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THE  
PRODUCTION OF CEMENT, LIME, CLAY PRODUCTS,  
STONE, AND OTHER STRUCTURAL  
MATERIALS

IN  
CANADA

During the Calendar Year

1917

*Advance Chapter of the Annual Report on the  
Mineral Production of Canada, 1917.*



OTTAWA

J. DE LABROQUIERIE TACHÉ  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
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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, sand and gravel, slate, and stone for building and other purposes; including granite, marble, limestone, sandstone, 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 1917 was \$19,837,-311, as compared with \$17,467,186 in 1916, and \$17,920,759 in 1915, the increase in 1917 being \$2,370,125, or 13.6 per cent, as compared with the previous year.

The total value of imports of the same class of products in 1917 was \$7,901,398, as against \$5,562,220 in 1916, and \$3,912,946 in 1915.

The total exports were valued at \$647,369 in 1917, as against \$681,239 in 1916, and \$519,676 in 1915.

The apparent total consumption of these structural products based upon the record of production, imports and exports, was in 1917 valued at \$27,091,340, as compared with \$22,348,167 in 1916, and \$21,314,029 in 1915, the increase in value of consumption in 1917 being \$4,743,187.

A summary of the production, imports, exports and consumption of structural materials and clay products in 1917 and 1916, and the annual production from 1910 to 1915, are shown in tables herewith:--

Structural Materials, Calendar Year, 1917.

	Production.	Imports.	Exports.	Consumption.
	\$	\$	\$	\$
Cement, portland.....	7,724,246	28,356	16,857	7,735,745
Clay products.....	4,779,038	6,610,837	138,143	1,251,732
Lime.....	1,558,487	78,251	74,523	1,562,215
Sand-lime brick.....	201,355			201,355
Sand and gravel.....	2,326,249	312,403	290,964	2,347,688
Slate.....	7,789	106,893		114,682
Stone.....	8,240,147	764,658	126,882	3,877,923
	19,837,311	7,901,398	647,369	27,091,340

## Structural Materials, Calendar Year, 1916.

	Production.	Imports.	Exports.	Consumption.
	\$	\$	\$	\$
Cement, portland.....	6,547,728	43,747	2,424	6,589,051
Clay products.....	4,120,805	4,554,167	80,112	8,594,860
Lime.....	1,091,463	96,332	66,406	1,121,389
Sand-lime brick.....	126,235			126,235
Sand and gravel.....	1,838,320	183,894	388,309	1,633,905
Slate.....	6,223	96,776		102,999
Stone.....	3,736,412	587,304	143,988	4,179,728
	17,467,186	5,562,220	681,239	22,348,167

## Production of Structural Materials, 1910-1915.

	1910.	1911.	1912.	1913.	1914.	1915.
	\$	\$	\$	\$	\$	\$
Cement.....	6,412,215	7,644,537	9,016,556	11,019,418	9,187,924	6,977,024
Clay products.....	7,629,956	8,359,933	10,575,869	9,504,314	6,871,957	3,914,488
Lime.....	1,137,079	1,517,599	1,844,849	1,609,398	1,360,628	1,015,702
Sand-lime brick.....	371,857	442,427	1,020,386	906,665	609,515	141,742
Sand and gravel.....	(a) 407,974	(a) 408,110	1,512,099	2,258,374	2,505,310	1,624,767
Slate.....	18,492	8,248	8,939	6,444	4,837	2,039
Stone.....	3,650,019	4,328,757	4,726,171	5,504,639	5,469,066	4,244,997
Total.....	19,627,592	22,709,611	28,794,869	30,809,752	26,009,227	17,920,759

(a) Exports only.

## CEMENT.

The total quantity of cement made in 1917 according to returns received from manufacturers was 4,987,255 barrels of 350 pounds net each (872,769 tons), as compared with 4,753,033 barrels (831,781 tons) made in 1916, an increase of 134,222 barrels (23,489 tons) or nearly 3 per cent.

The total quantity of Canadian portland cement sold in 1917, was 4,768,488 barrels (834,485 tons) as compared with 5,369,560 barrels (939,671 tons) sold in 1916, a decrease of 601,072 barrels (105,188 tons), or 11.2 per cent.

The total consumption of cement in 1917 including Canadian and imported cement was 4,777,068 barrels of 350 pounds each (835,987 tons) as compared with 5,390,156 barrels (943,252 tons) in 1916, a decrease of 613,088 barrels (107,290 tons), or 11.4 per cent.

The production of cement in Canada since 1909 though all classed as portland, has included an output of puzzolan cement, made from blast furnace slag at Sydney, N.S., and a small production of "natural portland," made at Babcock, Manitoba. The slag cement plant at Sydney has, however, been idle during the past three years.

The average number of men employed in Canadian cement plants during 1917 was 1,396, and total wages paid \$1,424,215. In 1916 the average number of men employed was 1,695 and wages paid \$1,307,224.

The production of cement in 1917 was derived from nine plants; seventeen other plants were idle throughout the year. The total capacity of the twenty-six completed plants is reported as 50,230 barrels the details of which are shown by provinces in the following table. As compared with 1916 the total number of plants shows a decrease of three, two plants having been reported as dismantled and a third abandoned.

Daily Capacity of Completed Plants, 1916, and 1917.

	1916.						1917.					
	Active.		Idle.		Total.		Active.		Idle.		Total.	
	No.	Cap- acity.	No.	Cap- acity.	No.	Cap- acity.	No.	Cap- acity.	No.	Cap- acity.	No.	Cap- acity.
Nova Scotia.....			1	140	1	140			1	140	1	140
Quebec.....	2	14,800	1	1,800	3	16,600	1	12,000	2	4,600	3	16,600
Ontario.....	7	10,950	9	8,900	16	19,850	5	9,700	9	8,150	14	17,850
Manitoba.....	2	3,725			2	3,725	2	3,640			2	3,640
Alberta.....	2	4,000	2	3,500	4	7,500			4	7,000	4	7,000
British Columbia.....	2	5,000	1	600	3	5,600	1	3,000	1	2,000	2	5,000
	15	38,475	14	14,940	29	53,415	9	28,340	17	21,890	26	50,230

The completed plants are distributed as follows: One in Nova Scotia using blast furnace slag; three in Quebec using limestone and clay; fourteen in Ontario of which eight use marl and six limestone; two rock plants in Manitoba, one of which makes a natural portland; four in Alberta, all limestone plants; and two limestone plants in British Columbia.

Statistics of the annual sales of natural rock and portland cement since 1887 are shown in the following table:

## Annual Production\* of Cement.

Calendar Year.	Natural Rock Cement.			Portland Cement.			Total.	
	Barrels.	Value.	Average value.	Barrels.	Value.	Average value.	Barrels.	Value.
		\$	\$ cts.		\$	\$ cts.		\$
1887.							69,848	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	20,221	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	78,885	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	397,590
1899.	147,387	119,308	0 81	255,366	513,983	2 01	396,753	633,291
1900.	125,428	99,994	0 80	292,124	562,916	1 93	417,552	662,910
1901.	133,328	94,415	0 71	317,066	565,615	1 78	450,394	660,030
1902.	127,931	98,932	0 77	594,594	1,028,618	1 73	722,525	1,127,550
1903.	92,252	74,665	0 81	627,741	1,150,592	1 83	719,993	1,225,247
1904.	56,814	50,247	0 88	910,358	1,287,992	1 41	967,172	1,338,239
1905.	14,184	10,274	0 72	1,346,548	1,913,740	1 42	1,360,732	1,924,014
1906.	8,610	6,052	0 70	2,119,764	3,164,807	1 49	2,128,374	3,170,859
1907.	5,775	4,043	0 70	2,436,903	3,777,328	1 55	2,441,868	3,781,371
1908.	1,044	815	0 78	2,665,289	3,709,139	1 39	2,666,333	3,709,954
1909.	0	0		4,067,709	5,345,802	1 31	4,067,709	5,345,802
1910.	0	0		4,753,975	6,412,215	1 35	4,753,975	6,412,215
1911.	0	0		5,692,915	7,644,537	1 34	5,692,915	7,644,537
1912.	0	0		7,132,732	9,106,556	1 28	7,132,732	9,106,556
1913.	0	0		8,658,805	11,019,418	1 27	8,658,805	11,019,418
1914.	0	0		7,172,480	9,187,924	1 28	7,172,480	9,187,924
1915.	0	0		5,681,032	6,977,024	1 23	5,681,032	6,977,024
1916.				5,369,560	6,547,728	1 22	5,369,560	6,547,728
1917.				4,768,488	7,724,246	1 62	4,768,488	7,724,246

\*Quantities sold or used.

A comparison of the principal statistics of 1917 and 1916 showing the increase, or decrease as the case may be, is given below.

In 1916 the sales exceeded the output, whereas in 1917 the quantity made was greater than that sold, resulting in an increased stock of cement on hand at the end of 1917.

## Comparison of Production, Sales and Imports of Portland Cement in 1916, and 1917.

		1916.	1917.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.	Bls.	5,369,560	4,768,488			601,072	11.2
Cement manufactured.	"	4,753,033	4,987,255	134,222	2.8		
Stock on hand Jan. 1.	"	2,072,266	1,441,609			630,657	30.4
Stock on hand Dec. 31	"	1,444,875	1,660,405	215,530	14.9		
Value of cement sold or used	\$	6,547,728	7,724,246	1,176,518	17.9		
Average price per barrel.	"	1.22	1.62	40	32.8		
Wages paid.	"	1,307,224	1,424,215	116,991	8.9		
Men employed.	No.	1,695	1,396			299	17.6
Imports of portland cement.	Bls.	20,596	8,580			12,016	58.3
Value of cement	\$	31,621	19,646			11,975	37.9
Average price per barrel.	"	1.54	2.20	0.75	48.7		
Total consumption of cement in Canada.	Bls.	5,390,156	4,777,068			613,088	11.4

Of the total cement made in 1917, 96,755 barrels were made from marl and 4,890,500 barrels from limestone. In 1911, 28 per cent of the total quantity of cement made was produced from marl, but the production from this source has fallen off so rapidly that in 1917 less than 2 per cent of the total was obtained from this source.

The proportion of cement made from marl and limestone since 1911 is shown in the following table:—

### Cement made from Marl and from Limestone.

Year.	Cement from Marl.		Cement from Limestone.	
	Quantity.	Per cent	Quantity.	Per cent
1911.....	1,626,857	28.0	*4,050,682	72.0
1912.....	1,420,155	20.0	*5,720,849	80.0
1913.....	1,491,131	16.8	*7,395,202	83.2
1914.....	641,869	7.3	*8,085,400	92.7
1915.....	429,268	8.3	4,724,495	91.7
1916.....	164,436	3.4	4,588,597	96.6
1917.....	96,755	1.9	4,890,500	98.1

\*Includes slag cement.

Statistics of the annual production of portland cement since 1897, showing the quantity made, quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

### Annual Production of Portland Cement.

(BARRELS.)

Year.	Number of operating plants.	Quantity made.	Quantity sold.	On hand Dec. 31.	Value of sales.	Average per barrel.	Daily capacity operating plants.
					\$	\$	
1897.....			119,763		209,380	1.75	
1898.....			163,084		324,168	1.99	
1899.....			225,366		513,983	2.01	
1900.....			292,124		562,916	1.91	
1901.....	4	360,160	317,066	58,094	565,615	1.78	
1902.....	8	562,335	594,594	33,446	1,028,618	1.73	3,900
1903.....	9	714,136	627,741	128,886	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	3,777,323	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	832,035	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	8,386,333	8,658,805	1,089,595	11,019,418	1.27	50,540
1914.....	24	8,727,269	7,172,480	2,628,117	9,187,924	1.28	48,815
1915.....	17	5,153,763	5,681,032	2,062,961	6,977,024	1.23	41,850
1916.....	15	4,753,033	5,369,560	1,444,875	6,547,728	1.22	38,475
1917.....	9	4,987,255	4,768,488	1,441,609	7,724,246	1.62	28,340

*Imports and Exports.*—The quantity of cement exported is not recorded, but the total value of exports in 1917 is reported as \$16,857, as against a value of exports in 1916 of \$2,424, and \$5,161 in 1915.

The imports of cement previous to 1901 were larger than the Canadian production, but gave way steadily to the increasing domestic output until 1909, during which year the imports amounted to 142,194 barrels, or about 3 per cent of the Canadian consumption. From 1910 to 1912, inclusive, there was a steady increase in the importation of cement, the imports in 1912 being 1,434,413 barrels. During four and one-half months of 1912 the duty was, on account of the scarcity in western Canada, reduced by one-half, and on May 31, 1913, a permanent reduction was made in the general tariff from 12½ cents to 10 cents per hundred pounds. The imports, however, have fallen to 254,093 barrels in 1913, 98,022 barrels in 1914, 28,190 barrels in 1915, 20,596 barrels in 1916, and 8,570 barrels in 1917.

The United States has been the principal source of imports during the past few years, supplying all imports in 1916 and over 96 per cent of the 1915 imports. During the latter year about 4 per cent was derived from Great Britain. In 1914 about 71 per cent, and in 1913, 68 per cent of the imports were from the United States. The source of imports during 1917 has not been separately published.

Statistics of the exports of cement since 1906 and of the imports since 1907 are given in the next two tables:—

### Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$		\$
1906.....	7,551	1909.....	113,362	1912.....	2,436	1915.....	5,161
1907.....	9,618	1910.....	12,914	1913.....	1,736	1916.....	2,424
1908.....	34,591	1911.....	4,067	1914.....	2,223	1917.....	16,857

### Imports of Cement.

Calendar Year.	Cement and Mfrs. of N.E.S.*	Hydraulic Cement.†			Portland Cement.		
		Quantity.	Value.	Average Value.	Quantity.	Value.	Average Value.
		Cwt.	\$	\$	Cwt.	\$	\$
1907.....	13,748	16,788	6,339	0.38	2,354,204	837,520	0.36
1908.....	5,843	2,752	921	0.33	1,641,672	531,045	0.32
1909.....	6,374	682	614	0.90	497,678	166,669	0.33
1910.....	7,718	365	349	0.96	1,222,586	468,046	0.38
1911.....	7,430	26,655	6,107	0.23	2,316,707	834,879	0.36
1912.....	9,698	†	.....	.....	5,020,446	1,969,529	0.39
1913.....	17,729	†	.....	.....	889,324	409,303	0.46
1914.....	12,533	†	.....	.....	343,076	147,158	0.43
1915.....	7,410	†	.....	.....	98,664	40,426	0.41
1916.....	12,126	†	.....	.....	72,087	31,621	0.44
1917.....	8,710	.....	.....	.....	30,031	19,616	0.65

\* 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 having been hitherto apparently small and practically negligible, although considerably greater in 1917 than in the immediately preceding years. The total consumption of cement in Canada in 1917 was 4,777,068 barrels (335,987 tons), made up of 4,768,438 barrels (334,485 tons) of Canadian cement and 8,580 barrels (1,502 tons) of imported cement, the Canadian cement representing 99.8 per cent and the imported cement 0.2 per cent of the total.

In 1916 the total consumption of cement was 5,390,156 barrels (943,277 tons), made up of 5,369,560 barrels (939,673 tons), of Canadian cement, and 20,596 barrels



(3,604 tons) of imported cement, the Canadian cement representing 99.6 per cent and the imported cement 0.4 per cent of the total.

### Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	Per cent.	Barrels.	Per cent.	Barrels.
1901.....	317,066	36	555,900	64	872,966
1902.....	594,594	52	544,954	48	1,139,548
1903.....	627,741	45	773,478	55	1,401,419
1904.....	910,358	54	784,630	46	1,694,988
1905.....	1,346,548	59	918,701	41	2,265,249
1906.....	2,119,764	76	665,845	24	2,785,609
1907.....	2,436,093	78	672,630	22	3,108,723
1908.....	2,665,289	85	469,049	15	3,134,338
1909.....	4,067,709	97	142,194	3	4,209,903
1910.....	4,753,975	93	349,310	7	5,103,285
1911.....	5,692,915	90	661,916	10	6,354,831
1912.....	7,132,732	83.3	1,434,413	16.7	8,567,145
1913.....	8,658,805	97.1	254,093	2.9	8,912,898
1914.....	7,172,480	98.7	98,022	1.3	7,270,502
1915.....	5,681,032	99.5	28,190	0.5	5,709,222
1916.....	5,369,560	99.7	20,596	0.4	5,390,156
1917.....	4,768,488	99.8	8,580	0.2	4,777,068

*Nova Scotia.*—There is but one cement plant in Nova Scotia, located at Sydney and operated by the Sydney Cement Company, Limited. Puzzolan cement is made from blast furnace slag and lime. This plant has not been operated for three years.

*Quebec.*—This Province has three completed cement mills, all operated by the Canada Cement Company, Limited; two situated near Montreal, one at Longue Pointe which has been idle throughout the year, in so far as cement making is concerned, though the plant has been used for the calcining of magnesite, the other at Montreal East, and the third plant at Hull. The Hull plant has also been used during 1917 calcining magnesite. The Montreal mills have now a combined daily capacity of 13,800 barrels and the Hull mill 2,800 barrels. The total quantity of cement sold or used by producers during 1917 in this Province was 2,079,625 barrels, valued at \$3,274,989, as compared with 2,150,475 barrels, valued at \$2,525,863 in 1916. Two additional cement plants are being completed in this Province, one at Neuville, the other at Point aux Trembles.

*Ontario.*—Ontario continues as the most important cement producing province in Canada, having now fourteen completed plants, with a total daily capacity of 17,850 barrels at the end of 1917.

The total sales of cement in Ontario during 1917 were 1,676,904 barrels, valued at \$2,267,610 as compared with 2,230,386 barrels, valued at \$2,312,677 in 1916.

The detailed statistics of production during 1916 and 1917 are shown in the next table.

### Cement Production in Ontario, 1916, and 1917.

	1916.	1917.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used. .... Bls.	2,230,386	1,676,904			553,482	24.8
Cement manufactured. .... "	1,858,693	1,865,735	7,092	0.4		
Stock on hand Jan. 1. .... "	753,301	378,365			374,936	49.8
Stock on hand Dec. 31. .... "	381,608	567,260	185,652	48.7		
Value of cement sold. .... \$	2,312,677	2,267,610			45,067	1.96
Wages paid. .... "	490,126	562,206	72,080	14.7		
Men employed. .... No.	722	599			123	17.0
Total daily capacity of operating plants. .... Bls.	10,950	9,700			1,250	11.4

## CLAYS AND CLAY PRODUCTS.<sup>1</sup>

For a number of years a small quantity of fireclay has been produced and sold as such, and during the past few years there has been a small, but increasing production of kaolin, or china-clay from a deposit in the Province of Quebec. With these exceptions, practically all of the clay production in Canada consists almost altogether of the manufactured product.

The clay products made in Canada comprise brick of various kinds, including common and pressed, ornamental and fancy building brick, paving brick, firebrick, porous fireproofing brick and blocks, sewerpipe and drain tile, pottery and sanitary ware, the last two products chiefly from imported clays.

The total value of the clay products sold or marketed in 1917 was \$4,779,038, as compared with a value of \$4,120,805 in 1916; \$3,914,488 in 1915; \$6,871,957 in 1914; \$9,504,314 in 1913, and \$10,575,869 in 1912:

The value of the production in 1917 was greater than that of 1916 by \$658,233, or an increase of about 16 per cent. The production in 1917, however, was only 45 per cent of the maximum production, which was reached in 1912.

For a few years previous to 1913 the annual production of clay products increased very rapidly, having more than doubled in that period. In 1913, however, the financial stringency affected building operations to such an extent as to greatly reduce the demand for building brick. There was actually a considerable increase in the quantity of common and pressed building brick manufactured during the year, but a large falling off in sales, so that large stocks of brick must have remained in manufacturers' hands at the close of the year. In 1914 there was a large falling off both in quantities of brick made and in quantities sold, and the stocks of common and pressed brick on hand at the end of the year were reported at 242,106,000 or about 44 per cent of the number sold during the year. In 1915, there was again a large decrease both in quantity of brick made and in the quantities sold. Sales, however, exceeded actual output, stocks having been depleted to a considerable extent to supply demand. Stocks of common and pressed brick on hand at the end of the year were reported as 147,817,000, or about 61 per cent of the stocks reported at the end of 1914. All classes of clay products showed a falling off in production, with the exception of firebrick, pottery and kaolin.

During 1916 and 1917, however, the total quantity of brick sold was about the same as that manufactured, and at the end of 1917 stocks had fallen to about 75,000,000.

The average number of men employed in 1917 was 3,915, as compared with 4,164 in the previous year, and the total wages paid were \$2,174,167, as against \$1,740,900 in 1916.

Of the total value of the sales in 1917, building brick and fireproofing contributed \$3,101,585, or about 64.8 per cent. Sewerpipe and tile production in 1917 were valued at \$1,218,470, or 25.5 per cent of the total. The total value of the production of pottery was \$604,405 of which \$122,878 only is estimated as attributable to Canadian clays, the balance being credited to imported clays.

The value of the production of fireclays and firebrick from domestic clay, was \$326,511, and the production of kaolin was 533 tons valued at \$9,594.

Detailed statistics of production of the several classes of clay products by provinces in 1916 and 1917, are shown in the following tables:—

<sup>1</sup> Special investigations of the clay and shale resources of Canada have been undertaken by the Department of Mines for a number of years, and several reports giving the results of these investigations have been published.

Information is now available regarding these materials on almost every portion of the settled part of the Dominion and may be obtained on application to the Director of the Mines Branch at Ottawa.

The Laboratory established in the Mines Branch building for the testing of clays is very completely equipped and material will be received and tested there free of charge under certain conditions stated in the description of the Laboratories of the Mines Branch—Bulletin No. 13, p.p. 45-46.

Production of Clay Products by Provinces, 1917.

Province.	Per cent of total value.	No. of active firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			
					No. manufactured.	No. sold.	Value of sales.	Per M.	No. manufactured.	No. sold.	Value of sales.	Per M.
							\$	\$			\$	\$
Nova Scotia .....	6.94	10	240	139,981	13,204,090	12,709,090	105,488	8.30	50,000	75,000	1,200	16.00
New Brunswick .....	1.07	6	71	32,161	2,550,000	2,550,000	28,450	11.15				
Quebec .....	20.57	31	752	40,900	74,285,687	67,114,597	593,733	8.85	6,639,020	6,688,772	108,995	16.29
Ontario .....	53.89	186	2,069	1,171,450	94,398,641	94,979,711	961,408	10.12	37,219,743	32,116,163	439,051	13.67
Manitoba .....	2.40	10	200	43,985	7,496,100	10,359,710	114,651	11.07				
Saskatchewan .....	1.64	9	60	22,251	3,730,000	4,157,524	36,453	8.77	801,000	1,121,000	22,565	20.13
Alberta .....	6.49	10	293	207,864	16,316,750	12,739,344	104,278	8.14	6,457,900	6,083,306	76,537	12.58
British Columbia .....	7.00	14	230	155,575	4,614,731	6,020,600	55,004	9.14	304,705	324,705	4,804	14.78
Total .....	100.00	276	3,915	2,174,167	216,595,999	210,630,576	1,999,465	9.49	51,472,368	46,408,946	653,153	14.07

Province.	Paving brick.		Ornamental and terra cotta.		Refractories	Fireproofing and hollow b'd'g blocks.	Pottery.	Sewer pipe.	Tiles, drain.	Kaolin.	Total
	No. sold.	Value.	No. sold.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.
		\$		\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia .....					62,650			160,817	1,387		331,542
New Brunswick .....							22,854				51,804
Quebec .....				12,728	42,188	56,746	11,306	147,269	750	9,594	983,310
Ontario .....				41,506		275,426	44,301	392,211	421,401		2,575,304
Manitoba .....											114,651
Saskatchewan .....					19,143				90		78,251
Alberta .....						46,476	44,417	35,285	2,998		309,991
British Columbia .....					202,530	16,085		48,180	8,082		334,685
Total .....				(d) 54,234	(b) 326,511	(c) 394,733	(a) 122,878	783,762	434,708	9,594	4,779,038

(a) There was also a production of \$481,617 from imported clays. (b) There was also a production of \$61,317 from imported clays. (c) Of which \$299,645 credited to fireproofing. (d) Of which \$21,380 credited to terra cotta.

### Production of Clay Products by Provinces, 1916.

Province.	Per cent of total value.	No. of active firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			
					No. manufactured.	No. sold.	Value of sales.	Per M.	No. manufactured.	No. sold.	Value of sales.	Per M.
Nova Scotia.....	5.79	7	278	98,401	10,995,000	8,015,000	62,103	7.49	220,000	93,000	1,445	15.53
New Brunswick..	1.04	8	132	39,543	4,550,000	4,075,074	41,701	10.23	65,000	65,000	1,080	16.62
Quebec.....	24.11	25	829	380,249	94,673,232	93,668,357	658,909	7.03	5,810,840	3,742,133	64,269	17.17
Ontario.....	52.06	205	2,226	942,926	108,671,845	103,854,020	817,321	7.87	35,249,733	37,281,665	378,994	10.17
Manitoba.....	2.53	11	129	24,930	5,353,000	8,911,694	91,464	10.26	.....	110,050	1,984	18.95
Saskatchewan.....	1.91	11	108	26,065	5,331,000	6,751,145	58,790	8.71	760,000	430,000	6,586	15.32
Alberta.....	5.46	10	214	94,804	6,500,000	7,114,890	58,360	8.20	1,255,000	3,033,321	34,422	11.35
British Columbia..	7.10	13	248	133,982	5,427,100	4,644,495	38,196	8.23	.....	191,920	3,575	18.62
<b>Total.....</b>	<b>100.00</b>	<b>290</b>	<b>4,164</b>	<b>1,740,900</b>	<b>241,521,177</b>	<b>237,034,675</b>	<b>1,826,844</b>	<b>7.71</b>	<b>43,360,573</b>	<b>44,947,089</b>	<b>492,355</b>	<b>10.95</b>

Province.	Paving brick.		Ornamental.		Refractories	Fireproofing	Pottery.	Sewer pipe.	Tiles, drain.	Kaolin.	Total.
	No. sold.	Value.	No. sold.	Value.	Value.	Value.	Value.	Value.	Value.	Value.	Value.
Nova Scotia.....	.....	.....	.....	.....	43,014	10,000	.....	121,878	30	.....	238,470
New Brunswick..	.....	.....	.....	.....	.....	.....	.....	.....	100	.....	42,881
Quebec.....	.....	.....	.....	.....	4,000	24,200	55,945	2,700	157,778	8,363	993,664
Ontario.....	865,900	13,844	593,811	17,102	.....	.....	218,345	35,300	320,453	343,677	2,145,036
Manitoba.....	.....	.....	.....	.....	.....	.....	10,800	.....	.....	.....	104,248
Saskatchewan.....	.....	.....	.....	.....	7,000	.....	6,292	.....	.....	.....	78,668
Alberta.....	.....	.....	.....	.....	.....	.....	53,334	23,069	53,141	2,814	225,140
British Columbia..	723,993	16,300	.....	.....	160,348	.....	6,839	.....	63,037	4,403	292,698
<b>Total.....</b>	<b>1,589,893</b>	<b>30,144</b>	<b>.....</b>	<b>21,102</b>	<b>(b) 234,562</b>	<b>361,555</b>	<b>(a) 61,069</b>	<b>716,287</b>	<b>359,387</b>	<b>17,500</b>	<b>4,120,805</b>

(a) There was also a production of \$330,104 from imported clays. (b) There was also a production of \$22,484 from imported clays.

## Sales of Clay Products by Provinces, 1912-1917.

Province.	1912.	1913.	1914.	1915.	1916.	1917.
Nova Scotia .....	\$ 272,053	\$ 332,272	\$ 266,204	\$ 221,881	\$ 238,470	\$ 331,542
New Brunswick.....	54,910	62,269	66,502	35,780	42,381	51,304
Quebec.....	1,680,460	1,606,816	1,267,700	918,425	993,664	983,310
Ontario.....	4,864,700	5,220,467	3,979,606	2,254,863	2,145,036	2,575,304
Manitoba.....	1,018,051	514,358	317,488	93,674	104,248	114,651
Saskatchewan.....	332,943	189,820	98,349	44,406	73,668	78,251
Alberta.....	1,356,184	893,408	462,199	115,696	225,140	309,991
British Columbia.....	996,568	684,904	113,909	229,763	292,698	334,685
	10,575,869	9,504,314	6,871,957	3,914,488	4,120,305	4,779,038

## Annual Value of Production of Clay Products, 1899-1917.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1899.....	\$ 2,988,099	1905.....	\$ 4,709,842	1911.....	\$ 8,359,933
1900.....	3,193,105	1906.....	5,072,635	1912.....	10,575,869
1901.....	3,382,706	1907.....	5,772,117	1913.....	9,504,314
1902.....	3,625,489	1908.....	4,500,702	1914.....	6,871,957
1903.....	4,034,289	1909.....	6,450,840	1915.....	3,914,488
1904.....	3,841,660	1910.....	7,629,956	1916.....	4,120,305
				1917.....	4,779,038

*Manitoba.*—The Commercial Cement Company of Winnipeg is operating a natural portland cement plant at Babcock, 75 miles southwest of Winnipeg, on the Canadian Northern railway. The capacity of the plant is reported as about 225 barrels per day. The mill of the Canada Cement Company near Winnipeg, at Tuxedo, has a daily capacity of 3,500 barrels. Limestone is obtained from a property in township 28, range 10, west of the first meridian, about 130 miles north of Winnipeg, on the Oak Point branch of the Canadian Northern railway.

*Alberta.*—This Province possesses four complete cement plants with a total daily capacity of about 7,000 barrels, located respectively at Exshaw, Calgary, Blairmore, and Marlboro. These are now all limestone plants, the last named having been remodelled during 1916 and changed from marl to rock.

In addition to the completed plants, there are two other rock plants on which construction work has been suspended, viz.: One at Blairmore owned by the Keystone Portland Cement Company, and one at Dauntless, near Medicine Hat, owned by the Canada Cement Company; the latter plant is being planned for a capacity of 1,000,000 barrels per annum.

The total quantity of cement marketed by producers in 1917 was 259,423 barrels, valued at \$567,969, as against 275,727 barrels, valued at \$477,332 in 1916.

*British Columbia.*—The cement plant at Princeton constructed by the British Columbia Portland Cement Company, Limited, with a capacity of 600 barrels daily, is now reported as abandoned. The Vancouver Portland Cement Company's mill at Tod Inlet has a total daily capacity of 3,000 barrels. The mill of the Associated Cement Company (Canada) Limited, at Bamberton, at Saanich Inlet, which has a total daily capacity of about 2,000 barrels, was idle throughout the year. At both mills, limestone, clay and shale are obtained in the vicinity of the works.

*Exports and Imports.*—The total value of the exports of clay products in 1917 was \$138,143, and included 4,464 building brick, valued at \$40,039; manufactures of clay, valued at \$83,600, and earthenware, valued at \$14,504.

### 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
1915. ....	1,155	9,089	25,202	11,281	45,572
1916. ....	1,746	13,942	58,550	7,620	80,112
1917. ....	4,464	40,039	83,600	14,504	138,143

The imports of clays and clay products reached a total value during the calendar year 1917 of \$6,610,837, which exceeded the domestic production by \$1,831,804. The total imports in 1916 were valued at \$4,554,167.

Clay imports are classified by the Department of Customs under three main divisions, including: brick and tile; earthenware and chinaware; and clays. The imports of clays in 1917 were valued at \$416,209, and included chiefly china-clay and fireclay, with a small quantity of pipe clay, and other clays not classified. The value of china-clay imported was \$97,856, and the fireclay, \$283,746.

The imports classified under brick and tile which apparently include products other than clay products, such as refractory silica brick, and magnesite brick, were valued in 1917 at \$3,599,046, as compared with a value in 1916 of \$2,048,259. A large portion of these imports is made up of firebrick, about 75 per cent of the total in 1917. The imports of magnesite brick during the last nine months of the year were valued at \$470,801.

The imports of earthenware and chinaware, of which the most important is tableware, were valued in 1917 at \$2,595,582, as compared with a value of \$2,180,414 in 1916. 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.

## Imports of Clay Products, Calendar Years, 1912 to 1917.

Imports.	1912.	1913.	1914.	1915.	1916.	1917.
Brick and tile—	\$	\$	\$	\$	\$	\$
Bath brick.....	1,927	2,690	1,894	630	902	2,299
Building brick.....	763,470	575,269	353,353	114,958	118,687	61,511
Building blocks.....	(b) 160,663	(a) 356,366	276,817	181,145	69,358	151,765
Paving brick.....	160,663	176,497	145,063	76,759	70,268	37,814
Firebrick, of a class or kind not made in Canada (free).....	953,621	976,097	585,712	577,458	1,162,679	1,994,212
Magnesite brick (9 mos.).....						(a) 470,801
Firebrick, n.o.p.....	(b) 4,018	(a) 216,760	154,421	235,613	495,113	691,578
Drain tile, not glazed.....	4,018	12,156	2,941	346	2,072	2,289
Drain pipe, sewer pipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	507,024	465,997	338,533	41,801	40,233	42,864
Manufactures of clay, n.o.p.....	818,467	339,760	178,056	72,649	88,952	143,913
Total.....	3,209,190	3,121,592	1,986,790	1,301,359	2,048,259	3,599,046
Earthenware and chinaware—						
Brown or coloured earthenware and stoneware, and Rockingham ware.....	62,161	70,632	71,083	74,864	145,490	120,369
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....	291,804	264,090	163,431	135,425	176,329	216,652
Demijohns, churns, or crocks.....	18,404	32,599	25,935	14,752	16,632	43,066
Tableware of china, porcelain, white granite or iron-stoneware.....	2,068,362	2,185,601	1,437,175	1,016,900	1,566,312	2,002,884
China and porcelain ware, n.o.p.....	71,751	43,696	30,006	18,312	17,304	24,791
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	160,082	173,445	104,285	40,286	41,189	24,904
Earthenware tiles, n.o.p.....	239,391	296,791	186,161	92,700	74,293	65,178
Manufactures of earthenware, n.o.p.....	183,001	248,016	174,146	66,771	142,865	97,738
Total.....	3,094,956	3,314,870	2,192,222	1,460,010	2,180,414	2,595,582
Clays—						
China-clay, ground or unground.....	127,402	149,337	150,881	124,658	114,110	97,856
Fireclay, ground or unground.....	140,500	143,399	90,233	87,267	187,124	283,746
Pipeclay, ground or unground.....	234	385	829	614	2,440	2,427
Clays, all other, n.o.p.....	20,258	31,169	46,185	24,557	21,820	32,180
Totals.....	288,394	324,290	288,128	237,096	325,494	116,209
Grand total.....	6,592,540	6,760,752	4,467,140	2,998,465	4,554,167	6,610,837
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material.....	382,920	477,133	359,288	182,757	173,244	231,277
Chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground.....	167,990	164,879	113,211	100,012	170,498	264,720

(a) Nine months. (b) Included in manufactures of clay, n.o.p.

## Imports of Clay Products during the Twelve Months ending March 1917, showing Countries of Origin.

Imports.	Great Britain.	United States.	France.	Japan.	Other Countries.	Total.
	\$	\$	\$	\$	\$	\$
Brick and tile—						
Bath brick.....	733	18				751
Building brick.....	2,311	112,094				114,405
Building blocks.....	127	91,375				91,502
Paving brick.....	12,744	52,753				65,497
Firebrick of a class or kind not made in Canada.....	32,221	483,838				516,059
Firebrick, n.o.p.....	131,010	1,140,963				1,271,973
Drain tile, not glazed.....	300	1,885				2,185
Drain pipe, sewer pipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	9,203	35,361				44,564
Manufactures of clay, n.o.p.....	10,532	86,172	5	101		96,810
Total.....	199,131	2,004,459	5	101		2,203,746
Earthenware and chinaware—						
Brown or coloured earthenware and stoneware, and Rockingham ware.....	39,918	101,230	182	4,400	1,431	147,062
C.C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....	100,908	79,658	408	6,383	404	187,761
Demijohns, churns or crocks.....	2,547	15,589			229	18,365
Tableware of china, porcelain white granite or iron-stoneware.....	1,308,830	88,680	97,248	231,322	32,565	1,758,595
Chinaware, to be silver mounted, imported by manufacturers of silverware.....	315					315
China and porcelain ware, n.o.p.....	5,618	7,857		2,608	852	16,935
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	5,417	32,804				38,221
Earthenware tiles, n.o.p.....	40,140	34,322				74,462
Manufactures of earthenware, n.o.p.....	30,402	110,447	153	6,030	273	147,310
Total.....	1,534,296	470,537	97,991	250,743	35,759	2,389,326
Clays—						
China-clay, ground or unground.....	46,064	61,674				107,738
Fireclay, ground or unground.....	10,858	162,974		18		173,850
Pipeclay, ground or unground.....	43	2,739				2,782
Clays, all other, n.o.p.....	199	20,257		21		20,477
Total.....	57,164	247,644		39		304,847
Grand total.....	1,790,641	2,722,640	97,996	250,883	(a) 35,759	4,897,919
Per cent of total.....	36.6	55.6	2.0	5.1	0.7	100.0
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material.....	90,034	84,722		7		174,763
Chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground.....	42,037	116,934				158,971

(a) Of which \$29,901 are imports from Holland.



## Imports of Clay Products (Total Value) 1909-17.

Calendar Year.	Brick and Tile.	Earthenware and Chinaware.	Clays.	Totals.
1909.....	1,249,450	1,781,759	216,330	3,247,539
1910.....	1,755,773	2,283,116	292,508	4,331,397
1911.....	2,369,761	2,516,536	270,247	5,156,544
1912.....	3,209,190	3,094,956	288,394	6,592,540
1913.....	3,121,592	3,314,870	324,290	6,760,752
1914.....	1,986,790	2,192,222	288,128	4,467,140
1915.....	1,301,359	1,460,010	237,096	2,998,465
1916.....	2,048,259	2,180,414	325,494	4,554,167
1917.....	3,599,046	2,595,582	416,209	6,610,837

*Total Consumption of Clay Products.*—An approximate estimate of the annual value of the consumption of clay products in Canada may be deduced from the available records of production—exports and imports. The total value of the consumption for the year 1917 estimated on this basis was \$11,251,732, of which 42.5 per cent was of domestic production. The approximate value of consumption in 1916 was \$8,594,860, of which 48 per cent was of domestic production. The following table shows the annual value of consumption of clay products since 1909 as well as the percentage of the total obtained from domestic sources. It will be observed that the maximum value of consumption was reached in 1912, but that in 1915 the consumption had fallen to but little more than one-third of this maximum. In 1916 and 1917, however, the value of consumption has again showed a substantial increase, though a much larger percentage of the total is now obtained outside of Canada than formerly. This increased consumption has been made up largely of refractory brick, including fire-brick, silica brick, and magnesite brick, used as furnace linings.

## Estimated Annual Value of Consumption of Clay Products.

Calendar Year.	Total Value of Consumption.	Per cent of Total supplied by Domestic Production.	Calendar Year.	Total Value of Consumption.	Per cent of Total supplied by Domestic Production.
	\$			\$	
1909.....	9,696,324	70.0	1914.....	11,291,024	61.0
1910.....	11,958,591	63.8	1915.....	6,867,381	57.0
1911.....	13,516,477	62.0	1916.....	8,594,860	48.0
1912.....	17,149,659	62.0	1917.....	11,251,732	42.5
1913.....	16,212,733	58.6			

## CLAY BUILDING BRICK.

The total sales from Canadian plants of clay building brick including common and pressed brick, but excluding ornamental, paving brick and fireproofing brick, are shown by provinces for the past two years in the following table. The production of common and pressed brick of which these figures are the totals have already been given in the general table of production of clay products.

## Sales of Clay Building Brick (Common and Pressed) 1916, and 1917.

Province.	1916.			1917.		
	No. Sold	Value.	Per Cent of Total Value.	No. Sold.	Value.	Per Cent of Total Value.
		\$			\$	
Nova Scotia.....	8,108,000	63,548	2.74	12,784,090	106,688	4.02
New Brunswick.....	4,140,074	42,781	1.85	2,550,000	28,450	1.07
Quebec.....	97,410,490	723,178	31.18	73,803,369	702,729	26.49
Ontario.....	141,135,685	1,196,315	51.58	127,095,874	1,400,459	52.80
Manitoba.....	9,021,744	93,448	4.03	10,359,710	114,651	4.32
Saskatchewan.....	7,181,145	65,376	2.82	8,278,521	59,018	2.23
Alberta.....	10,148,211	92,782	4.00	18,822,650	180,815	6.82
British Columbia.....	4,836,415	41,711	1.80	6,345,305	59,808	2.25
Total.....	231,931,764	2,319,199	100.00	257,039,522	2,652,618	100.00

Large stocks of brick were reported as being in manufacturers' hands at the close of 1915, the total number being 147,817 brick, or equivalent to 52 per cent of that year's sales. Stocks at the end of 1917 were reduced to about 75,000,000, equivalent to about 30 per cent of the year's sales.

A record of stocks on hand, by provinces in 1916-17 is shown in the following table:—

## Common and Pressed Brick Held in Stock by Manufacturers, December 31, 1916, and 1917.

Province.	1916.			1917.		
	Common Brick. M.	Pressed Brick. M.	Total. M.	Common Brick. M.	Pressed Brick. M.	Total. M.
Nova Scotia.....	1,980	127	2,107	2,115	50	2,165
New Brunswick.....	1,614	20	1,634	570	.....	570
Quebec.....	20,535	3,884	24,419	6,573	3,507	10,080
Ontario.....	41,368	8,755	50,123	30,186	10,133	40,319
Manitoba.....	5,728	289	6,017	4,595	.....	4,595
Saskatchewan.....	3,177	325	3,502	2,526	314	2,840
Alberta.....	5,417	1,502	6,919	6,913	3,119	10,032
British Columbia.....	6,060	876	6,936	4,118	150	4,268
Total.....	85,879	15,778	101,657	57,596	17,273	74,869

*Prices.*—The price of brick varies greatly with the quality, locality, market, or demand, the values as given in the tables of production are those at yard, or kiln, and do not include costs of delivery. They do not, therefore, represent the total cost to the consumer. The average values of common and pressed brick at kilns in each province during the years 1914, 1915, and 1916 are given in the following table:—

### Average Prices per Thousand of Common and Pressed Brick.

	Common brick.				Pressed brick.			
	1914.	1915.	1916.	1917.	1914.	1915.	1916.	1917.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	7 75	7 53	7 49	8 30	15 32	15 00	15 53	16 00
New Brunswick.....	10 61	9 29	10 23	11 15	22 50	22 00	16 62	.....
Quebec.....	7 40	7 10	7 03	8 85	15 91	15 73	17 17	16 29
Ontario.....	7 86	7 34	7 87	10 12	10 77	9 16	10 17	13 67
Manitoba.....	10 79	10 10	10 26	11 07	12 59	.....	18 95	.....
Saskatchewan.....	8 98	8 72	8 71	8 77	17 31	16 82	15 32	20 13
Alberta.....	7 92	8 63	8 20	8 19	13 52	9 88	11 35	12 58
British Columbia.....	8 56	9 23	8 23	9 14	26 50	21 41	18 62	14 78
Canada.....	7 99	7 48	7 71	9 49	11 91	9 89	10 95	14 07

*Exports and Imports of Building Brick.*—The exports of building brick have never been large, averaging for a considerable number of years prior to 1909 about \$6,000. The exports fell off somewhat from 1909 to 1911, but increased again to a value of \$11,871 in 1914 and \$40,039 in 1917. The record of exports for a number of years will be found in a previous table.

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 rapidly increased from \$100,000 to over \$760,000 in 1912, since which date there has been a fairly steady decrease, and the imports during the calendar year 1917 were less than those of any year since 1903 and amounted to 4,111,000 brick, valued at \$61,511.

### Imports of Building Brick.

Calendar year.	M.	Value.	Calendar year.	M.	Value.	Calendar year.	M.	Value.
		\$			\$			\$
1907.....	12,961	129,235	1911.....	51,102	475,865	1915.....	10,168	114,958
1908.....	14,931	110,981	1912.....	81,425	763,470	1916.....	10,083	118,687
1909.....	27,972	195,360	1913.....	56,846	575,269	1917.....	4,111	61,511
1910.....	29,049	274,482	1914.....	30,022	353,353			

*Ontario.*—The production of building brick in the several provinces has already been set forth in the tabulated statements. The Province of Ontario is credited in 1917 with over 52 per cent of the brick production of Canada. The total sales as reported by 186 firms were 127,095,874 brick, valued at \$1,400,459 including 94,979,711 common brick, valued at \$961,408 or an average of \$10.12 per thousand; and 32,116,163 pressed brick, valued at \$439,051, or an average of \$13.67 per thousand.

The city of Toronto and vicinity, including the counties of York, Peel, and Halton, is the principal brick making section, and in 1917 produced over 63 per cent of the Ontario production and about 33½ per cent of the total Canadian production of brick. The county of Wentworth, comprising the city of Hamilton and vicinity, produced about 14 per cent of the Ontario production, the greater part of the pressed brick reported as such was made in the Toronto and Hamilton districts.

The production by principal counties in Ontario in 1916 and 1917 is shown in the accompanying tables:—

### Sales of Common and Pressed Brick in Ontario by Principal Counties, 1917.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M	No.	Value.	Per M		
		\$	\$		\$			
Carleton.....	3,964,000	40,130	10.12				40,130	2.87
Essex.....	1,798,586	14,750	8.20				14,750	1.05
Halton and Peel.....	9,621,000	80,024	8.32	24,682,030	328,871	13.32	408,895	29.20
Kent.....	3,678,894	38,038	10.34				38,038	2.72
Lincoln.....	1,500,000	16,500	11.00				16,500	1.18
Middlesex.....	2,817,275	28,060	9.96				28,060	2.00
Peterboro.....	2,095,000	24,092	11.50				24,092	1.72
Renfrew.....	1,293,600	15,175	11.74				15,175	1.08
Thunder Bay District..	2,770,100	27,450	9.91				27,450	1.96
Victoria.....	1,240,000	13,280	10.71				13,280	0.95
Wentworth.....	15,320,667	145,715	9.51	3,607,250	49,592	13.75	195,307	13.95
York.....	39,653,627	420,409	10.58	3,752,913	59,163	15.76	479,572	34.24
Total, 13 counties.....	85,752,749	863,623	10.07	32,042,193	437,626	13.66	1,301,249	92.92
Total, other counties..	9,226,962	97,785	10.60	74,970	1,425	19.00	99,210	7.08
Total, Ontario.....	94,979,711	961,408	10.12	32,116,163	439,051	13.67	1,400,459	100.00

### Sales of Common and Pressed Brick in Ontario by Principal Counties, 1916.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M	No.	Value.	Per M		
		\$	\$		\$	\$		
Algoma.....	1,325,000	12,650	9.55	4,000	60	15.00	12,710	1.06
Carleton.....	4,513,088	36,973	8.19				36,973	3.09
Halton and Peel.....	8,567,000	60,382	7.05	28,340,000	286,266	10.10	346,648	28.97
Kent.....	6,215,050	48,443	7.79				48,443	4.06
Lincoln.....	2,157,455	20,173	9.35				20,173	1.69
Middlesex.....	3,734,160	32,556	8.72				32,556	2.72
Nipissing.....	1,160,900	10,191	8.78				10,191	0.85
Peterboro.....	1,465,000	13,918	9.50				13,918	1.16
Renfrew.....	2,502,330	22,960	9.17				22,960	1.92
Sudbury.....	1,480,000	14,800	10.00				14,800	1.24
Thunder Bay.....	1,476,650	12,274	8.31				12,274	1.03
Waterloo.....	1,892,275	14,700	7.77				14,700	1.23
Wentworth.....	14,442,815	101,162	7.01	6,329,288	53,543	8.46	154,705	12.93
York.....	39,095,893	308,793	7.90	2,608,377	39,125	15.00	347,923	29.08
Total, 15 counties....	90,007,616	709,980	7.89	37,281,665	378,994	10.17	1,088,974	91.03
Total, other counties..	13,846,404	107,341	7.75				107,341	8.97
Total, Ontario.....	103,854,020	817,321	7.87	37,281,665	378,994	10.17	1,196,315	100.00

## CLAY PAVING BRICK.

Paving brick has been made in Canada, chiefly at West Toronto, Ontario, from shale obtained from the banks of the Humber river, and more recently during the years 1914, 1915, and 1916 there has been a small production reported from Clayburn, B.C.

There was no production of paving brick reported for the year 1917. The annual production for a number of years has varied from 3,000,000 to over 5,000,000 per season.

The imports of paving brick during the past five years have considerably exceeded the domestic production. During the calendar year 1917 the imports were 2,190,000 valued at \$37,814, or an average value of \$7.27 per thousand, as against imports of 5,667,000 valued at \$70,268 in 1916.

## Annual Production of Paving Brick.\*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
1897.....	4,568	\$ 45,670	\$ 10 00	1907.....	3,618	\$ 72,354	\$ 20 00
1898.....				1908.....	3,720	59,456	15 98
1899.....	5,300	42,550	8 03	1909.....	3,760	67,408	17 93
1900.....	2,710	26,950	9 94	1910.....	4,215	78,980	18 74
1901.....	3,689	37,000	10 03	1911.....	5,220	79,444	15 22
1902.....	4,211	42,000	9 97	1912.....	4,580	85,989	18 78
1903.....	3,789	45,288	11 95	1913.....	4 208	75,669	17 98
1904.....	4,436	55,450	12 50	1914.....	2,707	49,627	18 33
1905.....	4,500	54,000	12 00	1915.....	1,228	20,694	16 85
1906.....	3,000	45,000	15 00	1916.....	1,590	30,144	18 96
				1917.....	Nil	Nil	Nil

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

## Imports of Paving Brick.

Calendar Year.	M.	Value.	Average per M.	Calendar Year.	M.	Value.	Average per M.
1907.....	5,438	\$ 62,570	\$ 11 51	1913.....	13,035	\$ 176,497	\$ 13 54
1908.....		100,013		1914.....	9,069	145,063	16 00
1909.....		139,336		1915.....	5,865	76,769	13 09
1910.....	10,503	124,994	11 90	1916.....	5,667	70,268	12 40
1911.....	11,450	164,292	14 34	1917.....	2,190	37,814	17 27
1912.....	11,793	106,663	13 62				

## FIRECLAY AND FIRECLAY PRODUCTS.

(BY JOSEPH KEELE.)

Fireclays as the name implies are those clays which can be subjected to high temperatures without softening, or deformation. This property of resistance to heat is termed refractoriness. Other materials besides fireclays, such as silica, magnesia, bauxite and chrome have the property of refractoriness, hence brick made from all these materials comes under the general head of refractories.

<sup>1</sup>References to occurrences of fireclays in Canada: "The Clay Resources of Southern Saskatchewan", N. B. Davis, Mines Branch. "Refractory Materials in Canada", J. Keele, Summary Report, Mines Branch, 1916—pp. 111-117.

Raw fireclays are classed according to their refractoriness as No. 1, 2 and 3. No. 1 fireclay is required to stand a temperature of cone 33 (3254 degrees F.) without softening and No. 3 fireclays are required to stand up at cone 26 (3,000 degrees F.). Clays which soften at temperatures between 2,600 and 3,000 degrees F. are called semi-refractory.

Fireclays occur at two points in Nova Scotia, at several localities in southern Saskatchewan, and at Clayburn in British Columbia. Fireclays are also known to occur on the Mattagami and Missinaibi rivers in northern Ontario, and on the Athabaska river below Fort McMurray in northern Alberta, but the deposits in both these regions are beyond the reach of transportation facilities at present.

Semi-refractory clays occur in the coal measures at Westville, Nova Scotia, and at Flower cove and Mintó in New Brunswick, and at several points in Southern Saskatchewan.

Firebrick are manufactured at Sydney Mines, N.S. from fireclay brought from Shubenacadie, N.S., and at Claybank, Sask., and at Clayburn and Kilgard, B.C.

The manufacture of firebrick has recently begun at St. Remi d'Amherst, Que., by the Canadian China Clay Company who use the discoloured kaolin in their deposit for this purpose.

Some refractory brick are made at Westville, N.S., from a shale which occurs in the coal measures in that vicinity.

As there are no fireclays, or semi-refractory clays known to occur in Ontario or Quebec, except those alluded to above, it is necessary to import either the raw clay, or the finished refractories, but most of the refractory material is imported in the finished state. A good deal of fireclay is imported, however, from the States of New Jersey and Pennsylvania and made into special shapes for furnace work and for stove linings, etc.

No. 1 fireclay was quoted at \$7 per ton and No. 2 fireclay at \$6 per ton on boat or cars at New Jersey points in 1917.

The total value of the sales of fireclay, firebrick, and fireclay bricks in 1917 was \$326,511, as compared with a valuation of \$234,562 in 1916. There was in addition in 1917, a production of fireclay products valued at \$61,317 reported as being made from imported clays. The production in 1917 included: fireclay, or refractory clay sold as such 10,534 tons, valued at \$49,455; firebrick 8,192,213 valued at \$199,171, or an average of \$24.31 per thousand, and other fireclay products valued at \$77,885. The production in 1916 included: fireclay, or refractory clay sold as such, 9,206 tons, valued at \$30,767; firebrick 5,688,511, valued at \$147,757, or an average of \$25.97 per thousand; and other fireclay products valued at \$56,038.

The imports of firebrick during the calendar year 1917, including magnesite brick, and probably other refractory brick such as silica brick, were valued at \$3,156,591. The imports of magnesite brick during the last nine months of the year have been separately stated having a value for that period included in the above table of \$470,801.

The imports of firebrick during the calendar year 1916 were valued at \$1,657,792, of which \$1,495,868 was from the United States, and \$161,924 from Great Britain.

Fireclay was imported during the calendar year 1917, to the value of \$283,746, as compared with a value of \$187,124 in 1916.

Statistics of the annual production since 1907 of firebrick, refractory clay, or fireclay sold as such, and of fireclay products, and statistics of the imports of firebrick and fireclay, are shown in the following tables:—

## Production of Fireclay and Fireclay Products.

Year.	Firebrick.			Fireclay.			Other fireclay products.	Total value.
	No. sold.	Value.	Per M.	Tons.	Value.	Per ton.	Value.	
1907	4,323,179	\$113,322	\$26.21				\$18,000	\$131,322
1908	2,415,871	70,429	29.16	1,984	\$ 8,121	\$4.09	31,752	110,302
1909	1,059,270	32,742	30.92	4,405	12,390	2.81	33,000	78,132
1910	1,375,400	21,352	21.34	1,425	5,863	4.11	15,000	50,215
1911	2,367,937	44,122	13.63	7,532	24,128	3.20	20,880	89,130
1912	3,429,594	67,192	19.59	6,307	24,343	3.86	34,050	125,685
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	107,688
1915	2,895,640	68,700	23.73	2,328	12,065	5.18	29,928	110,698
1916	5,688,511	147,757	25.97	9,206	30,767	3.34	56,038	234,562
1917	8,192,213	199,171	24.31	10,534	49,455	4.70	77,885	326,511

## Imports of Firebrick and Fireclay.

Calendar year.	Fireclay.	Firebrick.	Calendar year.	Fireclay.	Firebrick.	Calendar year.	Fireclay.	Firebrick.
1907	152,485	641,811	1911	125,199	814,414	1915	87,267	813,071
1908	86,879	380,905	1912	140,500	953,621	1916	187,124	1,657,792
1909	86,161	485,994	1913	143,399	1,192,857	1917	283,746	3,156,591
1910	124,293	811,927	1914	90,233	690,133			

## SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1917 was \$783,762, as compared with a value of \$716,287 in 1916. About 50 per cent of the value of the production in 1917 is credited to Ontario.

The imports of drain pipe and sewerpipe during 1917 were valued at \$42,864, as compared with a value of imports in 1916 of \$40,233.

The total sales of drain tile in Canada in 1917 as reported to this Branch, were valued at \$434,708, as compared with sales valued at \$359,387 in 1916. The greater part of this production is in Ontario, the sales in this Province as reported by the producers to this office being 21,445,000 valued at \$421,401, as against 20,205,837 valued at \$343,677 in 1916.

The imports of unglazed tile are apparently small, the value during the calendar year 1917 being \$2,289, as compared with \$2,072 in 1916.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe are shown in the following tables:—

## Production of Sewerpipe.

Calendar year.	Value.	Calendar year.	Value.	Calendar year.	Value.	Calendar year.	Value.
1888	\$ 266,320	1896	\$ 153,875	1904	\$ 440,894	1912	\$ 884,641
1889		1897	164,250	1905	382,000	1913	1,035,906
1890	348,000	1898	181,717	1906	350,045	1914	1,104,499
1891	227,300	1899	161,546	1907	667,100	1915	799,446
1892	367,660	1900	231,525	1908	514,362	1916	716,287
1893	350,000	1901	248,115	1909	645,722	1917	783,762
1894	250,325	1902	301,965	1910	774,110		
1895	257,045	1903	317,970	1911	812,716		

\* No record.

## Imports of Drain Tile and Sewerpipe.

Calendar year.	Drain tile. (a)	Sewerpipe. (b)	Calendar year.	Drain tile. (a)	Sewerpipe. (b)
1907.....	2,011	130,698	1913.....	12,156	465,997
1908.....	2,056	108,189	1914.....	2,941	338,533
1909.....	2,785	170,280	1915.....	346	41,801
1910.....	4,485	175,599	1916.....	2,072	40,233
1911.....	5,640	382,929	1917.....	2,289	42,864
1912.....	4,018	507,024			

(a) Drain tile, not glazed.

(b) Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

POTTERY AND EARTHENWARE.<sup>1</sup>

(By JOSEPH KEELE.)

Sanitary porcelain is made at St. Johns, Que., and electrical porcelain is made at Hamilton and Peterboro, Ont. These are the only firms in Canada at present making white wares. The raw materials, including clays, ground quartz and feldspar, are all imported.

Stoneware pottery such as crocks, jars, churns, and jardinières are made at Medicine Hat, Alberta, from Saskatchewan clay; at Hamilton, Ont., from imported clays, and at St. John, N.B., partly from Nova Scotia clay.

Flower pots are made at a few localities from the red burning brick and tile clays of the vicinity.

Quite an appreciable amount of stoneware clay is imported into Canada for modelling purposes either by sculptors or for use in schools giving instruction in the manual arts. This clay is supplied in a finely ground state and shipped in paper-lined barrels. The price quoted in 1917 was \$15 per ton at point of shipment.

Stoneware clay for ordinary factory use was quoted at \$4 per ton, on boat or cars in New Jersey in 1917.

The total value of the production of pottery and clay sanitary ware in 1917, according to returns received, was \$604,495, of which it is estimated that a value of \$481,617 is attributable to imported clays. The total value of the production in 1916 was \$391,173, of which \$330,104 was credited to imported clays.

## Annual Production of Pottery.

Calendar year.	Value.	Calendar year.	Value.	Calendar year.	Value.	Calendar year.	Value.
1888.....	\$ 27,750	1896.....	\$ 163,427	1904.....	\$ 140,000	1912.....	\$ 43,955
1889.....*		1897.....	129,629	1905.....	120,000	1913.....	53,533
1890.....	195,242	1898.....	214,675	1906.....	150,000	1914.....	35,371
1891.....	258,844	1899.....	185,000	1907.....	253,809	1915.....	64,900
1892.....	265,811	1900.....	200,000	1908.....	200,541	1916.....	61,069
1893.....	213,186	1901.....	200,000	1909.....	285,285	1917.....	122,878
1894.....	162,144	1902.....	200,000	1910.....	250,924		
1895.....	151,588	1903.....	200,000	1911.....	102,493		

\* Not available.

A detailed record of the imports of earthenware and chinaware will be found in the tables on pages 15 and 16.

<sup>1</sup>References to pottery clays in Canada: "Summary Report", Mines Br., 1917, pp. 112-114. "Clay Resources of Southern Saskatchewan", N. B. Davis, Mines Branch, 1918.



## KAOLIN.

The shipments of kaolin in 1917 were 533 tons, valued at \$9,594, as compared with 1,750 tons, valued at \$17,500, in 1916.

The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, operated by the Canadian China Clay Company, of Montreal, and since the beginning of operations has been as follows:—

## Annual Production of Kaolin.

Year.	Tons.	Value.	Average.	Year.	Tons.	Value.	Average.
1912.....	20	\$ 160	\$ 8 00	1915. . . .	1,300	\$ 13,000	\$ 10 00
1913.....	500	5,000	10 00	1916.....	1,750	17,500	10 00
1914.....	1,000	10,000	10 00	1917.....	533	9,594	18 00

The plant for refining the clay is situated 2 miles from St. Remi d'Amherst, and 7 miles from Huberdeau, the terminus of the Montfort branch of the Canadian Northern Quebec Railway, 46 miles northwest of Montreal.

The imports of china-clay, ground and unground, into Canada during the twelve months ending December, 1917, were 11,596 tons, valued at \$97,856, or \$8.44 per ton, as against imports of 19,062 tons, valued at \$114,110, or \$5.99 per ton, in 1916.

## Annual Imports of China-Clay.

Calendar year.	Tons.	Value.	Value per ton.	Calendar year.	Tons.	Value.	Value per ton.
1907.....	13,242	\$102,209	\$7 72	1913.....	21,164	\$149,337	\$ 7 06
1908.....	10,781	87,984	8 16	1914.....	20,437	160,881	7 38
1909.....	12,791	100,066	7 82	1915.....	21,940	124,658	5 68
1910.....	18,216	142,125	7 80	1916.....	19,062	114,110	5 99
1911.....	18,819	125,768	6 68	1917.....	11,596	97,856	8 44
1912.....	18,332	127,402	6 95				

## LIME.

The production of lime in 1917 is reported as 6,567,170 bushels, equivalent to about 229,851 tons, valued at \$1,558,487, or an average of 23.7 cents per bushel, or \$6.78 per ton, showing a considerable increase both in quantity and value over the production in 1916, which was 5,493,250 bushels, equivalent to about 192,264 tons, and valued at \$1,091,463, or an average of 20 cents per bushel, or \$5.75 per ton.

The average price per bushel of lime sold in 1917 varied from a minimum of 20 cents in Nova Scotia to a maximum of 34 cents in Alberta. About 88 per cent of the total production in 1917 was derived from Ontario, Quebec, and the Maritime Provinces.

The production of hydrated lime in 1917 was reported as 16,339 tons, the producing firms being as follows, viz. :—

The Standard White Lime Co., Ltd., Joliette, Que.  
 Lawrence Stone Co., Hull, Que.  
 Standard White Lime Co., Ltd., Guelph, Ont.  
 Christie, Henderson & Co., Ltd., Hespeler, Ont.  
 Aurora White Lime Co., Ltd., Aurora, Ont.  
 The Contractors Supply Co., Ltd., Orangeville, Ont.  
 The Toronto Plaster Company.  
 The Moose Horn Lime Company, Moose Horn, Man.  
 The Pacific Lime Co., Ltd., Blubber Bay, B.C.

## Lime Production by Provinces, 1917.

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	1	34	820	287	0.350	} 12.66
Nova Scotia .....	1	7	10,736	985,286	197,057	0.200	
New Brunswick .....	6	112	64,515	532,251	171,245	0.322	
Quebec .....	16	209	130,016	1,470,486	335,012	0.228	21.50
Ontario .....	33	318	250,076	2,846,850	668,368	0.235	42.89
Manitoba .....	4	60	42,413	393,982	92,932	0.236	5.96
Alberta .....	3	19	16,682	104,540	35,516	0.340	2.28
British Columbia .....	3	44	40,145	232,955	58,067	0.249	3.72
Total .....	67	770	554,617	6,567,170	1,558,487	0.237	100.00

## Lime Production by Provinces, 1916.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	Sales.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
			\$		\$	\$	
P. E. Island.....	1	2	81	1,734	546	0.315	0.05
Nova Scotia.....	1	10	8,956	909,800	181,960	0.200	16.67
New Brunswick.....	5	82	45,272	424,113	104,635	0.247	9.59
Quebec.....	21	270	101,121	1,498,845	267,119	0.178	21.47
Ontario.....	37	278	161,312	2,031,396	367,115	0.181	33.64
Manitoba.....	5	54	30,232	355,301	83,754	0.236	7.67
Alberta.....	3	18	7,919	78,019	20,033	0.257	1.84
British Columbia.....	3	44	26,472	194,042	66,301	0.342	6.07
Total.....	76	758	381,365	5,493,250	1,091,463	0.199	100.00

## Lime Production by Provinces, 1915.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	Sales.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
			\$		\$	\$	
Nova Scotia.....	1	10	4,802	915,086	183,017	0.200	18.02
New Brunswick.....	5	77	39,572	369,117	93,797	0.254	9.23
Quebec.....	20	209	100,449	1,351,306	274,831	0.203	27.06
Ontario.....	40	240	97,298	1,903,914	328,515	0.173	32.34
Manitoba.....	5	55	27,948	281,432	71,372	0.254	7.03
Alberta.....	4	22	8,288	74,162	14,445	0.195	1.42
British Columbia.....	3	20	15,378	152,237	49,725	0.327	4.90
Total.....	78	633	293,735	5,047,244	1,015,702	0.201	100.00

### Annual Production of Lime by Provinces.

Year.	Nova Scotia.			Prince Edward Island.			New Brunswick.			Quebec.			Ontario.		
	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.
		\$	\$		\$	\$		\$	\$		\$	\$		\$	\$
1906	50,000	13,600	0.27				405,450	94,290	0.23	923,563	201,816	0.22	2,885,000	496,785	0.17
1907	30,000	11,100	0.37	15,000	4,900	0.33	554,380	124,786	0.23	1,053,856	262,990	0.25	2,383,879	393,474	0.17
1908	37,500	12,000	0.32	13,568	4,102	0.30	155,748	34,262	0.22	857,700	201,357	0.23	2,087,731	358,507	0.17
1909	37,500	11,250	0.30	20,236	5,479	0.27	697,466	154,151	0.22	1,281,827	315,633	0.25	2,619,553	434,147	0.17
1910	40,000	8,800	0.22	15,750	4,690	0.30	470,050	103,593	0.22	1,227,555	299,126	0.23	2,988,020	476,137	0.16
1911	618,959	123,790	0.20	20,250	6,765	0.33	613,728	132,897	0.22	1,428,392	356,453	0.25	3,360,265	538,902	0.16
1912	684,625	136,930	0.20	24,971	8,191	0.33	616,835	133,742	0.22	1,727,614	474,595	0.27	3,376,193	573,269	0.17
1913	851,050	170,210	0.20	3,702	1,129	0.39	392,985	98,841	0.23	1,616,416	418,008	0.26	3,254,482	573,209	0.18
1914	516,029	103,206	0.20	1,693	542	0.32	391,739	102,980	0.26	1,767,935	389,064	0.22	3,393,078	556,850	0.16
1915	915,086	183,017	0.20				369,117	93,797	0.23	1,351,306	274,831	0.20	1,903,914	323,515	0.17
1916	909,800	181,960	0.20	1,734	546	0.31	424,113	104,635	0.23	1,498,845	267,119	0.18	2,031,996	367,115	0.18
1917	985,286	197,037	0.20	820	287	0.35	532,251	171,243	0.32	1,470,466	335,012	0.23	2,846,550	668,368	0.23
	Manitoba.			Saskatchewan.			Alberta.			British Columbia.			Canada.		
1906	620,201	119,792	0.19				240,000	56,200	0.23	106,192	26,694	0.25	5,230,406	1,009,177	0.19
1907	431,543	84,793	0.20	3,700	1,480	0.40	173,040	41,225	0.24	159,963	49,847	0.31	4,755,316	974,595	0.20
1908	138,786	24,192	0.17				135,040	34,500	0.26	176,435	44,027	0.23	3,601,468	712,947	0.20
1909	423,954	69,670	0.16				281,125	67,350	0.24	231,269	75,076	0.32	5,592,924	1,132,736	0.20
1910	606,679	100,808	0.17				303,214	69,268	0.23	196,878	72,657	0.37	5,848,146	1,137,079	0.19
1911	706,888	140,629	0.20				434,038	100,407	0.23	351,014	117,756	0.34	7,333,525	1,517,599	0.20
1912	818,237	168,257	0.21	4,000	1,440	0.36	704,035	166,520	0.24	517,329	181,905	0.35	8,475,839	1,844,849	0.22
1913	576,938	107,281	0.19	35,000	10,000	0.29	465,250	115,355	0.25	362,571	115,365	0.32	7,558,484	1,609,398	0.21
1914	526,167	92,898	0.18				280,252	58,321	0.21	151,689	56,767	0.37	7,028,582	1,360,628	0.19
1915	281,432	71,372	0.25				74,152	14,445	0.20	152,237	49,725	0.35	5,047,244	1,015,702	0.20
1916	355,301	83,754	0.24				78,019	20,033	0.26	194,042	66,301	0.34	5,493,250	1,091,463	0.20
1917	393,982	92,932	0.24				104,540	35,516	0.34	232,955	53,067	0.25	6,567,170	1,558,487	0.24

*Exports and Imports.*—The value of the lime exported during the calendar year 1917 was \$74,523, as compared with exports in 1916 valued at \$66,406. The imports of lime during the calendar year 1917 were 242,998 hundredweight, or 12,149 tons, valued at \$78,251, or an average of \$6.44 per ton. The imports in 1916 were equivalent to 21,178 tons, valued at \$96,332, or an average of \$4.55 per ton.

### Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$		\$
1906 .....	57,072	1909 .....	48,821	1912 .....	35,097	1915 .....	15,617
1907 .....	55,903	1910 .....	44,762	1913 .....	29,234	1916 .....	66,406
1908 .....	43,316	1911 .....	39,536	1914 .....	16,927	1917 .....	74,523

### Imports of Lime.

Year.	Barrels.	Value.	Average Value.	Year.	Barrels.	Value.	Average Value.
			\$			\$	\$
1907 .....	126,285	99,179	0.79	1913 .....	386,693	238,271	0.62
1908 .....	143,270	99,196	0.69	1914 .....	340,828	211,123	0.62
1909 .....	168,357	118,239	0.70	1915 .....	189,774	98,040	0.52
1910 .....	212,502	138,847	0.65	1916 .....	211,780	96,332	0.46
1911 .....	228,538	161,985	0.71	1917 .....	121,500	78,251	0.64
1912 .....	329,925	207,481	0.63				

**SAND-LIME BRICK.**

(By JOSEPH KEELE.)

The raw materials used in the manufacture of sand-lime brick are ordinary clean bank sand and hydrate lime, the proportion of the latter being about 6 per cent of the total weight of the mixture. The materials are thoroughly mixed by machinery and pressed into shape and submitted to steam under pressure in closed cylinders for about eight hours. The resulting bricks are light in colour and fairly hard and dense. They are much used for lining basement walls and the interior of factories. Their light colour and smoothness makes further finish on the walls unnecessary.

Sand-lime brick plants are generally located near cities so that the finished product can be conveyed by teams from the factory to the various jobs on which they are used as the less handling they receive before being laid the better the appearance in the wall.

The first record of the production of sand-lime brick in Canada was obtained for the year 1907 when there was a production by ten firms amounting to 16,492,971 brick, valued at \$167,795.

In 1917 the sales were reported at 18,001,090 valued at \$201,355, or an average of \$11.19 per thousand, as compared with sales in 1916 of 16,540,747 brick, valued at \$126,235.

**Annual Production of Sand-Lime Brick.**

Calendar Year.	No. of firms reporting sales.	Number sold.	Value.	Per M.
			\$	\$
1907 .....	10	16,492,971	167,795	10.17
1908 .....	9	17,288,260	152,856	8.84
1909 .....	9	27,052,864	201,650	7.45
1910 .....	13	44,598,541	371,857	8.34
1911 .....	16	51,535,243	442,427	8.58
1912 .....	20	96,448,402	1,020,886	10.58
1913 .....	22	92,586,676	906,665	9.79
1914 .....	21	70,650,030	609,515	8.63
1915 .....	18	17,960,802	141,742	7.89
1916 .....	15	16,540,747	126,235	7.63
1917 .....	13	18,001,990	201,355	11.19

## SAND AND GRAVEL.

The total sales of sand and gravel, produced in Canada during 1917, amounted to 9,182,417 tons valued at \$2,326,249, as against 8,156,207 tons valued at \$1,838,320 in 1916, an increase of \$487,929, or 26 per cent in total value.

The 1917 production included: building sand and sand for concrete and road-building, 1,505,907 tons valued at \$614,272; gravel, including sand and gravel and crushed gravel, 2,214,369 tons valued at \$904,584; railway ballast, 5,312,218 tons valued at \$718,801; moulding sand, 46,790 tons valued at \$46,018, and other sands, core sands, engine sands, etc., 103,133 tons valued at \$42,574.

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 valued at \$1,512,099. The increasing production during the next two or three years is no doubt due in considerable part to the greater efficiency in the collection of the record.

### Production of Sand and Gravel, 1917.

Province.	Sand.		Sand and Gravel.		Ballast.		All Other.		Total.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		\$		\$		\$		\$		\$
Nova Scotia.....	1,658	1,163	72,072	14,361	145,637	49,731	6,090	4,425	225,457	129,620
New Brunswick.....	30	6	11,880	3,636	506,491	43,420	.....	.....	513,401	47,062
Quebec.....	302,473	185,935	49,514	15,107	646,313	63,640	300	600	998,600	265,232
Ontario.....	1,115,912	381,968	962,604	365,940	2,074,558	342,868	130,092	79,276	4,283,076	1,170,052
Manitoba.....	59,495	27,378	457,834	225,346	119,273	35,254	2,200	1,103	638,802	289,081
Saskatchewan.....	21,687	15,489	14,410	7,913	907,873	88,873	.....	.....	943,970	112,275
Alberta.....	.....	.....	9,159	3,264	698,608	66,094	1,978	1,853	709,745	71,216
British Columbia.....	4,652	2,333	636,896	209,077	213,465	28,921	9,353	1,330	864,366	241,661
Total.....	1,505,907	614,272	(a)2,214,369	904,584	5,312,218	718,801	(b) 149,923	88,592	9,182,417	2,326,249

(a) Includes 246,065 tons of gravel, valued at \$149,988. (b) Includes 46,790 tons of moulding sand, valued at \$46,918.

### Production of Sand and Gravel, 1916.

Province.	Sand.		Sand and Gravel.		Ballast.		All Other.		Total.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		\$		\$		\$		\$		\$
Nova Scotia.....	32,719	19,620	67,563	45,262	66,000	13,800	9,289	5,949	175,571	84,631
New Brunswick.....	80	20	55,350	21,075	747,459	99,768	125	125	803,014	120,988
Quebec.....	368,915	137,905	26,335	9,336	539,365	65,597	131	46	934,746	212,884
Ontario.....	930,590	293,375	830,329	271,891	1,808,109	189,176	142,203	64,505	3,711,231	818,947
Manitoba.....	39,745	20,650	456,093	151,635	659,567	70,181	2,200	936	1,157,605	243,542
Saskatchewan.....	3,882	3,437	161,514	40,476	161,974	15,793	746	373	328,116	60,079
Alberta.....	575	230	45,723	16,708	420,034	49,620	1,168	584	467,500	67,142
British Columbia.....	2,813	574	415,993	211,147	157,178	17,254	2,440	1,222	578,424	230,197
Total.....	1,379,319	475,811	(a)2,058,900	767,530	4,559,686	521,189	(b) 158,502	73,790	8,156,207	1,838,320

(a) Includes 553,125 tons gravel, valued at \$162,260.

(b) Includes 19,251 tons moulding sand, valued at \$16,726.



## Annual Production of Sand and Gravel, 1912-1915.

Province.	1912.	1913.	1914.	1915.
	\$	\$	\$	\$
P. E. Island.....	13,549	101,201	100,016	71,821
Nova Scotia.....				
New Brunswick.....				
Quebec.....	243,126	638,778	370,713	260,983
Ontario.....	363,668	638,771	833,635	727,426
Manitoba.....	101,653	197,719	314,081	203,666
Saskatchewan.....	255,453	236,377	222,019	38,206
Alberta.....	148,704	265,165	273,115	47,197
British Columbia.....	385,945	180,863	391,731	256,454
Total.....	1,512,099	2,258,874	2,505,310	1,624,767

## Annual Exports of Sand and Gravel.

Calendar Year.	Short Tons.	Value.	Average per Ton.	Calendar Year.	Short Tons.	Value.	Average per Ton.
		\$	\$			\$	\$
1908.....	298,954	161,387	0.54	1913.....	644,633	440,956	0.68
1909.....	481,584	256,166	0.53	1914.....	952,370	802,358	0.84
1910.....	624,824	407,974	0.65	1915.....	808,022	380,549	0.47
1911.....	573,494	408,110	0.71	1916.....	1,114,913	388,309	0.35
1912.....	660,090	459,952	0.70	1917.....	1,075,374	290,964	0.27

## Annual Imports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Average Value.	Calendar Year.	Tons.	Value.	Average Value.
		\$	\$			\$	\$
1907.....	265,912	223,968	0.84	1913.....	439,673	440,343	1.00
1908.....	133,665	135,348	1.01	1914.....	273,812	224,759	0.82
1909.....	151,323	153,778	1.02	1915.....	199,597	120,756	0.60
1910.....	195,796	196,766	1.00	1916.....	233,777	183,894	0.79
1911.....	241,375	246,613	1.02	1917.....	328,520	312,403	0.95
1912.....	532,721	445,781	0.84				

## SLATE.

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

The production in 1917 was 1,422 squares valued at \$7,789, as compared with the production in 1916 of 1,262 squares valued at \$6,223.

## Annual Production of Slate.

Calendar Year.	Quantity.	Value.	Calendar Year.	Quantity.	Value.
		\$			\$
1886*	5,345	64,675	1902		19,200
1887	7,357	89,000	1903*	5,510	22,040
1888	5,314	90,689	1904	5,277	23,247
1889	6,935	119,160	1905		21,568
1890	6,368	100,250	1906		24,446
1891	6,000	65,000	1907	4,335	20,056
1892	5,130	69,070	1908	2,950	13,496
1893	7,112	90,825	1909	4,000	19,000
1894		75,550	1910	3,959	18,492
1895		58,900	1911	1,833	8,248
1896		53,370	1912	1,891	8,939
1897		42,800	1913	1,432	6,444
1898		40,791	1914	1,075	4,837
1899		33,406	1915	397	2,039
1900		12,100	1916	1,262	6,223
1901		9,980	1917	1,422	7,789

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

No exports of slate have been reported since 1886 with the exception of the years 1908 and 1909.

The imports of slate during the past twelve years have ranged in value from \$90,000 to over \$200,000 per annum.

The total value of the imports during the calendar year 1917 was \$106,893, and included: roofing slate, 3,909 squares valued at \$20,785; school writing slate, valued at \$40,603; slate pencils, \$8,717, and other slates and manufactures of, \$36,788.

## Imports of Slate during the Years 1913, 1914, 1915, 1916, and 1917.

Slate and manufactures of	1913.	1914.	1915.	1916.	1917.
	\$	\$	\$	\$	\$
Roofing slate	97,730	91,977	34,525	21,335	20,785
School writing slate	51,953	54,723	38,874	35,887	40,603
Slate pencils	9,166	6,514	4,954	11,309	8,717
Slate of all kinds and manufactures of	76,625	59,444	30,320	28,245	36,788
Mantles		598			
	235,474	213,256	108,676	96,776	106,893

## Imports of Slate.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$		\$
1907	134,063	1910	142,285	1913	235,474	1916	96,776
1908	120,232	1911	169,685	1914	213,256	1917	106,893
1909	135,221	1912	200,643	1915	108,676		

STONE.<sup>1</sup>

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone and flagstone, rubble, riprap, and crushed stone, limestone for furnace flux, sugar factories, etc., but stone used for burning lime or manufacturing cement is not included.

The kinds of stone quarried have been classed as granite (including trap rock, syenite, and other igneous rocks), limestone, sandstone, and marble.

The records are practically confined to quarry operations, and to the production of sawn or polished stone when these operations are carried on by quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals, such as farmers, and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is also used in railway construction work and in road building, of which the record is probably very incomplete.

The total value of the production of stone during 1917, according to returns received, was \$3,240,147, as compared with a value of \$3,736,412 in 1916, showing a falling off of \$496,265, or about 13 per cent.

The number of active firms reported in 1917 was 165, the total number of men employed 3,002, and total wages paid \$1,610,598.

Of the total value of the production in 1917, limestone contributed \$2,283,659, or 70.5 per cent; granite \$639,412, or 19.7 per cent; sandstone \$261,256, or 8.9 per cent, and marble \$55,820, or 1.7 per cent.

## Production of Stone by Provinces, 1917.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%	Labour.	
							No. men em- ployed.	Wages.
	\$	\$	\$	\$	\$			\$
Nova Scotia.....	111,529	433,987		24,005	569,521	17.6	532	300,204
New Brunswick.....	61,170	22,375		27,105	111,150	3.4	159	43,232
Quebec.....	281,242	625,711	55,820	28,820	991,593	30.6	1,172	499,515
Ontario.....	119,301	808,638		64,516	992,455	30.6	721	470,674
Manitoba.....		301,968			301,968	9.3	257	148,504
Alberta.....		672		6,310	7,482	0.3	6	2,100
British Columbia.....	66,170	89,808		110,000	265,978	8.2	155	146,368
Total.....	639,412	2,283,659	55,820	261,256	3,240,147		3,002	1,610,598
Per cent.....	19.7	70.5	1.7	8.1		100.0		

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

No. 100.—"The Building Stones of Canada, Vol. I: Building and Ornamental Stones of Ontario".

No. 203.—"Building Stones of Canada, Vol. II: Building and Ornamental Stones of the Maritime Provinces".

No. 279.—"Building Stones of Canada, Vol. III: Building and Ornamental Stones of the Province of Quebec".

No. 388.—"Building Stones of Canada, Vol. IV: Building and Ornamental Stones of the Provinces of Manitoba, Saskatchewan, and Alberta.

No. 452.—"Building Stones of Canada, Vol. V: Building and Ornamental Stones of the Province of British Columbia", (1917).

## Production of Stone by Provinces, 1916.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%	Labour.	
							No. men em- ployed.	Wages.
	\$	\$	\$	\$	\$			\$
Nova Scotia.....	164,870	263,803	.....	30,625	459,298	12.3	580	319,083
New Brunswick.....	59,325	6,900	.....	46,032	112,257	3.0	135	52,046
Quebec.....	422,297	799,354	118,810	30,004	1,370,465	36.7	1,729	790,512
Ontario.....	135,826	688,114	.....	33,083	857,023	22.9	864	439,981
Manitoba.....	.....	372,894	.....	.....	372,894	10.0	288	198,807
Alberta.....	.....	257	.....	.....	257	.....	.....	.....
British Columbia.....	464,949	92,769	.....	6,500	564,218	15.1	424	313,991
Total.....	1,247,267	2,224,091	118,810	146,244	3,736,412		4,020	2,115,320
Per cent.....	33.4	59.5	3.2	3.9		100.0		

Production of Stone by Kinds and by Provinces Showing Purposes Used, 1917.

By kinds.	Building.	Ornamental and monumental	Paving and curbstone.	Rubble.		Crushed.		Furnace Flux.		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	
	\$	\$	\$		\$		\$		\$	\$
Granite .....	194,402	129,069	44,258	43,229	32,588	320,958	239,095			639,412
Limestone .....	487,820	3,099	5,501	30,769	29,117	1,084,851	985,256	814,334	772,866	2,283,659
Marble .....	55,000					120	660	160	160	55,820
Sandstone .....	152,795		7,475	42,491	45,076	28,443	55,910			261,256
By Provinces.										
Nova Scotia .....	59,869	21,172	150	24,655	21,414	30,228	46,250	417,725	420,666	569,521
New Brunswick .....	5,270	46,802	800	23,696	25,855	11,668	23,348	2,250	9,075	111,150
Quebec .....	340,935	58,399	20,849	4,273	3,763	460,236	507,087	660	560	991,592
Ontario .....	76,696	4,595	25,435	25,025	23,958	855,517	599,854	303,877	261,917	992,455
Manitoba .....	290,172			3,100	2,568	12,516	9,228			301,968
Alberta .....	4,800			1,650	2,010	960	672			7,482
British Columbia .....	112,275	1,200		34,090	27,213	63,247	44,482	89,982	80,809	265,978
Total .....	890,017	132,168	* 57,234	116,489	106,781	1,434,372	1,280,921	814,494	773,026	3,240,147
Per cent .....	27.5	4.1	1.7		3.3		39.5		23.9	100.00

\* Of which 39,532 are paving blocks.

Production of Stone by Kinds and by Provinces Showing Purposes Used, 1916.

By kinds.	Building.	Ornamental and monumental	Paving and curbstone.	Rubble.		Crushed.		Furnace Flux.		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	
	\$	\$	\$		\$		\$		\$	\$
Granite.....	507,139	75,577	67,476	396,203	299,910	424,873	297,165			1,247,267
Limestone.....	629,650	3,158	1,673	104,049	60,161	1,387,235	1,049,219	824,110	480,230	2,224,091
Marble.....		103,400				27,464	15,410			118,810
Sandstone.....	36,853	951	8,190	74,677	53,529	29,772	46,721			146,244
<b>By Provinces.</b>										
Nova Scotia.....	107,202	1,585	5,515	76,652	62,342	13,970	22,510	465,831	260,143	459,298
New Brunswick.....	6,970	55,745	1,230	58,428	41,412	2,300	6,900			112,257
Quebec.....	445,031	119,239	49,716	48,020	32,393	300,407	724,026			1,370,465
Ontario.....	70,734	6,416	20,878	60,754	29,480	977,113	602,197	188,820	127,318	857,623
Manitoba.....	358,112			5,732	4,876	14,020	9,906			372,894
Alberta.....						643	257			257
British Columbia.....	185,533	100		325,343	243,097	60,891	42,719	169,459	92,769	564,218
Total.....	1,173,642	183,056	77,339	574,929	413,600	1,869,344	1,408,515	824,110	480,230	3,736,412
Per cent.....	31.4	4.9	2.0		11.1		37.7		12.9	

*Exports and Imports.*—The exports of stone from Canada in 1917 were valued at \$126,882, as against a value of \$143,988 in 1916. The principal item in the export of stone during the past few years has been building stone, unwrought, of which the exports in 1917 were 139,153 tons valued at \$122,430. There was also an export of ornamental granite, marble, etc., unwrought, of 230 tons valued at \$359; crushed stone 2,308 tons, valued at \$2,277, and dressed stone of all kinds valued at \$1,816.

The exports of the several classes of stone during the past three years as shown by the Customs record was as follows:—

#### Exports of Stone during the Calendar Years 1915, 1916, and 1917.

	1915.		1916.		1917.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		\$		\$		\$
Crushed .....	42,716	24,453	26,754	27,611	2,308	2,277
Ornamental, granite, marble, etc., unwrought .....	29,976	12,764	15,967	7,989	330	359
Building, freestone, limestone, etc., unwrought .....	35,804	28,910	128,453	103,796	139,153	122,430
Stone of all kinds, dressed .....		6,650		4,592		1,316
		72,777		143,988		126,882

#### Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
1908 .....	15,194	36,820	1913 .....	7,381	86,459
1909 .....	33,598	24,087	1914 .....	2,122	69,958
1910 .....	5,352	22,219	1915 .....	6,650	66,127
1911 .....	1,436	26,899	1916 .....	4,592	139,396
1912 .....	2,621	30,621	1917 .....	1,816	128,066

The imports of stone are classified as: building stone of all kinds, except marble; refuse; manufactures of granite and other stone; and marble and its manufactures.

The total value of the imports during the calendar year 1917 was \$764,658, as compared with a value of \$587,304 in 1916.

Details of imports are shown in the following tables:—

**Total Imports of Stone during the Calendar Years 1916 and 1917.**

Imports.	1916.		1917.	
	Short Tons.	Value.	Short Tons.	Value.
		\$		\$
<sup>1</sup> Building stone, rough .....		68,939		113,008
<sup>2</sup> Building stone, dressed.....		43,410		63,126
<sup>3</sup> Refuse stone.....	363,682	169,877	497,709	256,182
Granite, sawn only.....		5,049		3,189
Granite, manufactures of.....		91,939		80,299
Manufactures of stone, n.o.p.....		36,241		49,157
Marble and manufactures of—				
Marble, sawn or sand rubbed, not polished.....		92,414		121,644
Marble, rough, not hammered or chiselled.....		35,792		24,533
Marble, manufactures of, n.o.p.....		43,643		53,500
		587,304		764,658

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

<sup>2</sup> Flagstone and all other building stone, sawn, or dressed, or partially dressed.

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

**Annual Imports of Stone.**

Calendar Year.	Building Stone.		Manufactures of granite, etc., paving blocks.	Marble.	Refuse stone.	Total value.
	Rough.	Dressed.				
						\$
1907.....	73,140	85,683	161,250	254,897	79,371	654,341
1908.....	64,607	72,575	196,717	245,448	34,746	614,093
1909.....	102,470	178,087	221,097	182,147	54,428	738,229
1910.....	125,531	186,064	266,313	267,215		845,123
1911.....	85,084	307,784	272,512	384,252	91,214	1,140,846
1912.....	117,037	451,635	309,386	476,926	113,159	1,467,143
1913.....	105,576	464,540	302,398	577,028	191,307	1,640,849
1914.....	72,147	252,563	240,015	465,563	222,581	1,252,869
1915.....	54,249	57,761	180,188	152,454	94,521	539,173
1916.....	68,939	43,410	133,229	171,849	169,877	587,304
1917.....	113,008	63,126	132,645	199,697	256,182	764,658



## GRANITE.

The production of granite including traprock, syenite, etc., during 1917, according to returns received from 47 active firms, was valued at \$639,412, as compared with a production in 1916 valued at \$1,247,267.

## Value of Granite Production by Provinces, 1917.

Province.	Build- ing.	Monu- mental or orna- mental.	Curb or paving.	Rubble and riprap.		Crushed.		Total value.
				Short tons.	Value.	Short tons.	Value.	
	\$	\$	\$		\$		\$	\$
Nova Scotia.....	52,536	21,172	150	7,983	4,742	21,467	32,929	111,529
New Brunswick.....	3,900	46,802	800	300	120	7,068	9,548	61,170
Quebec.....	134,305	58,095	23,273	856	513	44,874	64,551	281,242
Ontario.....	2,361	1,800	20,030			187,302	96,585	119,301
British Columbia.....	2,275	1,200		34,090	27,213	60,247	35,482	66,170
Total.....	194,402	129,069	44,253	43,229	32,588	320,958	239,095	639,412

## Value of Granite Production by Provinces, 1916.

Province.	Build- ing.	Monu- mental or orna- mental.	Curb or paving.	Rubble and riprap.		Crushed.		Total value.
				Short tons.	Value.	Short tons.	Value.	
	\$	\$	\$		\$		\$	\$
Nova Scotia.....	97,750	785	5,515	62,350	49,470	7,750	11,350	164,870
New Brunswick.....		( <sup>1</sup> )55,595	1,230	450	2,500			59,325
Quebec.....	230,356	15,537	41,226	8,050	4,825	138,305	130,353	422,297
Ontario.....		3,560	19,505	10	18	217,927	112,743	135,826
British Columbia.....	157,033	100		325,343	243,097	60,891	42,719	464,949
Total.....	507,139	75,577	67,476	396,203	299,910	424,873	297,165	1,247,267

(<sup>1</sup>) Finished stone was produced at St. George to the value of \$113,745.

## Annual Production of Granite.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$		\$
1886.....	63,309	1894.....	109,936	1902.....	210,000	1910.....	739,516
1887.....	142,506	1895.....	84,838	1903.....	200,000	1911.....	1,119,865
1888.....	147,305	1896.....	106,709	1904.....	150,000	1912.....	1,373,119
1889.....	79,624	1897.....	61,934	1905.....	226,305	1913.....	1,653,791
1890.....	65,985	1898.....	81,073	1906.....	278,419	1914.....	2,176,602
1891.....	70,056	1899.....	90,542	1907.....	194,712	1915.....	1,525,553
1892.....	89,326	1900.....	80,000	1908.....	282,320	1916.....	1,247,267
1893.....	94,393	1901.....	155,000	1909.....	454,824	1917.....	639,412

## LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators, nor that of the stone used in the manufacture of cement, a record of lime and cement production being separately given. With these exceptions the total value of limestone produced in Canada in 1917 was \$2,283,659, as compared with a value of \$2,224,091 in 1916.

## Limestone Production by Provinces, 1917.

Province.	Building and ornamental.	Curb-stone and paving stone.	Rubble and riprap.		Crushed.		Furnace flux.		Total value.
			Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	
	\$	\$		\$		\$		\$	\$
Nova Scotia.....					8,761	13,321	417,725	420,666	433,987
New Brunswick.....					4,600	13,800	2,250	9,075	22,875
Quebec.....	151,434	96	3,417	3,250	405,560	470,531	500	400	625,711
Ontario.....	49,313	5,405	24,252	23,299	649,464	468,704	303,877	261,917	808,638
Manitoba.....	290,172		3,100	2,568	12,516	9,228			301,968
Alberta.....					960	672			672
British Columbia.....					3,000	9,000	89,982	80,808	89,808
Total.....	490,919	5,501	30,769	29,117	1,684,851	985,256	814,334	772,866	2,283,659

## Limestone Production by Provinces, 1916.

Province.	Building and ornamental.	Curb-stone and paving stone.	Rubble and riprap.		Crushed.		Furnace flux.		Total value.
			Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	
	\$	\$		\$		\$		\$	\$
Nova Scotia.....					1,220	3,660	465,831	260,143	263,803
New Brunswick.....					2,300	6,900			6,900
Quebec.....	215,037	300	39,970	27,568	621,987	556,449			799,354
Ontario.....	59,659	1,373	58,347	27,717	747,065	472,047	188,820	127,318	688,114
Manitoba.....	358,112		5,732	4,876	14,020	9,906	169,459		372,894
Alberta.....					643	267			267
British Columbia.....							92,769		92,769
Total.....	632,808	1,673	104,049	60,161	1,387,235	1,049,219	824,110	480,230	2,224,091

## Production of Limestone by Provinces, 1910-1915.

Province.	1910.	1911.	1912.	1913.	1914.	1915.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	192,919	245,216	275,944	258,719	94,239	255,024
New Brunswick.....	315	110				
Quebec.....	962,429	1,296,577	1,187,751	1,307,428	1,326,943	1,159,633
Ontario.....	722,763	680,461	862,052	1,196,130	853,906	634,728
Manitoba.....	328,029	315,782	381,572	382,984	346,258	153,113
Alberta.....				20,000		
British Columbia.....	43,121	56,780	55,617	38,830	51,435	79,583
Total.....	2,249,576	2,594,926	2,762,936	3,204,091	2,672,781	2,312,081

## 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 of the quarries at Philipsburg, and South Stukely, Que., together with the development of quarries in Ontario and British Columbia, has resulted in a considerable production of marble during the past nine years. The total value of the production in 1917 was returned as \$55,820, comprising ornamental marble, 1,210 tons, valued at \$55,000, and crushed marble, 280 tons, valued at \$820. The production in 1916 was valued at \$118,810, comprising ornamental marble, 1,034 tons, valued at \$103,400, and crushed marble, 27,464 tons, valued at \$15,410.

## Annual Production of Marble.

Calendar year.	Short tons.	Value.	Calendar year.	Short tons.	Value.
		\$			\$
1886.....	501	9,900	1897 to 1907 inclusive....	Nil.	Nil.
1887.....	242	6,224	1908.....		125,000
1888.....	191	3,100	1909.....		153,441
1889.....	33	980	1910.....		158,779
1890.....	780	10,776	1911.....		162,783
1891.....	240	1,752	1912.....		260,764
1892.....	240	3,600	1913.....		249,975
1893.....	590	5,100	1914.....		132,533
1894.....	Nil.	Nil.	1915.....		155,027
1895.....	200	2,000	1916.....	28,498	118,810
1896.....	224	2,405	1917.....	1,490	55,820

The imports of marble during the calendar year 1917 were valued at \$199,697, as compared with \$171,849 in 1916.

The annual imports of marbles are shown in the general table of imports.

## SANDSTONE.

The value of the production of sandstone during 1917 is reported as \$261,256, as compared with a value of \$146,244 in 1916. A large portion of the sandstone is quarried for building purposes, though considerable quantities are used for rubble and for paving.

There is included in the production of sandstone the output of several quarries containing a stone very high in silica and comparatively free from iron oxide, the product being shipped in a crushed or ground form and used for the manufacture of glass, for steel foundry work, or for the manufacture of ferro-silicon. The total shipments of this crushed sandstone in 1917 were 28,443 tons, valued at \$55,910, derived from quarries at Nelles Corners, Haldimand county, Ontario; Cascades Point, Vaudreuil, Que.; Melocheville, Beauharnois, Que. A similar quarry has also been opened up during 1918 at St. Canute, county of Two Mountains, Que.

### Value of Sandstone Production by Provinces, 1917.

Province.	Building and ornamental.	Paving.	Rubble and riprap.		Crushed.		Total value.
			Short tons.	Value.	Short tons.	Value.	
	\$	\$		\$		\$	\$
Nova Scotia.....	7,333		16,672	16,672			24,005
New Brunswick.....	1,370		23,396	25,735			27,105
Quebec.....		7,475			9,682	21,345	28,820
Ontario.....	29,292		775	659	18,761	34,565	64,516
Alberta.....	4,800		1,650	2,010			6,810
British Columbia.....	110,000						110,000
Total.....	152,795	7,475	42,491	45,076	28,443	55,910	261,256

### Value of Sandstone Production by Provinces, 1916.

Province.	Building and ornamental.	Paving.	Rubble and riprap.		Crushed.		Total value.
			Short tons.	Value.	Short tons.	Value.	
	\$	\$		\$		\$	\$
Nova Scotia.....	10,253		14,302	12,872	5,000	7,500	30,625
New Brunswick.....	7,120		57,978	38,912			46,032
Quebec.....		8,190			12,651	21,814	30,004
Ontario.....	13,931		2,397	1,745	12,121	17,407	33,083
British Columbia.....	6,500						6,500
Total.....	37,804	8,190	74,677	53,529	29,772	46,721	146,244

### Value of Sandstone Production by Provinces, 1910-1915.

Province.	1910.	1911.	1912.	1913.	1914.	1915.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	16,425	23,440	20,645	62,490	61,124	33,264
New Brunswick.....	51,793	35,337	68,260	70,737	236,647	145,177
Quebec.....		450			17,000	36,417
Ontario.....	62,247	54,032	59,240	54,758	59,923	19,588
Alberta.....	240,858	158,344	81,391	136,984	60,272	890
British Columbia.....	130,825	179,580	99,816	71,783	51,774	14,000
Total.....	502,148	451,183	329,352	396,732	487,140	249,336