CANADA

DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

THE

CLAY & CLAY PRODUCTS INDUSTRY

IN

CANADA

1931

(including 1. products from domestic clays
2. products from imported clays.)

Published by Authority of the HON. H. H. STEVENS, M. P.,
Minister of Trade and Commerce.

OTTAWA
1932

Annual Bulletin
48-26-10-32
800

Published by Authority of Hon. H. H. Stevens, M.P.,
Minister of Trade and Commerce.

DOMINION BUREAU OF STATISTICS - CANADA
Dominion Statistician: R. H. Coats, B.A., F.S.S.(Hon.),F.R.S.C.

Mining, Metallurgical and Chemical Branch
Chief: W. H. Losee, B.Sc.
X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.X.

CLAY AND CLAY PRODUCTS, 1931.

The Clay and Clay Products Industry in Canada is separated into two divisions: (1) Production from domestic clays, which includes the production of refractories, brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe and pottery, and (2) Production from imported clays, which includes the manufacture of porcelain insulators, refractories, earthenware, pottery and ceramic floor and wall tile.

The Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa reports that there were 203 plants representing a total capital investment of $38,139,546 operating in the domestic and imported clay and clay products industries in Canada during 1931. These industries in their entirety provided employment for 4,091 persons during the year; their earnings totalled $4,500,150. Production in 1931 was valued at $10,297,026.

A decrease in construction and general industrial activity during 1932 continued to adversely affect the Canadian clay and clay products industries throughout the period under review.

1. Production from Domestic Clays - The value of clay and clay products sold by Canadian producers during 1931 declined 25.9 per cent below the preceding year. Sales in 1931 reached a total value of $7,841,288 as compared with $10,593,578 in 1930. Ontario was the leading producing province accounting for 45 per cent of the total sales during the year; Quebec followed with 30 per cent. The other provinces, in order of production value, were: Alberta, British Columbia, Nova Scotia, Saskatchewan, New Brunswick and Manitoba.

Plants for the production of brick and tile were in operation during 1931 in every province in Canada except Prince Edward Island. In all, there were 189 plants engaged in the manufacture of various kinds of brick, sewer pipe, structural tile, drain tile and other clay products from Canadian clays or shales. Six firms produced coarse earthenware, stoneware and other pottery from domestic clays during the year; shipments of these commodities were valued at $257,125.

The production of firebrick, fireclay, and special fireclay blocks and shapes in Canada came from plants located in Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia; sales of these products reached a total value of $205,491.

Capital employed in the 189 plants making clay products from domestic clay during 1931 was reported at $33,819,164. Salaries and wages paid to the 3,259 employees amounted to $3,541,250. Fuel consumed during the year consisted of 33,550 tons of Canadian coal, 134,335 tons of imported coal, 34,333 cords of wood, 523,252 thousand cubic feet of natural gas and minor quantities of coke, fuel oil, gasoline and kerosene. The total cost of fuel used was $1,505,158. Electricity purchased by

the operating companies caused an outlay of $259,085.

PRINCIPAL STATISTICS OF THE CLAY PRODUCTS INDUSTRY IN CANADA, 1930 and 1931.

	1930	1931
Number of plants	203	189
Capital employed $	33,430,777	33,819,164
Number of employees: On salary	399	435
On wages	4,627	2,824
Total	5,026	3,259
Salaries and wages: Salaries $	922,499	918,781
Wages $	4,038,631	2,622,469
Total $	4,961,130	3,541,250
Cost of fuel and electricity $	1,922,606	1,505,158
Selling value of products $	10,593,578	7,841,288

PRODUCTION OF CLAY PRODUCTS IN CANADA, BY PROVINCES, 1930 and 1931.

	1930	1931
	$	$
Nova Scotia	495,333	467,126
New Brunswick	162,536	143,348
Quebec	2,464,044	2,360,908
Ontario	5,221,214	3,552,800
Manitoba	215,967	122,628
Saskatchewan	349,283	166,257
Alberta	997,685	529,716
British Columbia	687,516	498,505
CANADA	10,593,578	7,841,288

PRODUCTION OF CLAY AND CLAY PRODUCTS IN CANADA, 1931.

		Quantity	Total selling value
			$
Brick: Soft mud process	(Face M	5,476	116,316
	(Common M	41,177	619,357
Stiff mud process (wire cut)	(Face M	77,135	1,752,947
	(Common M	81,930	1,205,464
Dry press	(Face M	20,149	423,357
	(Common M	8,688	107,213
Fancy or ornamental brick (including special shapes, embossed and enamelled brick)	M	335	20,773
Sewer brick	M	2,253	43,692
Paving brick	M	19	682
Firebrick	M	2,248	107,597
Fireclay	tons	1,233	14,857
Bentonite	tons	187	935
Fireclay blocks and shapes	-	...	83,039
Structural tile: Hollow blocks (including fireproofing and load-bearing tile)	tons	105,635	1,046,634
Roofing tile	No.	6,935	720
Floor tile (quarries)	Sq.ft.	107,499	31,415
Drain tile	M	12,518	328,410
Sewer pipe (including copings, flue linings, etc.)	-	...	1,508,803
Pottery, glazed or unglazed	-	...	257,125
Other products	-	...	171,952
TOTAL	-	...	7,841,288

The Ontario Department of Mines in a recent report on the ceramic industry of Ontario supplies the following information regarding clays: Clays are roughly classed as kaolins, ball clays, fireclays, stoneware clays, common clays and shale, depending upon their purity and physical condition.

Kaolin, often called China clay, is used in the manufacture of white tableware, porcelain, sanitary goods, floor tile, wall tile, etc. In the paper mills it is used as a filler for the best grades of white paper and for wall paper. Kaolin is a refractory and will soften at about cone 34 or 1760 deg. C (3200 deg.F.).

Ball Clay - almost all white porcelain and pottery bodies contain kaolin, feldspar, ground silica and ball clay. The ball clay is not as pure as kaolin but is more plastic and adds to the strength of the product. Ball clay will soften at about 32 to 33 or 1700 deg. to 1745 deg. C.

Fireclay - Clays of this type are usually still more impure burning to a buff instead of a white; the classification proposed by the American Society for testing materials for clay firebrick is as follows:

No. 1 Heavy heat duty	- minimum cone	31	- 1680 deg. C.
No. 2 Intermediate heat duty	- " "	28	- 1615 deg. C.
No. 3 Moderate heat duty	- " "	26	- 1595 deg. C.
No. 4 Low heat duty	- " "	19	- 1515 deg. C.

Stoneware Clays - These overlap with the fireclays in refractoriness and may extend to a somewhat lower temperature. They must be of good plasticity, smooth and fine grained in texture, of good tensile strength in the unburned state and must vitrify without excessive burning shrinkage.

Sewer-pipe Clay - This clay is not a separate type but is usually a sub-division under fireclay, stoneware clay or shale. It should burn to a vitrified body or at least to a very low porosity with a reasonable firing shrinkage and should allow salt glazing.

Paving Brick Clay - This is not a separate type; paving brick are usually made from red burning shales which are low in lime, have a long vitrification range and a vitrified tough body.

Potters Clay - This is not a separate type. Almost any clay that will work well in moulding and drying can be made into some type of pottery. When an opaque glaze is used, the colour to which the clay burns is often not essential.

Common or Brick Clays - These are usually soft, young, surface clays being very impure and having low refractoriness. The softening point is seldom above cone 7, 1210 deg C. Such clays, which may be manufactured into soft mud or stiff mud brick with satisfactory burned properties, are used for both common and face purposes.

Shale - Shales are older clays, often of the same purity and refractoriness as common surface clays, some, however, may be more refractory. Owing usually to their hardness they have little plasticity as compared to clays. Fine grinding and mixing with softer surface material allows them to be worked. They make excellent face brick.

Haydite, a new product in the ceramic industry, is an overfired or bloated shale. Rapid heating without oxidation of organic matter causes it to overfire and bloat, becoming full of gas bubbles. This clinker is crushed and screened to various sizes and is used in concrete to replace sand and gravel. The result is a light building material that is said to be more satisfactory than the usual concrete.

Several cars of bentonite were shipped in 1931 to B.C. Refractories Ltd., Vancouver, from the deposits which occur associated with the coal seams near Princeton. This material which has extraordinary absorption powers, is used as a filler, etc., for different manufacturing purposes. This material was reported upon in 1930 by the Mines Branch, Ottawa.

The development of reinforced brick masonry (R.B.M.), hollow walls of brick and other new types of brick construction has become of major importance on this continent of recent years and is creating a great amount of inquiry from engineers, architects and contractors. All inquiries concerning brick construction will be welcomed by the Brick Manufacturers Association, 1305 Metropolitan Building, Toronto, Ontario.

Experiments were recently conducted in the Ceramic Department of the University of Toronto as to the possibility of producing a grey brick from Canadian clay that would supplant the imported product. Robert J. Montgomery and Jas. S. Little of this department state that there are two requirements that have to be considered from the standpoint of using local clays for making grey brick that will duplicate as nearly as possible the properties of the imported article. These are color (light burning clay) and porosity or density; L. P. Collins of the Mines Branch, Department of Mines, Ottawa, gives the following as the usual method adopted in producing grey brick in Pennsylvania: "A second grade buff-burning fireclay is used. Manganese dioxide is added to these clays and this black oxide imparts a grey color to the burned brick."

In Great Britain the British China Clay Producers Federation Ltd. was registered in 1932 as a company. Its objects are to promote and protect the status and general interests of producers of china clay and generally to watch over and assist the china clay industry, etc. Chemical Age in a brief survey of the applications of acid proof stoneware, states that the normal tensile strength of this ware is now 1,000 to 2,500 pounds per square inch; compressive strength may be as much as 80,000 pounds per square inch; for the storage of acids, stoneware vessels have many advantages; chemical stoneware is now made in a great variety of forms such as nitrating pans, equipped with stoneware stirrers; evaporating pans; absorption towers for scrubbing gases; pressure vessels; acid elevators; stills, receivers and condensing and cooling coils. In nearly all chemical plants there are opportunities for using stoneware pipes and cocks.

An article on contemporary detail in common brick recently issued by the Brick Manufacturers Association contains the following comment: "One of the interesting tendencies of contemporary architectural design is the growing use of brickwork for the expression of decorative detail.....The modernists here and abroad have found in common brick a remarkably plastic medium for the expression of their new design forms.... Those architects following the more orthodox precedent, however, have turned to brick to recreate the atmosphere of past ages for which purpose there is no more sympathetic material. Thus the modernists and the antiquarians, though much influenced by opposing ideas of design, have found common ground in their choice of the brick unit as a material most amenable to their respective purposes."

- - - - - - - - - -

2. Production from Imported Clays - The manufacturers of products from clays imported into Canada for this purpose were valued at $2,455,738 during 1931. This industry which had been advancing steadily each year since 1926 reached the present record of $3,373,038 in 1929 when a slowing up process set in, with the result that the $2,978,143 reported for 1930 marked the first decline in five years, after which the output value dropped to $2,455,738 during the year under review.

Among the products made from imported clays were porcelain insulators, sanitary ware, firebrick, sewer pipe, floor tile, pottery, textolite products, and many other lines having a lower output value.

Figures for this industry cover the operations of 14 plants, 10 of which were located in Ontario and 4 in Quebec. These plants employed a monthly average the year round of 832 people who received $958,900 in salaries and wages. Imported clays and other purchased materials cost $695,706 and the value added to these materials by manufacturing processes in Canada was $1,760,032.

Table 1 - PRINCIPAL STATISTICS OF THE IMPORTED-CLAY PRODUCTS INDUSTRY IN CANADA, 1927-1931.

Years	No. of plants	Capital employed	Average number of employees	Salaries and wages	Cost of materials at works	Selling value of products at works	Value added by manufacturing
		$		$	$	$	$
1927	13	2,834,820	624	814,955	567,519	2,088,238	1,520,719
1928	14	3,068,562	688	891,125	708,571	2,458,801	1,750,230
1929	15	3,472,052	872	1,112,881	992,150	3,373,038	2,380,888
1930	15	4,099,965	841	1,052,286	834,181	2,978,143	2,143,962
1931 -							
Quebec	4	2,150,763	275	349,424	191,920	787,858	595,938
Ontario ...	10	2,169,619	557	609,476	503,786	1,667,880	1,164,094
CANADA ..	14	4,320,382	832	958,900	695,706	2,455,738	1,760,032

Table 2 - EMPLOYEES, SALARIES AND WAGES, BY PROVINCES, IN THE IMPORTED-CLAY PRODUCTS INDUSTRY IN CANADA, 1930 and 1931.

Province	On salaries		On wages			Salaries and Wages		
	Male	Female	Male	Female	TOTAL	Salaries	Wages	Total
1930								
Quebec	27	3	219	6	255	67,024	257,933	324,957
Ontario	43	21	449	73	586	180,538	546,791	727,329
CANADA ..	70	24	668	79	841	247,562	804,724	1,052,286
1931								
Quebec	24	3	242	6	275	66,013	283,411	349,424
Ontario	45	14	420	78	557	160,754	448,722	609,476
CANADA ...	69	17	662	84	832	226,767	732,133	958,900

Table 3 - NUMBER OF WAGE-EARNERS IN MONTH OF HIGHEST EMPLOYMENT, CLASSED ACCORDING TO REGULAR HOURS WORKED PER WEEK, 1931. (OVERTIME NOT INCLUDED)

Regular hours per week	Number of wage-earners	Regular hours per week	Number of wage-earners
40 hours or less	64	51 - 53 hours	2
41 - 43 hours	1	54 hours	118
44 hours	60	55 hours	289
45 - 47 hours	29	56 - 59 hours	4
48 hours	5	60 hours	51
49 - 50 hours	182	Over 60 hours	13

Table 4 -- FUEL AND ELECTRICITY USED IN THE IMPORTED-CLAY PRODUCTS INDUSTRY IN CANADA, 1927 - 1931.

Kinds	Unit of measure	1930 Quantity	1930 Cost at works	1931 Quantity	1931 Cost at works
			$		$
Coal, anthracite	short ton	21	311	18	283
Coal, bituminous, Canadian	short ton	1,000	8,000	4,507	27,549
Coal, bituminous, imported	short ton	21,066	148,206	12,587	75,415
Coke	short ton	442	3,758	378	3,375
Kerosene	imp. gal.	237	52	237	41
Fuel oil	imp. gal.	67,618	3,937	291,415	25,384
Wood	cord	82	719	17	132
Gas, natural	M cu.ft.	26,426	12,467	23,501	11,380
Other fuel	--	...	228	...	165
Electricity purchased	k.w.h.	1,311,137	18,457	2,070,273	33,178
TOTAL	--	...	196,135	...	176,902

Table 5 -- POWER EMPLOYED IN THE IMPORTED-CLAY PRODUCTS INDUSTRY IN CANADA, 1930 and 1931.

	1930 Number of units	1930 Total horse power	1931 Number of units	1931 Total horse power
Steam engines	3	380	3	375
Gasoline, gas and oil engines	1	4	1	4
Total Primary Power	4	384	4	379
Electric motors run by purchased power	147	895	158	1,040
Total Power Employed	151	1,279	162	1,419
Electric motors run by primary power in same plant	12	127	22	298
Total Electric Power	159	2,022	180	1,338
Boilers	12	975	13	848

Table 6 -- MATERIALS USED IN MANUFACTURING IN THE IMPORTED-CLAY PRODUCTS INDUSTRY IN CANADA, 1930 and 1931.

Materials	Unit of measure	1930 Quantity	1930 Cost at works	1931 Quantity	1931 Cost at works
			$		$
Clay	ton	12,024	208,614	7,137	144,914
Feldspar	ton	2,254	51,211	1,885	34,394
Fireclay	ton	17,319	114,653	22,075	145,856
Flint	ton	2,816	28,958	1,419	27,853
Glazing materials	--	...	8,036	...	9,912
Hardware	--	...	270,104	...	219,688
Containers	--	...	59,911	...	60,023
All other materials	--	...	92,694	...	53,066
TOTAL	--	...	834,181	...	695,706

Table 7 - PRODUCTS MADE IN THE IMPORTED-CLAY PRODUCTS INDUSTRY IN CANADA, 1930 and 1931.

Products	1930 Selling value at works	1931 Selling value at works
	$	$
Firebrick	298,945	280,588
Porcelain insulators, sanitary ware, sewer pipe, floor tile, tanks, boiler linings, pottery, etc.	2,679,198	2,175,150
TOTAL	2,978,143	2,455,738

IMPORTS AND EXPORTS OF CLAY AND CLAY PRODUCTS

Canada's imports of clay and clay products during 1931 were valued at $7,628,858 as compared with $10,196,681 in the preceding year and $12,159,566 in 1929. Imports of these goods from the United Kingdom were valued at $3,389,950, from the United States, $3,093,775, from Japan, $340,505, from Germany, $267,876, from Czecho-Slovakia, $229,569, from France, $142,230, from Belgium, $98,469, from Italy, $30,728 and minor amounts from other countries. Included in the imports were earthenware and chinaware, firebrick, building bricks and blocks, magnesite brick, porcelain insulators, china, fire, pipe and other clays, etc.

Exports from Canada of building brick, manufactured and unmanufactured clays, earthenware, porcelain insulators, etc., were valued at $418,528 for the calendar year 1931. This compares with an export of $449,120 in the previous year and $375,506 in 1929.

IMPORTS INTO CANADA AND EXPORTS OF CLAY AND CLAY PRODUCTS, 1931.

		Quantity	Value $
IMPORTS -			
Building brick	M	7,323	204,903
Building blocks	-	...	75,276
Clays -			
China	Cwt.	366,926	192,516
Fire	Cwt.	887,033	167,893
Pipe	-	...	16,804
Other clays	-	...	152,270
Zirconium silicate	-	...	3,122
Zirconium oxide	-	...	7,999
Drain tile, unglazed	-	...	2
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed	-	...	53,128
Tiles or blocks of earthenware or stone prepared for Mosaic flooring	-	...	178,099
Tiles, earthenware, n.o.p.	-	...	378,099
Insulators, electric, porcelain	-	...	231,206
Pottery and chinaware	-	...	3,637,530
Brick, fire, other, valued at not less than $100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches for use exclusively in the construction or repair of a furnace, kiln, etc.	-	...	60,420

IMPORTS INTO CANADA AND EXPORTS OF CLAY AND CLAY PRODUCTS, 1931.
continued.

		Quantity	Value $
IMPORTS -- continued			
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln or other equipment of a manufacturing establishment	-	...	711,410
Firebrick, n.o.p.	-	...	41,382
Firebrick, chrome	-	...	48,230
Magnesite brick	-	...	152,435
Silica brick (containing not less than 90 per cent silica)	-	...	234,909
Paving brick	M	3,867	84,326
Other clay manufactures	-	...	996,899
TOTAL	-	...	7,628,858
EXPORTS -			
Building brick	M	1,085	21,144
Clay -			
Unmanufactured	Cwt.	8,015	4,161
Manufactures	-	...	25,736
Earthenware	-	...	33,745
Porcelain insulators	-	...	333,742
TOTAL	-	...	418,528