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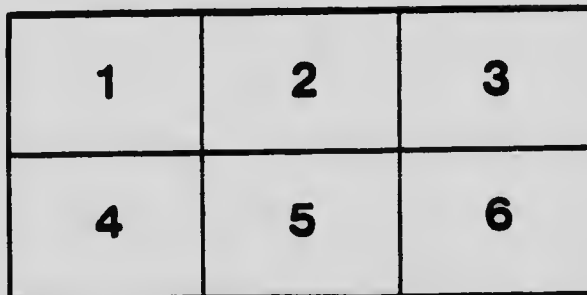
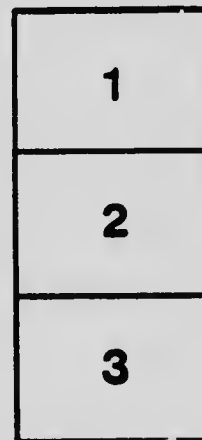
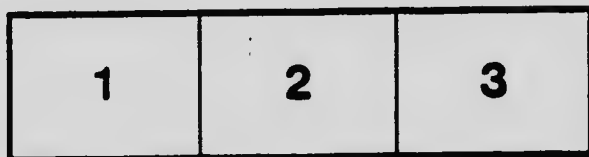
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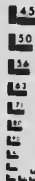
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HON. ALBERT SÉVIGNY, ACTING MINISTER; R. G. MCCONNELL, DEPUTY MINISTER.
MINES BRANCH
EUGENE HAANEL, PH.D., DIRECTOR.

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

IN

CANADA

During the Calendar Year

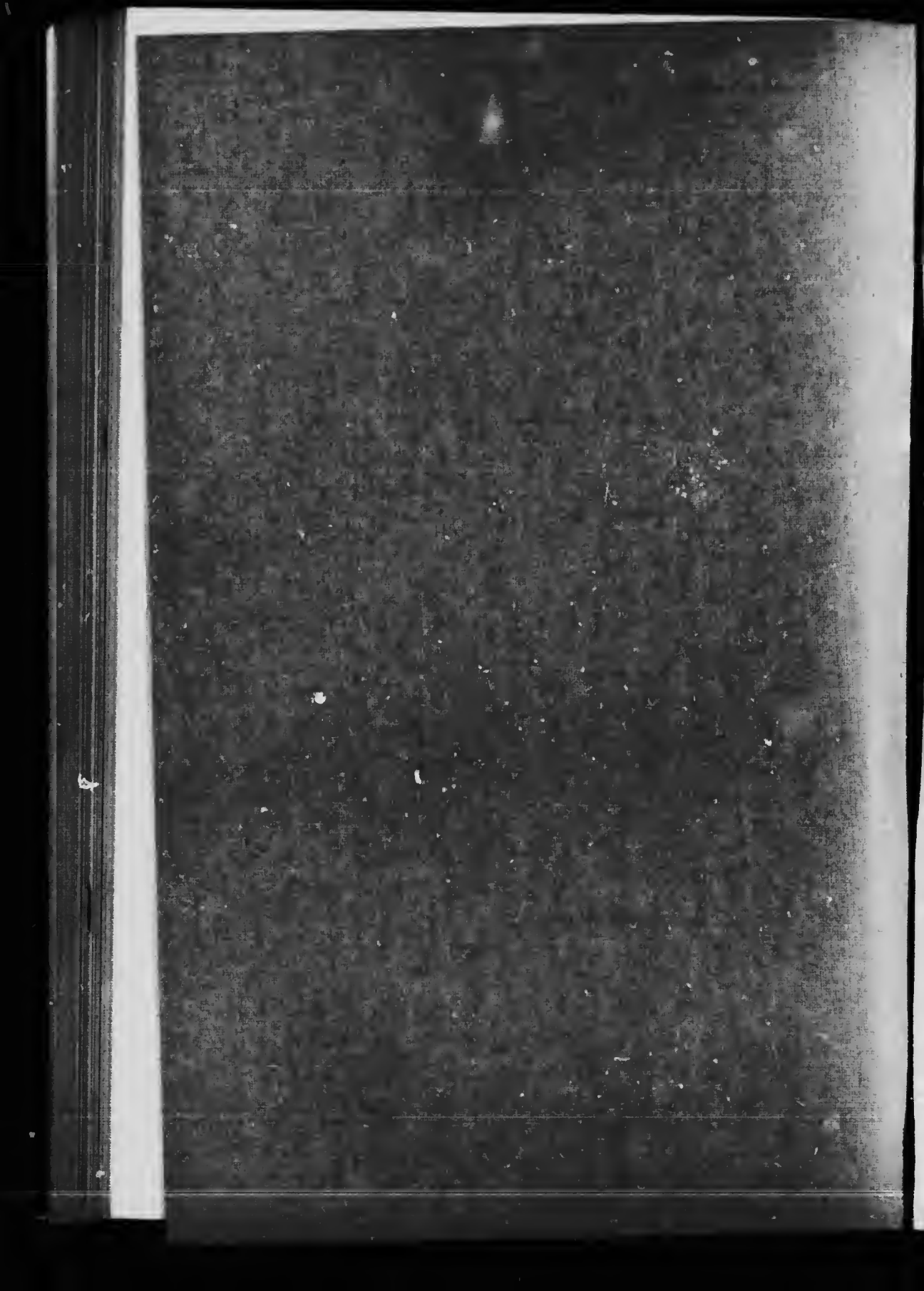
1916

*Advance Chapter of the Annual Report on the
Mineral Production of Canada, 1916*



OTTAWA
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CANADA
DEPARTMENT OF MINES
HON. ALBERT SÉVIGNY, ACTING MINISTER; R. G. McCONNELL, DEPUTY MINISTER.

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LETTER OF TRANSMITTAL

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

Sir,—

The accompanying report on "the Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada, during the Calendar Year 1916," which is submitted for publication as an advance chapter of the Annual Report on the Mineral Production of Canada, 1916, has been compiled under direction by Mr. John Casey, of this Division.

I have the honour to be,

Sir,

Your obedient servant,

(Signed) John McLeish.

Division of Mineral Resources and Statistics.

August 18, 1917.

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**ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE
MINERAL PRODUCTION OF CANADA, DURING THE
CALENDAR YEAR, 1916.**



STRUCTURAL MATERIALS AND CLAY PRODUCTS.

INTRODUCTORY.

The subjects included under this heading comprise, in the order treated: cement, clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc., lime, sand-lime brick, sand and gravel, slate, and stone for building and other purposes, including granite, marble, limestone, sandstone, etc. Previous to 1912 no attempt was made to collect a record of the production of sands and gravels in Canada, and the only statistics available were those of exports and imports. In 1912, however, a beginning was made in the collection of these statistics; but owing to the incompleteness of the available lists of producers and the failure of many to answer correspondence, only a very partial record was obtained. In 1913 the scope of the collection was extended to cover sands and gravels used by railways for ballasting, etc. The statistics of stone production do not include the stone used in making cement or lime, but are as complete as possible for all other established stone quarries; nevertheless there is undoubtedly a large production of stone for foundation work, road-making, and railway construction, of which no record is available.

The total value of the production of structural products in 1916 was \$17,467,186 as compared with \$17,920,759 in 1915, and \$26,009,227 in 1914, the decrease in 1916 being \$453,573, or 2.5 per cent, as compared with the previous year.

The total value of the imports of the same class of products in 1916 was \$5,562,220, as against \$3,912,946 in 1915, and \$6,528,838 in 1914.

The total exports were valued at \$681,239 in 1916, as against \$519,676 in 1915, and \$941,661 in 1914.

The apparent total consumption of these structural products based upon the record of production, imports and exports, was in 1916 valued at \$22,348,167, as compared with \$21,314,029 in 1915; and \$31,596,404 in 1914, the increase in consumption in 1916 being \$1,034,138, or 4.9 per cent, while compared with \$39,916,642 in 1913—the year of maximum consumption—the falling off was \$17,568,475 or about 44 per cent.

A summary of the production, imports, exports, and consumption of structural materials and clay products in 1916 and in 1915, and the annual production from 1910 to 1914 are shown in tables herewith:—

Structural Materials, Calendar Year 1916.

| | Production. | Imports. | Exports. | Consumption. |
|------------------------|-------------|-----------|----------|--------------|
| Cement, portland | \$6,547,728 | \$ 43,747 | \$2,424 | \$6,589,051 |
| Clay products | 4,120,805 | 4,554,167 | 80,112 | 8,594,860 |
| Lime | 1,091,463 | 96,332 | 66,406 | 1,121,389 |
| Sand-lime brick | 126,235 | 183,894 | 388,309 | 1,633,905 |
| Sand and gravel | 1,838,320 | 96,776 | ..... | 102,999 |
| Slate | 6,223 | 587,304 | 143,988 | 4,179,728 |
| Stone | 3,736,417 | ..... | ..... | ..... |
| | 17,467,186 | 5,562,220 | 681,239 | 22,348,167 |

Structural Materials, Calendar Year 1915.

| | Production. | Imports. | Exports. | Consumption. |
|------------------------|-------------|-----------|----------|--------------|
| Cement, portland | \$6,977,024 | \$ 47,836 | \$ 5,161 | \$ 7,019,699 |
| Clay products | 3,914,488 | 2,998,465 | 45,572 | 6,867,381 |
| Lime | 1,015,702 | 98,040 | 15,617 | 1,098,125 |
| Sand-lime brick | 141,742 | ..... | ..... | 141,742 |
| Sand and gravel | 1,624,767 | 120,756 | 380,549 | 1,364,974 |
| Slate | 2,039 | 108,676 | ..... | 110,715 |
| Stone | 4,244,997 | 539,173 | 72,777 | 4,711,393 |
| | 17,920,759 | 3,912,946 | 519,676 | 21,314,029 |

Production of Structural Materials, 1910-1914.

| | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------|--------------|--------------|--------------|---------------|--------------|
| Cement | \$ 6,412,215 | \$ 7,644,537 | \$ 9,016,556 | \$ 11,019,418 | \$ 9,187,924 |
| Clay products | 7,629,956 | 8,359,933 | 10,575,869 | 9,504,314 | 6,871,957 |
| Lime | 1,137,079 | 1,517,599 | 1,844,849 | 1,609,398 | 1,360,628 |
| Sand-lime brick | 371,857 | 442,427 | 1,020,386 | 906,665 | 609,515 |
| Sand and gravel | (a) 407,974 | (a) 408,110 | 1,512,099 | 2,258,874 | 2,505,310 |
| Slate | 18,492 | 8,248 | 8,939 | 6,444 | 4,837 |
| Stone | 3,650,019 | 4,328,757 | 4,726,171 | 5,504,639 | 5,469,056 |
| Total | 19,627,592 | 22,709,611 | 28,794,869 | 30,809,752 | 26,009,227 |

(a) Exports only.

The statistical situation with respect to the production of cement, clay and stone quarry products is closely reflected in the following annual records of building operations covering the same period. These figures as published in the "Labour Gazette" show a gradual increase in value of building permits reaching maximum in 1912, and since then showing rapid decreases until 1916 when a slight increase occurred. This same authority in its issue of March 1916 clearly indicated the strong demand for structural material during the five years immediately preceding 1913, more noticeable throughout the west. This section was also the first to feel the setback.

For the year 1916, the total value of building permits in selected localities was \$39,740,692, as compared with \$33,566,749 in the previous year showing an increase of \$6,173,943, or 18.4 per cent. Of the totals, Eastern Canada contributed \$32,160,844 or 81 per cent in 1916, and \$28,748,103

or about 86 per cent in 1915. The figures for eastern Canada in 1916 also show a decrease of over 63 per cent as compared with 1913, while a decrease of over 93 per cent is shown in western Canada when compared with 1912.

Building Permits Issued in Canada, 1915 and 1916.*

| | 1915. | 1916. | Increase (+) or Decrease (-) | % |
|-----------------------------|-------------------|-------------------|---------------------------------|-------------|
| Nova Scotia (2)..... | \$ 1,262,087 | \$ 1,348,534 | \$ + 86,447 | 6.8 |
| New Brunswick (2)..... | 864,339 | 675,980 | - 188,359 | 21.8 |
| Quebec (6)..... | 12,267,849 | 9,891,630 | - 2,376,219 | 19.3 |
| Ontario (15)..... | 14,353,828 | 20,244,700 | + 5,890,872 | 41.0 |
| Total East (25)..... | 28,748,103 | 32,160,844 | + 3,412,741 | 11.9 |
| Manitoba (2)..... | 1,862,455 | 2,752,173 | + 889,718 | 47.7 |
| Saskatchewan (3)..... | 574,987 | 687,170 | + 112,183 | 19.6 |
| Alberta (2)..... | 460,375 | 895,040 | + 434,665 | 94.4 |
| B. Columbia (3)..... | 1,920,829 | 3,245,465 | + 1,324,636 | 68.9 |
| Total West (10)..... | 4,818,646 | 7,579,848 | + 2,761,202 | 57.3 |
| Total 35 cities..... | 33,566,749 | 39,740,692 | + 6,173,943 | 18.4 |

*"Labour Gazette," February, 1917.

Building Permits Issued in Canada, 1910-1914.

| | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|-------------------|
| Nova Scotia (2)..... | \$ 831,594 | \$ 1,005,287 | \$ 1,209,781 | \$ 1,158,951 | \$ 990,293 |
| New Brunswick (2)..... | 637,390 | 655,655 | 689,795 | 2,822,780 | 852,655 |
| Quebec (6)..... | 21,378,821 | 20,998,391 | 26,638,493 | 34,893,249 | 24,527,591 |
| Ontario (15)..... | 33,964,103 | 39,824,589 | 50,024,770 | 49,486,583 | 38,558,430 |
| Manitoba (2)..... | 16,340,835 | 19,255,429 | 21,761,954 | 19,231,259 | 13,240,385 |
| Saskatchewan (3)..... | 6,350,749 | 12,534,901 | 20,947,160 | 13,070,665 | 2,783,235 |
| Alberta (2)..... | 7,750,950 | 16,579,899 | 34,840,639 | 17,862,103 | 8,938,627 |
| B. Columbia (3)..... | 15,523,410 | 22,862,605 | 29,090,352 | 17,962,307 | 6,889,765 |
| Total 35 cities..... | 102,777,858 | 133,716,766 | 185,252,934 | 154,487,900 | 96,780,981 |

CEMENT.

The total quantity of cement made in 1916, according to returns received from the manufacturers, was 4,753,033 barrels of 350 pounds net each (831,781 tons), as compared with 5,153,763 barrels (901,909 tons), made in 1915, a decrease of 400,730 barrels (70,128 tons), or nearly 7.8 per cent.

The total quantity of Canadian portland cement sold in 1916 was 5,369,560 barrels (939,671 tons), as compared with 5,681,032 barrels (994,181 tons), made in 1915, a decrease of 311,472 barrels (54,508 tons), or 5.5 per cent.

The total consumption of cement in 1916, including Canadian and imported cement was 5,390,156 barrels, of 350 pounds each (943,252 tons), as compared with 5,709,222 barrels (999,114 tons), in 1915, a decrease of 319,066 barrels (55,837 tons), or 5.6 per cent.

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

The average number of men employed in Canadian cement plants during 1916 was 1,695, and the total wages paid \$1,307,224. In 1915 the average number of men employed was 1,686, and wages paid \$1,184,459.

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

Annual Production* of Cement.

| Calendar Year. | Natural rock cement. | | | Portland cement. | | | Total. | |
|----------------|----------------------|-----------|----------------|------------------|------------|----------------|-----------|------------|
| | Barrels. | Value. | Average value. | Barrels. | Value. | Average value. | Barrels. | Value. |
| 1887. | | | | | | | | |
| 1888. | | | | | | | 69,843 | \$ 81,009 |
| 1889. | 90,474 | \$ 69,790 | \$0.77 | Nil. | Nil. | | 50,668 | 35,593 |
| 1890. | 87,521 | 74,822 | 0.85 | 14,695 | \$ 17,583 | \$1.20 | 90,474 | 69,790 |
| 1891. | 90,846 | 103,479 | 1.14 | 2,633 | 5,082 | 1.93 | 93,479 | 108,561 |
| 1892. | 88,187 | 94,912 | 1.08 | 29,221 | 52,751 | 1.81 | 117,408 | 147,663 |
| 1893. | 126,673 | 130,167 | 1.03 | 41,924 | 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 | 128,284 | 173,675 |
| 1896. | 70,705 | 60,500 | 0.86 | 78,385 | 141,151 | 1.80 | 149,090 | 201,651 |
| 1897. | 85,450 | 65,893 | 0.77 | 119,763 | 209,380 | 1.75 | 205,213 | 275,273 |
| 1898. | 87,125 | 73,412 | 0.84 | 163,051 | 321,168 | 1.99 | 250,209 | 397,580 |
| 1899. | 147,387 | 119,308 | 0.81 | 255,366 | 513,983 | 2.01 | 396,753 | 633,291 |
| 1900. | 125,428 | 99,994 | 0.80 | 292,124 | 562,916 | 1.93 | 417,552 | 662,910 |
| 1901. | 133,328 | 94,415 | 0.71 | 317,066 | 565,615 | 1.78 | 450,394 | 660,030 |
| 1902. | 127,931 | 98,932 | 0.77 | 594,594 | 1,028,618 | 1.73 | 722,525 | 1,127,550 |
| 1903. | 92,252 | 74,665 | 0.81 | 627,741 | 1,150,592 | 1.83 | 719,993 | 1,225,247 |
| 1904. | 56,814 | 50,247 | 0.88 | 910,358 | 1,287,992 | 1.41 | 967,172 | 1,338,239 |
| 1905. | 24,184 | 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 | 2,119,761 | 3,164,807 | 1.49 | 2,128,374 | 3,170,859 |
| 1907. | 5,775 | 4,043 | 0.70 | 2,446,903 | 3,777,328 | 1.55 | 2,441,868 | 3,724,371 |
| 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 | 7,614,537 | 1.34 | 5,692,915 | 7,614,537 |
| 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 | | 5,681,042 | 6,977,024 | 1.23 | 5,681,032 | 6,977,024 |
| 1916. | | | | 5,369,560 | 6,547,728 | 1.22 | 5,369,560 | 6,547,728 |

*Quantities sold or used.

The production of cement in 1916 was derived from 15 plants. Fourteen other plants were idle throughout the year, one of these making shipments from stocks. The total daily capacity of the 29 completed plants is 53,415 barrels, as shown in the following table:—

Daily Capacity of Completed Plants, 1916.

| | Active. | | Idle. | | Total. | |
|------------------|---------|----------|-------|----------|--------|----------|
| | No. | Capacity | No. | Capacity | No. | Capacity |
| Nova Scotia..... | | | 1 | 140 | 1 | 140 |
| Quebec..... | 2 | 14,800 | 1 | 1,800 | 3 | 16,600 |
| Ontario..... | 7 | 10,950 | 9 | 8,900 | 16 | 19,850 |
| Manitoba..... | 2 | 3,725 | | | 2 | 3,725 |
| Alberta..... | 2 | 4,600 | 2 | 3,500 | 4 | 7,500 |
| B. Columbia..... | 2 | 5,000 | 1 | 600 | 3 | 5,600 |
| | 15 | 38,475 | 14 | 14,940 | 29 | 53,155 |

The completed plants are distributed as follows: one in Nova Scotia, using blast furnace slag; three in Quebec, using limestone and clay; sixteen in Ontario, of which ten use marl, and six, limestone; two rock plants in Manitoba, one of which makes a "natural portland;" four in Alberta including one marl plant at Marlboro, and three limestone plants. During the year the plant at Marlboro was remodelled to use limestone, but was not expected to be in operation until 1917. In British Columbia there are three rock plants.

A comparison of the principal statistics of 1916 and 1915 showing the increase or decrease, as the case may be, is given in the next table.

In 1916 the sales exceeded the output, and quantity held in stock at the end of the year showed a decrease of 618,086 barrels, as compared with 1915. The average price per barrel at the mills for all plants, with the exception of those in Manitoba, has been steadily falling, being \$1.22 in 1916, as against \$1.23 in 1915; \$1.28 in 1914; \$1.27 in 1913; \$1.27½ in 1912; and \$1.34 in 1911. The average price at the mills in the several provinces was: Quebec, \$1.17 in 1916; and \$1.18 in 1915; Ontario, \$1.04 in 1916, and \$1.08 in 1915; Manitoba, \$1.86 in 1916, and \$1.84 in 1915; Alberta, \$1.73 in 1916, and \$1.78 in 1915; British Columbia, \$1.53 in 1916, and \$1.70 in 1915.

The imports of cement in 1916 showed a decrease in quantity of about 27 per cent. from the imports in 1915, while the average price fluctuated from \$1.61 in 1913 to \$1.50 in 1914; \$1.43 in 1915, and \$1.54 in 1916.

Comparison of Production, Sales, and Imports of Portland Cement in 1915 and 1916.

| | 1915. | 1916. | Increase. | Per cent. | Decrease. | Per cent. |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Cement sold or used.....Bls. | 5,681,032 | 5,369,560 | .... | .... | 311,472 | 5.5 |
| Cement manufactured....." | 5,153,763 | 4,753,033 | .... | .... | 400,730 | 7.8 |
| Stock on hand Jan. 1....." | 2,620,022 | 2,072,266 | .... | .... | 547,756 | 20.9 |
| Stock on hand Dec. 31....." | 2,062,961 | 1,444,875 | .... | .... | 618,086 | 29.9 |
| Value of cement sold or used.... \$ | 6,977,024 | 6,547,728 | .... | .... | 429,296 | 6.2 |
| Average price per barrel....." | 1.23 | 1.22 | .... | .... | 0.01 | 0.8 |
| Wages paid....." | 1,184,459 | 1,307,224 | 122,765 | 10.4 | .... | .... |
| Men employed.....No. | 1,686 | 1,695 | 9 | 0.5 | .... | .... |
| Imports of portland cement.....Bls. | 28,190 | 20,596 | .... | .... | 7,594 | 26.9 |
| Value of cement.....\$ | 40,426 | 31,621 | .... | .... | 8,805 | 21.8 |
| Average price per barrel....." | 1.43 | 1.54 | 0.11 | 7.7 | .... | .... |
| Total consumption of cement in Canada.....Bls. | 5,709,222 | 5,390,156 | .... | .... | 319,066 | 5.6 |

Of the total cement made in 1916, 164,436 barrels were made from marl and 4,588,597 barrels from limestone, whereas in 1915 the quantity made from marl was 429,268 barrels, and 4,724,495 barrels from limestone. In 1914, 641,869 barrels were made from marl and 8,085,400 barrels from limestone and slag. Practically all of the newer plants erected during the past few years are limestone plants.

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

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

*Includes slag cement.

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

Annual Production of Portland Cement.

(BARRELS.)

| Year. | Number of operating plants. | Quantity made. | Quantity sold. | On hand Dec. 31. | Value of sales. | Average per barrel. | Daily capacity operating plants. |
|-----------|-----------------------------|----------------|----------------|------------------|-----------------|---------------------|----------------------------------|
| 1897..... | | | 119,763 | | \$ 209,380 | \$1.75 | |
| 1898..... | | | 163,084 | | 324,168 | 1.99 | |
| 1899..... | | | 225,366 | | 513,983 | 2.01 | |
| 1900..... | | | 292,124 | | 562,916 | 1.91 | |
| 1901..... | 4 | 360,160 | 317,066 | 58,094 | 565,615 | 1.78 | |
| 1902..... | 8 | 562,335 | 594,594 | 33,446 | 1,028,618 | 1.73 | 3,900 |
| 1903..... | 9 | 714,136 | 627,741 | 128,386 | 1,150,592 | 1.83 | 4,850 |
| 1904..... | 10 | 908,990 | 910,358 | 112,051 | 1,287,992 | 1.41 | |
| 1905..... | 13 | 1,541,568 | 1,346,548 | 306,466 | 1,913,740 | 1.42 | 8,000 |
| 1906..... | 15 | 2,152,562 | 2,119,764 | 302,356 | 3,164,807 | 1.49 | 10,500 |
| 1907..... | 17 | 2,491,513 | 2,436,093 | 354,435 | 3,777,328 | 1.55 | 14,400 |
| 1908..... | 23 | 3,495,961 | 2,665,289 | 1,214,021 | 3,709,139 | 1.39 | 27,500 |
| 1909..... | 22 | 4,146,708 | 4,067,709 | 1,777,238 | 5,345,802 | 1.31 | 23,050 |
| 1910..... | 22 | 4,396,282 | 4,753,975 | 832,038 | 6,412,215 | 1.35 | 25,835 |
| 1911..... | 24 | 5,677,539 | 5,692,915 | 903,589 | 7,644,537 | 1.34 | 28,810 |
| 1912..... | 24 | 7,141,004 | 7,132,732 | 903,094 | 9,106,556 | 1.28 | 36,515 |
| 1913..... | 27 | 8,886,333 | 8,658,805 | 1,089,595 | 11,019,418 | 1.27 | 50,540 |
| 1914..... | 24 | 8,727,269 | 7,172,480 | 2,628,117 | 9,187,924 | 1.28 | 48,815 |
| 1915..... | 17 | 5,153,763 | 5,681,032 | 2,062,961 | 6,977,004 | 1.23 | 41,850 |
| 1916..... | 15 | 4,753,033 | 5,369,560 | 1,444,875 | 6,547,728 | 1.22 | 38,475 |

Imports and Exports.—The quantity of cement exported is not recorded but the value in 1916 is reported as \$2,424, as against a value of exports in 1915 of \$5,161, and \$2,223 in 1914.

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

The United States has been the principal source of imports during the past few years supplying all imports in 1916 and over 96 per cent of the 1915 imports. During the latter year about 4 per cent was derived from Great Britain. In 1914 about 71 per cent and in 1913, 68 per cent of the imports were from the United States.

The imports of cement during 1915 and 1916 by countries are shown in the next table:—

Imports of Cement 1915 and 1916.

| | 1915. | | | | 1916. | | | |
|---|--------|-----------|----------|----------------|--------|-----------|--------|----------------|
| | Cwt. | Per cent. | Value. | Average value. | Cwt. | Per cent. | Value. | Average value. |
| Great Britain..... | 3,726 | 3.8 | \$ 1,480 | \$0.40 | 4 | | \$ 5 | \$1.25 |
| United States..... | 94,938 | 96.2 | 38,946 | 0.41 | 72,083 | 100.0 | 31,616 | 0.44 |
| Total..... | 98,664 | 100.0 | 40,426 | 0.41 | 72,087 | 100.0 | 31,621 | 0.44 |
| Equivalent in barrels of 50 lbs..... | 28,190 | | | | 20,506 | | | |

A permanent revision of the cement duties was made in the early part of 1913, and from May 13, 1913, the cement duties have been as follows:—

| | British Preferential tariff. | Intermediate tariff. | General tariff |
|--|------------------------------|----------------------|----------------|
| Cement, portland, and hydraulic or water lime, in barrels, bags, or casks, the weight of the package to be included in the weight for duty per hundred pounds..... | 7 cents..... | 10 cents..... | 10 cents. |
| Bags in which cement or lime mentioned in the next preceding item is imported..... | 15 per cent.... | 20 per cent.... | 20 per cent. |

This is equivalent to a duty under the general and intermediate tariffs of 35 cents per barrel on cement, and 8 cents on the bags, or a total of 43 cents per barrel.

Statistics of the exports of cement since 1891, and of imports since 1880, are given in the next two tables:—

Exports of Cement.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------|----------------|----------|----------------|-----------|
| 1891..... | \$2,881 | 1900..... | \$ 3,296 | 1909..... | \$113,362 |
| 1892..... | 938 | 1901..... | 1,514 | 1910..... | 12,914 |
| 1893..... | 1,172 | 1902..... | 2,267 | 1911..... | 4,067 |
| 1894..... | 482 | 1903..... | 2,851 | 1912..... | 2,436 |
| 1895..... | 937 | 1904..... | 5,494 | 1913..... | 1,736 |
| 1896..... | 1,328 | 1905..... | 3,143 | 1914..... | 2,223 |
| 1897..... | 644 | 1906..... | 7,551 | 1915..... | 5,161 |
| 1898..... | 2,117 | 1907..... | 9,618 | 1916..... | 2,424 |
| 1899..... | 2,733 | 1908..... | 34,591 | | |

Imports of Cement.

| Fiscal Year | Cement and Mfrs. of N.E.S.* | Hydraulic cement.† | | | Portland cement. | | |
|-------------|-----------------------------|--------------------|----------|----------------|------------------|-----------|----------------|
| | | Quantity. | Value. | Average value. | Quantity. | Value. | Average value. |
| | | Barrels. | | | Barrels. | | |
| 1880 | \$ 28 | 10,034 | \$10,306 | \$1 03 | | | |
| 1881 | 298 | 7,812 | 7,821 | 1 00 | | \$ 55,774 | |
| 1882 | 86 | 1,948 | 13,410 | 1 12 | | 45,616 | |
| 1883 | 518 | 11,659 | 13,755 | 1 18 | | 66,579 | |
| 1884 | 1,236 | 8,606 | 9,814 | 1 11 | | 102,537 | |
| 1885 | 1,315 | 5,613 | 5,396 | 0 96 | | 102,857 | |
| 1886 | 1,851 | 6,164 | 6,028 | 0 98 | | 111,521 | |
| 1887 | 1,410 | 6,160 | 8,784 | 1 34 | 102,750 | 120,398 | |
| 1888 | 5,787 | 5,636 | 2 | 1 34 | 122,407 | 148,054 | \$1 44 |
| 1889 | 10,668 | 5,835 | 2 | 1 28 | 122,273 | 177,158 | 1 45 |
| 1890 | 5,443 | 5,440 | 9,018 | 1 66 | 192,322 | 179,406 | 1 37 |
| 1891 | 2,800 | 3,515 | 6,152 | 1 75 | 183,728 | 313,572 | 1 63 |
| 1892 | 3,394 | 2,214 | 2,782 | 1 26 | 187,237 | 304,648 | 1 66 |
| 1893 | 2,909 | 4,876 | 8,060 | 1 65 | 229,497 | 281,583 | 1 50 |
| 1894 | 2,618 | 1,054 | 985 | 0 93 | 224,150 | 316,170 | 1 38 |
| 1895 | 2,112 | 5,333 | 7,001 | 1 31 | 196,281 | 280,841 | 1 25 |
| 1896 | 3,672 | 5,688 | 8,948 | 1 57 | 304,407 | 242,813 | 1 24 |
| 1897 | 4,318 | 2,494 | 3,937 | 1 58 | 210,407 | 232,409 | 1 19 |
| | | Cwt. | | | | 352,587 | 1 20 |
| 1898 | 3,263 | 16,033 | 7,097 | 0 44 | 1,073,058 | 355,264 | 0 33 |
| 1899 | 8,929 | 1,678 | 694 | 0 41 | 1,300,424 | 467,994 | 0 36 |
| 1900 | 10,452 | 10,418 | 4,711 | 0 45 | 1,304,361 | 498,607 | 0 38 |
| 1901 | 4,890 | 17,784 | 6,865 | 0 39 | 1,612,432 | 654,595 | 0 41 |
| 1902 | 12,234 | 29,585 | 17,755 | 0 60 | 1,971,616 | 833,657 | 0 42 |
| 1903 | 16,281 | 13,690 | 6,333 | 0 46 | 2,316,853 | 868,131 | 0 37 |
| 1904 | 14,305 | 12,088 | 5,391 | 0 45 | 2,476,388 | 995,037 | 0 40 |
| 1905 | 18,489 | 16,961 | 10,690 | 0 63 | 4,228,394 | 1,234,649 | 0 29 |
| 1906 | 27,858 | 10,794 | 1,034 | 0 37 | 1,838,582 | 963,839 | 0 34 |
| | Calendar Year. | | | | | | |
| 1907 | 13,748 | 16,788 | 6,339 | 0 38 | 2,354,204 | 837,520 | 0 36 |
| 1908 | 5,843 | 2,752 | 921 | 0 33 | 1,641,672 | 531,045 | 0 32 |
| 1909 | 6,374 | 682 | 614 | 0 90 | 497,678 | 166,669 | 0 33 |
| 1910 | 7,718 | 365 | 349 | 0 96 | 1,222,586 | 468,046 | 0 38 |
| 1911 | 7,430 | 5,655 | 6,107 | 0 23 | 2,316,707 | 834,879 | 0 36 |
| 1912 | 9,698 | † | † | † | 5,020,446 | 1,969,529 | 0 29 |
| 1913 | 17,729 | † | † | † | 889,324 | 409,133 | 0 46 |
| 1914 | 12,533 | † | † | † | 343,076 | 147,538 | 0 43 |
| 1915 | 7,410 | † | † | † | 98,664 | 40,426 | 0 41 |
| 1916 | 12,126 | † | † | † | 72,087 | 31,621 | 0 44 |

* Cement not elsewhere specified and manufactures of cement.
† From 1912 included in portland cement.

Consumption of Cement.—The consumption of cement is represented practically by the domestic production, together with the imports, the exports being so comparatively small as to be negligible. The total consumption of cement in Canada in 1916 was 5,390,156 barrels (943,277 tons), made up of 5,369,560 barrels (939,673 tons), of Canadian cement, and 20,596 barrels (3,604 tons) of imported cement, the Canadian cement representing 99.6 per cent and the imported cement 0.4 per cent of the total.

In 1915 the total consumption of cement was 5,709,222 barrels (999,114 tons), made up of 5,681,032 barrels (994,181 tons), of Canadian cement and 28,190 barrels (4,933 tons) of imported cement, the Canadian cement representing 99.5 per cent, and the imported cement, 0.5 per cent of the total.

In 1914 the total consumption of cement was 7,270,502 barrels (1,272,338 tons), made up of 7,172,480 barrels (1,255,184 tons) of Canadian cement, and 98,022 barrels (17,154 tons) of imported cement, the Canadian cement representing 98.7 per cent and the imported cement 1.3 per cent of the total.

Annual Consumption of Portland Cement.

| Calendar Year. | Canadian. | | Imported. | | Total. |
|----------------|-----------|-----------|-----------|-----------|-----------|
| | Barrels. | Per cent. | Barrels. | Per cent. | Barrels. |
| 1901..... | 317,066 | 36 | 555,900 | 64 | 872,966 |
| 1902..... | 394,594 | 52 | 544,954 | 48 | 1,139,548 |
| 1903..... | 627,741 | 45 | 773,678 | 55 | 1,401,419 |
| 1904..... | 910,358 | 54 | 784,630 | 46 | 1,694,988 |
| 1905..... | 1,346,548 | 59 | 918,701 | 41 | 2,265,249 |
| 1906..... | 2,119,764 | 76 | 665,845 | 24 | 2,785,609 |
| 1907..... | 2,436,093 | 78 | 672,630 | 22 | 3,108,723 |
| 1908..... | 2,665,289 | 85 | 469,049 | 15 | 3,134,338 |
| 1909..... | 4,067,709 | 97 | 142,194 | 3 | 4,209,903 |
| 1910..... | 4,753,975 | 93 | 349,310 | 7 | 5,103,285 |
| 1911..... | 5,692,915 | 90 | 661,916 | 10 | 6,354,831 |
| 1912..... | 7,132,732 | 83.3 | 1,434,413 | 16.7 | 8,567,145 |
| 1913..... | 8,658,805 | 97.1 | 254,093 | 2.9 | 8,912,898 |
| 1914..... | 7,172,480 | 98.7 | 98,022 | 1.3 | 7,270,502 |
| 1915..... | 5,681,032 | 99.5 | 28,190 | 0.5 | 5,709,222 |
| 1916..... | 5,369,560 | 99.6 | 20,596 | 0.4 | 5,390,156 |

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

Quebec.—This Province has three completed cement mills, all operated by the Canada Cement Company, Limited; two situated near Montreal, one at Longue Pointe, which has been idle throughout the year, and one at Montreal East, and the third at Hull. The Montreal mills have now a combined daily capacity of 13,800 barrels and the Hull mill 2,800 barrels. The total quantity of cement sold or used by producers during 1916 in this Province was 2,150,475 barrels, valued at \$2,525,863, as compared with 2,390,724 barrels, valued at \$2,812,797 in 1915.

Ontario.—Ontario continues as the most important cement-producing province in Canada, having sixteen completed plants with a total daily capacity of 19,850 barrels at the end of 1916. Of these four limestone and three marl plants were operated during the year. The nine idle mills included one limestone and eight marl plants. The names of the operating companies and location of plants are shown in an accompanying list of producers.

The total sales of cement in Ontario during 1916 were 2,230,386 barrels valued at \$2,312,677, as compared with 2,407,670 barrels valued at \$2,597,807 in 1915. There was thus a decrease in sales of 177,284 barrels, or over 7 per cent.

The detailed statistics of production during 1916 and 1915 are shown in the next table.

Cement Production in Ontario, 1915 and 1916.

| | 1915. | 1916. | Increase. | Per cent. | Decrease. | Per cent. |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Cement sold or used..... Bls. | 2,407,670 | 2,230,386 | | | 177,284 | 7.4 |
| Cement manufactured..... " | 2,425,912 | 1,858,691 | | | 467,219 | 20.1 |
| Stock on hand Jan. 1..... " | 842,957 | 731,301 | | | 89,656 | 10.6 |
| Stock on hand Dec. 31..... " | 761,199 | 481,608 | | | 379,591 | 49.9 |
| Value of cement sold..... \$ | 2,597,807 | 2,312,677 | | | 285,130 | 11.0 |
| Wages paid..... " | 482,606 | 490,126 | 7,520 | 1.6 | | |
| Men employed..... No. | 801 | 722 | | | 79 | 9.9 |
| Total daily capacity of operating plants..... Bls. | 12,550 | 10,950 | | | 1,600 | 12.7 |

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

Alberta.—This Province possesses four completed cement plants with a total daily capacity of about 7,500 barrels, located respectively at Exshaw, Calgary, Blairmore, and Marlboro. The first three are limestone plants, and the last was remodelled during the year and changed from marl to rock.

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

The total quantity of cement marketed by producers in 1916 was 275,727 barrels, valued at \$477,832, as against 233,648 barrels valued at \$415,009 in 1915.

British Columbia.—The two plants at Tod Inlet were in operation during 1916, one for a short period only. The Vancouver Portland Cement Company's mill has a daily capacity of 3,000 barrels. The mill of the Associated Cement Company (Canada), Ltd., successors to the Portland Cement Construction Company, Ltd., at Bamberton, has a daily capacity of about 2,000 barrels. In both cases the limestone, shale, and clay are obtained in the vicinity of the works.

The plant at Bamberton constructed by the British Columbia Portland Cement Co., Ltd., capacity averaging 600 barrels daily, remained idle throughout the year.

The total sales of cement from British Columbia mills in 1916 were 285,679 barrels, valued at \$436,459, as compared with 309,436 barrels, valued at \$526,042 in 1915.

The production of cement in Ontario has already been shown separately, and the aggregate production in all other provinces during 1915 and 1916 is given in the next table.

Cement Production in Other Provinces, 1915 and 1916.

| | 1915. | 1916. | Increase. | Per cent. | Decrease. | Per cent. |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Cement sold or used..... Bls. | 3,273,462 | 3,139,174 | | | 134,188 | 4.1 |
| Cement manufactured..... " | 2,827,851 | 2,894,340 | 66,489 | 2.4 | | |
| Stock on hand Jan. 1..... " | 1,777,065 | 1,318,965 | | | 458,100 | 25.8 |
| Stock on hand Dec. 31..... " | 1,301,762 | 1,063,267 | | | 238,495 | 18.3 |
| Value of cement sold..... \$ | 4,379,217 | 4,235,051 | | | 144,166 | 3.3 |
| Wages paid..... " | 701,853 | 817,098 | 115,245 | 16.4 | | |
| Men employed..... No. | 885 | 973 | 88 | 9.9 | | |
| Total daily capacity of operating plants..... Bls. | 29,300 | 27,525 | | | 1,775 | 6.0 |

List of Manufacturers of Cement.

| OPERATOR AND ADDRESS. | LOCATION OF PLANT. | RAW MATERIALS USED. | KILNS. | | TOTAL DAILY CAPACITY. | WORKS SUPERINTENDENT OR REPRESENTATIVE. |
|---|------------------------------|----------------------|--------|---------------|-----------------------|---|
| | | | No. | LENGTH. | | |
| <i>Nova Scotia.</i> | | | | | | |
| Sydney Cement Co., Ltd., Sydney, N.S., Box 509 | Sydney..... | * Blast furnace slag | | FEET | BARRELS 140(?) | H. C. Burchell |
| <i>Quebec.</i> | | | | | | |
| Canada Cement Co., Ltd., Montreal, Que., Herald Bldg.— | | | | | | |
| Montreal Mill No. 1..... | Montreal East..... | Limestone | 4-4-0 | 125-110-150 | 12,000 | F. P. Jones, Gen. Mgr. |
| Montreal Mill No. 2..... | Longue Pointe..... | " | 4 | 125 | 1,800 | H. E. Doble, Secy. |
| International Mill..... | Mill..... | " | 10 | 60 | 2,800 | F. B. Kilbourn, Supt. |
| La Société des Industries de Chambord | Chambord..... | " | | | | I. S. O'Neil, Supt. |
| <i>Ontario.</i> | | | | | | |
| Canada Cement Co., Ltd., Montreal, Que.— | | | | | | |
| Bellefleur Mill (No. 4)..... | Bellefleur (Point Anne)..... | Limestone | 8 | 60 | 1,800 | H. L. Shock, Supt. |
| Bellefleur Mill (No. 5)..... | (Thurlow Tp)..... | " | 6 | 125 | 2,700 | " |
| Lakerfeld Mill..... | Lakerfeld..... | Marl | 3-5 | 60-100 | 1,233 | E. W. Bailey, Supt. |
| Marbank Mill..... | Marbank (Hungerford Tp)..... | " | 3-5 | 95-60 | 1,200 | C. J. Matt, Supt. |
| Port Colborne Mill..... | Port Colborne..... | Limestone | 4 | 100 | 3,000 | S. R. Preston, Supt. |
| Owen Sound Portland Cement Co., Ltd., Listowel, Ont. | Shallow Lake..... | Marl | 5 | 100 | 1,400 | Mr. Harrington, Supt. |
| The Ontario Portland Cement Co., Ltd., Bramford, 51 George | Wood..... | " | 2 | 100 | 800 | Robt. Oliver |
| The National Portland Cement Co., Ltd., Durham, Ont. | Blue Lake..... | " | 4 | 70 | 500 | Supt. H. Reid, Mgr. |
| The Hanover Portland Cement Co., Ltd., Hanover, Ont. | Durham..... | " | 8 | 70 | 1,400 | V. G. Calder |
| Superior Portland Cement Co., Ltd., Orangeville, Ont. (In liquidation). | Hanover..... | " | 3 | 100 | 750 | E. D. Gruetzer |
| The Union Cement Co., Ltd., Owen Sound, Ont. | Orangeville..... | " | 4 | 80 | 800 | " |
| The Imperial Portland Cement Co., Ltd., Owen Sound, Ont. | Owen Sound..... | Limestone | 4-1 | 60-70 | 800 | E. L. Dates |
| Ben Allen Portland Cement Co., Ltd., Owen Sound, R. R. No. 7 | " | Marl | 3 | 100 | 650 | D. J. Kennedy, V.P. |
| Kirkfield Portland Cement Co., Ltd., Toronto, c-o 15 Wellington, W. Receiver. | " | (Marl) | | | | J. D. McMillan, Pres. |
| St. Marys Cement Limited, Toronto, 49 Wellington E. | Raven Lake..... | Marl | 1-3 | 125-60 | 500 | " |
| The Crown Portland Cement Co., Ltd., Toronto, c-o 85 Bay, Liquidator. | St. Marys..... | Limestone | 1-3 | 160 | 1,800 | " |
| <i>Manitoba.</i> | | | | | | |
| The Commercial Cement Co., Ltd., Winnipeg, Man., 307 Quebec Bank | Warton..... | " | 4 | 100 | 1,200 | J. G. Lund, Supt. |
| Canada Cement Co., Ltd., Montreal, Que..... | Rabcock | Natural P. C. | 6 | 40 (Vertical) | 225 | A. W. Gordon |
| | Fusco, Winnipeg. | Limestone. | 4 | 150 | 3,500 | A. W. Clark, Supt. |

List of Manufacturers of Cement.—Continued.

| OPERATOR AND ADDRESS. | LOCATION OF PLANT. | RAW MATERIALS USED. | KILNS. | | TOTAL DAILY CAPACITY. | WORKS SUPERINTENDENT, OR REPRESENTATIVE. |
|---|---------------------------|---------------------|--------|-------------|-----------------------|--|
| | | | No. | LENGTH. | | |
| <i>Alberta.</i> | | | | | | |
| Canada Cement Co., Ltd., Montreal, Que.— | | | | | | |
| Alberta Mill..... | Calgary..... | * Limestone..... | 3 | 100 | 1,500 | E. French, Supt. |
| Dauntless Mill..... | Dauntless..... | † Limestone..... | 3 | 80-150 | 3,000 | A. G. Beck, Supt. |
| The Rocky Mountains Cement Co., Ltd., Calgary, Alberta, Box 1604. | Exshaw..... | * Limestone..... | 2 | 99 | 1,000 | L. G. Eaton, Supt. |
| The Keystone Portland Cement Co., Ltd., Calgary, Box 1236. | Blairmore..... | "..... | 3 | 140 | 2,000 | W. J. Burd, Supt. |
| The Edmonton Cement Co., Ltd., Edmonton, 707 Tegner Bldg..... | Matlboro..... | "..... | | | | J. R. Patterson, Supt. |
| <i>British Columbia.</i> | | | | | | |
| The Associated Cement Co. (Canada), Ltd., Victoria, B.C., Box 1591. | Bamberton, Tod Inlet..... | Limestone..... | 2 | 185 | 2,000 | H. Anderson. |
| British Columbia Portland Cement Co., Ltd., Vancouver, 615 Hastings W. (in liquidation) | Princeton..... | "..... | 1 | 125 | 600 | Jno. D. Kearna, Liquidator. |
| Vancouver Portland Cement Co., Ltd., Victoria, Box 681..... | Tod Inlet..... | "..... | 1-1-2 | 170-125-155 | 3,000 | R. P. Butchart, Man. Dir. |

*Idle 1916 ‡ New plant, not yet completed. (a) Plant undergoing change from marl to gravel rock, when company went into liquidation.

CLAY AND CLAY PRODUCTS.¹

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

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

The total value of the clay products sold or marketed in 1916 was \$4,120,805, as compared with \$3,914,488 in 1915; \$6,871,957 in 1914; \$9,043,313 in 1913, and \$10,575,869 in 1912.

The production in 1916 showed a slight increase over 1915: \$206,317, or 5.3 per cent. It was but little over one-third the maximum production reached in 1912.

For a few years previous to 1913 the annual production of clay products increased very rapidly, having more than doubled in that period. In 1913, however, the financial stringency affected building operations to such an extent as to greatly reduce the demand for building brick. There was actually a considerable increase in the quantity of common and pressed building brick manufactured during the year, but a large falling off in sales, so that large stocks of brick must have remained in manufacturers' hands at the close of the year. In 1914 there was a large falling off both in quantities of brick made and in quantities sold, and the stocks of common and pressed brick on hand at the end of the year were reported as 242,106,000,

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

The following reports have been published dealing with clays:—

Mines Branch, Department of Mines:

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

"Notes on Clay Deposits near McMurray, Alberta," by Sydney C. Ellis B.Sc., (Bulletin No. 10), 1915. Geological Survey Branch, Department of Mines:

"The Clay and Shale Deposits of Nova Scotia, and Portions of New Brunswick." By H. Ries and J. Keele, 1911.

"Preliminary Report on the Clay and Shale Deposits of the Western Provinces." By H. Ries and J. Keele, 1912.

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

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

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

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

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

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

or about 44 per cent of the number sold during the year. In 1915, there was again a large decrease both in quantity of brick made and in quantities sold. Sales, however, exceeded actual output, stocks having been depleted to a considerable extent to supply demand. Stocks of common and pressed brick on hand at the end of the year were reported as 147,817,000, or about 61 per cent of the stocks reported at the end of 1914. All classes of clay products showed a falling off in production, with the exception of firebrick, pottery and kaolin.

During 1916, however, the total quantity sold was about the same as that manufactured, while stocks of common and pressed brick held on hand at the close of the year, fell to slightly over 100,000,000 and all classes of clay products showed increased sales.

The average number of men employed in 1916 was 4,164 as compared with 4,405 of the previous year, and total wages paid were \$1,740,900, as against \$1,452,828 in 1915.

Of the total value of the sales in 1916, building and paving brick, including fireproofing, contributed \$2,732,000, or about 66.3 per cent, as against \$2,571,153, or about 65.6 per cent of the total in 1915. Sewerpipe and tile production in 1916 were valued at \$1,075,674, or 26.1 per cent of the total, as against \$1,154,742, or 29.5 per cent of the total in 1915. The total value of the production of pottery in 1916 was reported as \$391,173, of which \$61,069 only is estimated as attributable to Canadian clays and the balance to imported clays. Compared with the previous year the production of building, paving and fireproofing brick shows an increase of 6.3 per cent, and the production of sewerpipe and tiles, a decrease of 6.8 per cent.

The value of the production of fireclays and firebrick from domestic clays was \$234,562, as against \$110,693 in 1915. The production of kaolin in 1916 was 1,750 tons, valued at \$17,500, as against 1,300 tons, valued at \$13,000 in 1915.

The average price of common building brick for the whole of Canada in 1916 was \$7.71 per M, as compared with \$7.48 per M in 1915; \$7.99 in 1914; \$8.85 in 1913; \$9.11 in 1912; \$8.37 in 1911; and \$8.13 in 1910. The average prices of pressed, or front brick for the same years were respectively: \$10.95; \$9.89; \$11.91; \$12.40; \$12.85; \$12.53 and \$11.89, thus showing a general increase in the cost of building brick until 1912, falling off again in 1913, 1914, 1915, with a higher price ruling again in 1916.

Ontario is by far the largest producer of clay products, having contributed in 1916 over 52 per cent of the total values marketed during the year as against nearly 58 per cent of the total values marketed during 1915.

Quebec contributed 24.1 per cent in 1916, as against 23.5 per cent in 1915; Alberta 5.5 per cent in 1916, as compared with 2.9 per cent in 1915; Manitoba 2.5 per cent in 1916, as against 2.4 per cent in 1915; and

British Columbia 7.1 per cent in 1916, as compared with 5.8 per cent in the previous year.

Nova Scotia contributed 5.8 per cent of the total values marketed during 1916, as against 5.7 per cent in 1915.

The following tables of production and of imports of clay products furnish comparisons of particular interest. In the first place an estimate of the value of consumption of clay products is furnished.

The total value of the imports in 1916 was \$4,554,167 (not including certain items probably in part covering clay products), and after deducting a small export, a total approximate consumption of clay products valued at \$8,594,860 is shown, of which 48 per cent was of domestic production.

In 1915 the approximate consumption was valued at \$6,867,381 of which 57 per cent was of domestic production.

In 1914 the approximate consumption was valued at \$11,291,024, of which about 61 per cent was of domestic production.

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

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

In the case of building brick, the imports are small compared with the home production, amounting to not much more than 5 per cent of the latter. The imports of paving brick in 1916 were more than double, and those of firebrick about twelve times the Canadian production. The imports of drain tile and sewerpipe were about 4 per cent of the Canadian production.

Statistics of production in 1916 and 1915 of the several classes of clay products by provinces are shown in the following tables:—

Production of Clay Products by Provinces, 1916.

| Province. | Per cent of total value. | No. of active firms reporting. | No. of men employed. | Wages. | Common brick. | | | | Pressed brick. | | | | | | |
|-----------------------|--------------------------|--------------------------------|----------------------|-------------|---------------------|-------------|-----------------|--------|---------------------|------------|-----------------|--------|----------------|--|--------|
| | | | | | No. manu- factured. | No. sold. | Value of sales. | Per M. | No. manu- factured. | No. sold. | Value of sales. | Per M. | | | |
| Nova Scotia..... | 5.79 | 7 | 278 | \$ 98,401 | 10,095,000 | 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 | 94,673,245 | 4,668,357 | 658,009 | 7.03 | 5,810,840 | 3,732,128 | 64,769 | 17.17 | | | |
| Ontario..... | 52.06 | 205 | 2,226 | 942,926 | 108,912,245 | 103,854,020 | 817,321 | 7.87 | 35,249,733 | 37,270,050 | 375,994 | 10.17 | | | |
| Manitoba..... | 2.53 | 11 | 129 | 24,930 | 108,912,245 | 8,911,694 | 91,464 | 10.26 | 769,000 | 340,080 | 1,984 | 18.95 | | | |
| Saskatchewan..... | 1.91 | 11 | 108 | 26,063 | 5,331,000 | 6,751,145 | 58,790 | 8.71 | 1,258,000 | 3,033,321 | 6,586 | 15.32 | | | |
| Alberta..... | 5.46 | 10 | 214 | 94,484 | 5,520,000 | 7,114,890 | 58,360 | 8.70 | 1,258,000 | 191,920 | 34,222 | 11.35 | | | |
| British Columbia..... | 7.10 | 13 | 248 | 133,982 | 5,427,100 | 4,644,495 | 38,196 | 8.23 | 43,360,573 | 492,355 | 3,575 | 18.62 | | | |
| Total..... | 100.00 | 290 | 4,164 | 1,740,900 | 241,521,177 | 237,034,675 | 1,826,844 | 7.71 | 43,360,573 | 44,947,089 | 492,355 | 10.95 | | | |
| Province. | | Paving brick. | | Ornamental. | Refractories. | | Fireproofing. | | Pottery. | | Sewerpipes. | | Tiles, drains. | | Total. |
| | | No. sold. | Value. | | Value. | Value. | Value. | Value. | Value. | Value. | Value. | Value. | Value. | | |
| Nova Scotia..... | | | | | | | | | | | | | | | |
| New Brunswick..... | | | | | | | | | | | | | | | |
| Quebec..... | | | | | | | | | | | | | | | |
| Manitoba..... | | | | | | | | | | | | | | | |
| Saskatchewan..... | | | | | | | | | | | | | | | |
| Alberta..... | | | | | | | | | | | | | | | |
| British Columbia..... | | | | | | | | | | | | | | | |
| Total..... | | | | | | | | | | | | | | | |

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

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

Production of Clay Products by Provinces, 1915.

| Province. | Per cent of total value. | No. of active firms reporting. | No. of men employed. | Wages. | Common brick. | | | | Pressed brick. | | | |
|-----------------------|--------------------------|--------------------------------|----------------------|-------------|--------------------------------|---------------|-----------------|------------|--------------------|------------|-----------------|---------|
| | | | | | No. manuf-actured. | No. sold. | Value of sales. | Per M. | No. manuf-actured. | No. sold. | Value of sales. | Per M. |
| Nova Scotia..... | 5.67 | 11 | 204 | \$ 75,219 | 6,462,000 | 6,462,000 | \$ 48,684 | 7.53 | 100,000 | 100,000 | \$ 1,500 | \$15.00 |
| New Brunswick..... | 0.62 | 5 | 90 | 27,225 | 3,150,000 | 3,075,000 | 33,450 | 9.29 | 50,000 | 40,000 | 50,800 | 15.70 |
| Quebec..... | 23.46 | 33 | 980 | 308,056 | 74,834,071 | 79,734,518 | 566,085 | 7.10 | 3,219,000 | 3,990,517 | 62,766 | 18.75 |
| Ontario..... | 57.60 | 245 | 2,613 | 886,850 | 104,858,929 | 123,977,112 | 910,459 | 7.34 | 37,778,496 | 43,504,736 | 398,308 | 9.16 |
| Manitoba..... | 2.30 | 12 | 199 | 16,835 | 5,076,000 | 8,679,411 | 87,194 | 10.10 | ..... | ..... | ..... | ..... |
| Saskatchewan..... | 1.13 | 13 | 43 | 7,332 | 1,809,000 | 4,134,185 | 36,482 | 8.72 | 55,000 | 423,860 | 7,119 | 16.82 |
| Alberta..... | 2.96 | 13 | 137 | 50,340 | 2,523,887 | 3,753,746 | 32,399 | 8.63 | 1,349,555 | 13,250 | 13,250 | 9.88 |
| British Columbia..... | 5.87 | 17 | 139 | 80,075 | 735,230 | 4,405,280 | 39,734 | 9.23 | 239,652 | 418,492 | 8,951 | 21.41 |
| Total..... | 100.00 | 349 | 4,465 | 1,452,828 | 16,819,067 | 231,732,882 | 1,755,187 | 7.48 | 11,452,148 | 19,817,166 | 492,774 | 9.89 |
| Province. | | Paving brick. | | Ornamental. | Firebrick and fire-clay slabs. | Fireproofing. | Pottery. | Sewerpipe. | Tiles, drain. | Kaolin. | Total. | |
| | | No. sold. | Value. | | | | | | | | | Value. |
| Nova Scotia..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| New Brunswick..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Quebec..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Ontario..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Manitoba..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Saskatchewan..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Alberta..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| British Columbia..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Total..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |

(a) There was also a production of \$252,180 from imported clays. (b) There was also a production of \$23,807 from imported clays.

Sales of Clay Products by Provinces, 1911-1916.

| Province. | 1911. | 1912. | 1913. | 1914. | 1915. | 1916. |
|-----------------------|------------|------------|------------|------------|------------|------------|
| Nova Scotia..... | \$ 274,249 | \$ 272,053 | \$ 332,272 | \$ 266,204 | \$ 221,881 | \$ 238,470 |
| New Brunswick..... | 38,000 | 54,910 | 62,269 | 66,502 | 35,780 | 42,881 |
| Quebec..... | 1,341,467 | 1,680,460 | 1,606,816 | 1,267,700 | 918,425 | 993,664 |
| Ontario..... | 3,916,575 | 4,861,700 | 5,220,467 | 3,979,606 | 2,254,863 | 2,145,036 |
| Manitoba..... | 834,428 | 1,018,051 | 514,358 | 317,488 | 93,674 | 104,248 |
| Saskatchewan..... | 226,958 | 332,943 | 189,820 | 98,349 | 44,406 | 78,668 |
| Alberta..... | 1,052,751 | 1,356,184 | 893,408 | 462,199 | 115,696 | 225,140 |
| British Columbia..... | 675,505 | 996,568 | 684,904 | 413,909 | 229,763 | 292,698 |
| | 8,359,933 | 10,575,869 | 9,504,314 | 6,871,957 | 3,914,488 | 4,120,805 |

Annual Value of Production of Clay Products, 1899-1916.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|-------------|----------------|-------------|----------------|--------------|
| 1899..... | \$2,988,099 | 1905..... | \$3,709,842 | 1911..... | \$ 8,359,933 |
| 1900..... | 3,195,105 | 1906..... | 5,072,635 | 1912..... | 10,575,869 |
| 1901..... | 3,382,706 | 1907..... | 5,772,117 | 1913..... | 9,504,314 |
| 1902..... | 3,625,489 | 1908..... | 4,500,702 | 1914..... | 6,871,957 |
| 1903..... | 4,034,286 | 1909..... | 6,450,840 | 1915..... | 3,914,488 |
| 1904..... | 3,841,560 | 1910..... | 7,629,956 | 1916..... | 4,120,805 |

Exports and Imports.—The total value of the exports of clay products in 1916 was \$80,112, and included 1,746,000 building brick, valued at \$13,942; manufactures of clay valued at \$58,550, and earthenware valued at \$7,620.

In 1915 the total value of the exports of clay products was \$45,572, which included 1,115,000 building brick, valued at \$9,089; manufactures of clay valued at \$25,202, and earthenware valued at \$11,281.

Exports of Clay Products.

| Calendar Year. | Building brick. | | 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 | 18,759 |
| 1913..... | 977 | 8,579 | 27,201 | 16,553 | 52,333 |
| 1914..... | 1,486 | 11,871 | 26,866 | 9,336 | 48,073 |
| 1915..... | 1,155 | 9,089 | 25,202 | 11,281 | 45,572 |
| 1916..... | 1,746 | 13,942 | 58,550 | 7,620 | 80,112 |

The imports of clays and clay products reached a total value during the calendar year 1916 of \$4,554,167, which exceeded the domestic production by \$433,362. The total imports in 1915 were valued at \$2,998,463.

Clay imports are classified by the Department of Customs under three main subdivisions, including: brick, and tile, earthenware and china ware, and clays. The imports of clays in 1916 were valued at \$325,494, and

included chiefly china-clay and fireclay with a small quantity of pipe-clay, and other clays not classified. The value of china-clay imported was \$114,110, and of fireclay \$187,124. In 1915 the total value of the imports of clays was \$237,096, and included china-clay valued at \$124,658, and fireclay at \$87,267. The imports of these clays have varied considerably from year to year, the imports of china-clay in 1914 and fireclay in 1916 being the highest recorded.

The imports classified under brick and tile were valued in 1916 at \$2,048,259, as compared with a value of \$1,301,359 in 1915. A large portion of these imports is made up of firebrick, over 80 per cent in 1916. There is also a considerable import of building and paving brick, of sewer-pipe and drain tile, and of building blocks, and manufactures of clay not specified.

The imports of earthenware and chinaware, of which the most important class is tableware, were valued in 1916 at \$2,180,414, as against \$1,460,010 in 1915. These imports are chiefly of a class of goods not manufactured in Canada and for which the raw materials are not as yet obtainable from Canadian sources.

The detailed record of imports during the calendar years 1911 to 1916 is shown in the next table.

Imports of Clay Products, Calendar Years, 1911 to 1916.

| | 1911. | 1912. | 1913. | 1914. | 1915. | 1916. |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| Imports. | | | | | | |
| Brick and tile.— | | | | | | |
| Bath brick..... | 2,623 \$ | 1,927 \$ | 2,690 \$ | 1,894 \$ | 630 \$ | 902 |
| Building brick..... | 475,865 | 763,470 | 575,269 | 353,353 | 114,958 | 118,687 |
| (a)..... | | | | | 181,145 | 69,353 |
| (b)..... | | | | | 276,817 | 70,268 |
| (c)..... | | | | | 145,063 | 1,162,679 |
| (d)..... | | | | | 577,458 | 2,495,113 |
| (e)..... | | | | | 235,613 | 2,072 |
| Paving brick..... | 814,414 | 983,621 | 976,097 | 535,712 | | |
| (a)..... | | | | | | |
| (b)..... | | | | | | |
| (c)..... | | | | | | |
| (d)..... | | | | | | |
| (e)..... | | | | | | |
| Firebrick n.o.p..... | 5,640 | 4,018 | 12,156 | 2,911 | 346 | |
| Drain tile, not glazed..... | 382,929 | 507,024 | 465,997 | 338,533 | 41,801 | 40,233 |
| Drain pipe, sewerpipe, and earthenware fittings (before, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed)..... | 523,998 | 818,467 | 399,769 | 178,056 | 72,649 | 88,952 |
| Manufactures of clay, n.o.p..... | 2,369,761 | 3,209,190 | 3,121,592 | 1,986,790 | 1,301,359 | 2,048,289 |
| Total..... | 52,106 | 62,161 | 70,632 | 71,683 | 74,864 | 115,499 |
| Earthenware and chinaware..... | 184,291 | 291,804 | 264,090 | 163,431 | 135,252 | 156,329 |
| Brown or coloured earthenware and stoneware, and Rockingham ware..... | 4,933 | 18,304 | 32,599 | 25,935 | 14,252 | 16,632 |
| C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p..... | 1,718,882 | 2,068,362 | 2,185,601 | 1,437,178 | 1,046,000 | 1,566,312 |
| Demi-glazes, churns, or crocks..... | 62,025 | 71,751 | 43,666 | 100,865 | 18,312 | 17,304 |
| Tableware of china, porcelain, white granite or iron-stoneware..... | 123,203 | 160,092 | 173,693 | 100,865 | 40,286 | 41,189 |
| China, and porcelain ware, n.o.p..... | 154,351 | 239,391 | 296,791 | 156,161 | 92,700 | 74,293 |
| Tiles and blocks of earthenware or stone prepared for mosaic flooring..... | 217,951 | 183,001 | 248,106 | 174,146 | 66,771 | 142,865 |
| Earthenware tiles, n.o.p..... | | | | | | |
| Manufactures of earthenware, n.o.p..... | 2,516,536 | 3,094,956 | 3,314,870 | 2,102,222 | 1,460,010 | 2,180,314 |
| Total..... | 125,768 | 137,402 | 149,337 | 150,881 | 124,659 | 114,110 |
| Clays:— | 128,199 | 140,500 | 133,399 | 90,233 | 87,267 | 187,124 |
| China-clay ground, or unground..... | 7,286 | 234 | 385 | 829 | 614 | 2,440 |
| Pipe-clay, ground or unground..... | 17,494 | 20,258 | 31,169 | 46,185 | 24,557 | 21,950 |
| Clays all other, n.o.p..... | 270,247 | 288,394 | 324,290 | 288,128 | 237,066 | 325,494 |
| Totals..... | 5,156,544 | 6,592,540 | 6,769,752 | 4,467,140 | 2,998,465 | 4,554,167 |
| Grand total..... | 285,847 | 382,970 | 477,136 | 350,288 | 182,587 | 173,244 |
| Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material..... | 147,640 | 167,970 | 164,879 | 113,211 | 100,012 | 170,498 |
| Chalk, china or Cornwall stone, cliff stone and feldspar, flintspar, magnesite, ground or unground..... | | | | | | |

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

In addition to the imports of clay products, there is also shown in the preceding table a considerable annual importation of "chalk, china or corn-wall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground", much of which is, no doubt, used in connexion with the manufacture of clay products. The value of these imports during the calendar year 1916 was \$170,498, of which \$124,948 was from the United States, and \$45,550 from Great Britain. The value of the imports under this item during the calendar year 1915 was \$100,012. There is also shown an annual importation of "baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material", the value of such imports during 1916 being \$173,244, as compared with \$182,757 during the year 1915.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and porcelain ware, white granite or iron-stoneware, etc., are brought from France and Japan. The imports during the fiscal year ending March 31, 1916, showing the country of origin, are shown in the next table. Of the brick and tile imported 88.3 per cent was from the United States and 11.6 per cent from Great Britain; and only \$449 worth from all other countries. Of the earthenware and chinaware, 64.4 per cent was imported from Great Britain, 20.1 per cent from the United States; 7.0 per cent from France; and 7.7 per cent from Japan. The crude clays were imported principally from Great Britain and the United States.

Imports of Clay Products during the Twelve Months Ending March 1916, Showing Countries of Origin.

| Imports. | Great Britain. | United States. | France. | Japan. | Other countries. | Total. |
|---|----------------|----------------|---------|---------|------------------|-----------|
| Brick and tile— | | | | | | |
| Bath brick..... | \$ 881 | 12 | | | | \$ 893 |
| Building brick..... | 4,632 | 105,162 | | | | 109,794 |
| Building blocks..... | 1,855 | 136,163 | | | | 138,018 |
| Paving brick..... | 15,267 | 62,585 | | | \$ 447 | 77,852 |
| Firebrick of a class or kind not made in Canada..... | 90,564 | 626,782 | | | | 717,346 |
| Firebrick, n.o.p..... | 34,502 | 281,093 | | | | 315,595 |
| Drain tile, not glazed..... | 12,441 | 21,930 | | | | 34,371 |
| Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and invert blocks, glazed or unglazed..... | 9,849 | 54,166 | | \$ 2 | | 64,017 |
| Manufactures of clay, n.o.p..... | 170,044 | 1,286,782 | | | 447 | 1,459,273 |
| Total..... | 13,830 | 79,170 | 70 | 124 | 426 | 93,620 |
| Earthenware and chinaware— | 85,470 | 45,077 | \$ 549 | 4,951 | 1,256 | 127,099 |
| Brown or coloured earthenware and stoneware, and Rockingham ware..... | 782,139 | 10,693 | | 96,982 | 8,310 | 1,025,248 |
| C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p..... | 5,437 | 37,250 | | | | 42,687 |
| Demi-johns, churns, or crocks..... | 6,507 | 5,980 | | 6,441 | | 19,052 |
| Tableware of china, porcelain, white granite or iron-stoneware..... | 7,252 | 31,570 | | 347 | | 39,526 |
| China and porcelain ware, n.o.p..... | 29,696 | 54,667 | | 348 | | 84,462 |
| Tiles or blocks of earthenware or stone prepared for mosaic flooring..... | 19,843 | 42,061 | 211 | 5,013 | 417 | 67,575 |
| Earthenware tiles, n.o.p..... | 950,944 | 297,276 | 103,815 | 113,777 | 10,941 | 1,476,753 |
| Manufactures of earthenware, n.o.p..... | 50,618 | 77,972 | | | | 128,590 |
| Total..... | 24,014 | 80,801 | | | | 104,847 |
| Clays— | 7 | 1,291 | | | | 1,298 |
| China-clay, ground or unground..... | 454 | 23,499 | | | 7 | 23,992 |
| Fire-clay, ground or unground..... | 75,093 | 183,563 | | | | 258,727 |
| Clays, all other, n.o.p..... | 1,196,081 | 1,769,621 | 103,815 | 113,843 | 11,395 | 3,194,755 |
| Total..... | 37,444 | 55,371 | 3,251 | 3,561 | 0,366 | 100,000 |
| Grand total..... | 72,299 | 102,643 | 158 | | | 175,100 |
| Per cent of total..... | 36,006 | 88,768 | | | | 124,774 |
| Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material | | | | | | |
| Chalk, china or Cornwall stone, cliff stone, and fieldspar, fluorspar, magnesite, ground or unground | | | | | | |

Imports of Clay Products (Total Value) 1900-16.

| Fiscal Year. | Brick and tile.** | Earthenware and chinaware. | Clays. | Totals. |
|----------------|-------------------|----------------------------|-----------|-------------|
| 1900 | \$ 145,914 | \$ 959,526 | \$122,565 | \$1,228,405 |
| 1901 | 333,333 | 1,114,677 | 141,251 | 3,589,271 |
| 1902 | 172,281 | 1,275,093 | 140,521 | 1,587,895 |
| 1903 | 157,783 | 1,406,610 | 176,416 | 1,740,809 |
| 1904 | 259,421 | 1,611,356 | 143,706 | 2,015,483 |
| 1905 | 761,756 | 1,636,214 | 176,805 | 2,574,775 |
| 1906 | 1,000,372 | 1,692,359 | 220,504 | 2,913,235 |
| 1907* | 770,686 | 1,422,880 | 178,249 | 2,371,806 |
| 1908 | 1,079,556 | 2,190,784 | 267,779 | 3,538,060 |
| Calendar Year. | | | | |
| 1909 | 1,249,450 | 1,781,759 | 216,130 | 3,247,339 |
| 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 | 1,301,380 | 1,460,016 | 237,096 | 2,998,465 |
| 1916 | 2,018,259 | 2,180,444 | 325,494 | 4,524,167 |

*9 months ending March 1907.

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

Canadian Customs Duties affecting clays and clay products in force are shown as follows: Supplemented since April 8, 1915 by a war tax of 5 per cent ad valorem Preferential and 7½ per cent Intermediate and General.

Canadian Customs Duties on Clay Products.

| | British Preferential tariff. | Intermediate tariff. | General tariff. |
|---|------------------------------|----------------------|-----------------|
| 281 Firebrick of a class or kind not made in Canada | Free. | Free. | Free. |
| 282 Building brick, paving brick, and nfgs. of clay or cement (n.o.p.) | 32½% | 20% | 22½% |
| 283 Drain tiles not glazed | 15 " | 17½ " | 20 " |
| 284 Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks glazed or unglazed, earthenware tiles (n.o.p.) | 25 " | 32½ " | 35 " |
| 285 Tiles or blocks of earthenware or of stone prepared for mosaic flooring | 20 " | 27½ " | 30 " |
| 286 Earthenware and stoneware, viz., demijohns, churns, or crocks | 20 " | 27½ " | 30 " |
| 287 Tableware of china, porcelain, white granite or ironstone | 15 " | 27½ " | 27½ " |
| 288 Earthenware and stoneware, brown or coloured and Rockingham ware, "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware (n.o.p.) | 20 " | 27½ " | 30 " |
| 289 Closets, urinals, basins, lavatories, baths, bath-tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material | 20 " | 30 " | 35 " |
| 295 Clays, including china-clays, fireclays and pipeclay, not further manufactured than ground; ganister and sand; gravels; earths, crude only | Free. | Free. | Free. |

CLAY BUILDING BRICK.

The total sales from Canadian plants of clay building brick including common and pressed brick, but excluding ornamental, paving, firebrick, and fireproofing brick, are shown by provinces for the past four years in the tables following.

In 1916 the total sales were 281,981,764, valued at \$2,319,199, made up of 237,034,675 common brick, valued at \$1,826,844, or an average value of \$7.71 per thousand, and 44,947,089 pressed brick, valued at \$492,355, or an average value of \$10.95 per thousand. In addition to these, there was a production of ornamental brick valued at \$21,102, and a production of fireproofing brick, valued at \$361,555.

In 1915 the total sales were 284,550,042, valued at \$2,247,961 made up of 234,732,882 common brick, valued at \$1,755,187 or an average value of \$7.48 per thousand, and 49,817,160 pressed brick, valued at \$492,774, or an average value of \$9.89 per thousand. The production of ornamental brick was valued at \$49,097, and fireproofing brick, valued at \$253,401.

In 1914 the total sales were 551,148,620, valued at \$4,769,417, made up of 457,513,762 common, valued at \$3,653,861, or an average value of \$7.99 per thousand, and 93,634,858 pressed brick, valued at \$1,115,556, or an average value of \$11.91 per thousand. There were also 1,554,496 ornamental brick produced, valued at \$23,592 and fireproofing brick and architectural terracotta valued at \$405,543.

Sales of Clay Building Brick (Common and Pressed) 1915 and 1916.

| Province. | 1915. | | | 1916. | | |
|------------------|-------------|-----------|--------------------------|-------------|-----------|--------------------------|
| | No. sold. | Value. | Per cent of total value. | No. sold. | Value. | Per cent of total value. |
| Nova Scotia | 6,562,000 | \$ 50,184 | 2.23 | 8,108,000 | \$ 63,548 | 2.74 |
| New Brunswick | 3,715,000 | 35,030 | 1.56 | 4,140,074 | 42,781 | 1.85 |
| Quebec | 83,735,065 | 628,851 | 27.97 | 97,410,490 | 723,178 | 31.18 |
| Ontario | 167,481,848 | 1,308,767 | 58.22 | 111,135,685 | 1,196,315 | 51.58 |
| Manitoba | 8,630,411 | 87,194 | 3.88 | 9,021,744 | 93,418 | 4.03 |
| Saskatchewan | 4,607,045 | 43,601 | 1.94 | 7,181,145 | 65,376 | 2.82 |
| Alberta | 5,094,301 | 45,649 | 2.03 | 10,148,211 | 92,782 | 4.00 |
| British Columbia | 1,724,372 | 48,685 | 2.17 | 4,836,415 | 41,711 | 1.80 |
| Total | 284,550,042 | 2,247,961 | 100.00 | 281,981,764 | 2,319,199 | 100.00 |

Large stocks of bricks were reported as being in manufacturers' hands at the close of 1915, the total number being 147,817,000 brick, or equivalent to 52 per cent of the year's sales. Stocks at the end of 1916 were reduced to 101,657,000 equivalent to 36 per cent of the year's sales.

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

Common and Pressed Brick Held in Stock by Manufacturers December 31, 1915 and 1916.

| Province. | 1915. | | | 1916. | | |
|------------------------|------------------------|-------------------------|----------------|------------------------|-------------------------|----------------|
| | Common brick. M. | Pressed brick. M. | Total M | Common brick. M. | Pressed brick. M. | Total M. |
| Nova Scotia | 50 | | 500 | 1,980 | 127 | 2,107 |
| New Brunswick | 90 | 42 | 742 | 1,644 | 20 | 1,664 |
| Quebec | 7,826 | 2,539 | 29,415 | 20,535 | 3,884 | 24,419 |
| Ontario | 6,202 | 15,014 | 78,246 | 41,368 | 8,755 | 50,123 |
| Manitoba | 1,804 | 190 | 14,990 | 5,728 | 289 | 6,017 |
| Saskatchewan | 5,054 | 40 | 5,678 | 3,177 | 425 | 3,602 |
| Alberta | 8,433 | 3,750 | 12,125 | 5,417 | 1,502 | 6,919 |
| British Columbia | 6,044 | 151 | 6,171 | 6,060 | 876 | 6,936 |
| Total..... | 127,914 | 23,309 | 147,817 | 85,879 | 15,778 | 101,657 |

The exports of building brick since 1891, and the imports since 1880, are shown in the following tables. The exports have never been large, averaging for a number of years, about \$6,000 per annum. The exports fell off somewhat from 1909 to 1911, but increased again to a value of \$11,871 in 1914, \$9,089 in 1915, and \$13,942 in 1916.

The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value; during the past ten years however, the imports have rapidly increased from \$100,000 to over \$760,000 in 1912. During the calendar year 1916 the imports were 10,083,000 brick, valued at \$118,687 of which 133,000, valued at \$2,351, or an average of \$17.67 per thousand were imported from Great Britain, and 9,950,000, valued at \$116,336, or an average of \$11.69 per thousand from the United States. The imports during the calendar year 1915 were 10,168,000 brick, valued at \$114,958, of which 375,000, valued at \$4,592, or an average value of \$12.24 per thousand, were imported from Great Britain, and 9,793,000, valued at \$110,366, or an average value of \$11.27 per thousand, from the United States.

Exports of Building Brick.

| Calendar Year. | M. | Value. | Calendar Year. | M. | Value. | Calendar Year. | M. | Value. |
|----------------|-------|----------|----------------|-------|----------|----------------|-------|----------|
| 1891 | 246 | \$ 1,163 | 1900 | 546 | \$ 4,528 | 1909 | 365 | \$ 2,255 |
| 1892 | 1,963 | 12,192 | 1901 | 646 | 5,189 | 1910 | 390 | 2,762 |
| 1893 | 6,073 | 44,110 | 1902 | 2,110 | 12,786 | 1911 | 391 | 3,977 |
| 1894 | 1,095 | 7,405 | 1903 | 891 | 5,699 | 1912 | 694 | 8,493 |
| 1895 | 1,655 | 8,665 | 1904 | 696 | 5,357 | 1913 | 977 | 8,579 |
| 1896 | 983 | 5,678 | 1905 | 754 | 5,888 | 1914 | 1,486 | 11,871 |
| 1897 | 573 | 2,679 | 1906 | 697 | 6,541 | 1915 | 1,155 | 9,089 |
| 1898 | 65 | 442 | 1907 | 802 | 6,193 | 1916 | 1,746 | 13,942 |
| 1899 | 172 | 1,351 | 1908 | 2,344 | 9,047 | | | |

Imports of Building Brick.

| Fiscal Year. | M. | Value. | Fiscal Year. | M. | Value. | Fiscal Year. | M. | Value. |
|--------------|-------|----------|--------------|--------|-----------|----------------|--------|-----------|
| 1880..... | 340 | \$ 2,067 | 1893..... | 1,489 | \$ 11,108 | 1906..... | 21,934 | \$194,897 |
| 1881..... | 415 | 4,281 | 1894..... | 2,220 | 18,320 | Calendar Year. | | |
| 1882..... | 3,500 | 24,572 | 1895..... | 575 | 4,705 | 1907..... | 12,961 | 129,235 |
| 1883..... | 1,448 | 14,234 | 1896..... | 1,057 | 23,189 | 1908..... | 14,931 | 110,981 |
| 1884..... | 3,263 | 20,258 | 1897..... | 2,094 | 10,336 | 1909..... | 27,972 | 195,360 |
| 1885..... | 3,108 | 14,632 | 1898..... | 639 | 6,652 | 1910..... | 29,049 | 274,482 |
| 1886..... | 983 | 5,929 | 1899..... | 2,611 | 21,306 | 1911..... | 51,102 | 475,865 |
| 1887..... | 276 | 2,440 | 1900..... | 1,792 | 19,305 | 1912..... | 81,425 | 763,470 |
| 1888..... | 2,483 | 20,720 | 1901..... | 2,800 | 20,677 | 1913..... | 56,846 | 575,269 |
| 1889..... | 2,590 | 24,585 | 1902..... | 4,087 | 33,802 | 1914..... | 30,022 | 353,353 |
| 1890..... | 1,933 | 12,500 | 1903..... | 2,881 | 28,493 | 1915..... | 10,168 | 114,958 |
| 1891..... | 589 | 9,714 | 1904..... | 13,458 | 117,468 | 1916..... | 10,083 | 118,687 |
| 1892..... | 621 | 5,075 | 1905..... | 25,515 | 168,122 | | | |

Prices.—The price of brick varies greatly with the quality, locality, market, or demand. The values, as given in the table of production, are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1916, according to these returns was \$7.71 as compared with \$7.48 in 1915, \$7.99 in 1914, \$8.85 in 1913, and \$9.11 in 1912; and of pressed brick \$10.95 in 1916, as compared with \$9.89 in 1915, \$11.91 in 1914, \$12.49 in 1913, and \$12.86 in 1912.

In the Maritime Provinces during 1916 the price of common brick varied from \$7.50 to \$12.00, averaging for Nova Scotia \$7.49, and for New Brunswick \$10.23. In Quebec, the price of common brick varied between \$5.50 and \$9.00, averaging \$7.03, while the price of pressed brick averaged \$17.17. The average price of common brick in Ontario was \$7.87, and pressed brick was \$10.17. In all the western provinces, common brick ranged from \$8.00 to \$11.50, averaging \$10.26 in Manitoba, \$8.71 in Saskatchewan, \$8.20 in Alberta, and \$8.23 in British Columbia. Pressed brick ranged from \$9.62 to \$25.00 in individual yards, averaging \$18.95 in Manitoba, \$15.32 in Saskatchewan, \$11.35 in Alberta, and \$18.62 in British Columbia.

The following table shows the average values at the kilns, of common and pressed brick, during 1914, 1915, and 1916, as furnished by the producers.

Average Prices per Thousand of Common and Pressed Brick.

| | Common brick. | | | Pressed brick. | | |
|-----------------------|---------------|---------|---------|----------------|----------|---------|
| | 1914. | 1915. | 1916. | 1914. | 1915. | 1916. |
| Nova Scotia..... | \$ 7.75 | \$ 7.53 | \$ 7.49 | \$ 15.32 | \$ 15.00 | \$15.53 |
| New Brunswick..... | 10.61 | 9.29 | 10.23 | 22.50 | 22.00 | 16.62 |
| Quebec..... | 7.40 | 7.10 | 7.03 | 15.91 | 15.73 | 17.17 |
| Ontario..... | 7.86 | 7.34 | 7.87 | 10.77 | 9.16 | 10.17 |
| Manitoba..... | 10.79 | 10.10 | 10.26 | 12.59 | ..... | 18.95 |
| Saskatchewan..... | 8.98 | 8.72 | 8.71 | 17.31 | 16.82 | 15.32 |
| Alberta..... | 7.92 | 8.63 | 8.20 | 13.52 | 9.88 | 11.35 |
| British Columbia..... | 8.56 | 9.23 | 8.23 | 26.50 | 21.41 | 18.62 |
| Canada..... | 7.99 | 7.48 | 7.71 | 11.91 | 9.89 | 10.95 |

PRODUCTION OF BRICK BY PROVINCES.

Nova Scotia and New Brunswick.—The total sales in Nova Scotia were 8,108,000 brick, valued at \$63,548, as compared with sales of 6,562,000 brick, valued at \$50,184 in 1915. The chief sources of production were: Pugwash, Elmsdale, New Glasgow, Wallace Bridge, and Plymouth.

The total sales in New Brunswick were 4,140,074 brick, valued at \$42,781, as compared with 3,715,000 brick, valued at \$35,030 in 1915, the principal points of production being: Fredericton, St. John, Lewisville, St. Leonard, Bathurst, and Grafton.

Quebec.—The total sales of brick in Quebec in 1916 were: 97,410,490, valued at \$723,178, comprising 93,668,357 common brick, valued at \$658,909, or \$7.03 per thousand, and 3,742,133 pressed brick, valued at \$64,269, or \$17.17 per thousand.

The sales in 1915 were 83,735,065, valued at \$628,851, comprising 79,744,548 common brick, valued at \$566,085, or \$7.10 per thousand, and 3,990,517 pressed brick, valued at \$62,766, or \$15.73 per thousand.

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

Ontario.—This Province is credited in 1916 with over 52 per cent of the brick production of Canada, the total sales as reported by 205 firms, being 141,135,685 brick, valued at \$1,196,315, including 103,854,020 common brick, valued at \$817,321, or an average of \$7.87 per thousand, and 37,281,665 pressed brick, valued at \$378,994, or an average of \$10.17 per thousand.

The total sales in 1915 were 167,481,848 brick, valued at \$1,308,767, and included 123,977,112 common brick, valued at \$910,459, or an average of \$7.34 per thousand, and 43,504,736 pressed brick, valued at \$398,308, or an average of \$9.14 per thousand.

The city of Toronto and vicinity, including the counties of York, Peel, and Halton, is the principal brick-making section, and in 1916 produced about 58 per cent of the Ontario production, or about 30 per cent of the total Canadian production of brick. The county of Wentworth, comprising the city of Hamilton and vicinity, produced about 13 per cent of the Ontario production.

The greater part of the pressed brick reported as such was made in the Toronto and Hamilton districts.

The production by principal counties in 1915 and 1916 is shown in the accompanying tables.

53
62
17
17
95
32
35
62
95

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

| County. | Common. | | | Pressed. | | | Total value. | Per cent. |
|----------------------------|-------------|-----------|---------|------------|---------|---------|--------------|-----------|
| | No. | Value. | Per M. | No. | Value. | Per M. | | |
| Algoma..... | 1,325,000 | \$ 12,650 | \$ 9.55 | 4,000 | \$ 60 | \$15.00 | \$ 12,710 | 1.06 |
| Carleton..... | 4,513,088 | 36,973 | 8.19 | | | | 36,973 | 3.09 |
| Halton & Peel..... | 8,567,000 | 60,382 | 7.05 | 28,340,000 | 286,266 | 10.10 | 346,648 | 28.97 |
| Kent..... | 6,215,050 | 48,443 | 7.79 | | | | 48,443 | 4.06 |
| Lincoln..... | 2,137,455 | 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 | 8.77 | | | | 10,191 | 0.85 |
| Peterborough..... | 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 | 8.34 | | | | 12,274 | 1.03 |
| Waterloo..... | 1,892,275 | 14,700 | 7.77 | | | | 14,700 | 1.23 |
| Wentworth..... | 14,442,815 | 101,162 | 7.01 | 6,329,288 | 53,543 | 8.46 | 154,705 | 12.93 |
| York..... | 39,095,893 | 308,798 | 7.90 | 2,608,377 | 39,125 | 15.00 | 347,923 | 29.08 |
| Total, 15 counties..... | 90,007,616 | 709,980 | 7.89 | 37,281,665 | 378,994 | 10.17 | 1,088,974 | 91.03 |
| Total, other counties..... | 13,846,400 | 107,341 | 7.75 | | | | 107,341 | 8.97 |
| Total, Ontario..... | 103,854,020 | 817,321 | 7.87 | 37,281,665 | 378,994 | 10.17 | 1,196,315 | 100.00 |

Sales of Common and Pressed Brick in Ontario by Principal Counties, 1915.

| County. | Common. | | | Pressed. | | | Total value. | Per cent. |
|----------------------------|-------------|-----------|---------|------------|----------|---------|--------------|-----------|
| | No. | Value. | Per M. | No. | Value. | Per M. | | |
| York..... | 48,656,434 | \$336,701 | \$ 6.92 | 2,708,600 | \$37,379 | \$13.80 | \$ 374,080 | 28.56 |
| Halton..... | | | | 25,176,560 | 214,251 | 8.51 | 214,251 | 16.37 |
| Wentworth..... | 5,439,140 | 92,856 | 6.01 | 5,679,873 | 52,356 | 9.22 | 145,212 | 11.10 |
| Peel..... | 11,396,130 | 98,393 | 8.71 | 5,426,438 | 48,095 | 8.86 | 146,488 | 11.19 |
| Carleton..... | 6,028,000 | 47,667 | 7.91 | | | | 47,667 | 3.64 |
| Russell..... | 3,200,000 | 23,400 | 7.31 | 1,000,000 | 12,000 | 12.00 | 35,400 | 2.70 |
| Kent..... | 3,864,300 | 27,973 | 7.24 | | | | 27,973 | 2.14 |
| Grey..... | 1,614,000 | 11,197 | 6.94 | 120,000 | 1,080 | 9.00 | 12,277 | 0.94 |
| Middlesex..... | 4,935,500 | 38,434 | 7.79 | 800,000 | 8,000 | 10.00 | 46,434 | 3.55 |
| Renfrew..... | 2,516,000 | 20,853 | 8.29 | | | | 20,853 | 1.59 |
| Essex..... | 2,693,000 | 19,705 | 7.32 | | | | 19,705 | 1.51 |
| Thunder Bay District..... | 1,010,500 | 11,925 | 11.80 | | | | 11,925 | 0.91 |
| Total, 12 counties..... | 101,252,994 | 729,104 | 7.20 | 40,911,471 | 373,161 | 9.12 | 1,102,265 | 84.22 |
| Total, other counties..... | 22,724,118 | 181,355 | 7.98 | 2,593,265 | 25,147 | 9.70 | 206,502 | 15.78 |
| Total, Ontario..... | 123,977,112 | 910,459 | 7.34 | 43,504,736 | 398,308 | 9.16 | 1,308,767 | 100.00 |

The annual production of common and pressed brick, as ascertained by the Ontario Bureau of Mines, is shown in the following table. The figures differ only slightly from those reported directly to the Mines Branch.

Building Brick Made in Ontario since 1898.

(Is ascertained by the Ontario Bureau of Mines.)

| | Common brick. | | | Pressed brick. | | |
|-----------|---------------|------------|---------------|----------------|-----------|---------------|
| | M. | Value. | Average per M | M. | Value. | Average per M |
| 1898..... | 170,000 | \$ 914,000 | \$5.376 | \$ 8,970 | \$100,344 | \$11.187 |
| 1899..... | 233,898 | 1,313,750 | 5.617 | 10,808 | 105,000 | 9.715 |
| 1900..... | 240,430 | 1,379,590 | 5.738 | 1 562 | 114,419 | 9.896 |
| 1901..... | 259,265 | 1,530,460 | 5.903 | 12,846 | 104,394 | 8.127 |
| 1902..... | 220,500 | 1,111,000 | 6.399 | 19,755 | 144,171 | 7.298 |
| 1903..... | 230,000 | 1,561,700 | 6.790 | 23,703 | 218,550 | 9.220 |
| 1904..... | 200,000 | 1,430,000 | 7.150 | 26,857 | 226,750 | 8.413 |
| 1905..... | 250,000 | 1,937,500 | 7.750 | 26,000 | 234,000 | 9.000 |
| 1906..... | 300,000 | 2,157,000 | 7.190 | 39,860 | 337,795 | 8.475 |
| 1907..... | 273,882 | 2,109,978 | 7.704 | 69,763 | 648,683 | 9.298 |
| 1908..... | 222,361 | 1,575,875 | 7.087 | 56,167 | 485,819 | 8.640 |
| 1909..... | 246,308 | 1,916,147 | 7.779 | 53,167 | 490,571 | 9.227 |
| 1910..... | 304,988 | 2,374,287 | 7.785 | 44,201 | 458,596 | 10.375 |
| 1911..... | 354,546 | 2,801,971 | 7.903 | 52,764 | 564,630 | 10.711 |
| 1912..... | 385,000 | 3,178,250 | 8.255 | 65,598 | 634,169 | 9.667 |
| 1913..... | 408,808 | 3,452,352 | 8.445 | 81,238 | 919,741 | 11.321 |
| 1914..... | 294,400 | 2,336,207 | 7.935 | 61,934 | 656,944 | 10.607 |
| 1915..... | 91,967 | 763,591 | 8.30 | 24,836 | 217,330 | 8.751 |
| 1916..... | 58,541 | 497,896 | 8.52 | (a) | | |

(a) Not separately stated.

In addition to the ordinary clay-building brick, there were produced in this Province, in 1916, ornamental brick, valued at \$17,102, and fire-proofing valued at \$218,345. In 1915 the production of ornamental brick was valued at \$12,140, and of fire-proofing and terra cotta \$41,040.

Manitoba.—All the western provinces showed an increase in brick sales. In Manitoba the total sales were 9,021,744 valued at \$93,448, as compared with sales in 1915 of 8,630,411, valued at \$87,194. Stocks on hand at the end of December 1916 were reported as 6,017,000 brick. The principal brick-making plants are at Winnipeg, St. Boniface, Lac du Bonnet, Portage la Prairie, Sidney, Balmoral, Learys, and Neepawa.

Saskatchewan.—The total sales of clay-building brick in Saskatchewan in 1916 were 7,181,145, valued at \$65,376, as against sales in 1915 of 4,607,045, valued at \$43,601. Stocks on hand at the end of 1916 were 3,502,000. The principal clay plants operated were at Estevan, Shand, Prince Albert, Arcola, Meota, Clay Bank, Pilot Butte, Verigin, and Broadview.

Alberta.—The total sales of clay-building brick in 1916 were 10,148,211, valued at \$98,782, as compared with sales in 1915 of 5,094,301, valued at \$45,649, and stocks on hand at the end of 1916 amounted to 6,919,000 brick. In addition to ordinary building-brick, there was a production of fireproofing brick, valued at \$53,334, as compared with \$30,263 in 1915. The principal centres of production were: Edmonton, Medicine Hat, Redcliff, Lethbridge, and Sandstone.

British Columbia—The total sales of brick in this Province in 1916 were reported as 4,836,415, valued at \$41,771, as against sales in 1915 of 4,724,372, valued at \$48,685, while stocks on hand at the end of the year were 6,936,000 brick. There was also a production of fireproofing brick, valued at \$6,839, as against a value of \$24,983 in 1915. The principal centres of brick manufacture were: Grand Forks, Clayburn, Kilgard, Port Haney and vicinity, Victoria, Sydney, and East Wellington.

CLAY-PAVING BRICK.

The total production of paving bricks and paving blocks in Canada in 1916 was reported as 1,589,893, valued at \$30,144, or an average value of \$18.96 per thousand, as compared with 1,227,647 valued at \$20,694, or an average value of \$16.85 per thousand in 1915.

This paving brick is made chiefly at West Toronto, Ontario, from shale obtained from the banks of the Humber river, although during the past three years there has also been a small production reported from Clayburn, British Columbia.

The annual production has, for a number of years, varied from 3,000,000 to over 5,000,000 per season; and the Ontario output finds a market chiefly in Toronto.

Statistics of production since 1897 are shown in the next table.

The imports of paving brick during the past five years have considerably exceeded the domestic production. During the calendar year 1916 the imports were: 5,667,000, valued at \$70,268, or an average value of \$12.40 per thousand, and included: 4,772,000 valued at \$57,524, or an average of \$12.05, from the United States, and 895,000, valued at \$12,774, or an average of \$14.24 from Great Britain.

The total imports during the calendar year 1915 were 5,865,000, valued at \$76,759, or an average value of \$13.09 per thousand, and included 4,747,000, valued at \$61,468, or an average of \$12.95 from the United States, and 1,118,000, valued at \$15,291 or an average value of \$13.68 from Great Britain.

Annual Production of Paving Brick.*

| Year. | M. | Value. | Average per M. | Year. | M. | Value. | Average per M. |
|-----------|-------|----------|----------------|-----------|-------|----------|----------------|
| 1897..... | 4,568 | \$45,670 | \$10.00 | 1907..... | 3,618 | \$72,354 | \$20.00 |
| 1898..... | | | | 1908..... | 3,720 | 59,456 | 15.98 |
| 1899..... | 5,300 | 42,550 | 8.03 | 1909..... | 3,760 | 67,408 | 17.93 |
| 1900..... | 2,710 | 26,950 | 9.94 | 1910..... | 4,215 | 78,980 | 18.74 |
| 1901..... | 3,689 | 37,000 | 10.03 | 1911..... | 5,220 | 79,444 | 15.22 |
| 1902..... | 4,211 | 42,000 | 9.97 | 1912..... | 4,580 | 85,989 | 18.78 |
| 1903..... | 3,789 | 45,288 | 11.95 | 1913..... | 4,208 | 75,669 | 17.98 |
| 1904..... | 4,436 | 55,450 | 12.50 | 1914..... | 2,707 | 49,627 | 18.33 |
| 1905..... | 4,500 | 54,000 | 12.00 | 1915..... | 1,228 | 20,694 | 16.85 |
| 1906..... | 3,000 | 45,000 | 15.00 | 1916..... | 1,590 | 30,144 | 18.96 |

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

Imports of Paving Brick.

| Year. | M. | Value. | Average per M. | Year. | M. | Value. | Average per M. |
|--------------|-------|----------|----------------|----------------|--------|-----------|----------------|
| Fiscal Year. | | | | Calendar Year. | | | |
| 1895..... | 275 | \$ 5,006 | \$18.20 | 1907..... | 5,438 | \$ 62,570 | \$11.51 |
| 1896..... | 918 | 10,132 | 11.04 | 1908..... | | 100,013 | |
| 1897..... | 52 | 719 | 13.83 | 1909..... | | 139,336 | |
| 1898..... | 367 | 2,337 | 6.37 | 1910..... | 10,503 | 124,994 | 11.90 |
| 1899..... | 1,583 | 23,648 | 11.94 | 1911..... | 11,450 | 164,292 | 14.34 |
| 1900..... | 2,175 | 35,614 | 16.39 | 1912..... | 11,793 | 106,663 | 9.06 |
| 1901..... | 900 | 10,414 | 11.57 | 1913..... | 13,035 | 176,497 | 13.54 |
| 1902..... | 1,030 | 16,788 | 16.30 | 1914..... | 9,069 | 145,063 | 16.00 |
| 1903..... | 1,337 | 18,811 | 14.07 | 1915..... | 5,865 | 76,759 | 13.09 |
| 1904..... | 1,986 | 29,753 | 14.98 | 1916..... | 5,567 | 70,268 | 12.40 |
| 1905..... | 3,350 | 32,578 | 13.86 | | | | |
| 1906..... | 4,104 | 46,008 | 11.21 | | | | |

FIRECLAY AND FIRECLAY PRODUCTS.

There are a number of clays from different parts of Canada that have been used in the manufacture of refractory brick, or firebrick, and for furnace linings, etc., which have been usually termed "fireclays." These include clays found with the coal measures at Westville, Sydney Mines, and North Sydney, N.S., and at Comox, V.I., also clays found south of Moosejaw, at Claybank, Sask., at Clayburn, near the city of Vancouver, B.C., and at Kilgard, B.C. Stove linings and other refractory clay products are made at several places in Ontario and Quebec from imported clays.

The total value of the sales of fireclay, firebrick, and fireclay products in 1916 was \$234,562, as compared with a valuation of \$110,693 in 1915. There was, in addition, in 1916, a production of fireclay products valued at \$22,484 reported as being made from imported clays.

The production in 1916 included fireclay, or refractory clay sold as such, 9,206 tons, valued at \$30,767; firebrick 5,688,511, valued at \$147,757, or an average of \$25.97 per thousand; and other fireclay products valued at \$56,038.

The production in 1915 included fireclay and refractory clay sold as such 2,328 tons, valued at \$12,065; firebrick 2,895,640, valued at \$68,700, or an average of \$23.73 per thousand; and other fireclay products valued at \$29,928.

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

The imports of firebrick during the calendar year 1915 were valued at \$813,071, of which \$718,299 was from the United States, \$93,926 from Great Britain, and \$846 from other countries.

Fireclay was imported during the calendar year 1916 to the value of \$187,124, as compared with a value of \$87,267 in 1915; \$90,233 in 1914; and \$143,399 in 1913.

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

Production of Fireclay and Fireclay Products.

| Year. | Firebrick. | | | Fireclay. | | | Other fireclay products. | Total value. |
|-----------|------------|-----------|---------|-----------|---------|----------|--------------------------|--------------|
| | No. sold. | Value. | Per M. | Tons. | Value. | Per ton. | Value. | |
| 1907..... | 4,323,179 | \$113,322 | \$26.21 | | | | \$18,000 | \$131,322 |
| 1908..... | 2,415,871 | 70,429 | 29.16 | 1,084 | \$8,121 | \$4.09 | 31,752 | 110,302 |
| 1909..... | 1,059,270 | 32,742 | 30.92 | 4,405 | 12,390 | 2.81 | 33,000 | 78,132 |
| 1910..... | 1,375,400 | 21,352 | 21.34 | 1,425 | 5,863 | 4.11 | 15,000 | 50,215 |
| 1911..... | 2,367,937 | 44,122 | 18.63 | 7,532 | 24,128 | 3.20 | 20,880 | 89,130 |
| 1912..... | 3,429,594 | 67,192 | 19.59 | 6,307 | 24,343 | 3.86 | 34,050 | 125,585 |
| 1913..... | 3,667,276 | 86,164 | 23.50 | 3,345 | 14,018 | 4.19 | 42,556 | 142,738 |
| 1914..... | 2,815,690 | 72,299 | 25.67 | 2,171 | 12,875 | 5.93 | 22,394 | 107,568 |
| 1915..... | 2,895,640 | 68,700 | 23.73 | 2,328 | 12,065 | 5.18 | 29,928 | 110,693 |
| 1916..... | 5,688,511 | 147,757 | 25.97 | 9,206 | 30,767 | 3.34 | 56,035 | 231,562 |

Imports of Firebrick and Fireclay.

| Fiscal Year. | Fireclay. | | Firebrick. | | Calendar Year. | Firebrick. | |
|-------------------------|-----------|--------|------------|--------|----------------|------------|------------|
| | Value. | Per M. | Value. | Per M. | | Value. | Per M. |
| 1900..... | \$ 50,291 | | \$ 39,535 | | 1909..... | \$ 86,161 | \$ 485,994 |
| 1901..... | 79,530 | | 32,831 | | 1910..... | 124,293 | 811,927 |
| 1902..... | 64,541 | | 45,608 | | 1911..... | 125,199 | 814,414 |
| 1903..... | 94,509 | | 34,522 | | 1912..... | 140,500 | 953,621 |
| 1904..... | 52,716 | | 38,335 | | 1913..... | 143,399 | 1,192,857 |
| 1905..... | 73,847 | | 44,746 | | 1914..... | 90,233 | 690,133 |
| 1906..... | 131,130 | | 51,892 | | 1915..... | 87,267 | 813,071 |
| 1907 Calendar Year..... | 152,485 | | 641,811 | | 1916..... | 187,124 | 1,657,792 |
| 1908..... | 86,879 | | 380,905 | | | | |

SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1916 was \$716,287, as compared with a value of \$799,446 in 1915, \$1,104,499 in 1914 and \$1,035,906 in 1913. About 45 per cent of the production in 1916 was made in Ontario.

Following is a list of firms reporting production of sewerpipe in 1916:—

Standard Clay Products, Limited, St. Johns, Que., and New Glasgow, N.S.
 Ontario Sewerpipe Company, Mimico, Ont.
 Dominion Sewerpipe Company, Swansea, Ont.
 Hamilton and Toronto Sewerpipe Company, Hamilton, Ont.
 Alberta Clay Products Company, Medicine Hat, Alta.
 Kilgard Fireclay Company, Kilgard, B.C.
 The Clayburn Company, Limited, Clayburn, B.C.
 British Columbia Pottery Company, Victoria, B.C.

The imports of drainpipe and sewerpipe during 1916 were valued at \$40,233, of which \$30,814 were imported from the United States, and \$9,419 from Great Britain.

The total imports during 1915 were valued at \$41,801, of which \$28,496 were imported from the United States, and \$13,305 from Great Britain.

The total sales of drain tile in Canada in 1916 as reported to this Branch were valued at \$359,387, as compared with sales of \$355,296 in 1915 and \$366,340 in 1914. The greater part of this production is in Ontario; the sales in this Province as reported by the producers being 20,205,837, valued at \$343,677, as against 18,812,712, valued at \$341,467 in 1915.

The Ontario Bureau of Mines reports the total number of drain tile made in that Province during 1916, as 16,562,000, valued at \$302,080, or an average of \$18.24 per thousand, as compared with 17,837,000, valued at \$321,253, or an average of \$18.01 per thousand in 1915.

The imports of unglazed tile are comparatively small, the value during the calendar year 1916 being \$2,072, as compared with \$346, in 1915, and \$2,941 in 1914.

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

Production of Sewerpipe.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|-----------|----------------|-----------|----------------|------------|
| 1888..... | \$266,320 | 1898..... | \$181,717 | 1908..... | \$ 514,362 |
| 1889..... | * | 1899..... | 161,546 | 1909..... | 645,722 |
| 1890..... | 348,090 | 1900..... | 231,528 | 1910..... | 774,110 |
| 1891..... | 227,300 | 1901..... | 218,115 | 1911..... | 812,716 |
| 1892..... | 367,660 | 1902..... | 301,968 | 1912..... | 882,641 |
| 1893..... | 350,030 | 1903..... | 317,970 | 1913..... | 1,035,906 |
| 1894..... | 250,325 | 1904..... | 440,894 | 1914..... | 1,104,499 |
| 1895..... | 257,045 | 1905..... | 382,000 | 1915..... | 799,446 |
| 1896..... | 153,875 | 1906..... | 350,045 | 1916..... | 716,287 |
| 1897..... | 161,250 | 1907..... | 667,100 | | |

*Not available.

Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

| Year. | No. | Value. | Year. | No. | Value. | Year. | No. | Value. |
|-----------|------------|-----------|-----------|------------|-----------|-----------|------------|-----------|
| 1891..... | 7,500,000 | \$ 90,000 | 1900..... | 19,544,000 | \$209,738 | 1909..... | 27,418,000 | \$363,555 |
| 1892..... | 10,000,000 | 100,000 | 1901..... | 21,592,000 | 231,374 | 1910..... | 21,028,000 | 318,460 |
| 1893..... | 17,300,000 | 190,000 | 1902..... | 17,510,000 | 199,000 | 1911..... | 21,630,000 | 349,558 |
| 1894..... | 25,000,000 | 280,000 | 1903..... | 18,200,000 | 227,000 | 1912..... | 16,463,000 | 279,579 |
| 1895..... | 14,330,000 | 157,000 | 1904..... | 16,000,000 | 210,000 | 1913..... | 16,935,000 | 292,767 |
| 1896..... | 13,200,000 | 144,000 | 1905..... | 15,000,000 | 220,000 | 1914..... | 14,710,000 | 277,530 |
| 1897..... | * | * | 1906..... | 17,700,000 | 252,500 | 1915..... | 17,837,000 | 321,253 |
| 1898..... | 22,668,000 | 225,000 | 1907..... | 15,578,000 | 230,154 | 1916..... | 16,562,000 | 302,080 |
| 1899..... | 21,027,400 | 240,246 | 1908..... | 24,800,000 | 338,622 | | | |

*Not stated.

Imports of Drain Tile and Sewerpipe.

| Fiscal Year. | Drain tile. (a) | Sewerpipe. (b) | Fiscal Year. | Drain tile. (a) | Sewerpipe. (b) |
|--------------|--------------------|-------------------|----------------|--------------------|-------------------|
| 1880 | | \$33,796 | 1899 | \$ 1,817 | \$ 32,071 |
| 1881 | | 37,368 | 1900 | 1,383 | 37,766 |
| 1882 | | 70,061 | 1901 | 1,264 | 54,819 |
| 1883 | | 70,699 | 1902 | 269 | 55,261 |
| 1884 | \$5,585 | 66,170 | 1903 | 252 | 57,106 |
| 1885 | 2,911 | 66,678 | 1904 | 1,637 | 53,938 |
| 1886 | 1,905 | 56,048 | 1905 | 1,229 | 101,166 |
| 1887 | 2,193 | 69,020 | 1906 | 3,727 | 141,353 |
| 1888 | 4,290 | 96,967 | Calendar Year. | | |
| 1889 | 2,346 | 86,869 | 1907 | 2,011 | 130,698 |
| 1890 | 3,780 | 73,651 | 1908 | 2,056 | 108,189 |
| 1891 | 673 | 86,522 | 1909 | 2,785 | 170,280 |
| 1892 | 473 | 59,064 | 1910 | 4,485 | 175,599 |
| 1893 | 110 | 38,891 | 1911 | 5,640 | 382,929 |
| 1894 | 53 | 24,572 | 1912 | 4,018 | 507,024 |
| 1895 | 695 | 20,358 | 1913 | 12,156 | 465,997 |
| 1896 | 339 | 18,957 | 1914 | 2,941 | 348,533 |
| 1897 | 416 | 33,870 | 1915 | 346 | 41,801 |
| 1898 | 157 | 29,454 | 1916 | 7,072 | 40,233 |

(a) Drain tile, not glazed.

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

POTTERY AND EARTHENWARE.

The pottery made from Canadian clays has been, hitherto chiefly of the common grades, such as flower pots, jardinières, crocks, jars, churns, etc. A number of potters made a higher grade product of stoneware, but the majority of these used imported clays. Sanitary ware is made at St. Johns, Que., and at other points, but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitary ware in 1916, according to returns received, was \$391,173, of which it is estimated that a value of \$330,104 is attributable to imported clays. The total value of the production in 1915 was \$317,080, of which a value of \$252,180 was credited to imported clays.

Annual statistics of production are shown herewith:—

Annual Production of Pottery.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|---------------|----------------|-----------|----------------|-----------|
| 1888 | \$27,750 | 1898 | \$211,675 | 1908 | \$200,541 |
| 1889 | Not available | 1899 | 185,000 | 1909 | 285,285 |
| 1890 | 195,242 | 1900 | 200,000 | 1910 | 250,924 |
| 1891 | 258,844 | 1901 | 200,000 | 1911 | 102,493 |
| 1892 | 265,811 | 1902 | 200,000 | 1912 | 43,955 |
| 1893 | 213,186 | 1903 | 200,000 | 1913 | 53,533 |
| 1894 | 162,144 | 1904 | 140,000 | 1914 | 35,371 |
| 1895 | 151,588 | 1905 | 120,000 | 1915 | 64,900 |
| 1896 | 164,427 | 1906 | 150,000 | 1916 | 61,069 |
| 1897 | 129,629 | 1907 | 252,399 | | |

Details of the imports of earthenware and chinaware showing the values imported and the countries of origin, have already been shown in the general table of imports.

The imports in 1916 were valued at \$2,180,414, as compared with a value \$1,460,010 in 1915; \$2,192,222 in 1914; and \$3,314,870 in 1913. These imports are subdivided into eight classes, and in 1916 included: Brown or coloured earthenware, etc., \$145,490; C.C., or cream-coloured ware, decorated, printed, sponged, etc., \$176,329; demijohns, churns, or crocks, \$16,632; tableware of china, porcelain, white granite, etc., \$1,566,312; china and porcelain ware, n.o.p., \$17,304; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$41,189; earthenware tiles, n.o.p. \$74,293; manufactures of earthenware, n.o.p., \$142,865.

The imports in 1915 included: Brown, or coloured earthenware, etc., \$74,864; C.C. or cream-coloured ware, decorated, printed, sponged, etc., \$135,425; demijohns, churns, or crocks, \$14,752; tableware of china, porcelain, white granite, etc., \$1,016,900; china and porcelain ware, n.o.p., \$18,312; tiles, or blocks of earthenware, or stone prepared for mosaic flooring, \$40,286; earthenware tiles, n.o.p., \$92,700; manufactures of earthenware, n.o.p., \$66,771.

It will be observed that there has been a large decrease in all but two classes of earthenware and chinaware imported in 1916. Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, France, Japan, and other countries.

Imports of Earthenware and Chinaware.

| Fiscal Year. | Value. | Fiscal Year. | Value. | Fiscal Year. | Value. |
|--------------|-----------|--------------|------------|--------------------|-------------|
| 1880..... | \$322,333 | 1893..... | \$ 709,737 | 1906..... | \$1,692,359 |
| 1881..... | 439,029 | 1894..... | 695,314 | 1907 (9 mos.)..... | 1,422,880 |
| 1882..... | 646,734 | 1895..... | 547,935 | 1908..... | 2,190,784 |
| 1883..... | 657,886 | 1896..... | 575,493 | Calendar Year. | |
| 1884..... | 544,586 | 1897..... | 595,822 | 1909..... | 1,781,759 |
| 1885..... | 511,853 | 1898..... | 675,874 | 1910..... | 2,283,116 |
| 1886..... | 599,269 | 1899..... | 916,727 | 1911..... | 2,316,536 |
| 1887..... | 750,691 | 1900..... | 959,526 | 1912..... | 3,094,956 |
| 1888..... | 697,082 | 1901..... | 1,114,677 | 1913..... | 3,314,870 |
| 1889..... | 697,949 | 1902..... | 1,275,093 | 1914..... | 2,492,222 |
| 1890..... | 695,206 | 1903..... | 1,406,610 | 1915..... | 1,460,010 |
| 1891..... | 634,907 | 1904..... | 1,611,356 | 1916..... | 2,180,414 |
| 1892..... | 748,810 | 1905..... | 1,636,214 | | |

KAOLIN.

The shipments of kaolin in 1916 were 1,750 tons, valued at \$17,500, as compared with 1,300 tons, valued at \$13,000 in 1915.

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

Annual Production of Kaolin.

| Year. | Tons. | Value | Average. |
|-----------|-------|--------|----------|
| 1912..... | 20 | \$ 160 | \$ 8.00 |
| 1913..... | 500 | 5,000 | 10.00 |
| 1914..... | 1,000 | 10,000 | 10.00 |
| 1915..... | 1,300 | 13,000 | 10.00 |
| 1916..... | 1,750 | 17,500 | 10.00 |

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

The imports of china-clay, ground and unground, into Canada during the twelve months ending December 1916, were 19,062 tons, valued at \$114,110, or \$5.99 per ton, as against imports of 21,940 tons, valued at \$124,658, or \$5.68 per ton in 1915.

The imports of earthenware and chinaware, as already noted, were valued at \$2,180,414 in 1916, \$1,460,010 in 1915, \$2,192,222 in 1914, and \$3,314,870 in 1913, and consist chiefly of tableware of china, porcelain, etc.

Annual Imports of China-Clay.

| Calendar Year. | Tons. | Value. | Value per ton. |
|----------------|--------|-----------|----------------|
| 1907..... | 13,242 | \$102,209 | \$7.72 |
| 1908..... | 10,781 | 87,984 | 8.16 |
| 1909..... | 12,791 | 100,066 | 7.82 |
| 1910..... | 18,216 | 142,125 | 7.80 |
| 1911..... | 18,819 | 125,768 | 6.68 |
| 1912..... | 18,332 | 127,402 | 6.95 |
| 1913..... | 21,164 | 149,337 | 7.06 |
| 1914..... | 20,437 | 150,881 | 7.38 |
| 1915..... | 21,940 | 124,658 | 5.68 |
| 1916..... | 19,062 | 114,110 | 5.99 |

LIME.

The production of lime which in 1916 amounted to 5,493,250 bushels (equivalent to about 192,264 tons), valued at \$1,091,463, or an average of 20 cents per bushel, or \$5.75 per ton, shows an increase of 446,006 bushels, or 8.8 per cent over the 1915 production, of 5,047,244 bushels (equivalent to about 176,654 tons), valued at \$1,015,702, also an average of 20 cents per bushel.

In 1914 the production was 7,028,582 bushels (equivalent to about 246,000 tons), valued at \$1,360,628, an average of 19 cents per bushel, or \$5.53 per ton.

Returns were received from 76 firms in 1916, as compared with 78 firms in 1915. The average number of men employed in 1916 was 758, and wages paid \$381,365, as against 633 men employed and \$293,735 paid in wages in 1915. Statistics in respect to labour and wages in lime production, however, should be used with some discrimination, as many firms producing lime are also engaged in the quarrying of stone for purposes other than lime-burning, and are unable to make separate reports as to labour employed. This is particularly evident in the records from Nova Scotia and New Brunswick, since, for the first mentioned, the record includes only the labour employed at the kilns, while, for the latter, quarry costs are also included.

The average price per bushel of lime sold in 1916 varied from a minimum 18 cents in Ontario to a maximum 34 cents in British Columbia.

Over 84 per cent of the total production in 1916 was derived from Ontario, Quebec, and the Maritime Provinces, as against 88 per cent of the total from these provinces in 1915, 85 per cent in 1914, and 72 per cent in 1912.

The production of hydrated lime, amounting to a total of 9,137 tons, was reported by six firms, viz.: The Standard Lime Company, Limited, Joliette, Que.; The Standard White Lime Company, and The Ontario Reformatory at Guelph, The Elora White Lime Company, Limited, Elora, and The Contractors Supply Company, Limited, Orangeville, in Ontario; and the Pacific Lime Company, Limited, Blubber Bay, B.C.

Lime Production by Provinces, 1916.

| Province. | No. of active firms reporting. | Men employed. | Wages paid. | SALES. | | | |
|-----------------------|--------------------------------|---------------|-------------|-----------|-----------|---------------------|--------------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent of total value. |
| P. E. Island..... | 1 | 2 | \$ 81 | 1,734 | \$ 546 | \$ 0.315 | 0.05 |
| Nova Scotia..... | 1 | 10 | 8,956 | 909,800 | 181,060 | 0.200 | 16.67 |
| New Brunswick..... | 5 | 82 | 45,272 | 424,113 | 104,635 | 0.247 | 9.59 |
| Quebec..... | 21 | 270 | 101,121 | 1,498,845 | 267,119 | 0.178 | 24.47 |
| Ontario..... | 37 | 278 | 161,312 | 2,031,396 | 367,115 | 0.181 | 33.64 |
| Manitoba..... | 5 | 54 | 30,232 | 355,301 | 83,754 | 0.236 | 7.67 |
| Alberta..... | 3 | 18 | 7,919 | 78,019 | 20,033 | 0.257 | 1.84 |
| British Columbia..... | 3 | 44 | 26,472 | 194,042 | 66,301 | 0.342 | 6.07 |
| Total..... | 76 | 758 | 381,365 | 5,493,250 | 1,091,463 | 0.199 | 100.00 |

Lime Production by Provinces, 1915.

| Province. | No. of active firms reporting. | Men employed. | Wages paid. | SALES. | | | |
|-----------------------|--------------------------------|---------------|-------------|-----------|------------|---------------------|--------------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent of total value. |
| Nova Scotia..... | 1 | 10 | \$ 4,802 | 915,086 | \$ 183,017 | \$0.200 | 18.02 |
| New Brunswick..... | 5 | 77 | 39,572 | 369,117 | 93,797 | 0.254 | 9.23 |
| Quebec..... | 20 | 209 | 100,449 | 1,351,306 | 274,831 | 0.203 | 27.06 |
| Ontario..... | 40 | 240 | 97,298 | 1,903,914 | 328,515 | 0.173 | 32.34 |
| Manitoba..... | 5 | 55 | 27,948 | 281,432 | 71,372 | 0.254 | 7.03 |
| Alberta..... | 4 | 22 | 8,288 | 74,152 | 14,415 | 0.195 | 1.42 |
| British Columbia..... | 3 | 20 | 15,378 | 152,237 | 49,725 | 0.327 | 4.90 |
| Total..... | 78 | 633 | 293,735 | 5,047,244 | 1,015,702 | 0.201 | 100.00 |

Lime Production by Provinces, 1914.

| Province. | No. of active firms reporting. | Men employed. | Wages paid. | SALES. | | | |
|-----------------------|--------------------------------|---------------|-------------|-----------|-----------|---------------------|--------------------------|
| | | | | Bushels. | Value. | Average per bushel. | Per cent of total value. |
| P. E. Island..... | 1 | 2 | \$ 61 | 1,693 | \$ 542 | \$0.32 | 0.04 |
| Nova Scotia..... | 1 | 15 | 6,900 | 516,029 | 103,206 | 0.20 | 7.59 |
| New Brunswick..... | 5 | 89 | 47,224 | 391,739 | 102,980 | 0.26 | 7.57 |
| Quebec..... | 18 | 258 | 137,640 | 1,767,935 | 389,064 | 0.22 | 28.59 |
| Ontario..... | 43 | 429 | 224,937 | 3,393,078 | 556,850 | 0.16 | 40.92 |
| Manitoba..... | 7 | 123 | 47,331 | 526,167 | 92,898 | 0.18 | 6.83 |
| Alberta..... | 6 | 58 | 25,963 | 283,252 | 58,321 | 0.21 | 4.29 |
| British Columbia..... | 4 | 41 | 28,275 | 151,689 | 56,767 | 0.37 | 4.17 |
| Total..... | 85 | 1,015 | 518,331 | 7,028,582 | 1,360,628 | 0.19 | 100.00 |

Annual Production of Lime by Provinces.

| Year. | NOVA SCOTIA. | | | P. E. ISLAND. | | | NEW BRUNSWICK. | | | QUEBEC. | | | ONTARIO. | | |
|-------|--------------|-----------|----------|---------------|---------|----------|----------------|-----------|----------|--------------|-----------|----------|-----------|-----------|----------|
| | Bushels. | Value. | Average. | Bushels. | Value. | Average. | Bushels. | Value. | Average. | Bushels. | Value. | Average. | Bushels. | Value. | Average. |
| 1906 | 50,000 | \$ 13,600 | \$0.27 | 15,000 | \$4,900 | \$0.33 | 405,450 | \$ 94,200 | \$0.23 | 923,563 | \$101,816 | \$0.22 | 2,885,000 | \$196,785 | \$0.17 |
| 1907 | 30,000 | 11,100 | 0.37 | 13,500 | 4,100 | 0.30 | 553,430 | 131,700 | 0.24 | 1,053,856 | 262,900 | 0.25 | 2,333,870 | 303,474 | 0.17 |
| 1908 | 37,500 | 12,000 | 0.32 | 13,500 | 4,400 | 0.33 | 155,738 | 43,200 | 0.28 | 857,700 | 201,357 | 0.23 | 2,087,731 | 358,507 | 0.17 |
| 1909 | 37,500 | 11,250 | 0.30 | 20,230 | 5,470 | 0.27 | 697,466 | 151,151 | 0.22 | 1,251,221 | 315,633 | 0.25 | 2,610,553 | 434,137 | 0.16 |
| 1910 | 40,000 | 8,500 | 0.21 | 15,750 | 4,690 | 0.30 | 470,050 | 105,593 | 0.23 | 1,134,585 | 292,120 | 0.26 | 2,988,020 | 476,137 | 0.16 |
| 1911 | 638,500 | 123,700 | 0.20 | 20,250 | 6,765 | 0.33 | 613,725 | 132,897 | 0.22 | 1,727,641 | 356,451 | 0.20 | 3,300,265 | 538,902 | 0.17 |
| 1912 | 638,500 | 123,700 | 0.20 | 24,971 | 8,191 | 0.33 | 616,835 | 133,713 | 0.22 | 1,727,641 | 356,451 | 0.20 | 3,300,265 | 538,902 | 0.17 |
| 1913 | 831,050 | 176,980 | 0.21 | 4,762 | 1,129 | 0.30 | 392,985 | 98,811 | 0.25 | 1,616,416 | 474,895 | 0.29 | 3,376,193 | 573,266 | 0.17 |
| 1914 | 516,020 | 104,210 | 0.20 | 3,762 | 1,542 | 0.32 | 391,739 | 102,950 | 0.26 | 1,767,035 | 474,895 | 0.27 | 3,376,193 | 573,266 | 0.17 |
| 1915 | 915,086 | 183,017 | 0.20 | 1,693 | 542 | 0.32 | 369,117 | 93,797 | 0.25 | 1,351,406 | 373,831 | 0.28 | 3,493,078 | 556,850 | 0.16 |
| 1916 | 909,800 | 181,960 | 0.20 | 1,731 | 531 | 0.31 | 423,113 | 104,635 | 0.25 | 1,498,845 | 367,119 | 0.25 | 2,931,396 | 367,115 | 0.18 |
| | MANITOBA. | | | SASKATCHEWAN. | | | ALBERTA. | | | B. COLUMBIA. | | | CANADA. | | |
| 1906 | 620,201 | 119,792 | 0.19 | 3,709 | 1,486 | 0.40 | 240,000 | 56,200 | 0.23 | 193,192 | 26,692 | 0.25 | 3,230,476 | 1,009,177 | 0.19 |
| 1907 | 431,504 | 84,793 | 0.20 | ..... | ..... | ..... | 173,040 | 41,225 | 0.24 | 159,467 | 44,837 | 0.31 | 4,755,316 | 974,595 | 0.20 |
| 1908 | 431,504 | 84,793 | 0.20 | ..... | ..... | ..... | 135,000 | 34,500 | 0.26 | 176,435 | 44,837 | 0.25 | 3,601,468 | 712,447 | 0.20 |
| 1909 | 423,954 | 69,676 | 0.17 | ..... | ..... | ..... | 281,125 | 67,350 | 0.24 | 231,469 | 75,057 | 0.32 | 3,892,924 | 1,132,756 | 0.20 |
| 1910 | ..... | ..... | ..... | ..... | ..... | ..... | 303,214 | 69,268 | 0.23 | 196,878 | 75,657 | 0.37 | 2,838,140 | 1,137,070 | 0.19 |
| 1911 | ..... | ..... | ..... | ..... | ..... | ..... | 434,038 | 100,307 | 0.23 | 351,012 | 117,756 | 0.31 | 2,838,140 | 1,137,070 | 0.19 |
| 1912 | ..... | ..... | ..... | ..... | ..... | ..... | 704,250 | 166,530 | 0.25 | 517,329 | 118,368 | 0.35 | 3,372,520 | 1,343,890 | 0.22 |
| 1913 | ..... | ..... | ..... | ..... | ..... | ..... | 465,250 | 115,355 | 0.25 | 362,571 | 151,686 | 0.32 | 2,858,851 | 1,343,890 | 0.22 |
| 1914 | ..... | ..... | ..... | ..... | ..... | ..... | 280,252 | 58,331 | 0.21 | 151,686 | 56,767 | 0.37 | 2,858,851 | 1,343,890 | 0.22 |
| 1915 | ..... | ..... | ..... | ..... | ..... | ..... | 74,152 | 14,445 | 0.20 | 152,237 | 49,725 | 0.33 | 2,858,851 | 1,343,890 | 0.22 |
| 1916 | ..... | ..... | ..... | ..... | ..... | ..... | 78,019 | 20,033 | 0.26 | 194,042 | 66,301 | 0.34 | 5,493,250 | 1,091,463 | 0.20 |

Exports and Imports.—The value of the lime exported during the calendar year 1916 was \$66,406, the destination being mainly the United States. In 1915 the exports were valued at \$15,617. The imports of lime during the calendar year 1916 were 211,780 barrels (21,178 tons), valued at \$96,332, or an average of 46 cents per barrel, and were derived chiefly from the United States. The imports during 1915 were 189,774 barrels (18,977 tons), valued at \$98,040, or an average of 52 cents per barrel.

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

Exports of Lime.

| Calendar Year. | Value. | Calendar Year. | Value. | Calendar Year. | Value. |
|----------------|-----------|----------------|-----------|----------------|----------|
| 1891..... | \$119,853 | 1900..... | \$ 80,852 | 1909..... | \$48,821 |
| 1892..... | 121,535 | 1901..... | 99,194 | 1910..... | 44,762 |
| 1893..... | 86,623 | 1902..... | 116,009 | 1911..... | 39,536 |
| 1894..... | 83,670 | 1903..... | 131,412 | 1912..... | 35,097 |
| 1895..... | 71,697 | 1904..... | 73,838 | 1913..... | 29,234 |
| 1896..... | 70,820 | 1905..... | 85,723 | 1914..... | 16,927 |
| 1897..... | 53,177 | 1906..... | 57,072 | 1915..... | 15,617 |
| 1898..... | 49,594 | 1907..... | 55,903 | 1916..... | 66,406 |
| 1899..... | 73,565 | 1908..... | 43,316 | | |

Imports of Lime.

| Year. | Barrels. | Value. | Average value. | Year. | Barrels. | Value. | Average value. |
|--------------|----------|---------|----------------|----------------|----------|-----------|----------------|
| Fiscal Year. | | | | Fiscal Year. | | | |
| 1880..... | 6,100 | \$6,013 | \$0.99 | 1899..... | 15,720 | \$ 11,124 | \$ 0.71 |
| 1881..... | 5,796 | 4,177 | 0.72 | 1900..... | 12,865 | 11,211 | 0.87 |
| 1882..... | 5,064 | 5,365 | 1.06 | 1901..... | 19,657 | 14,534 | 0.74 |
| 1883..... | 7,623 | 9,224 | 1.21 | 1902..... | 24,602 | 17,584 | 0.71 |
| 1884..... | 10,801 | 11,200 | 1.04 | 1903..... | 31,108 | 22,470 | 0.72 |
| 1885..... | 12,072 | 11,503 | 0.95 | 1904..... | 54,359 | 39,639 | 0.73 |
| 1886..... | 11,021 | 9,347 | 0.85 | 1905..... | 98,676 | 71,588 | 0.73 |
| 1887..... | 10,835 | 8,524 | 0.79 | 1906..... | 134,334 | 93,630 | 0.70 |
| 1888..... | 10,142 | 7,537 | 0.74 | Calendar Year. | | | |
| 1889..... | 13,079 | 9,363 | 0.72 | 1907..... | 126,285 | 99,179 | 0.79 |
| 1890..... | 3,149 | 5,360 | 0.66 | 1908..... | 143,270 | 99,196 | 0.69 |
| 1891..... | 6,259 | 4,273 | 0.68 | 1909..... | 168,357 | 118,239 | 0.70 |
| 1892..... | 6,132 | 4,241 | 0.69 | 1910..... | 212,502 | 138,847 | 0.65 |
| 1893..... | 6,879 | 4,917 | 0.71 | 1911..... | 228,538 | 161,985 | 0.71 |
| 1894..... | 6,766 | 4,907 | 0.73 | 1912..... | 329,925 | 207,481 | 0.63 |
| 1895..... | 12,008 | 5,733 | 0.48 | 1913..... | 386,693 | 238,271 | 0.62 |
| 1896..... | 10,239 | 7,331 | 0.72 | 1914..... | 340,828 | 211,123 | 0.62 |
| 1897..... | 16,108 | 10,529 | 0.65 | 1915..... | 189,774 | 98,040 | 0.52 |
| 1898..... | 12,850 | 9,002 | 0.70 | 1916*..... | 211,780 | 96,332 | 0.46 |

*Duty 20 per cent.

The Province of Ontario is the principal lime producing province, having in recent years contributed from 30 to 42 per cent of the total output. In 1916 the contribution was 37 per cent of the total production.

Statistics of the annual production of lime in Ontario, as published by the Ontario Bureau of Mines since 1896, are shown in the next table. For the years previous to 1910 these returns are slightly higher than those obtained by the Mines Branch.

Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

| Calendar Year. | Bushels. | Value. | Average per bushel. | Calendar Year. | Bushels. | Value. | Average per bushel. |
|----------------|-----------|-----------|---------------------|----------------|-----------|-----------|---------------------|
| 1896..... | 1,800,000 | \$222,000 | \$0.12 | 1907..... | 2,650,000 | \$418,700 | \$0.17 |
| 1897..... | ..... | ..... | ..... | 1908..... | 2,442,331 | 448,596 | 0.18 |
| 1898..... | 2,620,000 | 308,000 | 0.12 | 1909..... | 2,633,500 | 470,858 | 0.18 |
| 1899..... | 4,342,500 | 535,000 | 0.12 | 1910..... | 2,889,235 | 474,531 | 0.16 |
| 1900..... | 3,893,000 | 544,000 | 0.14 | 1911..... | 2,469,773 | 402,340 | 0.16 |
| 1901..... | 4,100,000 | 550,000 | 0.13 | 1912..... | 2,297,525 | 381,672 | 0.17 |
| 1902..... | 4,300,000 | 617,000 | 0.14 | 1913..... | 2,300,991 | 390,600 | 0.17 |
| 1903..... | 3,400,000 | 520,000 | 0.15 | 1914..... | 2,075,228 | 333,407 | 0.16 |
| 1904..... | 2,600,000 | 406,800 | 0.16 | 1915..... | 1,340,394 | 244,953 | 0 |
| 1905..... | 3,100,000 | 424,700 | 0.14 | 1916*..... | 1,367,005 | 243,942 | 0. |
| 1906..... | 2,885,000 | 496,785 | 0.17 | | | | |

*Prelim

SAND-LIME BRICK.

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

In 1916 the sales were reported as 16,540,747 brick, valued at \$126,235, or an average of \$7.63 per thousand, as against sales in 1915 of 17,960,802 brick, valued at \$141,742, or an average of \$7.89 per thousand. During 1916 a decrease in sales is shown. Sales were made very largely from stock since the total number of brick made during the year was reported as only 13,884,400, while stocks at the end of the year amounted to 5,178,175 brick.

Annual Production of Sand-Lime Brick.

| Calendar Year. | No. of firms reporting sales. | Number sold. | Value. | Per M. |
|----------------|-------------------------------|--------------|------------|---------|
| 1907..... | 10 | 16,492,971 | \$ 167,795 | \$10.17 |
| 1908..... | 9 | 17,288,260 | 152,856 | 8.84 |
| 1909..... | 9 | 27,052,864 | 201,650 | 7.45 |
| 1910..... | 13 | 44,593,541 | 371,857 | 8.34 |
| 1911..... | 16 | 51,535,243 | 442,427 | 8.58 |
| 1912..... | 20 | 96,448,402 | 1,020,386 | 10.58 |
| 1913..... | 22 | 92,586,676 | 906,665 | 9.79 |
| 1914..... | 21 | 70,650,030 | 609,515 | 8.63 |
| 1915..... | 18 | 17,960,802 | 141,742 | 7.89 |
| 1916..... | 15 | 16,540,747 | 126,235 | 7.63 |

SAND AND GRAVEL.

The production of sand and gravel in Canada during 1916, according to returns received by this office, amounted to 8,156,207 tons, valued at \$1,838,320, showing an increase in quantity of 1,710,490 tons or 26.5 per cent, and an increase in value of \$213,553 or 13.1 per cent, as compared with the production reported for 1915.

The 1916 production included: building sand and sand for concrete and road building, etc., 1,379,319 tons, valued at \$475,811; gravel and crushed gravel, 553,125 tons, valued at \$162,250; sand and gravel, 1,505,775 tons, valued at \$605,280; railway ballast, 4,559,686 tons, valued at \$521,189; moulding sand, 19,251 tons, valued at \$16,726; and other sands (mostly engine sands), 139,051 tons, valued at \$57,064.

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

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

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

Production of Sand and Gravel, 1916.

| Province. | SAND. | | SAND AND GRAVEL. | | BALLAST. | | ALL OTHER. | | TOTAL. | |
|-----------------------|-------------|-----------|------------------|-----------|-------------|-----------|-------------|----------|-------------|-----------|
| | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. |
| Nova Scotia..... | 32,719 | \$ 19,620 | 67,563 | \$ 45,262 | 66,000 | \$ 13,800 | 9,289 | \$ 5,949 | 175,571 | \$ 84,631 |
| New Brunswick..... | 40 | 20 | 55,350 | 21,075 | 747,459 | 99,768 | 115 | 125 | 803,014 | 120,988 |
| Quebec..... | 368,915 | 137,905 | 26,335 | 9,336 | 539,365 | 65,597 | 146 | 46 | 934,746 | 212,984 |
| Ontario..... | 930,590 | 293,375 | 830,329 | 271,891 | 1,808,109 | 189,176 | 142,303 | 64,505 | 3,711,231 | 818,947 |
| Manitoba..... | 39,745 | 20,650 | 456,093 | 151,635 | 659,567 | 70,481 | 2,766 | 373 | 1,157,605 | 243,542 |
| Saskatchewan..... | 3,882 | 3,437 | 161,514 | 40,476 | 161,974 | 15,781 | 1,168 | 584 | 328,116 | 60,079 |
| Alberta..... | 3,575 | 230 | 45,723 | 16,708 | 420,034 | 15,620 | 1,168 | 584 | 467,500 | 67,142 |
| British Columbia..... | 2,813 | 574 | 415,993 | 211,137 | 157,178 | 17,254 | 2,440 | 1,222 | 578,424 | 230,197 |
| Total..... | 1,379,319 | 475,811 | (a)2,058,900 | 767,530 | 4,559,686 | 521,189 | (b) 158,302 | 73,790 | 8,156,207 | 1,838,320 |

(a) Includes 553,125 tons gravel, valued at \$162,250. (b) Includes 19,251 tons moulding sand, valued at \$16,726.

Production of Sand and Gravel, 1915.

| Province. | SAND. | | SAND AND GRAVEL. | | BALLAST. | | ALL OTHER. | | TOTAL. | |
|-----------------------|------------------|----------------|------------------|----------------|------------------|----------------|----------------|---------------|------------------|------------------|
| | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. |
| | | \$ | | \$ | | \$ | | \$ | | \$ |
| Nova Scotia..... | 21,897 | 17,441 | 102,582 | 38,196 | 236,500 | 11,825 | 7,070 | 4,359 | 368,049 | 71,821 |
| New Brunswick..... | 2,450 | 1,445 | 4,220 | 1,631 | 316,522 | 15,938 | ..... | ..... | 323,192 | 19,014 |
| Quebec..... | 399,253 | 204,745 | 4,245 | 4,777 | 450,575 | 51,461 | ..... | ..... | 866,073 | 269,983 |
| Ontario..... | 675,708 | 189,538 | 529,386 | 195,303 | 1,684,902 | 282,015 | 150,807 | 60,570 | 3,033,383 | 727,426 |
| Manitoba..... | 29,135 | 10,537 | 239,987 | 147,114 | 214,772 | 52,745 | 350 | 270 | 484,244 | 203,666 |
| Saskatchewan..... | 11,944 | 10,568 | 24,450 | 17,113 | 75,525 | 9,745 | ..... | ..... | 111,919 | 38,206 |
| Alberta..... | 2,565 | 459 | 32,670 | 25,916 | 335,024 | 20,755 | ..... | ..... | 390,617 | 47,197 |
| British Columbia..... | 27,304 | 5,886 | 395,749 | 167,308 | 439,477 | 82,773 | 5,670 | 868,240 | 617,490 | 256,454 |
| Total..... | 1,169,756 | 440,619 | 1,338,409 | 591,135 | 3,773,297 | 527,257 | 164,255 | 65,756 | 6,445,717 | 1,624,767 |

Annual Production of Sand and Gravel, 1912-1914.

| Province. | 1912. | 1913. | 1914. |
|-----------------------|-----------|------------|------------|
| P. E. Island..... | \$ 13,549 | \$ 101,201 | \$ 100,016 |
| Nova Scotia..... | | | |
| New Brunswick..... | 213,126 | 638,778 | 370,713 |
| Quebec..... | 363,668 | 638,771 | 833,635 |
| Ontario..... | 101,653 | 197,719 | 314,081 |
| Manitoba..... | 255,453 | 236,377 | 222,019 |
| Saskatchewan..... | 148,704 | 265,165 | 273,115 |
| Alberta..... | 385,946 | 180,863 | 391,731 |
| British Columbia..... | | | |
| Total..... | 1,512,090 | 2,258,874 | 2,505,310 |

Statistics of the exports and imports of sand and gravel, are published in the annual reports of the Department of Customs, and the following tables are compiled from this source since 1893. During 1916 there were exported from Canada 1,114,913 tons of sand and gravel, valued at \$388,309, while the imports were 233,777 tons, valued at \$183,894.

Annual Export of Sand and Gravel.

| Calendar Year. | Short Tons. | Value. | Average per ton. | Calendar Year. | Short Tons. | Value | Average per ton. |
|----------------|-------------|-----------|------------------|----------------|-------------|-----------|------------------|
| 1893..... | 329,116 | \$121,795 | \$0.37 | 1905..... | 306,935 | \$152,805 | \$0.50 |
| 1894..... | 324,656 | 86,940 | 0.27 | 1906..... | 336,550 | 139,712 | 0.41 |
| 1895..... | 277,162 | 118,359 | 0.43 | 1907..... | 298,095 | 119,853 | 0.40 |
| 1896..... | 224,769 | 80,110 | 0.36 | 1908..... | 298,954 | 161,387 | 0.54 |
| 1897..... | 152,963 | 76,729 | 0.50 | 1909..... | 481,584 | 256,166 | 0.53 |
| 1898..... | 165,954 | 90,498 | 0.55 | 1910..... | 624,824 | 407,974 | 0.65 |
| 1899..... | 242,450 | 101,640 | 0.42 | 1911..... | 573,494 | 408,110 | 0.71 |
| 1900..... | 197,558 | 101,666 | 0.51 | 1912..... | 660,090 | 459,952 | 0.70 |
| 1901..... | 197,302 | 117,465 | 0.60 | 1913..... | 644,633 | 440,956 | 0.68 |
| 1902..... | 159,793 | 119,120 | 0.75 | 1914..... | 952,370 | 802,358 | 0.84 |
| 1903..... | 355,792 | 124,006 | 0.35 | 1915..... | 808,022 | 380,549 | 0.47 |
| 1904..... | 399,809 | 129,803 | 0.32 | 1916..... | 1,114,913 | 388,309 | 0.35 |

Annual Imports of Sand and Gravel.

| Fiscal Year. | Tons. | Value. | Average value. | Fiscal Year. | Tons. | Value. | Average value. |
|--------------|---------|-----------|----------------|----------------|---------|-----------|----------------|
| 1893..... | 26,065 | \$ 31,739 | \$ 1.22 | 1906..... | 116,500 | \$173,727 | \$ 1.49 |
| 1894..... | 41,573 | 33,506 | 0.81 | Calendar Year. | | | |
| 1895..... | 19,609 | 24,779 | 1.26 | 265,912 | 223,968 | 0.84 | |
| 1896..... | 18,953 | 24,601 | 1.30 | 133,665 | 135,348 | 1.01 | |
| 1897..... | 21,308 | 25,222 | 1.18 | 151,323 | 153,778 | 1.02 | |
| 1898..... | 32,148 | 43,287 | 1.35 | 1909..... | 241,375 | 196,766 | 1.00 |
| 1899..... | 30,288 | 42,209 | 1.39 | 1910..... | 195,796 | 246,613 | 1.02 |
| 1900..... | 35,713 | 41,280 | 1.16 | 1911..... | 439,673 | 445,781 | 0.84 |
| 1901..... | 35,749 | 42,891 | 1.20 | 1912..... | 532,721 | 440,343 | 1.00 |
| 1902..... | 47,381 | 58,668 | 1.24 | 1913..... | 439,673 | 224,759 | 0.82 |
| 1903..... | 91,518 | 95,647 | 1.05 | 1914..... | 273,812 | 120,756 | 0.60 |
| 1904..... | 110,634 | 107,547 | 0.97 | 1915..... | 199,597 | 183,894 | 0.79 |
| 1905..... | 85,339 | 92,722 | 1.09 | 1916..... | 233,777 | | |

SLATE.

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

The production in 1916 was 1,262 squares, valued at \$6,223, as compared with a production in 1915 of 397 squares, valued at \$2,039, and of 1,075 squares, valued at \$4,837 in 1914.

Annual Production of Slate.

| Calendar Year. | Quantity. | Value. | Calendar Year. | Quantity. | Value. |
|----------------|-----------|-----------|----------------|-----------|----------|
| 1886* | 5,345 | \$ 64,675 | 1902 | | \$19,200 |
| 1887 | 7,357 | 89,000 | 1903* | 5,510 | 22,040 |
| 1888 | 5,314 | 90,689 | 1904 | 5,277 | 23,247 |
| 1889 | 6,935 | 119,160 | 1905 | | 21,568 |
| 1890 | 6,368 | 100,250 | 1906 | | 24,446 |
| 1891 | 5,000 | 65,000 | 1907 | 4,335 | 20,056 |
| 1892 | 5,180 | 69,670 | 1908 | 2,950 | 13,426 |
| 1893 | 7,112 | 90,825 | 1909 | 4,000 | 19,000 |
| 1894 | | 75,550 | 1910 | 3,959 | 18,492 |
| 1895 | | 58,960 | 1911 | 1,833 | 8,248 |
| 1896 | | 53,370 | 1912 | 1,894 | 8,939 |
| 1897 | | 42,800 | 1913 | 1,432 | 6,444 |
| 1898 | | 40,791 | 1914 | 1,075 | 4,837 |
| 1899 | | 33,406 | 1915 | 397 | 2,039 |
| 1900 | | 12,100 | 1916 | 1,262 | 6,223 |
| 1901 | | 9,980 | | | |

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

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

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

The total value of the imports during the calendar year 1916 was \$96,776, and included: roofing slate, 4,412 squares, valued at \$21,335; school writing slate, \$35,887; slate pencils, \$11,309; and other slates and manufactures of, \$28,245. The total value of the imports during the calendar year 1915 was \$108,676 and included: roofing slate, 7,483 squares, valued at \$34,528; school writing slate, \$38,874; slate pencils, \$4,954; and other slates and manufactures of, \$30,320.

The imports of roofing slate, school writing slate, and manufactures of slate n.o.p., are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come chiefly from the United States.

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

| Slate and manufactures of. | 1913. | 1914. | 1915. | 1916. |
|---|----------|----------|----------|----------|
| Roofing slate..... | \$97,230 | \$91,977 | \$34,528 | \$21,335 |
| School writing slate..... | 51,953 | 54,723 | 38,874 | 35,887 |
| Slate pencils..... | 9,166 | 6,514 | 4,954 | 11,309 |
| Slate of all kinds and manufactures of..... | 76,625 | 59,444 | 30,320 | 28,245 |
| Mantels..... | | 598 | | |
| | 235,474 | 213,256 | 108,676 | 96,776 |

Exports of Slate.

| Calendar Year. | Tons. | Value. | Calendar Year. | Tons. | Value. |
|----------------|-------|---------|-------------------|-------|---------|
| 1884..... | 539 | \$6,845 | 1893..... | 178 | \$3,168 |
| 1885..... | 346 | 5,274 | 1894..... | 187 | 2,610 |
| 1886..... | 34 | 495 | 1895..... | 36 | 574 |
| 1887..... | 27 | 373 | 1896..... | 301 | 8,913 |
| 1888..... | 22 | 475 | 1897 to 1907..... | Nil. | Nil. |
| 1889..... | 26 | 3,303 | 1908..... | 134 | 2,539 |
| 1890..... | 12 | 153 | 1909..... | Nil. | 612 |
| 1891..... | 15 | 195 | 1910 to 1916..... | Nil. | Nil. |
| 1892..... | 87 | 2,038 | | | |

Imports of Slate.

| Fiscal Year. | Value. | Fiscal Year. | Value | Year. | Value. |
|--------------|----------|--------------|----------|----------------|-----------|
| 1880..... | \$21,431 | 1893..... | \$51,179 | Calendar Year. | |
| 1881..... | 22,184 | 1894..... | 29,267 | 1907..... | \$134,063 |
| 1882..... | 24,543 | 1895..... | 19,471 | 1908..... | 120,282 |
| 1883..... | 24,968 | 1896..... | 24,176 | 1909..... | 135,221 |
| 1884..... | 28,816 | 1897..... | 21,615 | 1910..... | 142,285 |
| 1885..... | 28,169 | 1898..... | 21,907 | 1911..... | 169,685 |
| 1886..... | 27,852 | 1899..... | 33,100 | 1912..... | 200,643 |
| 1887..... | 27,845 | 1900..... | 53,707 | 1913..... | 235,474 |
| 1888..... | 23,151 | 1901..... | 72,187 | 1914..... | 213,256 |
| 1889..... | 41,370 | 1902..... | 72,601 | 1915..... | 108,676 |
| 1890..... | 22,871 | 1903..... | 84,437 | 1916..... | 96,776 |
| 1891..... | 46,104 | 1904..... | 86,057 | | |
| 1892..... | 50,441 | 1905..... | 93,228 | | |
| | | 1906..... | 112,941 | | |

STONE.¹

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

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

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

The total value of the production of stone in 1916, according to returns received was \$3,736,412, as compared with a value of \$4,244,997 in 1915, showing a falling off of \$508,585, or over 12 per cent.

The number of active firms reporting in 1916 was 198, the total number of men employed 4,020, and the total wages paid \$2,115,320. In 1915 the number of active firms reporting was 236, the number of men employed 5,144, and the total wages paid \$2,188,302.

Of the total value of the 1916 production, limestone contributed \$2,224,091, or 59.5 per cent; granite \$1,247,267, or 33.4 per cent; sandstone \$146,244, or 3.9 per cent; and marble \$118,810, or 3.2 per cent.

Stone was used for building purposes to the value of \$1,173,642, or 31.4 per cent of the total; monumental and ornamental to the value of \$183,086, or 4.9 per cent; curb, paving, and flagstone \$77,339, or 2 per cent; rubble 574,929 tons, valued at \$413,600, or 11.1 per cent; crushed stone 1,869,344 tons valued at \$1,408,515, or 37.7 per cent; and furnace flux 824,110 tons, valued at \$480,230, or 12.9 per cent.

By provinces, Quebec shows again the largest output, having a value of \$1,370,465, or 36.7 per cent of the total; being made up of limestone

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

No. 100. "The Building Stones of Canada, Vol. I." "Building and Ornamental Stones of Ontario."
 No. 203. "Building Stones of Canada, Vol. II." "Building and Ornamental Stones of the Maritime Provinces."
 No. 279. "Building Stones of Canada, Vol. III." "Building and Ornamental Stones of the Province of Quebec."
 No. 388. "Building Stones of Canada, Vol. IV." "Building and Ornamental Stones of the Provinces of Manitoba, Saskatchewan, and Alberta."

to the value of \$799,354, granite valued at \$422,297, marble \$118,810, and sandstone \$30,004. Ontario takes second place with a production of \$857,023, or about 23 per cent of the total, of which limestone is credited with \$688,114, granite \$135,826, and sandstone \$33,083. British Columbia ranks third in order of importance with a total of \$564,218, including granite \$464,949, sandstone \$6,500 and limestone \$92,769. The Nova Scotia production was valued at \$459,298, comprising limestone \$263,803, granite \$164,870, and sandstone \$30,625. In Manitoba the production, all of which was limestone was valued at \$372,894. New Brunswick is credited with \$112,257, made up chiefly of granite and sandstone.

Production of Stone by Provinces, 1916.

| Province. | Granite. | 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 | \$ 319,983 |
| New Brunswick... | 59,325 | 6,900 | ..... | 46,032 | 112,257 | 3.0 | 135 | 52,046 |
| Quebec..... | 422,297 | 7,700,354 | \$118,810 | 30,004 | 1,370,465 | 36.7 | 1,729 | 790,512 |
| Ontario..... | 135,826 | 688,114 | ..... | 33,083 | 857,023 | 22.9 | 864 | 439,981 |
| Manitoba..... | ..... | 372,894 | ..... | ..... | 372,894 | 10.0 | 288 | 198,807 |
| Alberta..... | ..... | 257 | ..... | ..... | 257 | ..... | ..... | ..... |
| British Columbia.. | 464,949 | 92,769 | ..... | 6,500 | 564,218 | 15.1 | 424 | 313,991 |
| Total..... | 1,247,267 | 2,224,091 | 118,810 | 146,244 | 3,736,412 | 100.0 | 4,020 | 2,115,320 |
| Per cent..... | 33.4 | 59.5 | 3.2 | 3.9 | ..... | ..... | ..... | ..... |

Production of Stone by Provinces, 1915.

| Province. | Granite. | Lime-stone. | Marble. | Sand-stone. | Total. | % | Labour. | |
|------------------|-----------|-------------|-----------|-------------|------------|-------|------------------------|------------|
| | | | | | | | No. men em- ployed. | Wages. |
| Nova Scotia..... | \$ 79,636 | \$ 255,024 | ..... | \$ 33,264 | \$ 367,924 | 8.7 | 659 | \$ 233,396 |
| New Brunswick.. | 8,335 | ..... | ..... | 145,177 | 153,512 | 3.6 | 192 | 74,845 |
| Quebec..... | 594,744 | 1,189,633 | \$145,400 | 36,417 | 1,966,194 | 46.3 | 2,638 | 1,045,280 |
| Ontario..... | 140,894 | 634,728 | 10,927 | 19,588 | 806,137 | 19.0 | 1,009 | 371,218 |
| Manitoba..... | 351 | 153,113 | ..... | ..... | 153,464 | 3.6 | 148 | 94,785 |
| Alberta..... | ..... | ..... | ..... | 890 | 890 | ..... | 8 | 700 |
| British Columbia | 701,593 | 79,583 | 1,700 | 14,000 | 796,876 | 18.8 | 490 | 368,078 |
| Total..... | 1,525,553 | 2,312,081 | 158,027 | 249,336 | 4,244,997 | ..... | 5,144 | 2,188,302 |
| Per cent..... | 35.9 | 54.5 | 3.7 | 5.9 | ..... | 100.0 | ..... | ..... |

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

| By kinds. | Building. | Ornamental and monumental. | Paving and curberstone. | 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 | \$ 397,165 | 824,110 | \$ 480,230 | \$ 1,247,267 |
| Limestone..... | 629,650 | 3,158 | 1,673 | 104,049 | 60,161 | 1,387,235 | 1,049,310 | ..... | ..... | 2,224,091 |
| Marble..... | ..... | 103,400 | ..... | 2,464 | ..... | 2,464 | 15,410 | ..... | ..... | 118,810 |
| Sandstone..... | 36,853 | 951 | 8,190 | 74,677 | 53,559 | 29,772 | 46,721 | ..... | ..... | 166,244 |
| By Provinces. | | | | | | | | | | |
| Nova Scotia..... | 107,201 | 1,586 | 5,515 | 76,652 | 62,342 | 13,970 | 22,510 | 465,831 | 260,143 | 459,298 |
| New Brunswick..... | 6,970 | 55,745 | 1,230 | 58,428 | 41,412 | 2,300 | 6,900 | ..... | ..... | 112,257 |
| Quebec..... | 445,091 | 119,239 | 49,716 | 48,020 | 32,393 | 800,407 | 724,026 | ..... | ..... | 1,370,465 |
| Ontario..... | 70,734 | 6,416 | 20,878 | 60,754 | 29,480 | 977,113 | 602,197 | 188,820 | 127,318 | 1,857,023 |
| Manitoba..... | 388,112 | ..... | ..... | 5,732 | 4,876 | 14,020 | 9,906 | ..... | ..... | 372,864 |
| Alberta..... | ..... | ..... | ..... | ..... | ..... | 643 | 257 | ..... | ..... | 257 |
| British Columbia..... | 185,533 | 100 | ..... | 325,343 | 243,097 | 60,891 | 42,719 | 169,459 | 92,769 | 564,218 |
| Total | 1,173,642 | 183,086 | 77,339 | 574,929 | 413,600 | 1,869,344 | 1,408,515 | 824,110 | 480,230 | 3,736,412 |
| Per cent. | 31.4 | 4.9 | 2.0 | ..... | 11.1 | ..... | 37.7 | ..... | 12.9 | ..... |

Production of Stone by Kinds and by Provinces Showing Purposes Used, 1915.

| By kinds. | Building. | Ornamental and monumental. | Paving and curbstone. | RUBBLE. | | CRUSHED. | | FURNACE FLUX. | | Total Value. |
|-----------------------|------------------|----------------------------|-----------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|
| | | | | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. | |
| | | | | | | | | | | |
| Granite..... | \$ 487,599 | \$ 80,377 | \$ 88,474 | 569,410 | \$ 407,842 | 541,811 | \$ 461,261 | 814,854 | \$433,822 | \$ 1,525,553 |
| Limestone..... | 400,017 | 68,973 | 27,539 | 155,961 | 102,250 | 1,828,365 | 1,279,480 | ..... | ..... | 2,312,081 |
| Marble..... | 143,321 | ..... | ..... | ..... | ..... | 25,039 | 14,706 | ..... | ..... | 158,027 |
| Sandstone..... | 51,386 | 680 | 22,091 | 191,513 | 147,032 | 20,015 | 28,147 | ..... | ..... | 249,336 |
| By Provinces. | | | | | | | | | | |
| Nova Scotia..... | 16,464 | 18,700 | 4,531 | 43,064 | 23,846 | 77,941 | 52,633 | 481,346 | 251,750 | 367,924 |
| New Brunswick..... | 24,473 | 8,160 | 10,935 | 144,343 | 120,022 | ..... | ..... | ..... | ..... | 153,512 |
| Quebec..... | 566,693 | 116,369 | 102,635 | 98,044 | 75,427 | 1,272,934 | 1,104,730 | 110 | 110 | 1,966,194 |
| Ontario..... | 84,529 | 5,151 | 29,503 | 65,742 | 34,842 | 937,072 | 546,193 | 176,021 | 105,868 | 806,137 |
| Manitoba..... | 118,396 | ..... | ..... | 19,871 | 14,592 | 31,545 | 20,844 | ..... | ..... | 153,464 |
| Alberta..... | 271,693 | 1,500 | 500 | 545,780 | 388,395 | 95,738 | 59,194 | 157,377 | 76,094 | 796,876 |
| British Columbia..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Total..... | 1,082,323 | 150,030 | 138,104 | 916,884 | 657,124 | 2,415,230 | 1,783,594 | 814,854 | 433,822 | 4,244,997 |
| Per cent..... | 25.5 | 3.5 | 3.3 | ..... | 15.5 | ..... | 42.0 | ..... | 10.2 | 100.0 |

Exports and Imports.—The exports of stone from Canada in 1916 were valued at \$143,988, as against \$72,777 in 1915, and \$72,080 in 1914. The principal item in the export of stone during the past few years was building stone, unwrought, of which the exports in 1916 were 128,453 tons, valued at \$103,796. There was also an export of ornamental granite, marble, etc., unwrought, of 15,967 tons, valued at \$7,989; crushed stone 26,754 tons, valued at \$27,611, and dressed stone of all kinds valued at \$4,592.

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

Exports of Stone during the Calendar Years 1914, 1915, and 1916.

| | 1914. | | 1915. | | 1916. | |
|--|-------------|----------|-------------|----------|-------------|-----------|
| | Short Tons. | Value. | Short Tons. | Value. | Short Tons. | Value. |
| Crushed..... | 25,130 | \$18,153 | 42,716 | \$24,453 | 26,754 | \$ 27,611 |
| Ornamental granite, marble, etc., unwrought..... | 231 | 5,607 | 29,976 | 12,764 | 15,967 | 7,989 |
| Building, freestone, limestone, etc., unwrought..... | 63,009 | 46,198 | 35,804 | 28,910 | 128,453 | 103,796 |
| Stone of all kinds, dressed..... | | 2,122.. | | 6,650 | | 4,592 |
| | | 72,080.. | | 72,777.. | | 143,988 |

Exports of Stone and Marble, Wrought and Unwrought.

| Calendar Year. | Wrought. | Unwrought. | Calendar Year. | Wrought. | Unwrought. |
|----------------|----------|------------|----------------|----------|------------|
| 1890..... | \$21,725 | \$ 43,611 | 1904..... | \$ 4,760 | \$ 17,802 |
| 1891..... | 13,398 | 46,162 | 1905..... | 3,545 | 13,089 |
| 1892..... | 7,698 | 47,424 | 1906..... | 23,097 | 4,675 |
| 1893..... | 9,102 | 12,532 | 1907..... | 4,233 | 3,087 |
| 1894..... | 22,576 | 34,130 | 1908..... | 15,194 | 36,820 |
| 1895..... | 8,587 | 51,616 | 1909..... | 33,598 | 24,087 |
| 1896..... | 4,934 | 32,897 | 1910..... | 5,352 | 22,219 |
| 1897..... | 9,415 | 42,034 | 1911..... | 1,436 | 26,899 |
| 1898..... | 2,526 | 65,370 | 1912..... | 2,621 | 30,621 |
| 1899..... | 5,092 | 101,931 | 1913..... | 7,381 | 86,459 |
| 1900..... | 5,933 | 115,711 | 1914..... | 2,122 | 69,958 |
| 1901..... | 5,917 | 157,739 | 1915..... | 6,650 | 66,127 |
| 1902..... | 8,632 | 124,829 | 1916..... | 4,592 | 139,396 |
| 1903..... | 7,684 | 46,295 | | | |

The imports of stone are classified as: building stone of all kinds, except marble; refuse stone; manufactures of granite and other stone; and marble and its manufactures. The total value of the imports during the calendar year 1916 was \$587,304, as compared with a value of \$539,173 in 1915, showing a slight increase. The imports during 1916 comprised: Building stone (rough), valued at \$68,939; building stone (dressed) \$43,410; granite and manufactures of granite \$133,229; marble and manufactures of \$171,849; and refuse stone 363,682 tons, valued at \$169,877.

The total value of the imports from the United States in 1916 was

\$437,310; Great Britain \$90,100; Italy \$386; and from other countries \$59,508.

The imports during 1915 comprised: building stone (rough) valued at \$54,249; building stone (dressed) \$57,761; granite and manufactures of granite \$179,604; paving blocks \$584; marble and manufactures of \$152,454 and refuse stone 269,912 tons, valued at \$94,521.

The total value of the imports from the United States in 1915 was \$401,612; Great Britain \$136,153; Italy \$483; and from other countries \$925.

During both years the imports were derived chiefly from the United States and Great Britain, the United States supplying building stone, paving blocks, marble, and refuse stone principally, and Great Britain mainly manufactures of granite. Marble was obtained also in small quantities from Italy and other countries.

Total Imports of Stone during the Calendar Years 1915 and 1916.

| Imports. | 1915. | | 1916. | |
|--|-------------|-----------|-------------|-----------|
| | Short Tons. | Value. | Short Tons. | Value. |
| Building stone, rough ¹ | | \$ 54,249 | | \$ 68,939 |
| Building stone, dressed ² | | 57,761 | | 43,410 |
| Refuse stone ³ | 269,912 | 94,521 | 563,682 | 169,877 |
| Granite, sawn only..... | | 2,350 | | 5,049 |
| Granite, manufactures of..... | | 141,831 | | 91,939 |
| Paving blocks..... | | 584 | | 36,241 |
| Manufactures of stone, n.o.p..... | | 35,423 | | |
| Marble and manufactures of— | | 86,640 | | 92,414 |
| Marble, sawn or sand rubbed, not polished..... | | 24,801 | | 35,792 |
| Marble, rough, not hammered or chiselled..... | | 41,013 | | 43,643 |
| Marble, manufactures of, n.o.p..... | | | | |
| | | 539,173 | | 587,304 |

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

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

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

Imports of Stone, Showing Country of Origin, Calendar Year 1916.

| Imports. | Great Britain. | | United States. | | Italy. | Other countries. |
|--|----------------|--------|----------------|-----------|--------|------------------|
| | Short Tons. | Value. | Short Tons. | Value. | Value. | Value. |
| Building stone, rough ¹ | | | | \$ 68,939 | | |
| Building stone, dressed ² | | \$ 239 | | 43,171 | | |
| Refuse stone..... | 20 | 4 | 279,884 | 122,217 | | \$47,656 |
| Granite, sawn only..... | | 538 | | 4,311 | | |
| Granite, manufactures of..... | | 83,995 | | 7,944 | | |
| Paving blocks..... | | | | 32,882 | | 1,241 |
| Manufactures of stone, n.o.p..... | | 2,118 | | | | |
| Marble and manufactures of— | | | | | | |
| Marble, sawn or sand rubbed, not polished..... | | 1,028 | | 88,864 | | 2,522 |
| Marble rough, not hammered or chiselled..... | | | | 35,792 | | |
| Marble, manufactures of, n.o.p..... | | 2,178 | | 32,990 | \$386 | 8,089 |
| Total..... | | 90,100 | | 437,310 | 386 | 59,508 |

Annual Imports of Stone.

| Fiscal Year. | BUILDING STONE. | | Manufactures of granite, etc., paving blocks. | Marble. | Flagstone.* | Total value. |
|--------------|-----------------|----------|---|-----------|----------------|--------------|
| | Rough. | Dressed. | | | | |
| 1880..... | \$ 32,824 | \$ 3,146 | \$ 29,408 | \$ 63,015 | | \$ 128,393 |
| 1881..... | 7,823 | 50,326 | 36,877 | 85,977 | \$ 241 | 181,244 |
| 1882..... | 32,848 | 775 | 37,267 | 109,505 | 848 | 181,243 |
| 1883..... | 33,429 | 1,632 | 45,636 | 128,520 | 99 | 209,316 |
| 1884..... | 46,232 | 4,856 | 45,290 | 108,771 | 1,158 | 206,307 |
| 1885..... | 28,433 | 2,058 | 39,867 | 117,752 | 1,756 | 174,949 |
| 1886..... | 36,776 | 4,899 | 41,984 | | 9,443 | 210,854 |
| 1887..... | 47,819 | 6,549 | 41,829 | 104,250 | 10,966 | 211,413 |
| 1888..... | 84,263 | 2,110 | 47,487 | 94,681 | 21,077 | 249,618 |
| 1889..... | 89,723 | 10,591 | 61,341 | 118,421 | 15,451 | 295,527 |
| 1890..... | 126,456 | 5,699 | 84,396 | 99,353 | 48,995 | 364,899 |
| 1891..... | 151,119 | 19,771 | 61,051 | 107,661 | 36,348 | 372,950 |
| 1892..... | 85,169 | 10,381 | 39,479 | 106,268 | 15,048 | 256,345 |
| 1893..... | 47,609 | 8,901 | 49,323 | 96,177 | 8,500 | 210,510 |
| 1894..... | 48,097 | 4,811 | 49,510 | 94,657 | 2,429 | 199,504 |
| 1895..... | 37,732 | 6,550 | 51,050 | 83,422 | 84 | 178,838 |
| 1896..... | 42,737 | 11,393 | 51,499 | 90,065 | Nil. | 195,694 |
| 1897..... | 27,442 | 11,272 | 34,026 | 77,150 | 227 | 150,117 |
| 1898..... | 25,322 | 3,173 | 41,240 | 95,894 | 1,540 | 167,129 |
| 1899..... | 43,494 | 4,546 | 60,148 | 104,879 | Nil. | 210,067 |
| 1900..... | 63,376 | 1,157 | 57,039 | 94,017 | 63 | 215,652 |
| 1901..... | 45,039 | 1,039 | 66,639 | 96,159 | 116 | 208,992 |
| 1902..... | 69,972 | 29,102 | 72,397 | 130,424 | 1,231 | 303,126 |
| 1903..... | 71,202 | 16,664 | 78,629 | 153,481 | | 319,976 |
| 1904..... | 59,864 | 33,914 | 141,165 | 181,511 | | 416,454 |
| 1905..... | 49,004 | 53,813 | 150,160 | 145,466 | | 398,443 |
| 1906..... | 66,994 | 65,134 | 178,435 | 189,589 | Refuse Stone.† | 500,152 |
| 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 | 307,764 | 272,512 | 384,252 | 91,214 | 1,140,846 |
| 1912..... | 117,037 | 451,635 | 309,386 | 475,926 | 113,159 | 1,467,143 |
| 1913..... | 105,576 | 464,540 | 302,398 | 577,028 | 191,307 | 1,640,849 |
| 1914..... | 72,147 | 252,563 | 240,015 | 465,563 | 222,581 | 1,252,869 |
| 1915..... | 54,249 | 57,761 | 180,188 | 152,454 | 94,521 | 539,173 |
| 1916..... | 69,939 | 43,410 | 133,229 | 171,849 | 169,877 | 587,304 |

*Included in building stone since 1903.

†Not shown separately previous to Nov. 29, 1906.

GRANITE.

The production of granite, including trap-rock, syenite, etc., in 1916, according to returns received from 62 active firms was valued at \$1,247,267, as compared with a production in 1915 by 69 firms, valued at \$1,525,553, showing a decreased production in 1916 of \$278,286, or over 18 per cent.

The largest production is reported from British Columbia in 1916, the value being \$464,949, as against \$701,593 in 1915. The value of the production in Quebec was \$422,297, as against \$594,744 in 1915. Ontario produced granite to the value of \$135,826 in 1916, as compared with \$140,894 in 1915. Much of the rough stone quarried in New Brunswick, as well as stone imported from Redbeach, Maine, is worked up into finished ornamental and monumental stone in mills at St. George, N.B. The value of

the finished stone produced at this point in 1916 was \$113,745, as against value of \$95,993 in 1915.

Value of Granite Production by Provinces, 1916.

| Province. | Building. | 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 Brun- swick..... | (1) 55,595 | 1,230 | 450 | 2,500 | ..... | ..... | ..... | 59,325 |
| Quebec..... | 230,356 | 15,537 | 41,226 | 8,050 | 4,825 | 138,305 | 130,353 | 422,297 |
| Ontario..... | ..... | 3,560 | 19,505 | 10 | 18 | 217,927 | 112,743 | 135,826 |
| British Columbia. | 157,033 | 100 | ..... | 325,343 | 243,097 | 60,891 | 42,719 | 464,949 |
| Total..... | 507,139 | 75,577 | 67,476 | 396,203 | 299,910 | 424,873 | 297,165 | 1,247,267 |

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

Value of Granite Production by Provinces, 1915.

| Province. | Building. | Monu- mental or orna- mental. | Curb, or paving. | Rubble and Riprap. | | Crushed. | | Total Value. |
|------------------------------------|-----------|--|---------------------|--------------------|---------|----------------|-----------|-----------------|
| | | | | Short Tons. | Value. | Short Tons. | Value. | |
| Nova Scotia. | \$ 6,300 | \$18,700 | \$ 4,531 | 1,064 | \$ 746 | 73,121 | \$ 49,359 | \$ 79,636 |
| New Brun- swick..... | (2) 7,400 | 935 | ..... | ..... | ..... | ..... | ..... | 8,335 |
| Quebec..... | 223,418 | 51,599 | 58,942 | 17,675 | 15,586 | 252,954 | 245,199 | 594,744 |
| Ontario..... | 1,888 | 1,178 | 24,066 | 4,891 | 3,115 | 126,780 | 110,647 | 140,894 |
| Manitoba. British. Columbia. | ..... | ..... | ..... | ..... | ..... | 195 | 351 | 351 |
| ..... | 255,993 | 1,500 | ..... | 545,780 | 388,395 | 88,761 | 55,705 | 701,593 |
| Total..... | 487,599 | 80,377 | 88,474 | 569,410 | 407,842 | 541,811 | 461,261 | 1,525,553 |

(2) Finished stone was produced at St. George to the value of \$95,993.

Annual Production of Granite.

| Calendar Year. | Short Tons. | Value. | Calendar Year. | Value. |
|----------------|-------------|-----------|----------------|------------|
| 1886..... | 6,062 | \$ 63,309 | 1901..... | \$ 155,000 |
| 1887..... | 21,217 | 142,506 | 1902..... | 210,000 |
| 1888..... | 21,352 | 147,305 | 1903..... | 200,000 |
| 1889..... | 10,197 | 79,624 | 1904..... | 150,000 |
| 1890..... | 13,307 | 65,985 | 1905..... | 226,305 |
| 1891..... | 13,637 | 70,056 | 1906..... | 278,419 |
| 1892..... | 24,302 | 89,326 | 1907..... | 194,712 |
| 1893..... | 22,521 | 94,393 | 1908..... | 282,320 |
| 1894..... | 16,392 | 109,936 | 1909..... | 454,824 |
| 1895..... | 19,238 | 84,838 | 1910..... | 739,516 |
| 1896..... | 18,717 | 106,709 | 1911..... | 1,119,865 |
| 1897..... | 19,345 | 61,934 | 1912..... | 1,373,119 |
| 1898..... | 23,897 | 81,073 | 1913..... | 1,653,791 |
| 1899..... | 13,418 | 90,542 | 1914..... | 2,176,602 |
| 1900..... | ..... | 80,000 | 1915..... | 1,525,553 |
| ..... | ..... | ..... | 1916..... | 1,247,267 |

LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators, nor that of the stone used in the

manufacture of cement, a record of lime and cement production being separately given. With these exceptions, the total value of limestone produced in Canada in 1916 was \$2,224,091, as compared with the value of \$2,312,081 in 1915, showing a slight decrease.

During 1916 the production of limestone for building purposes was valued at \$632,808, as against \$468,990 in 1915. The production of curbstone and paving stone was valued at \$1,673, as against \$27,539 in 1915. The production of rubble and riprap was 104,049 tons, valued at \$60,161, as against 155,961 tons, valued at \$102,250 in 1915. The production of crushed stone was 1,387,235 tons, valued at \$1,049,219, as against 1,828,365 tons, valued at \$1,279,480 in 1915. The production of furnace flux was 824,110 tons, valued at \$433,822, as against 814,854 tons, valued at \$433,822, in 1915.

Limestone Production by Provinces, 1916.

| Province. | Building and ornamental. | Curbstone and paving stone. | Rubble and riprap. | | Crushed. | | Furnace flux. | | Total value. |
|-----------------------|--------------------------|-----------------------------|--------------------|-----------|-------------|-----------|---------------|-----------|--------------|
| | | | Short tons. | Value. | Short tons. | Value. | Short tons. | Value. | |
| Nova Scotia..... | | | | | 1,220 | \$ 3,660 | 465,831 | \$260,143 | \$ 263,803 |
| New Brunswick..... | | | | | 2,300 | 6,900 | | | 6,900 |
| Quebec..... | \$215,037 | \$ 300 | 39,970 | \$ 27,568 | 621,987 | 556,449 | | | 799,354 |
| Ontario..... | 59,659 | 1,373 | 58,347 | 27,717 | 747,065 | 472,047 | 188,820 | 127,318 | 688,114 |
| Manitoba..... | 358,112 | | 5,732 | 4,876 | 14,020 | 9,906 | 169,459 | | 372,894 |
| Alberta..... | | | | | | 643 | 257 | | 257 |
| British Columbia..... | | | | | | | 92,769 | | 92,769 |
| Total..... | 632,808 | 1,673 | 104,049 | 60,161 | 1,387,235 | 1,049,219 | 824,110 | 430,230 | 2,224,091 |

Limestone Production by Provinces, 1915.

| Province. | Building and ornamental. | Curbstone and paving stone. | Rubble and riprap. | | Crushed. | | Furnace flux. | | Total value. |
|-----------------------|--------------------------|-----------------------------|--------------------|-----------|-------------|-----------|---------------|-----------|--------------|
| | | | Short tons. | Value. | Short tons. | Value. | Short tons. | Value. | |
| Nova Scotia..... | | | | | 4,820 | \$ 3,274 | 481,346 | \$251,750 | \$ 255,024 |
| Quebec..... | \$277,581 | \$25,693 | 80,369 | \$ 59,841 | 981,535 | 826,408 | 110 | 110 | 1,189,633 |
| Ontario..... | 73,381 | 1,846 | 55,721 | 27,817 | 803,683 | 425,816 | 176,021 | 105,868 | 634,728 |
| Manitoba..... | 118,028 | | 19,871 | 14,592 | 31,350 | 20,493 | | | 153,113 |
| British Columbia..... | | | | | 6,977 | 3,489 | 157,377 | 76,094 | 79,583 |
| Total..... | 468,990 | 27,539 | 155,961 | 102,250 | 1,828,365 | 1,279,480 | 814,854 | 433,822 | 2,312,081 |

Production of Limestone by Provinces, 1909-1914.

| Province. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------|------------|------------|------------|------------|------------|-----------|
| Nova Scotia..... | \$ 161,922 | \$ 192,919 | \$ 245,216 | \$ 275,944 | \$ 258,719 | \$ 94,239 |
| New Brunswick..... | 30 | 315 | 110 | | | |
| Quebec..... | 972,253 | 962,429 | 1,296,577 | 1,187,751 | 1,307,428 | 1,326,943 |
| Ontario..... | 639,674 | 722,763 | 680,461 | 862,052 | 1,196,130 | 853,906 |
| Manitoba..... | 328,554 | 328,029 | 315,782 | 381,572 | 382,984 | 346,258 |
| Alberta..... | | | | | 20,000 | |
| British Columbia..... | 37,258 | 43,121 | 56,780 | 55,617 | 38,830 | 51,435 |
| Total..... | 2,139,681 | 2,249,576 | 2,594,926 | 2,762,036 | 3,204,091 | 2,672,781 |

MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only \$45,837 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production, but the opening up of the quarries at Philipsburg, and South Stukely, Que., together with the development of quarries in Ontario, and British Columbia, has resulted in a considerable production of marble during the past nine years. The total value of the production in 1916 was returned as \$118,810 comprising: ornamental marble 1,034 tons, valued at \$103,400; and crushed 27,464 tons, valued at \$15,410; as compared with a total value of \$158,027 in 1915.

Annual Production of Marble.

| Calendar Year. | Short Tons. | Value. | Calendar Year. | Short Tons. | Value. |
|----------------|-------------|---------|-----------------------------|-------------|----------|
| 1886..... | 501 | \$9,900 | 1896..... | 224 | \$ 2,405 |
| 1887..... | 242 | 6,224 | 1897 to 1907 inclusive..... | Nil. | Nil. |
| 1888..... | 191 | 3,100 | 1908..... | | 125,000 |
| 1889..... | 83 | 980 | 1909..... | | 158,441 |
| 1890..... | 780 | 10,776 | 1910..... | | 158,779 |
| 1891..... | 240 | 1,752 | 1911..... | | 162,783 |
| 1892..... | 240 | 3,600 | 1912..... | | 260,764 |
| 1893..... | 590 | 5,100 | 1913..... | | 249,975 |
| 1894..... | Nil. | Nil. | 1914..... | | 132,533 |
| 1895..... | 200 | 2,000 | 1915..... | | 158,027 |
| | | | 1916..... | 28,498 | 118,810 |

The imports of marble during the calendar year 1916, were valued at \$171,849, as compared with \$152,454 in 1915, and \$465,563 in 1914.

The annual imports of marbles since 1880 are shown in the general table of imports.

SANDSTONE.

The value of the production of sandstone in 1916 is reported as \$146,244, as compared with a value of \$249,336 in 1915. A large portion of the sandstone is quarried for building purposes, though large quantities are used for rubble and paving.

Of the production in 1916, building and ornamental stone was sold to the value of \$37,804, this amount, including rough stone valued at \$36,513, and dressed stone valued at \$1,291. The production of rubble and riprap in 1916 was 74,677 tons, valued at \$53,529, and of crushed stone 29,772 tons, valued at \$46,721.

Of the production in 1915, building and ornamental stone was sold to the value of \$52,066. There was included in this amount, rough stone, valued at \$40,401, and dressed stone valued at \$11,665. The production of rubble and riprap was \$91,531 tons, valued at \$147,032, and 20,015 tons of crushed stone, valued at \$28,147.

Value of Sandstone Production by Provinces, 1916.

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

Value of Sandstone Production by Provinces, 1915.

| Province. | Building and ornamental. | Paving. | Rubble and Riprap. | | Crushed. | | Total value. |
|-----------------------|--------------------------|----------|--------------------|-----------|-------------|----------|--------------|
| | | | Short tons. | Value. | Short tons. | Value. | |
| Nova Scotia..... | \$ 10,164 | | 42,000 | \$ 23,100 | | | \$ 33,264 |
| New Brunswick..... | 25,155 | | 144,343 | 120,022 | | | 145,177 |
| Quebec..... | | \$18,000 | | | 13,406 | \$18,417 | 36,417 |
| Ontario..... | 2,357 | 3,591 | 5,170 | 3,190 | 6,609 | 9,730 | 19,588 |
| Alberta..... | 390 | 500 | | | | | 890 |
| British Columbia..... | 14,000 | | | | | | 14,000 |
| Total..... | 52,066 | 22,091 | 191,513 | 147,032 | 20,015 | 28,147 | 249,336 |

Value of Sandstone Production by Provinces, 1909-1914.

| Province. | 1909. | 1910. | 1911. | 1912. | 1913. | 1914. |
|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Nova Scotia..... | \$ 21,850 | \$ 16,425 | \$ 23,440 | \$ 20,645 | \$ 62,490 | \$ 61,124 |
| New Brunswick..... | 30,609 | 51,793 | 35,337 | 68,260 | 70,787 | 236,647 |
| Quebec..... | | | 450 | | | 17,000 |
| Ontario..... | 62,824 | 62,247 | 54,032 | 59,240 | 54,738 | 59,923 |
| Alberta..... | 90,383 | 240,858 | 158,344 | 81,391 | 136,984 | 60,272 |
| British Columbia..... | 168,513 | 130,825 | 179,580 | 99,816 | 71,783 | 51,774 |
| Total..... | 374,179 | 502,148 | 451,183 | 329,352 | 396,782 | 487,140 |

