4,436	55,450	12 50	1913.....	4,208	75,669	17 98
1905.....	4,500	54,000	12 00	1914.....	2,707	49,627	18 33

* Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
Fiscal Year.				Fiscal Year.			
1895.....	275	5,006	18 20	1906.....	4,104	46,008	11 21
1896.....	918	10,132	11 04	1907 (9 mos.).....	2,182	23,256	10 66
1897.....	52	719	13 83	1908.....	5,340	61,346	11 49
1898.....	367	2,337	6 37	1909.....		101,187	↑
1899.....	1,583	23,648	14 94	Calendar Year.			
1900.....	2,175	35,644	16 39	1910.....	10,503	124,994	11 90
1901.....	900	10,414	11 57	1911.....	11,450	164,292	14 34
1902.....	1,030	16,788	16 30	1912.....	11,793	160,663	13 62
1903.....	1,337	18,811	14 07	1913.....	13,035	176,497	13 54
1904.....	1,986	29,753	14 98	1914.....	9,069	145,063	16 00
1905.....	3,350	32,578	13 86				

*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, and the total number has, therefore, been omitted. 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 fireclays, firebrick, and fireclay products in 1914 was \$107,568, as compared with a valuation of \$142,738 in 1913, and \$125,585 in 1912. There was in addition, in 1914, a production of fireclay products valued at \$30,264 reported as being made from imported clays.

The production in 1914 included fireclay or refractory clay, sold as such to the extent of 2,171 tons valued at \$12,875; firebrick 2,815,690, valued at \$72,299, or an average of \$25.67 per thousand; and other fireclay products valued at \$22,394.

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.

The imports of firebrick during the calendar year 1914 were valued at \$690,133 of which \$592,650 was from the United States, \$93,837 from Great Britain, and \$3,646 from other countries.

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.

Fireclay was imported, during the calendar year 1914, to the value of \$90,233 as compared with a value of \$143,399 in 1913, and \$140,500 in 1912.

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.....	2,415,871	70,429	29 16	1,984	8,121	4 09	31,752	110,302
1909.....	1,059,270	32,742	30 92	4,405	12,390	2 81	33,000	78,132
1910.....	1,375,400	21,352	21 34	1,425	5,863	4 11	15,000	50,215
1911.....	2,367,937	44,122	18 63	7,532	24,128	3 20	20,880	89,130
1912.....	3,429,594	67,102	19 59	6,307	24,343	3 86	34,050	125,585
1913.....	3,667,276	86,164	23 50	3,345	14,018	4 19	42,556	142,738
1914.....	2,815,690	72,299	25 67	2,171	12,875	5 93	22,394	107,568

Imports of Firebrick and Fireclay.

Fiscal Year.	Fireclay.	Firebrick.	Fiscal Year.	Fireclay.	Firebrick.
	\$	\$		\$	\$
1900.....	59,291	39,535	1908.....	155,873	639,347
1901.....	79,530	32,831	1909.....	77,146	350,457
1902.....	64,541	45,608	Calendar Year.		
1903.....	94,509	34,522	1910.....	124,293	811,927
1904.....	52,716	38,335	1911.....	125,199	814,414
1905.....	73,837	44,746	1912.....	140,500	953,621
1906.....	131,130	51,892	1913.....	143,399	1,192,857
1907*.....	85,044	349,185	1914.....	90,233	690,133

* 9 months ending March.

SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1914 was \$1,104,499 as compared with a value of \$1,035,906 in 1913 and \$884,641 in 1912. About 54 per cent of the production in 1914 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 1914 were valued at \$338,533 of which \$305,546 were imported from the United States; \$32,866 from Great Britain and \$121 from other countries. The total imports 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 sales of drain tile in Canada in 1914 as reported to this Branch were valued at \$366,340, as compared with sales of \$338,522 in 1913 and \$357,862 in 1912. The greater part of this production is in the Province of Ontario; the sales in this Province in 1914 as reported to this Branch were 18,592,254, valued at \$343,662, as against a value of \$314,859 in 1913, and \$308,050 in 1912.

The Ontario Bureau of Mines reports the total number of drain tile made in that Province during 1914 as 14,710,000, valued at \$277,530 or an average of \$18.87 per thousand, as compared with 16,935,000, valued at \$292,767 or an average of \$17.28 per thousand in 1913.

The imports of unglazed tile are comparatively small, the value during the calendar year 1914 being \$2,941, as compared with \$12,156 in 1913 and \$4,018 in 1912.

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.....	382,000	1914.....	1,104,499

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	1907..	15,578,000	250,122
1892.....	10,000,000	100,000	1900...	19,544,000	209,738	1908...	24,800,000	338,658
1893.....	17,300,000	190,000	1901...	21,592,000	231,374	1909...	27,418,000	363,550
1894.....	25,000,000	280,000	1902...	17,510,000	199,000	1910...	21,028,000	318,456
1895.....	14,330,000	157,000	1903...	18,200,000	227,000	1911...	21,630,000	349,545
1896.....	13,200,000	144,000	1904...	16,000,000	210,000	1912...	16,463,000	279,579
1897.....	*	*	1905...	15,000,000	220,000	1913...	16,935,000	292,767
1898.....	22,668,000	225,000	1906...	17,700,000	252,500	1914...	14,710,000	277,530

* 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	1898.....	157	29,454
1881.....		37,368	1899.....	1,817	32,071
1882.....		70,061	1900.....	1,383	37,766
1883.....		70,699	1901.....	1,264	54,819
1884.....	5,583	66,170	1902.....	269	55,261
1885.....	2,911	66,678	1903.....	252	57,100
1886.....	1,905	56,048	1904.....	1,637	53,958
1887.....	2,183	69,020	1905.....	1,229	101,166
1888.....	4,290	96,967	1906.....	4,727	131,353
1889.....	2,346	80,869	1907 (9 mos.).....	12,106	93,458
1890.....	3,780	73,654	1908.....	2,080	125,747
1891.....	673	86,522	1909.....	2,394	106,399
1892.....	473	59,064	Calendar Year.		
1893.....	110	38,891	1910.....	4,485	175,599
1894.....	53	24,572	1911.....	5,640	382,929
1895.....	695	20,358	1912.....	4,018	507,024
1896.....	339	18,957	1913.....	12,165	465,997
1897.....	416	33,870	1914.....	2,941	338,533

(a) Drain tile, not glazed.

(b) Drain pipes, sewer pipes, 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 made 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 1914, according to returns received, was \$312,846 of which it is estimated that the value of \$277,475 is attributable to imported clays. The total value of the production in 1913 was \$368,916 of which a value of \$315,383 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	1906.....	150,000
1889.....	Not available.	1898.....	214,675	1907.....	253,809
1890.....	195,242	1899.....	185,000	1908.....	200,541
1891.....	258,844	1900.....	200,000	1909.....	285,285
1892.....	265,811	1901.....	200,000	1910.....	250,924
1893.....	213,186	1902.....	200,000	1911.....	102,493
1894.....	162,144	1903.....	200,000	1912.....	43,955
1895.....	151,583	1904.....	140,000	1913.....	53,533
1896.....	163,427	1905.....	120,000	1914.....	35,371

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 1914 were valued at \$2,192,222, as compared with a value of \$3,314,870 in 1913, and \$3,094,956 in 1912. These imports are subdivided into eight classes, and in 1914 included: brown or coloured earthenware, etc., \$71,083; C. C. or cream-coloured ware; decorated, printed, sponged, etc., \$163,431; demijohns, churns or crocks \$25,935; tableware of china, porcelain, white granite, etc., \$1,437,175; china and porcelain ware, n.o.p., \$30,006; tiles or blocks of earthenware, or stone prepared for mosaic flooring, \$104,285; earthenware tiles, n.o.p., \$186,161; manufactures of earthenware, n.o.p., \$174,146.

The imports of 1913 comprised: 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.

It will be observed that there has been a general decrease in almost all classes of earthenware and chinaware imported in 1914. 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	1892.....	748,810	1904.....	1,611,356
1881.....	439,029	1893.....	709,737	1905.....	1,636,214
1882.....	646,734	1894.....	695,514	1906.....	1,692,359
1883.....	657,886	1895.....	547,935	1907 (9 mos.).....	1,422,880
1884.....	544,886	1896.....	575,493	1908.....	2,190,784
1885.....	511,853	1897.....	595,822	1909.....	1,716,887
1886.....	599,269	1898.....	675,874	Calendar Year.	
1887.....	750,691	1899.....	916,727	1910.....	2,283,116
1888.....	697,082	1900.....	959,526	1911.....	2,516,536
1889.....	697,949	1901.....	1,114,677	1912.....	3,094,956
1890.....	695,206	1902.....	1,275,093	1913.....	3,314,870
1891.....	634,907	1903.....	1,406,610	1914.....	2,192,222

KAOLIN.

About 1,000 tons of kaolin valued at \$10,000 were shipped in 1914, as compared with 500 tons valued at \$5,000 in 1913, and 20 tons valued at \$160, in 1912. The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, which have been 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 Montefort Branch of the Canadian Northern Quebec railway—94 miles northwest of Montreal.

The imports of china-clay ground and unground, into Canada during the twelve months ending December 1914, were 20,437 tons, valued at \$150,881, or \$7.38 per ton, as against imports of 21,164 tons, valued at \$149,337 or \$7.06 per ton in 1913, and 18,332 tons valued at \$127,402 or \$6.95 per ton in 1912. 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 \$2,192,222 in 1914, 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 1914 being 288,858 gross tons, valued at \$1,908,407, and in 1913, 240,120 gross tons, valued at \$1,625,451.

The St. Remi d'Amherst kaolin deposits have been described by Mr. Keele in Geological Survey Memoir No. 64¹ from which the following extracts have been taken:—

"The crude material, therefore, is a mixture of fine-grained white clay and angular fragments of quartz, mostly under one-fourth of an inch in size. A small quantity of tourmaline is also present. In some parts of the vein the material is almost free from quartz, but for the most part quartz forms over 50 per cent of the deposit."

"The lumps of crude kaolin coming from the mine are broken up in a blunger, an iron tank filled with water, in which a vertical shaft, furnished with horizontal arms, revolves. The quartz settles to the bottom of the tank, while the clay is carried off through an overflow pipe and led into a series of troughs, where the finest particles of sand are deposited. After flowing slowly through the troughs, the clay-water finally falls into settling tanks. The clay gradually sinks to the bottom of the tanks and the clear liquid is pumped out. By means of this washing process the deposits yield from 30 to 40 per cent of fine-grained clay. A chemical analysis made from a sample of the washed clay by G. E. F. Lundell, gave the following results:—

Silica.....	46.13
Alumina.....	39.45
Iron oxide.....	0.72
Lime.....	None.
Magnesia.....	None.
Potash.....	0.20
Soda.....	0.09
Loss on ignition.....	13.81

100.40

¹ Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele, Memoir 64, Geological Survey, Dept. of Mines, 1915, p. 2.

"The analysis shows the material to be of high purity. The physical tests are as follows. The washed kaolin requires 45 per cent of water for tempering. It has a fair amount of plasticity, but like all kaolin, it works rather short and crumbly. The shrinkage on drying is 7 per cent."

Cone.	Fire shrinkage. %	Absorption. %
010	3.0	34.3
06	3.6	34.3
1	4.5	32.0
5	9.3	20.0
9	11.3	17.0
34	Softens.	

"This material has greater plasticity and higher shrinkages than most of the standard brands of washed kaolin or china-clay. The samples for testing were taken from near the surface, but at deeper levels, it is possible that the kaolin will not be so plastic and not shrink so much on drying and burning."

"The Canadian China Clay Company which operates this mine is disposing of the washed product in Montreal, where it is used as a paper filler. On account of its fineness of grain and pure white colour, it is very suitable for this purpose."

"Washed kaolin is one of the ingredients used in all whiteware pottery bodies, such as tableware, china, porcelain, wall tile, sanitary pottery, electrical porcelain, etc. Potters generally call it china-clay. It is the most valuable of all the clays."

"PROSPECTING FOR KAOLIN."

"Considerable prospecting has been done for kaolin in the vicinity of St. Remi, but so far no other workable deposit has been uncovered."

"The whole country has been heavily glaciated, and much of the residual clays which may have existed in pre-glacial time have been removed by erosion. A sheet of glacial drift materials, principally boulder clay, covers the slopes of the hills, and the valley bottoms. The kaolin was first discovered by a farmer when sinking a well. He went through 15 feet of boulder clay, and found the white clay deposit beneath. There are probably other deposits in the region, as the Grenville rocks occur at intervals as far west as the Ottawa river and beyond. The general prevalence of the drift covering renders prospecting a tedious and difficult operation, and kaolin being a soft deposit, is never exposed to the surface, unless a stream has cut down to it through the overburden."

LIME.

The lime industry in common with other materials of construction was affected by the financial depression during the latter part of the year 1913 and throughout 1914, and a falling off in production is shown. According to returns received from the producers, the total production in 1914 was 7,028,582 bushels, this being the amount sold or used (equivalent to about 246,000 tons) valued at \$1,360,628, or an average of 19 cents per bushel, or about \$5.53 per ton.

The production in 1913 was reported as 7,558,484 bushels, (264,547 tons) valued at \$1,609,398, or an average of 21 cents per bushel, or \$6.08 per ton. The decrease in production in 1914 was therefore 529,902 bushels, or slightly over 7 per cent.

Returns were received from 85 active firms in 1914, as compared with 77 firms in 1913. The average number of men employed in 1914 was 1,015, and wages paid \$518,331, as against 1,076 men employed and \$577,841 paid in wages in 1913. 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 1914 varied from a minimum of 16½ cents in Ontario, to a maximum of 37 cents in British Columbia. In 1913, the range was from a minimum of 18 cents in Ontario to a maximum of 32 cents in British Columbia.

Production of hydrated lime was reported by four firms, viz: The Standard Lime Co. Ltd., Joliette, Que., The Standard White Lime Co. of Guelph, Ont., The Contractors Supply Co. Ltd., Orangeville, Ont., and the Guelph Ontario Reformatory.

Lime Production by Provinces, 1914.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent. of total value.
P. E. Island.....	1	2	\$ 61	1,693	\$ 542	cts. 32	% 0.04
Nova Scotia.....	1	15	6,900	516,029	103,206	20	7.59
New Brunswick.....	5	89	47,224	391,739	102,980	26.3	7.57
Quebec.....	18	258	137,640	1,767,935	389,064	22	28.59
Ontario.....	43	429	224,937	3,393,078	556,850	16.4	40.92
Manitoba.....	7	123	47,331	526,167	92,898	17.7	6.83
Alberta.....	6	58	25,963	280,252	58,321	20.8	4.29
British Columbia....	4	41	28,275	151,689	56,767	37.4	4.17
Total.....	85	1,015	518,331	7,028,582	1,360,628	19.3	100.00

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.
P. E. Island.....	1	2	\$ 130	3,762	\$ 1,129	cts. 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.
P. E. Island.....	4	10	\$ 844	24,971	\$ 8,191	cts. 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, 1910 and 1911.

Province.	1910.				1911.			
	Bushels.	Value.	Average per bushel.	Per cent of total value.	Bushels.	Value.	Average per bushel.	Per cent of total value.
		\$	cta.	%		\$	cta.	%
Nova Scotia.....	55,750	13,490	24	1.2	639,200	130,555	53	8.60
New Brunswick.....	470,050	105,593	22	9.3	613,728	132,897	22	8.76
Quebec.....	1,227,555	299,126	23	26.3	1,428,392	356,453	25	23.49
Ontario.....	2,988,020	476,137	16	41.9	3,360,265	538,902	16	35.51
Manitoba.....	606,679	100,808	17	8.8	706,888	140,629	20	9.27
Alberta.....	303,214	69,268	23	6.1	434,038	100,407	23	6.61
British Columbia.....	196,878	72,657	37	6.4	351,014	117,756	34	7.76
	5,848,146	1,137,079	19	100.0	7,533,525	1,517,599	20	100.00

Exports and Imports:—The value of the lime exported during the calendar year 1914 was \$16,927, the destination being mainly the United States. In 1913, the exports were valued at \$29,234. The imports of lime during the calendar year 1914, were 340,828 barrels, (34,083 tons) valued at \$211,123, or an average of 62 cents per barrel, or \$6.16 per ton, and were derived chiefly from the United States. The imports during 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.

Annual statistics of exports and imports are given in the next two tables:—

Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	119,853	1899.....	73,565	1907.....	55,903
1892.....	121,535	1900.....	80,852	1908.....	43,316
1893.....	86,623	1901.....	99,194	1909.....	48,821
1894.....	83,670	1902.....	116,009	1910.....	44,762
1895.....	71,697	1903.....	131,412	1911.....	39,536
1896.....	70,820	1904.....	73,838	1912.....	35,097
1897.....	53,177	1905.....	85,723	1913.....	29,234
1898.....	49,594	1906.....	57,072	1914.....	16,927

Imports of Lime.

Year.	Barrels.	Value.	Average value.	Year.	Barrels.	Value.	Average value.
Fiscal Year.		\$	\$ cts.	Fiscal Year.		\$	\$ cts.
1880.....	6,100	6,013	0 99	1898.....	12,850	9,002	0 70
1881.....	5,796	4,177	0 72	1899.....	15,720	11,124	0 71
1882.....	5,064	5,365	1 06	1900.....	12,865	11,211	0 87
1883.....	7,623	9,224	1 21	1901.....	19,657	14,534	0 74
1884.....	10,804	11,200	1 04	1902.....	24,602	17,584	0 71
1885.....	12,072	11,503	0 95	1903.....	31,108	22,470	0 72
1886.....	11,021	9,347	0 85	1904.....	54,359	39,639	0 73
1887.....	10,835	8,524	0 79	1905.....	98,676	71,588	0 73
1888.....	10,142	7,537	0 74	1906.....	134,334	93,630	0 70
1889.....	13,079	9,363	0 72	1907 (9 mos.).....	88,919	67,573	0 76
1890.....	8,149	5,360	0 66	1908.....	129,379	99,611	0 77
1891.....	6,259	4,273	0 68	1909.....	153,934	106,263	0 69
1892.....	6,132	4,241	0 69	Calendar Year.			
1893.....	6,879	4,917	0 71	1910.....	212,502	138,847	0 65
1894.....	6,766	4,907	0 73	1911.....	228,538	161,985	0 71
1895.....	12,008	5,743	0 48	1912.....	329,925	207,481	0 63
1896.....	10,239	7,331	0 72	1913.....	386,693	238,271	0 62
1897.....	16,108	10,529	0 65	1914*.....	340,828	211,123	0 62

*Duty 20 per cent.

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 1914, 41 per cent of the total value, and the latter 29 per cent. The western provinces accounted for about 15 per cent of the total in 1914, as against 22 per cent in 1913 and 28 per cent in 1912.

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	1906.....	2,885,000	496,785	17
1897.....				1907.....	2,650,000	418,700	17
1898.....	2,620,000	308,000	12	1908.....	2,442,331	448,596	18
1899.....	4,342,500	535,000	12	1909.....	2,633,500	470,858	18
1900.....	3,893,000	544,000	14	1910.....	2,889,235	474,531	16
1901.....	4,100,000	550,000	13	1911.....	2,469,773	402,340	16
1902.....	4,300,000	617,000	14	1912.....	2,297,525	381,672	17
1903.....	3,400,000	520,000	15	1913.....	2,300,991	390,600	17
1904.....	2,600,000	406,800	16	1914*.....	2,075,228	333,363	16
1905.....	3,100,000	424,700	14				

* Preliminary.

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 1914, the total sales were reported as 70,650,030 brick, valued at \$609,515, or an average of \$8.63 per thousand, as against sales in 1913 of 92,586,676 brick, valued at \$906,665, or an average of \$9.79 per thousand.

Stocks of brick on hand at the end of the year were reported as 16,796,000 brick.

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
1914.....	21	70,650,030	609,515	8 63

SAND AND GRAVEL.

Previous to 1912, no attempt had been made by this Department to obtain statistics of the production of building sand or of gravel in Canada. In 1912, however, a beginning was made, the returns received showing a production of sand and gravel, valued at \$1,512,099.

For the year 1913 the collection was extended to include a record of the production of sand and gravel for railroad ballasting, but at the time of closing the statistics, several important returns had not been received. However, the total value of the production as reported was \$2,258,874.

The total value of the production in 1914 as reported was \$2,505,310, but it is probable that the record is more complete than for the previous years which doubtless accounts in large measure for the fact that an increase in production is shown.

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

Annual Production of Sand and Gravel.

Province.	1912.	1913.	1914.
	\$	\$	\$
P. E. Island.....			
Nova Scotia.....	13,549	101,201	100,016
New Brunswick.....			
Quebec.....	243,126	638,778	370,713
Ontario.....	363,668	638,771	833,635
Manitoba.....	101,653	197,719	314,081
Saskatchewan.....	255,453	236,377	222,019
Alberta.....	148,704	265,165	273,115
British Columbia.....	385,946	180,863	391,731

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 1914, there were exported from Canada 952,370 tons of sand and gravel, valued at \$802,358; while during the same year there were imported 273,812 tons, valued at \$224,759.

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	1904.....	399,809	129,803	32
1894.....	324,656	86,940	27	1905.....	306,935	152,805	50
1895.....	277,162	118,359	43	1906.....	336,550	139,712	41
1896.....	224,769	80,110	36	1907.....	298,095	119,853	40
1897.....	152,963	76,729	50	1908.....	298,954	161,387	54
1898.....	165,954	90,498	55	1909.....	481,584	256,166	53
1899.....	242,450	101,640	42	1910.....	624,824	407,974	65
1900.....	197,558	101,666	51	1911.....	573,494	408,110	71
1901.....	197,302	117,465	60	1912.....	660,090	459,952	70
1902.....	159,793	119,120	75	1913.....	644,633	440,956	68
1903.....	355,792	124,006	35	1914.....	952,370	802,358	84

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	1904.....	110,634	107,547	0 97
1894.....	41,573	33,506	0 81	1905.....	85,339	92,722	1 09
1895.....	19,609	24,779	1 26	1906.....	116,500	173,727	1 49
1896.....	18,953	24,604	1 30	1907 (9 mos.)..	171,700	177,412	1 03
1897.....	21,308	25,222	1 18	1908.....	266,704	223,043	0 84
1898.....	32,148	43,287	1 35	1909.....	132,158	136,011	1 03
1899.....	30,288	42,209	1 39	Calendar Year.			
1900.....	35,713	41,280	1 16	1910.....	195,796	196,766	1 00
1901.....	35,749	42,891	1 20	1911.....	241,375	246,613	1 02
1902.....	47,381	58,668	1 24	1912.....	532,721	445,781	0 84
1903.....	91,518	95,647	1 05	1913.....	439,673	440,343	1 00
				1914.....	273,812	224,759	0 82

SLATE.

There is a small annual production of slate in Canada obtained from the New Rockland quarries, Melbourne township, Richmond county, and from quarries at Botsford in Temiscouata county, both operated by Messrs. Fraser and Davies.

The production in 1914 was 1,075 squares valued at \$4,837 as compared with a production in 1913 of 1,432 squares, valued at \$6,444.

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	90,689	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	13,496
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
			1914.....	1,075	4,837

* From 1903, in squares; previously, in tons.

No exports of slate have been reported since 1896 with the exception of the years 1908 and 1909.

The imports of slate during the past eight years ranged from \$100,000 to over \$200,000 per annum.

The total value of the imports during the calendar year, 1914, was \$213,256, and included: roofing slate, \$91,977; school writing slate, \$54,723; slate pencils \$6,514; mantels \$598; and other slates and manufactures of, \$59,444. 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 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, 1913, and 1914.

Slate and manufactures of.	Calendar year 1911.	Calendar year 1912.	Calendar year 1913.	Calendar year 1914.
Roofing slate.....	\$ 83,075	\$ 88,911	\$ 97,730	\$ 91,977
School writing slate.....	35,049	39,858	51,953	54,723
Slate pencils.....	6,036	6,978	9,166	6,514
Slate of all kinds and manufactures of.....	45,525	65,896	76,625	59,444
Mantels.....				598
	169,685	200,643	235,474	213,256

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 1914.....	Nil	Nil
1892.....	87	2,038			

Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$ 21,431	1892.....	50,441	1904.....	86,057
1881.....	22,184	1893.....	51,179	1905.....	93,228
1882.....	24,543	1894.....	29,267	1906.....	112,941
1883.....	24,968	1895.....	19,471	1907 (9 mos.).....	95,520
1884.....	28,816	1896.....	24,176	1908.....	131,069
1885.....	28,169	1897.....	21,615	1909.....	124,065
1886.....	27,852	1898.....	24,907	Calendar Year.	
1887.....	27,845	1899.....	33,100	1910.....	142,285
1888.....	23,151	1900.....	53,707	1911.....	169,685
1889.....	41,370	1901.....	72,187	1912.....	200,643
1890.....	22,871	1902.....	72,601	1913.....	235,474
1891.....	46,104	1903.....	84,437	1914.....	213,256

STONE.¹

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone, and flagstone, rubble, 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 1914, according to returns received, was \$5,469,056, as compared with a value of \$5,504,639 in 1913, showing a slight decrease amounting to \$35,583, or less than one per cent.

The number of active firms reporting in 1914 was 219, the total number of men employed 5,929, and the total wages paid \$2,871,817; in 1913, the number of active firms reporting was 218, the number of men employed 6,131, and wages paid \$3,219,465.

Of the total value of the 1914 production, limestone contributed \$2,672,781, or 48.9 per cent; granite \$2,176,602, or 39.8 per cent; sandstone \$487,140, or 8.9 per cent, and marble \$132,533, or 2.4 per cent.

Stone was used for building purposes to the value of \$1,632,763, or 29.8 per cent of the total; monumental and ornamental to the value of \$201,348, or 3.7 per cent; curb, paving and flagstone \$217,578, or 4 per cent; rubble \$1,236,157, or 22.6 per cent; crushed stone \$1,951,337 or 35.7 per cent, and furnace flux 427,966 tons, valued at \$229,873, or 4.2 per cent.

¹ A special investigation has been undertaken by the Mines Branch on the building and ornamental stones of Canada, by Prof. W. A. Parks, of Toronto University, and three reports of this series have been completed, as follows:—

No. 100. "The Building Stones of Canada, Vol. I." "Building and Ornamental Stones of Ontario."
 No. 203. "Building Stones of Canada, Vol. II." "Building and Ornamental Stones of the Maritime Provinces."
 No. 279. "Building Stones of Canada, Vol. III." "Building and Ornamental Stones of the Province of Quebec."

By provinces, Quebec again shows the largest output, having a value of \$2,286,078, or 41.8 per cent of the total; being made up of limestone to the value of \$1,326,943; granite valued at \$842,845, marble \$98,890. Ontario takes second place with a production of \$1,253,849, or 23 per cent of the total, of which limestone is credited with \$853,906; granite \$309,720; sandstone \$59,923, and marble \$30,300. British Columbia ranks third in order of importance with a total of \$1,024,683, including granite \$918,131; sandstone \$51,774; limestone \$51,435, and marble \$3,343. The production in Manitoba was valued at \$361,912, made up of limestone \$346,258 and granite \$15,654. The Nova Scotia production was valued at \$221,090, comprising: limestone \$94,239; granite \$65,727; and sandstone \$61,124. The Alberta production was reported as \$60,272, all sandstone. New Brunswick is credited with \$261,172 made up chiefly of sandstone and granite.

Production of Stone by Provinces, 1914.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%	Labour.	
							No. men em- ployed.	Wages.
	\$	\$	\$	\$	\$			\$
Nova Scotia.....	65,727	94,239	.....	61,124	221,090	4.1	441	120,944
New Brunswick.....	24,525	.....	.....	236,647	261,172	4.8	277	156,619
Quebec.....	842,845	1,326,943	98,890	17,400	2,286,078	41.8	2,400	1,145,873
Ontario.....	309,720	853,906	30,300	59,923	1,253,849	22.9	1,575	645,728
Manitoba.....	15,654	346,258	.....	.....	361,912	6.6	373	190,241
Alberta.....	.....	.....	.....	60,272	60,272	1.1	78	46,943
British Columbia.....	918,131	51,435	3,343	51,774	1,024,683	18.7	785	565,469
Total.....	2,176,602	2,672,781	132,533	487,140	5,469,056	.....	5,929	2,871,817
Per cent.....	39.8	48.9	2.4	8.9	.....	100.0	.....	.....

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	.....	.....

Value of Stone for Various Purposes in 1914.

Kind.	Building.	Orna- mental and monu- mental.	Paving and curb- stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	496,261	93,948	138,443	793,736	654,214	.....	2,176,602
Limestone.....	876,544	13,504	55,420	241,698	1,255,742	229,873	2,672,781
Marble.....	33,643	93,386	.....	2,614	2,890	.....	132,533
Sandstone.....	226,315	510	23,715	198,109	38,491	.....	487,140
Total.....	1,632,763	201,348	217,578	1,236,157	1,951,337	229,873	5,469,056

Value of Stone Sold for Various Purposes in 1913.

Kind.	Building.	Orna- mental and monu- mental.	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	288,144	262,955	563,907	2,250,533	452,294	5,504,639

Production of Stone by Provinces and for Purposes Used, 1914.

Province.	Building.	Orna- mental and monu- mental.	Paving and curb- stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	78,504	20,964	2,649	22,083	2,651	94,239	221,090
New Brunswick.....	52,287	13,983	10,702	184,200	.....	.....	261,172
Quebec.....	916,978	154,012	97,895	112,655	994,637	9,901	2,286,078
Ontario.....	153,871	12,089	100,332	180,272	859,085	74,298	1,253,849
Manitoba.....	230,160	.....	.....	.....	16,654	.....	361,912
Alberta.....	59,572	.....	.....	700	.....	.....	60,272
British Columbia.....	151,391	300	6,000	736,247	79,310	51,435	1,024,683
Total.....	1,632,763	201,348	217,578	1,236,157	1,951,337	229,873	5,469,056
Per cent.....	29.8	3.7	4.0	22.6	35.7	4.2	100.0

Production of Stone by Provinces and for Purposes Used, 1913.

Province.	Building.	Orna- mental and monu- mental.	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	288,144	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

Exports and Imports.—The exports of stone from Canada in 1914 were valued at \$72,080 as against \$93,840 in 1913 and \$33,242 in 1912. The principal item in the export of stone during the past three years has been building stone unwrought, of which the exports in 1914 were 63,009 tons, valued at \$46,198. The exports of dressed stone in 1914 including both ornamental and building stone, were valued at \$2,122.

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 1912, 1913, 1914.

	1912.		1913.		1914.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Stone—						
Crushed.....			4,814	3,126	25,130	18,153
Ornamental, granite, marble, etc., unwrought.....	2,339	1,826	1,942	687	231	5,607
Building, freestone, limestone, etc., unwrought.....	108,516	28,795	191,981	82,646	63,009	46,198
Ornamental, granite, marble, etc., dressed.....		2,458		7,381		1,752
Building, freestone, limestone, etc., dressed.....		163		0		370
		33,242		93,840		72,080

Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought	Calendar Year.	Wrought.	Unwrought.
	\$	\$		\$	\$
1890.....	21,725	43,611	1903.....	7,684	46,295
1891.....	13,398	46,162	1904.....	4,760	17,802
1892.....	7,698	47,424	1905.....	3,545	13,089
1893.....	9,102	12,532	1906.....	23,097	4,675
1894.....	22,576	34,130	1907.....	4,233	3,087
1895.....	8,587	51,616	1908.....	15,194	36,820
1896.....	4,934	32,897	1909.....	33,598	24,087
1897.....	9,415	42,034	1910.....	5,352	22,219
1898.....	2,526	65,370	1911.....	1,436	26,899
1899.....	5,092	101,931	1912.....	2,621	30,621
1900.....	5,933	115,711	1913.....	7,381	86,459
1901.....	5,917	157,739	1914.....	2,122	69,958
1902.....	8,632	124,829			

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 1914, was \$1,252,869; as compared with a value of \$1,640,849 in 1913, showing a decrease of \$387,980, or about 23 per cent.

The imports during 1914 comprised: building stone, (rough) valued at \$72,147, building stone (dressed) \$252,563; granite and manufactures of granite \$235,587; paving blocks \$4,428; marble and manufactures of, \$465,563; and refuse stone 416,816 tons, valued at \$222,581.

The total value of the imports from the United States in 1914 was \$909,618; Great Britain, \$202,055; Italy, \$37,610; and from other countries, \$103,586.

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 manufacture 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. 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.

Total Imports of Stone During the Calendar Years 1913 and 1914.

Imports.	1913.		1914.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough ¹		105,576		72,147
Building stone, dressed ²		464,540		252,563
Refuse stone ³	356,073	191,307	416,816	222,581
Granite, sawn only.....		14,979		5,346
Granite, manufactures of.....		174,155		196,622
Paving blocks.....		52,321		4,428
Manufactures of stone, n.o.p.....		60,943		33,619
Marble and manufactures of:—				
Marble, sawn or sand rubbed, not polished.....		258,225		204,863
Marble, rough, not hammered or chiselled.....		128,475		115,339
Marble, manufactures of, n.o.p.....		190,328		145,361
		1,640,849		1,252,869

¹ Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

² Flagstone and all other building stone, sawn or dressed, or partially dressed.

³ Stone refuse not sawn, hammered, or chiselled, not fit for flagstone, building stone, or paving.

Imports of Stone, Showing Country of Origin, Calendar Year 1914.

Imports.	Great Britain.		United States.		Italy.	Other countries
	Tons.	Value.	Tons.	Value.	Value.	Value.
		\$		\$	\$	\$
Building stone, rough ¹		718		71,429		
Building stone, dressed ²		1,189		251,374		
Refuse stone.....			300,072	146,860		75,725
Granite, sawn only.....		851		4,495		
Granite, manufactures of.....		178,946		14,580		3,096
Paving blocks.....				4,428		
Manufactures of stone, n.o.p.....		6,645		23,700		3,274
Marble and manufactures of:—						
Marble, sawn or sand rubbed, not polished.....		1,142		174,977	28,095	649
Marble, rough, not hammered or chiselled.....				100,783	9,515	5,041
Marble, manufactures of n.o.p.....		12,564		116,992		15,805
Total.....		202,055		909,618	37,610	103,586
		16.1%		72.6%	3.0%	8.3%

¹ Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

² Flagstone; all other building stone, sawn, or dressed.

Annual Imports of Stone.

Fiscal Year.	BUILDING STONE.		Manufactures of granite, etc., Paving blocks.	Marble.	Flagstone.	Total value.
	Rough.	Dressed.				
	\$	\$	\$	\$	\$	\$
1880.....	32,824	3,146	29,408	63,015	.....	128,393
1881.....	7,823	50,326	36,877	85,977	241	181,244
1882.....	32,848	775	37,267	109,505	848	181,243
1883.....	33,429	1,632	45,636	128,520	99	209,316
1884.....	46,232	4,856	45,290	108,771	1,158	206,307
1885.....	28,433	2,058	39,867	102,835	1,756	174,949
1886.....	36,776	4,899	41,984	117,752	9,443	210,854
1887.....	47,819	6,549	41,829	104,250	10,966	211,413
1888.....	84,263	2,110	47,487	94,681	21,077	249,618
1889.....	89,723	10,591	61,341	118,421	15,451	295,527
1890.....	126,456	5,699	84,396	99,353	48,995	364,899
1891.....	151,119	19,771	61,051	107,661	36,348	372,950
1892.....	85,169	10,381	39,479	106,268	15,048	256,345
1893.....	47,609	8,901	49,323	96,177	8,500	210,510
1894.....	48,097	4,811	49,510	94,657	2,429	199,508
1895.....	37,732	6,350	51,050	83,422	84	178,838
1896.....	42,737	11,393	51,499	97,065	Nil	195,694
1897.....	27,442	11,272	34,026	77,150	227	150,117
1898.....	25,322	3,173	41,240	95,894	1,540	167,129
1899.....	43,494	4,546	60,148	104,879	Nil	210,067
1900.....	63,376	1,157	57,039	94,017	63	215,652
1901.....	45,039	1,039	66,639	96,159	116	208,992
1902.....	69,972	29,102	72,397	130,424	1,231	303,126
1903.....	71,202	16,604	78,629	153,481	**	319,976
1904.....	59,864	33,914	141,165	181,511	.....	416,454
1905.....	49,004	53,813	150,160	145,466	.....	398,443
1906.....	66,994	65,134	178,435	189,589	.....	500,152
1907*.....	58,398	78,967	136,779	176,450	.....	450,594
1908.....	80,950	90,740	192,248	287,587	Refuse stone.	651,525
1909.....	63,984	72,961	193,949	200,928	.....	531,822
1910.....	125,531	186,064	266,313	267,215	.....	845,123
1911.....	85,084	307,784	272,512	384,252	91,214	1,140,846
1912.....	117,037	451,635	309,386	475,926	113,159	1,467,143
1913.....	105,576	464,540	302,398	577,028	191,307	1,640,849
1914.....	72,147	252,563	240,015	465,563	222,581	1,252,809
Calendar Year.						

* 9 months ending March 1907.

** Included in building stone since 1903.

GRANITE.

The production of granite including trap-rock, syenite, etc., in 1914, according to returns received from 69 active firms reporting, was valued at \$2,176,602, as compared with a production in 1913, by 65 firms, valued at \$1,653,791, showing an increased production in 1914 of \$522,811 or 31.6 per cent.

The largest production is reported from British Columbia in 1914, the value being \$918,131 as against \$469,666 in 1913. The value of the production in Québec was \$842,845 as against \$790,896 in 1913. Ontario produced granite to the value of \$309,720 in 1914, as compared with \$324,062 in 1913. There was comparatively little change in production in New Brunswick, but an increase of over 100 per cent in the Nova Scotia production. 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 1914 was \$90,840, as against a value of \$85,803 produced in 1913.

Value of Granite Production by Provinces, 1914.

Province.	Building.	Monu- mental or orna- mental.	Curb, or paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	26,324	20,614	2,649	13,940	2,200	65,727
New Brunswick.....		*13,823	10,702			24,525
Quebec.....	370,403	57,626	45,052	12,809	356,955	842,845
Ontario.....	3,260	1,585	74,040	30,740	200,095	309,720
Manitoba.....					15,654	15,654
British Columbia.....	96,274	300	6,000	736,247	79,310	918,131
Total.....	496,261	93,948	138,443	793,736	654,214	2,176,602

* "Finished" stone in 1914 was valued at \$90,840.

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.

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.....		739,516
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
			1914.....		2,176,602

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 1914 was \$2,672,781, as compared with the value of \$3,204,091 in 1913, or a decrease of about 17 per cent.

There was an increase in the production of building and paving stone, and a falling off in the production of furnace flux, crushed stone and rubble.

The production during 1914 of limestone for building purposes, was valued at \$890,048, as against \$799,471 in 1913. The value of crushed stone in 1914 was \$1,255,742, as against \$1,680,834 in the previous year. Curbstone and paving stone were produced to the value of \$55,420 in 1914, as against \$14,073 in 1913. The value of rubble in 1914 was \$241,698, as against \$257,419 in 1913. The production of furnace flux was 427,966 tons, valued at \$229,873, as compared with 862,774 tons valued at \$452,294 in 1913.

Value of Limestone Production by Provinces, 1914.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
					Tons.	\$	
	\$	\$	\$	\$		\$	\$
Nova Scotia.....					176,817	94,239	94,239
Quebec.....	549,575	617,392	52,843	97,232	13,467	9,901	1,326,943
Ontario.....	120,313	563,363	2,577	93,355	116,468	74,298	853,906
Manitoba.....	220,160	74,987		51,111			346,258
British Columbia.....					121,214	51,435	51,435
Total.....	890,048	1,255,742	55,420	241,698	427,966	229,873	2,672,781

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

Production of Limestone by Provinces 1909-1912.

Province.	1909.	1910.	1911.	1912.
	\$	\$	\$	\$
Nova Scotia.....	161,922	192,919	245,216	275,944
New Brunswick.....	30	315	110	.....
Quebec.....	972,253	962,429	1,296,577	1,187,751
Ontario.....	639,674	722,763	680,461	862,052
Manitoba.....	328,554	328,029	315,782	381,572
British Columbia.....	37,258	43,121	56,780	55,617
Total.....	2,139,681	2,249,576	2,594,926	2,762,936

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 seven years. The total value of the production in 1914 was returned as \$132,533, as compared with \$249,975 in 1913, and \$260,764 in 1912.

Marble quarries were operated during 1914 at Philipsburg and South Stukely, Que., Dungannon and Faraday townships in Ontario, and at Marble Head, B. C. A new quarry was also being opened up in Texada Island, British Columbia.

Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	501	9,900	1896.....	224	2,405
1887.....	242	6,224	1897 to 1907 inclusive.	NIL	NIL
1888.....	191	3,100	1908.....	.....	125,000
1889.....	83	980	1909.....	.....	158,441
1890.....	780	10,776	1910.....	.....	158,779
1891.....	240	1,752	1911.....	.....	162,783
1892.....	340	3,600	1912.....	.....	260,764
1893.....	590	5,100	1913.....	.....	249,975
1894.....	NIL	NIL	1914.....	.....	132,533
1895.....	200	2,000			

The imports of marble during the calendar year 1914 were valued at \$465,563 as compared with \$577,028 in 1913, and \$475,976 in 1912.

The annual imports of marble since 1880 are shown in the general table of imports, page 55.

SANDSTONE.

The value of the production of sandstone in 1913 is reported as \$487,140, as compared with a value of \$396,782 reported for 1912. The greater part of the sandstone is quarried for building purposes, though large quantities were used for rubble and paving purposes during 1914.

Of the production in 1914, building and ornamental stone was sold to the value of \$226,825, or 47 per cent of the total value of production. There was included in this amount, rough stone valued at \$108,606 and dressed stone valued at \$118,219.

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, there being included in this amount, rough stone valued at \$142,895 and dressed stone valued at \$181,125.

Value of Sandstone Production by Provinces, 1914.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	52,530	451		8,143	61,124
New Brunswick.....	52,447			184,200	236,647
Quebec.....		17,400			17,400
Ontario.....	10,502	20,640	23,715	5,066	59,923
Alberta.....	59,572			700	60,272
British Columbia.....	51,774				51,774
Total.....	226,315	38,491	23,715	198,109	487,140

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 1909-1912.

Province.	1909.	1910.	1911.	1912.
	\$	\$	\$	\$
Nova Scotia.....	21,850	16,425	23,440	20,645
New Brunswick.....	30,609	51,793	35,337	68,260
Quebec.....			450	
Ontario.....	62,824	62,247	54,032	59,240
Alberta.....	90,383	240,858	158,344	81,391
British Columbia.....	168,513	130,825	179,580	99,816
Total.....	374,179	502,148	451,183	329,352