MANUFACTURES OF THE NON-METALLIC MINERALS IN CANADA

1919-1923

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Minister of Trade and Commerce

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NOTE ON STATISTICS OF PRODUCTION

In the collection of production data, the Dominion Bureau of Statistics makes a division between primary and secondary production. In the first-named class, there are separate sections for the collection of statistics on (*a*) **Agricultural Products,** (*b*) **Furs,** (*c*) **Fish,** (*d*) **Forest Products,** (*e*) **Mineral Products,** and (*f*) **Construction.**

The scheme of classification used for the collection of data on the manufacturing industries of Canada provides for a grouping of producing concerns according to the principal component material of the major products made. For example, makers of leather goods are classified under "Animal Products"; the pulp and paper industry, under "Wood and Paper," etc.

In order that students of the Bureau reports on manufactures may have a true conception of the plan followed, an outline of the scheme of classification in use is given below:

Classification of Manufacturing Industries in Canada for the Collection of Production Statistics

Manufactures of:

(1) **Vegetable Products,** including—Coffee and Spices; Cocoa and Chocolate; Preserved and Canned Products; Pickles, Vinegar and Cider; Flour and Cereals; Bread and other Bakery Products; Macaroni and Vermicelli; Distilled and Brewed Liquors and Wines; Rubber Products; Starch and Glucose; Sugar; Tobacco Products; Linseed Oil and Oil Cake.

(2) **Animal Products,** including—Fish and Fish Products; Dairy Factory Products; Meat and Meat Products; Leather and Leather Products; Furs and Fur Products.

(3) **Textiles and Textile Products,** including—Cotton Textiles (Cloth, Yarn, Thread and Waste); Woollen Textiles (Cloth, Yarn, Blankets, Felt and Waste); Silk Products; Factory-made Clothing; Carpets, Rugs and Mats; Cordage, Rope and Twine.

(4) **Wood and Paper,** including—Pulp and Paper Mill Products; Paper Goods, Printing, Publishing and Lithographing; Saw and Planing Mill Products; Furniture; Carriages, Wagons and Sleighs; Wooden Containers; Woodenware; Turned Wood Products; and the output of similar wood-using industries.

(5) **Iron and Steel and their Products,** including—Pig-Iron and Ferro-Alloys; Steel and Rolled Products; Castings and Forgings; Boilers and Engines; Agricultural Implements; Industrial Machinery; Office and Household Machinery; Automobiles; Auto Accessories; Bicycles; Railway Rolling Stock; Heating and Ventilating Equipment; Wire and Wire Goods; Sheet Metal Products; Hardware and Tools; Miscellaneous Iron and Steel Products.

(6) **Manufactures of Non-Ferrous Metal Products,** including—Aluminium Products; Brass and Copper Products; Lead, Tin and Zinc Products; Manufactures of Precious Metals; Electrical Apparatus and Supplies.

(7) **Manufactures of Non-Metallic Mineral Products,** including—Aerated Waters; Asbestos and Allied Products; Cement Products and Sand-Lime Brick; Coke and By-Products; Glass (blown, cut, ornamental, etc.); Illuminating and Fuel Gas; Monumental and Ornamental Stone; Petroleum Products; Miscellaneous Manufactured Non-Metallic Mineral Products, including (*a*) Artificial Abrasives; (*b*) Abrasive Products; (*c*) Artificial Graphite and Electrodes; (*d*) Fuel Briquettes; (*e*) Gypsum Products; (*f*) Mica Trimming.

(8) **Chemicals and Allied Products,** including—Coal Tar and its Products; Explosives, Ammunition, Fireworks and Matches; Fertilizers; Medicinal and Pharmaceutical Preparations; Pigments, Paints and Varnishes; Soaps, Perfumes, Cosmetics and Toilet Preparations; Inks, Dyes, and Colour Compounds; Wood Distillates and Extracts.

(9) **Miscellaneous Products,** including—Brooms and Brushes; Electric Light and Power; Musical Instruments, etc.

PREFACE

The title "Manufactures of the Non-Metallic Minerals" includes the wide range of industries which use non-metallic mineral products as raw materials.

The report covers the five-year period 1919-1923, and its publication completes the series issued by the Bureau on the statistics of manufactures based chiefly on minerals. Besides reporting semi-annually on the primary mineral production of Canada, with monthly and yearly reports on coal, the Bureau publishes annual reports on the secondary or manufacturing industries related thereto, including (1) Iron and Steel and Their Products (on which subject there is also a monthly report); (2) Manufactures of the Non-Ferrous Metals; (3) Chemicals and Allied Products; and now (4) Manufactures of the Non-Metallic Minerals. There is thus afforded a general survey of production in the mining, metallurgical, chemical and allied fields in Canada.

In this report the industries dealt with include several of first importance, such as coke-making, the production of illuminating and fuel gas, the refining of petroleum, and the manufacture of glass; there are also various other industries which are individually interesting, such as the manufacture of aerated waters, the production of sand-lime brick and concrete tile and blocks, the fabrication of brake linings and other commodities from asbestos and magnesia, and the manufacture of artificial abrasives and of graphite electrodes by means of the electric furnace.

The growth in the volume and variety of Canada's commerce makes it desirable that Canadian manufacturers should be informed in respect to important phases of production in Canada, as well as in regard to the possibilities in the import and export trade. The Bureau reports on production aim to provide a complete service in this field. On the next preceding page there is a brief note on the Bureau's classification of industries for the collection of production statistics, which shows the place of the present report in the general scheme.

The report has been prepared by Mr. W. H. Losee, B.Sc., of the staff of the Bureau, under the direction of Mr. S. J. Cook, B.A., A.I.C., F.C.I.C., Chief of the Mining, Metallurgical and Chemical Branch.

R. H. COATS,
Dominion Statistician.

Dominion Bureau of Statistics,

Ottawa, November 25, 1924.

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Summary Statistics Relating to the Manufacture of Non-Metallic Mineral Products Industries in Canada, 1919-1923

AERATED WATERS

Year	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of materials	Value of products	Value added by manufacturing
		$		$	$	$	$
1919	320	6,545,803	2,036	1,575,339	3,385,583	7,366,759	3,981,176
1920	330	8,259,814	1,913	2,079,421	4,343,849	9,354,693	5,010,844
1921	320	8,236,946	1,932	1,811,983	3,607,147	9,176,868	5,569,721
1922	283	8,205,457	1,537	1,803,364	2,705,957	6,594,509	3,888,552
1923	295	8,315,389	1,724	1,843,531	2,672,332	6,408,832	3,736,500

ASBESTOS AND ALLIED PRODUCTS

1919	5	878,398	114	158,957	214,725	546,870	332,145
1920	11	1,180,101	201	248,214	432,350	940,072	507,722
1921	11	1,351,278	132	273,522	385,810	804,603	418,793
1922	11	1,610,700	156	189,059	271,749	615,160	343,411
1923	9	1,486,589	145	176,986	260,281	583,013	322,732

CEMENT PRODUCTS AND SAND LIME BRICK

1919	99	2,086,619	483	483,094	462,927	1,376,483	913,556
1920	104	2,654,198	580	741,385	720,717	2,221,231	1,500,514
1921	118	2,789,066	664	639,658	694,923	2,095,997	1,401,074
1922	135	2,777,968	614	659,973	825,238	2,139,811	1,314,573
1923	126	2,707,199	646	743,993	814,772	2,403,488	1,588,716

COKE AND BY-PRODUCTS

1919	7	24,528,611	910	1,631,268	11,007,882	13,145,228	2,137,346
1920	6	10,278,539	875	1,696,088	13,409,921	15,580,615	2,170,694
1921	5	10,866,300	647	1,222,789	12,295,797	14,214,728	1,918,931
1922	6	20,363,785	533	710,893	6,130,628	7,336,627	1,205,999
1923	5	20,494,442	598	842,376	11,437,863	13,901,445	2,463,582

GLASS

1919	32	7,962,124	2,999	3,163,148	2,741,564	8,324,718	5,583,154
1920	52	13,057,183	4,039	4,867,520	4,604,534	13,795,690	9,191,156
1921	48	13,725,482	3,097	3,621,708	3,974,358	11,461,932	7,487,574
1922	45	15,033,327	2,984	3,369,854	3,287,091	8,842,588	5,555,497
1923	46	14,892,372	3,350	3,778,802	3,714,516	11,098,026	7,383,511

ILLUMINATING AND FUEL GAS

1919	39	28,185,654	2,521	2,683,079	6,112,354	11,967,264	5,854,910
1920	52	35,386,690	3,114	3,679,235	9,851,981	17,758,401	7,906,420
1921	50	37,097,280	2,818	3,984,976	9,279,097	18,772,285	9,492,588
1922	48	39,615,765	3,107	3,974,705	8,580,208	19,089,170	10,508,962
1923	45	45,526,495	3,021	3,801,832	9,024,084	19,605,340	10,581,256

MONUMENTAL AND ORNAMENTAL STONE

1919	156	2,934,820	888	1,166,597	1,084,757	3,158,552	2,073,795
1920	176	4,181,670	1,166	1,688,242	1,781,031	5,205,886	3,424,855
1921	173	3,971,172	1,207	1,652,837	1,478,097	4,540,028	3,061,931
1922	208	5,027,935	1,273	1,809,444	1,814,548	4,908,487	3,123,939
1923	210	5,073,618	1,278	1,842,963	1,683,126	5,025,003	3,341,877

PETROLEUM PRODUCTS

1919	18	44,554,855	3,919	5,301,879	27,076,751	44,554,581	17,477,830
1920	19	52,709,887	4,153	6,551,826	39,168,692	59,573,448	20,404,756
1921	16	57,564,588	4,014	6,182,514	36,629,576	52,932,415	16,302,839
1922	19	62,054,029	3,555	5,492,683	38,413,191	57,035,563	18,622,372
1923	20	61,027,704	4,257	5,648,320	36,816,696	46,280,534	9,463,838

*MISCELLANEOUS NON-METALLIC MINERAL PRODUCTS

1919	28	3,490,613	1,483	605,270	969,080	2,826,157	1,857,077
1920	44	5,464,978	3,302	1,633,179	1,533,065	4,579,216	3,046,151
1921	23	2,253,322	902	411,044	553,517	1,256,938	703,421
1922	26	6,354,115	1,371	722,080	1,318,652	3,015,539	1,696,887
1923	38	7,262,403	2,917	1,492,846	2,879,015	8,147,331	5,268,316

Total for all Industries listed above

1919	**704**	**121,167,497**	**15,353**	**16,859,231**	**53,055,623**	**93,266,642**	**40,210,989**
1920	**794**	**142,173,061**	**19,343**	**23,185,110**	**75,846,140**	**129,009,252**	**53,163,112**
1921	**764**	**146,853,434**	**15,413**	**19,801,091**	**68,898,922**	**115,255,794**	**46,356,872**
1922	**781**	**161,063,081**	**15,130**	**18,738,955**	**63,377,262**	**109,637,454**	**46,260,192**
1923	**794**	**166,286,211**	**17,936**	**20,171,649**	**69,302,684**	**113,453,012**	**44,150,328**

*The Miscellaneous Non-Metallic Mineral Products group includes: The Abrasive Products Industry; the Artificial Graphite and Electrodes Industry; Gypsum Products Industry; Mica Trimming Industry, and, in 1922 and 1923, the Artificial Abrasives Industry.

NOTE—The foregoing list of industries includes all those shown in the Bureau classification under the heading "Manufactures of Non-Metallic Mineral Products." But there are several other groups classified by the Bureau as primary mineral industries which are ordinarily regarded as manufacturing enterprises. These industries have been described in the *Annual Reports of the Mineral Production of Canada* to which the reader is referred for detailed information, but for convenience of reference and for the making of a grand total the principal statistics relating to them have been repeated below.

Summary of Principal Statistics Relative to Certain Mineral Industries, in Canada, 1919-1923

(From *The Annual Report of the Mineral Production of Canada.*)

CLAY PRODUCTS

BRICK AND TILE

Years	Number of plants	Capital employed	Average number of employees	Salaries and wages paid	⊙ Miscellaneous expenses	⊙ Cost of fuel	Net value of products
		$		$	$	$	$
1921	202	21,138,115	3,597	2,780,204	1,206,828	1,393,297	6,526,440
1922	216	23,821,180	3,904	3,782,341	2,112,790	1,644,463	8,911,539
1923	204	24,866,834	3,954	4,045,487	1,410,051	2,254,445	8,220,269

CLAY SEWER PIPE

1921	5	3,177,036	465	566,838	226,974	329,486	1,503,715
1922	5	3,057,149	448	547,411	282,705	217,228	1,571,464
1923	5	3,022,522	459	561,515	307,870	307,681	1,421,002

FIREBRICK AND FIRE CLAY PRODUCTS

1921	7	1,643,122	233	308,040	88,873	74,318	604,921
1922	5	1,705,753	182	264,548	53,015	82,228	683,266
1923	6	1,786,353	192	286,377	61,277	90,286	605,968

STONEWARE AND POTTERY

1921	4	275,265	104	112,800	127,396	15,065	216,284
1922	4	280,467	112	124,575	22,010	12,652	252,889
1923	4	314,862	110	117,221	88,233	14,607	230,924

CEMENT

1919	8	39,475,774	1,614	1,836,275	1,909,126	1,344,583	9,802,433
1920	13	44,941,686	2,301	3,757,641	1,738,152	3,457,796	14,798,070
1921	14	49,160,180	2,751	3,443,884	2,602,029	2,788,820	14,195,145
1922	11	41,573,737	1,753	2,315,240	2,976,152	2,457,456	15,438,484
1923	10	38,284,494	1,842	2,551,784	2,947,242	2,809,414	15,064,661

LIME

1919	52	4,106,774	969	799,834	355,171	533,342	2,310,607
1920	57	4,760,007	1,028	1,291,801	554,709	912,309	3,818,553
1921	66	4,990,969	931	949,966	407,620	698,992	2,781,197
1922	62	4,984,910	1,110	1,013,486	522,222	725,168	3,165,005
1923	56	6,050,954	1,197	1,191,416	806,916	953,709	3,266,608

SALT

1919	7	2,961,036	317	348,769	347,465	415,305	1,397,929
1920	9	2,221,606	327	459,381	411,408	533,880	1,544,724
1921	13	2,267,708	330	411,832	381,126	527,013	1,673,685
1922	11	2,205,184	371	432,961	407,105	369,000	1,628,323
1923	12	2,406,992	368	412,597	404,046	356,794	1,713,516

Total of Mineral Industries Listed Above

1919*	**248**	**78,483,330**	**6,119**	**6,426,312**	**3,991,619**	**3,770,133**	**21,403,591**
1920*	**309**	**79,859,925**	**8,591**	**10,713,869**	**4,466,662**	**7,547,310**	**30,811,254**
1921	**311**	**82,652,395**	**8,411**	**8,573,564**	**5,040,846**	**5,826,991**	**27,591,385**
1922	**314**	**77,628,380**	**7,880**	**8,479,862**	**6,375,999**	**5,508,195**	**31,650,967**
1923	**297**	**76,733,011**	**8,131**	**9,166,397**	**6,025,635**	**6,786,936**	**30,522,948**

GRAND TOTAL

1919*	**950**	**191,650,827**	**21,472**	**23,285,543**	.....	.....	**114,670,263**
1920*	**1,103**	**222,032,986**	**27,934**	**33,898,979**	.....	.....	**159,820,506**
1921	**1,075**	**229,507,829**	**23,824**	**28,334,655**	.....	.....	**142,757,179**
1922	**1,095**	**238,691,461**	**23,018**	**27,217,917**	.....	.....	**141,288,421**
1923	**1,091**	**243,519,223**	**26,067**	**29,338,046**	.....	.....	**143,976,560**

* Includes totals for Clay Products.

⊙ Cost of electricity used was included with miscellaneous expenses from 1919 to 1922; but in 1923 this item was combined with cost of fuel.

DOMINION BUREAU OF STATISTICS, CANADA

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MANUFACTURES OF THE NON-METALLIC MINERALS IN CANADA DURING THE YEARS 1919-1923

CHAPTER I

GENERAL REVIEW

Introduction.—The statistics relating to the industries manufacturing non-metallic mineral products in Canada during the years 1919, 1920, 1921, 1922 and 1923 have been compiled and classified for the purpose of this report in nine main groups as follows:—Aerated Waters; Asbestos and Allied Products; Cement Products; Sand-Lime Brick; Coke and By-Products; Glass; Illuminating and Fuel Gas; Monumental and Ornamental Stone; Petroleum Products; Miscellaneous Manufactured Non-Metallic Mineral Products, which includes Artificial Abrasives; Abrasive Products; Artificial Graphite and Electrodes; Gypsum Products; and the Products of the Mica Trimming Shops.

Most of the industries under review reached the peak of their production in the year 1920. The depleted condition of the world's markets for many products immediately following the war, provided cause for a great increase in production, so that during the next two years, with plants operating at full capacity, the output more than met the current demand, and the surplus accumulated at the close of 1920 had a depressing effect on production in the following year. In the year 1919 the number of plants reporting was 704; this increased to 794 in 1920, dropped back to 764 in 1921 and then rose again to 781 in 1922 and 794 in 1923. Of this latter number, 36 were located in Nova Scotia, 3 in Prince Edward Island, 30 in New Brunswick, 175 in Quebec, 434 in Ontario, 31 in Manitoba, 22 in Saskatchewan, 25 in Alberta and 38 in British Columbia. The total capital invested in these plants was $121,167,497 in 1919; four years later it totalled $166,786,211. The total number of salaried employees and wage-earners was 15,353 in 1919; this increased to 19,343 in 1920, fell away to 15,413 in 1921 and in 1923 numbered 17,936 persons. The amount of money paid out for salaries and wages amounted to $16,859,231 in 1919, increased to $23,185,110 in 1920, and then declined to $20,171,649 in 1923.

The value of raw materials increased from 53 millions of dollars in 1919 to 76 millions in 1920, went down as low as 63 millions in 1922, but improved in 1923 until the amount stood at a little over 69 millions of dollars.

The value of products increased from 93 million dollars in 1919 to 129 millions in 1920. In 1921 the value of the output was in the neighbourhood of 115 million dollars; in 1922 about 109 millions, while in 1923 it had an upward trend to a total above 113 millions of dollars.

Aerated Waters.—The aerated waters industry is distributed fairly well over the whole of the Dominion; almost every town has a small soda water and soft drinks plant, and more especially in the larger cities where strenuous advertising campaigns have been carried on to promote the use of carbonated beverages, the industry has increased in size until the bottling establishments have attained considerable industrial importance. In the peak year of 1920, aerated waters valued at more than 9 million dollars were produced. Sales have not been so large in recent years, but a general review of the figures for the past two years seems to show that the industry is firmly established, and that the annual production should now be well maintained. While the consumption of aerated waters is, of course, always greater during the summer season, the amount used in other months is very considerable. The production from year to year also varies with the prevailing weather conditions; when the summer is unusually hot, the consumption of aerated waters is greatly increased.

Asbestos and Allied Products.—Under this heading there have been included the data reported by manufacturers who use asbestos as a major constituent of the products fabricated by them, including sheets and boards, roofing and flooring, asbestos and magnesia packing and pipe covering, cement, and such plastic products as boiler lining.

By means of education, research, careful advertising and efficient service, the use of asbestos and other insulating materials as heat savers is becoming extended annually. The high price of fuel in recent years has emphasized the saving which can be effected by the proper insulation of steam pipes and hot water pipes in private dwellings as well as in large industrial works. Most of the plants for making and distributing these insulating materials are situated in the provinces of Quebec and Ontario where the larger plants using such products are located. Recently, a large company has entered this field in Quebec near the source of supply of raw material and will manufacture not only for home consumption, but will take advantage of the preferential export duties with some of the British Dominions.

Cement Products.—This group includes those firms who produce concrete blocks, tile, sewer pipe, sills, piles, posts and other manufactures of concrete and artificial stone with cement as the binding medium.

It has been found quite difficult to arrive at some standard whereby it would be feasible to classify the cement products manufactured, because of their varied sizes and shapes; for this reason the value only is reported.

Sand-Lime Brick.—Practically all of the sand-lime brick produced in Canada is manufactured by large brick companies, whose plants are located near the industrial centres. These companies have a supply of sand near at hand and the increase in production of this product has grown rapidly since the year 1919.

Coke and By-Products.—The coke industry in Canada is dependent more or less upon the demand of the iron and steel industries and of the smelters treating the non-ferrous metal ores. Coke plants are located in the provinces of Nova Scotia, Ontario, Alberta and British Columbia.

The British Empire Steel Corporation of Sydney, N.S., make by-product coke from their own coal; the Steel Company of Canada at Hamilton, Ont., and the Algoma Steel Corporation at Sault Ste. Marie, Ont., buy United States coal and make by-product coke for their own consumption. In the Crow's Nest Pass coal area in Alberta and British Columbia, beehive coke is made from domestic coal by the International Coal and Coke Company and by the Crow's Nest Pass Coal Company; much of this coke is sold for use at the smelter of the Consolidated Mining and Smelting Company at Trail, B.C. Coal from Vancouver Island is shipped to Anyox, B.C., and there made into by-product coke by the Granby Consolidated Mining, Smelting and Power Company for their own use.

The total value of coke made in Canada during 1923 amounted to $10,142,500; that imported during the same time cost $5,790,771 while the value of coke exported was $433,497.

As in most of the other industries during the period under review, the coke industry reached its peak in the year 1920. In 1922, the value of products was approximately one-half of the sum reported in 1920, but the trend is again upward and in 1923 the production was nearly as large as in 1920.

Glass.—In the glass industry are included those plants making pressed and blown glass; window glass; cut glass; plain, plate or bevelled mirrors; or bending plate and sheet glass; and assembling leaded and other art glass.

A large glass company whose products are mainly pressed and blown glass, has a head office in Montreal, Canada, and operates plants at strategic points across the continent. Two other companies established plants in Ontario for the manufacture of window glass but one of these closed down in 1923. There is no plate glass made in Canada, and the entire supply, therefore, is imported and cut and bevelled as required.

Illuminating and Fuel Gas.—The illuminating and fuel gas industry in Canada is chiefly centered in the larger cities of the Dominion and is closely associated with those sections of the country where manufacturing predominates.

Since more use is made of coal gas and carburetted water gas than any other kind, these are the most important. Pintsch gas is made at many divisional points along the railroads and is supplied in cylinders for railway-car lighting purposes. Acetylene gas is used in several prairie towns where the size of the municipality is not large enough to warrant a coal-gas plant or where the cost of coal for gas-making is prohibitive.

The by-products of this important industry, coke, tars, light oils, etc., made available by large scale production, provide an incentive to increase plant size where an increase in population and the number of industries to be served warrant the additional outlay, and where the by-products are readily marketable.

The burning of coke in the house furnace, the necessity of enriching the soil with nitrogen fertilizers, the large increase in refrigerating operations, and the extended use of tars and tar products have provided such additional markets for gas house by-products that some of the larger plants have been prompted to increase their output.

A few plants established in smaller towns, where it did not pay to install equipment for the recovery of the by-products, have ceased operations because of the inroads of hydro-electric power. Nevertheless, gas has its particular uses in the industrial field as well as for domestic purposes and statistics show that this industry is gaining ground annually.

Monumental and Ornamental Stone.—The development in Canada of the raw materials required by this industry has been slow. Because of the known quality of the Italian marbles, Scotch granites, and Vermont marbles and granites, it has been difficult to educate the Canadian people to the fact that Canadian granites and marbles and building stone, worthy of any edifice, exist in abundance.

Domestic markets, of course, are comparatively small and where foreign operators have large markets, their operations can be carried on more extensively thus reducing their costs and allowing them to export, and meet competition in other countries. It is interesting, nevertheless, to note that the interior walls of the new centre block of the Canadian Parliament Buildings at Ottawa have been constructed of a beautiful fossilized limestone from Manitoba and that the head office building of the Bank of Toronto at Toronto, has been decorated with marble from a Canadian quarry. The use of Canadian stone for such purposes is increasing.

Granite monuments for memorials are also being used; some Canadian red granites compare favourably with those imported. Most of the monument makers import the stone in the rough and finish it in their own shops cuttting the design fitted to a particular purpose.

As in other industries, 1920 was the peak year, over $5,000,000 being reported as the value of the products. The industry did not show the same quick depression in 1921 that characterized some other industries, and in 1923 it came back to practically the same production values as reported for 1920.

Petroleum Products.—This is by far the largest industry of the group under review. It includes the refining of petroleum, both Canadian and imported, and also the making of lubricating oils and greases consisting wholly or in part of mineral oils.

With a view largely to the economies to be effected in distribution, refineries are situated at favourable points across the Dominion, some being on the eastern coast, some on the western coast and some in the central sections. The refineries situated on the eastern and western coasts obtain their crude petroleum from the United States, Mexico, or South America by tank steamers; this naturally brings transportation costs down to a minimum.

The increase in use of the internal combustion engine has augmented the annual demand for gasoline and for lubricating oils. The adaptation of fuel oil as a substitute for coal in industrial plants and private dwellings is also increasing the consumption of this product. But the supply has kept pace with the demand. New oil fields are being opened up each year and the price of many of the refinery products has a downward trend.

Miscellaneous Non-Metallic Mineral Products.—(a) *Artificial Abrasives and Abrasive Products.*—Machine parts of micrometer gauge accuracy can be made with greater ease by the use of fine grinding wheels than by any cutting tool and the increased manufacture of artificial abrasives in recent years, has been due largely to the growing demand for greater production in Canada of finely-finished machine tools and parts.

Artificial abrasives produced in the electric furnace include alundum, made by fusing bauxite, and carborundum, a carbide of silicon.

The product as it comes from the furnace is crushed and screened to size and is either moulded and bonded, burnt in a kiln, tested, and made ready for market in the form of grinding wheels or is sold to the manufacturers of emery cloth and similar abrasive products.

(b) *Artificial Graphite and Electrodes.*—Dr. Acheson of Niagara Falls, N.Y., discovered, that by subjecting anthracite coal to certain treatment in the electric furnace, the carbon could be changed to graphite, from which material electrodes are made for use in electric furnaces. The result of his findings has been of great benefit as many plants operating electric furnaces now use electrodes made from artificial graphite as noted in a subsequent chapter dealing with this subject.

(c) *Gypsum Products.*—Plaster of Paris or calcined gypsum has been used for a long time in the manufacture of plaster models, plaster castings and other products in which a hard, quick setting with a smooth finish is demanded. It is also being used more extensively in wall plaster and in water paints for tinting purposes.

(*d*) *Mica Trimming.*—This industry is chiefly centred in the provinces of Ontario and Quebec in small towns near the source of supply. Mica is the best known and most effective electrical insulator and the trend of manufacture of electrical machinery and apparatus is reflected in the mica industry at once.

The figures given in the table for this industry do not represent the total amount of business done in mica trimming shops. Many miners operate their own trimming shops and report their production to the mining section of the Bureau. The figures herein show the value of the products of those mica-trimming shops that have no direct mining connection but which buy the raw material, trim or split it, thus enhancing the value, and sell it again to larger dealers in the mica business.

Primary Products.—As of general interest, a summary of the principal statistics relating to the manufacture of structural materials and clay products during the years 1919 to 1923 has been abstracted from the *Reports of the Mineral Production of Canada* issued by this Bureau. The data in the reports on the mineral production of Canada show the production of primary raw materials, but there are many products described therein which are produced by a manufacturing process, though the cost of the raw materials used is generally considered as negligible. These industries, on the border-line between mining and manufacturing, may be classified under either heading, so that, while the Bureau reports show them under "primary mineral production" for convenience, the inclusion herein of the principal data in regard thereto, may interest the general reader.

Under the heading "Clay Products" are the brick and tile industry, the clay sewer pipe industry, the fire brick and fire clay industry and the stoneware and pottery industry.

The *brick and tile industry* had a capital of 24.8 million dollars in 1923, when 204 plants were operating. They employed 3,954 people, who received salaries and wages to the extent of about 4 million dollars. The fuel used amounted to about 2 million dollars in value, and the net value of the products made was in the neighbourhood of 8 million dollars. In 1922, there were 216 plants operating and though the capital employed in operating plants was about one million dollars less than in 1923, the products manufactured amounted to about $700,000 more. In 1921, returns were received from 202 plants, with a value of products amounting to about 6.5 million dollars.

The *clay sewer pipe industry* showed no great change in the three years. Five plants operated, with a capital of about $3,000,000. They employed an average of about 450 people, who received in the neighbourhood of half-a-million dollars in wages and salaries. The cost of fuel was about $300,000 and the value of the products was almost 1.5 million dollars.

In the *fire brick and fire clay industry*, 6 plants operated in 1923, as against 5 in 1922, and 7 in 1921. About 1.78 million dollars was invested in the industry, and on the average, 200 hands were employed, to whom over a quarter-of-a-million dollars was paid. The cost of fuel amounted to $90,286 and the value of the products was slightly over $600,000.

Four plants were engaged in the manufacture of *stoneware and pottery*, with a capitalization of about $300,000. This industry employed slightly more than 100 people. and wages and salaries paid to them averaged about $116,000. The fuel used does not vary much from year to year, $14,607 worth being used in 1923. The annual value of the products amounted to about one-quarter-of-a-million dollars.

Under the general heading of "*Structural Materials*," the commodities cement and lime are also included. The cement industry is naturally dependent on the amount of construction undertaken in the Dominion each year. There were 10 plants making cement in 1923 as compared with 11 in 1922 and 14 in 1921. The total capital employed in the respective years was 38 million dollars; 41 million dollars; and 49 million dollars. In 1923, there were 1,842 people employed, who received salaries and wages to the amount of 2.5 million dollars. Miscellaneous expenses amounted to 3 million dollars and fuel to about 2.8 million dollars. The value of the products reported was slightly over 15 million dollars. In 1922, the value of products was given as 15.4 million dollars and in 1921, the sales amounted to 14.2 million dollars.

In the manufacture of lime during 1921 and 1922, there were 66 and 62 plants operated, respectively. The capital employed was in the neighbourhood of $5,000,000 in both years. In 1921, the average number of employees was 931 and they were paid slightly less than one million dollars. In the year 1922 the 1,110 people on the rolls received slightly more than one million dollars for their services. Miscellaneous expenses approached the half-million dollar mark and fuel consumed was valued at three-quarters-of-a-million dollars. The value of the lime sold in 1921 was $2,781,197 and in 1922 the total was $3,165,005. In 1923 though only 56 plants reported, the total capital employed was $6,050,954, and there were 1,197 people on the rolls, who received about 1.2 million dollars in salaries and wages. The miscellaneous expenses, $806,916, were much higher than in the other two years, and the cost of fuel, $953,709, was also greater. Lime to the value of $3,266,608 was made in 1923.

In the chapters pertaining to the several different industries under review will be found further excerpts from the *Reports of the Mineral Production of Canada* for the years 1921, 1922 and 1923, which it seemed advisable to add to this report as relative information.

Table 1.—Number of Plants and Value of Products in the Manufacture of Non-Metallic Mineral Products, by Industries and Provinces, 1919-1923

Industry	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
AERATED WATERS—										
Number of Plants—										
1919	19	4	19	98	129	5	16	13	17	320
1920	23	3	20	92	136	7	14	13	22	330
1921	22	3	20	86	129	8	14	15	23	320
1922	17	2	14	75	127	6	11	13	18	283
1923	18	2	15	78	133	7	12	14	16	295
Value of Products—										
1919 $	410,153	16,628	369,539	2,360,272	2,193,643	1,096,029	414,687	305,532	200,276	7,366,759
1920 $	458,340	79,215	469,990	2,532,392	2,804,290	1,831,729	435,575	318,594	424,568	9,354,693
1921 $	390,421	76,777	280,365	2,819,104	2,644,953	1,943,369	406,019	342,520	273,310	9,176,868
1922 $	261,511	.....	199,046	1,934,327	2,646,236	556,099	441,525	294,657	182,442	6,594,509
1923 $	206,271	.....	217,658	2,219,767	2,504,055	392,449	344,481	275,026	210,667	6,408,832
ASBESTOS AND ALLIED PRODUCTS—										
Number of Plants—										
1919	.....	.....	.....	2	2	.....	.....	.....	1	5
1920	1	.....	.....	2	6	1	.....	.....	1	11
1921	1	.....	.....	2	7	.....	.....	.....	1	11
1922	1	.....	.....	2	7	.....	.....	.....	1	11
1923	1	.....	.....	2	5	.....	.....	.....	1	9
Value of Products—										
1919 $	.....	.....	.....	.....	.....	.....	.....	.....	.....	546,870
1920 $	.....	.....	.....	.....	274,136	.....	.....	.....	.....	940,072
1921 $	.....	.....	.....	.....	276,861	.....	.....	.....	.....	804,603
1922 $	.....	.....	.....	.....	317,421	.....	.....	.....	.....	615,160
1923 $	.....	.....	.....	.....	312,728	.....	.....	.....	.....	583,013
CEMENT PRODUCTS AND SAND—LIME BRICK—										
Number of Plants—										
1919	2	.....	2	12	80	1	1	1	.....	99
1920	2	.....	3	14	80	2	3	.....	.....	104
1921	2	.....	3	15	93	2	2	.....	1	118
1922	2	.....	4	13	112	1	2	.....	1	135
1923	2	.....	3	14	106	1	.....	.....	.....	126
Value of Products—										
1919 $	.....	.....	.....	128,227	1,060,496	.....	.....	.....	.....	1,376,483
1920 $	.....	.....	75,422	341,888	1,565,405	.....	.....	.....	.....	2,221,231
1921 $	.....	.....	300,987	220,820	1,429,412	.....	.....	.....	.....	2,095,997
1922 $	.....	.....	59,969	256,178	1,740,862	.....	.....	.....	.....	2,139,811
1923 $	.....	.....	29,892	275,663	2,080,975	.....	.....	.....	.....	2,403,488
COKE AND BY-PRODUCTS—										
Number of Plants—										
1919	2	.....	.....	.....	2	.....	.....	.....	3	7
1920	2	.....	.....	.....	2	.....	.....	.....	2	6
1921	1	.....	.....	.....	2	.....	.....	.....	2	5
1922	1	.....	.....	.....	2	.....	.....	.....	3	6
1923	1	.....	.....	.....	2	.....	.....	.....	2	5

Table 1.—Number of Plants and Value of Products in the Manufacture of Non-Metallic Mineral Products, by Industries and Provinces, 1919-1923—Continued.

Industry	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
COKE AND BY-PRODUCTS—*Con.*										
Value of Products—										
1919.....$										13,145,728
1920.....$										15,580,615
1921.....$										14,214,728
1922.....$										7,336,027
1923.....$										13,901,445
GLASS—										
Number of Plants—										
1919.....			1	6	23			1	1	32
1920.....				12	32	4		1	3	52
1921.....				11	29	4		1	3	48
1922.....				11	26	4		1	3	45
1923.....				12	26	3		1	4	46
Value of Products—										
1919.....$				1,726,619	5,829,708					8,324,718
1920.....$				3,665,622	8,878,080	227,664			19,478	13,795,690
1921.....$				3,700,922	6,894,961	106,349			16,280	11,161,932
1922.....$				3,174,413	4,921,727	74,738			16,250	8,842,588
1923.....$				3,558,481	6,497,965	68,498			36,061	11,098,026
ILLUMINATING AND FUEL GAS—										
Number of Plants—										
1919.....	1		1	4	21	7	2	1	2	39
1920.....	1		2	6	27	9	2	1	4	52
1921.....	1		2	5	24	9	3	1	5	50
1922.....	1		2	5	22	9	3	1	5	48
1923.....	1		2	4	22	8	2	1	5	45
Value of Products—										
1919.....$				4,134,077	6,882,316	142,580				11,967,264
1920.....$				5,906,555	9,257,640	1,371,805			826,331	17,758,401
1921.....$				5,474,119	10,503,443	1,396,513	48,912		958,818	18,772,285
1922.....$				6,250,769	10,089,862	1,342,411	41,186		1,003,381	19,089,170
1923.....$				6,725,181	10,163,815	1,277,012			1,021,327	19,605,340
MONUMENTAL AND ORNAMENTAL STONE—										
Number of Plants—										
1919.....	8	1	6	32	83	8	7	4	7	156
1920.....	8	1	7	37	95	11	6	4	7	176
1921.....	9		8	32	97	11	5	5	6	173
1922.....	12	1	11	37	114	13	6	5	9	208
1923.....	12	1	10	42	114	11	7	5	8	210
Value of Products—										
1919.....$	65,408		110,303	499,472	1,709,078	343,393	243,064	91,690	76,494	3,158,552
1920.....$	82,684		156,175	997,024	2,833,527	604,366	268,782	120,533	103,600	5,205,886
1921.....$	56,437		133,263	914,529	2,432,504	614,007	110,035	142,597	136,656	4,510,028
1922.....$	84,154		191,252	895,431	2,970,497	441,129	106,229	123,681	135,946	4,968,487
1923.....—.$	106,387		141,224	959,141	3,088,871	312,340	147,692	111,563	136,496	5,025,003
PETROLEUM PRODUCTS—										
Number of Plants—										
1919.....	1			2	8	1	1	3	2	18
1920.....	1			3	10	1	1	2	1	19
1921.....	1			3	7	1	1	2	1	16
1922.....	1			3	8	1	1	3	2	19
1923.....	1			3	8	1	1	4	2	20
Value of Products—										
1919.....$					24,053,443			224,642		44,554,581
1920.....$				7,714,668	33,011,260					59,573,448
1921.....$				6,214,689	22,655,704					52,932,415
1922.....$				6,809,297	24,318,314			137,313		57,035,563
1923.....$				8,308,601	19,040,812			301,241		46,280,534
MISCELLANEOUS NON-METALLIC PRODUCTS—										
Number of Plants—										
1919.....	1		1	14	10	2				28
1920.....			1	24	17	2				44
1921.....				12	10	1				23
1922.....				11	15					26
1923.....				20	18					38

Table 1.—Number of Plants and Value of Products in the Manufacture of Non-Metallic Mineral Products, by Industries and Provinces, 1919-1923—Concluded

Industry	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
MISCELLANEOUS NON-METALLIC PRODUCTS—Con.										
Value of Products—										
1919.....$	.....	.....	.....	608,570	1,415,703	.....	.....	.....	.....	2,826,157
1920.....$	.....	.....	.....	1,039,058	2,642,716	.....	.....	.....	.....	4,579,216
1921.....$	.....	.....	.....	225,568	1,025,403	.....	.....	.....	.....	1,256,938
1922.....$	.....	.....	.....	619,283	2,396,256	.....	.....	.....	.....	3,015,539
1923.....$	.....	.....	.....	1,435,247	6,712,084	.....	.....	.....	.....	8,147,331
ALL INDUSTRIES—										
Number of Plants, 1919...	34	5	30	170	358	24	27	23	33	704
Value of Products, 1919...$	10,416,384	45,278	868,209	15,769,766	50,527,636	2,175,237	5,652,266	1,396,652	6,415,184	93,266,612
Number of Plants, 1920...	38	4	33	190	405	37	26	21	40	794
Value of Products, 1920...$	10,090,646	118,410	1,116,078	22,748,327	68,849,029	4,911,852	10,633,054	1,675,679	8,861,177	129,009,252
Number of Plants, 1921...	37	3	33	166	398	30	25	24	42	764
Value of Products, 1921...$	13,159,670	76,777	858,971	20,072,987	57,459,827	4,429,373	8,342,690	1,318,010	9,537,489	115,255,794
Number of Plants, 1922...	35	3	31	157	433	34	23	23	42	781
Value of Products, 1922...$	11,854,235	98,834	575,464	20,216,532	53,808,088	2,075,119	9,552,997	1,238,558	9,317,627	109,637,454
Number of Plants, 1923..	36	3	30	175	434	31	22	25	38	794
Value of Products, 1923...$	10,400,494	59,147	523,732	23,734,921	58,179,525	2,600,261	8,169,997	1,651,984	8,132,951	113,453,012

NOTE—Totals for Canada include data for those provinces in which fewer than 3 concerns in a given industry were in operation.

Table 2.—Cost of Materials Used in the Manufacture of Non-Metallic Mineral Products in Canada, by Industries, 1919-1923

Industry	1919	1920	1921	1922	1923
	$	$	$	$	$
Aerated waters	3,385,583	4,343,849	3,607,147	2,705,957	2,672,332
Asbestos and allied products	214,725	432,350	385,810	271,749	260,281
Cement products and sand-lime brick	462,927	720,717	694,923	825,238	814,772
Coke and by-products	11,007,882	13,409,921	12,295,797	6,130,628	11,437,863
Glass	2,741,564	4,604,534	3,974,358	3,287,091	3,714,515
Illuminating and fuel gas	6,112,354	9,851,981	9,279,697	8,580,208	9,024,084
Monumental and ornamental stone	1,084,757	1,781,031	1,478,097	1,844,548	1,683,128
Petroleum products	27,076,751	39,168,692	36,629,576	38,413,191	36,816,696
Miscellaneous non-metallic products	969,080	1,533,065	553,517	1,318,652	2,879,015
Total	**53,055,623**	**75,846,140**	**68,898,922**	**63,377,262**	**69,302,684**

Table 3.—Value of Products Made in the Manufacture of Non-Metallic Mineral Products in Canada, by Industries, 1919-1923

Industry	1919	1920	1921	1922	1923
	$	$	$	$	$
Aerated waters	7,366,759	9,354,693	9,176,868	6,594,509	6,408,832
Asbestos and allied products	546,870	940,072	804,603	615,160	583,013
Cement products and sand-lime brick	1,376,483	2,221,231	2,095,997	2,139,811	2,403,488
Coke and by-products	13,145,228	15,580,615	14,214,728	7,336,627	13,901,445
Glass	8,324,718	13,795,690	11,461,932	8,842,588	11,098,026
Illuminating and fuel gas	11,967,264	17,758,401	18,772,285	19,089,170	19,605,340
Monumental and ornamental stone	3,158,552	5,205,886	4,540,028	4,968,487	5,025,003
Petroleum products	44,554,581	59,573,448	52,932,415	57,035,563	46,280,534
Miscellaneous non-metallic products	2,826,157	4,579,216	1,256,938	3,015,539	8,147,331
Total	**93,266,612**	**129,009,252**	**115,255,794**	**109,637,454**	**113,453,012**

Table 4.—Value Added in the Manufacture of Non-Metallic Mineral Products in Canada, by Industries, 1919-1923

Industry	1919	1920	1921	1922	1923
	$	$	$	$	$
Aerated waters	3,981,176	5,010,844	5,569,721	3,888,552	3,736,500
Asbestos and allied products	332,145	507,722	418,793	343,411	322,732
Cement products and sand-lime brick	913,556	1,500,514	1,401,074	1,314,573	1,588,716
Coke and by-products	2,137,346	2,170,694	1,918,931	1,205,999	2,463,582
Glass	5,583,154	9,191,156	7,487,574	5,555,497	7,383,511
Illuminating and fuel gas	5,854,910	7,906,420	9,492,588	10,508,962	10,581,256
Monumental and ornamental stone	2,073,795	3,424,855	3,061,931	3,123,939	3,341,877
Petroleum products	17,477,830	20,404,756	16,302,839	18,622,372	9,463,838
Miscellaneous products	1,857,077	3,046,151	703,421	1,696,887	5,268,316
Total	**40,210,989**	**53,163,112**	**46,356,872**	**46,260,192**	**44,150,328**

Table 5.—Cost of Materials Used in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province	1919	1920	1921	1922	1923
	$	$	$	$	$
Nova Scotia	6,482,982	6,775,349	8,363,255	7,013,385	7,484,366
Prince Edward Island	19,233	63,605	37,933	47,680	77,095
New Brunswick	272,687	435,554	322,474	210,792	193,464
Quebec	7,652,813	11,937,469	9,475,814	9,187,515	12,238,980
Ontario	29,774,028	42,388,728	36,176,447	31,325,447	33,603,742
Manitoba	989,783	2,344,655	2,083,492	1,603,084	1,487,302
Saskatchewan	3,731,042	5,587,801	5,123,023	5,546,198	4,932,684
Alberta	515,868	566,099	470,827	494,199	797,550
British Columbia	3,617,187	5,745,980	6,845,657	7,948,962	8,847,441
Canada	**53,055,623**	**75,846,140**	**68,898,922**	**63,377,262**	**69,302,684**

Table 6.—Value of Products Made in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province	1919	1920	1921	1922	1923
	$	$	$	$	$
Nova Scotia	10,416,384	10,090,646	13,159,670	11,854,235	10,400,494
Prince Edward Island	45,278	118,419	76,777	98,834	59,147
New Brunswick	868,209	1,146,078	858,971	575,464	523,732
Quebec	15,769,766	22,748,327	20,072,987	20,216,532	23,734,921
Ontario	50,527,636	68,849,029	57,459,827	53,808,088	58,179,525
Manitoba	2,175,237	4,911,852	4,429,373	2,975,119	2,600,261
Saskatchewan	5,652,266	10,638,054	8,342,690	9,552,997	8,168,997
Alberta	1,396,652	1,675,679	1,318,010	1,238,558	1,651,984
British Columbia	6,415,184	8,861,177	9,537,489	9,317,627	8,132,951
Canada	**93,266,612**	**129,009,252**	**115,255,794**	**109,637,454**	**113,453,012**

Table 7.—Value Added in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province	1919	1920	1921	1922	1923
	$	$	$	$	$
Nova Scotia	3,933,402	3,315,297	4,796,415	4,840,850	2,916,128
Prince Edward Island	26,045	54,805	38,844	51,154	*17,948*
New Brunswick	595,522	680,524	536,497	364,672	330,268
Quebec	8,116,953	10,810,858	10,597,173	11,029,017	11,495,941
Ontario	20,753,608	26,460,301	21,283,380	22,482,641	24,575,783
Manitoba	1,185,454	2,567,197	2,345,881	1,372,035	1,112,899
Saskatchewan	1,921,224	5,050,253	3,219,667	4,006,799	3,237,313
Alberta	880,784	1,108,680	847,183	744,359	854,434
British Columbia	2,797,997	3,115,197	2,691,832	1,368,665	*354,490*
Canada	**40,210,989**	**53,163,112**	**46,356,872**	**46,260,192**	**41,150,328**

Note.—Figures in italics represent negative differences between the value of products and the cost of materials.

Table 8.—Number of Employees, Salaries and Wages, Paid in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
						$	$	$
Nova Scotia—								
1919	64	20	1,506	14	1,604	124,476	1,991,310	2,115,786
1920	85	21	1,540	11	1,657	204,764	2,129,003	2,333,767
1921	84	24	1,322	12	1,442	196,548	1,844,380	2,040,928
1922	79	20	1,047	13	1,159	183,202	1,368,621	1,551,823
1923	76	18	767	11	872	165,822	830,524	996,346
Prince Edward Island—								
1919	2	1	13	1	17	770	9,266	10,036
1920	2	1	13	5	21	4,668	16,107	20,775
1921	3	1	6	4	14	5 685	5,361	11,046
1922	3	1	9	4	17	6,299	12,747	19,046
1923	2	2	12	6	22	7,318	16,560	23,878
New Brunswick—								
1919	39	8	277	13	337	57,647	230,906	288,553
1920	40	10	346	9	405	71,628	316,838	388,466
1921	30	7	221	6	264	58,177	194,683	252,860
1922	57	11	162	4	234	76,748	151,594	228,342
1923	46	15	134	5	200	49,884	118,232	168,116
Quebec—								
1919	287	73	2,443	956	3,759	485,793	2,465,467	2,951,260
1920	389	103	2,934	2,400	5,826	727,530	3,612,649	4,340,179
1921	370	80	2,954	743	4,147	766,264	3,419,550	4,185,814
1922	444	91	2,703	935	4,173	854,964	3,151,228	4,006,192
1923	509	137	2,758	1,891	5,295	1,060,688	3,169,606	4,230,294
Ontario—								
1919	775	294	6,355	273	7,697	1,444,085	7,678,043	9,122,128
1920	939	372	7,435	323	9,069	2,124,951	10,296,695	12,421,646
1921	873	335	5,947	241	7,396	2,020,408	8,097,471	10,117,879
1922	979	348	6,049	150	7,526	2,167,065	7,759,727	9,927,692
1923	967	353	6,889	301	8,510	2,251,956	8,941,115	11,193,071
Manitoba—								
1919	55	14	500	1	570	105,885	328,050	433,935
1920	194	36	580	2	812	356,250	775,243	1,131,493
1921	87	24	555	6	672	185,857	670,319	856,176
1922	117	29	346	1	493	239,412	483,356	722,768
1923	99	24	340	5	468	194,559	372,362	566,921
Saskatchewan—								
1919	60	5	332	4	401	94,328	523,183	617,511
1920	50	5	350	2	407	94,639	613,415	708,054
1921	76	5	423	5	509	138,775	614,665	753,440
1922	91	7	410	2	510	177,246	612,503	789,749
1923	68	8	372	3	451	145,223	552,487	697,710
Alberta—								
1919	42	8	252	15	317	83,059	281,122	364,181
1920	64	13	270	19	366	155,463	336,422	491,885
1921	40	4	152	10	206	76,362	181,245	257,607
1922	62	11	186	10	269	114,888	225,730	340,618
1923	76	13	1,263	17	1,369	168,309	1,344,295	1,512,604
British Columbia—								
1919	96	17	534	4	651	177,064	778,777	955,841
1920	122	18	637	3	780	233,230	1,115,615	1,348,845
1921	170	14	575	4	763	410,864	914,477	1,325,341
1922	129	13	606	1	749	264,703	887,122	1,151,825
1923	121	15	612	1	749	257,003	525,706	782,709
Canada—								
1919	**1,420**	**440**	**12,212**	**1,281**	**15,353**	**2,573,107**	**14,286,124**	**16,859,231**
1920	**1,885**	**579**	**14,105**	**2,774**	**19,343**	**3,973,123**	**19,211,987**	**23,185,110**
1921	**1,733**	**494**	**12,155**	**1,031**	**15,413**	**3,858,940**	**15,942,151**	**19,801,091**
1922	**1,961**	**531**	**11,518**	**1,130**	**15,130**	**4,085,427**	**14,652,628**	**18,738,955**
1923	**1,964**	**585**	**13,147**	**2,240**	**17,936**	**4,300,852**	**15,870,797**	**20,171,649**

Table 9.—Fuel Consumption in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province		Anthracite	Bituminous	Coke	Fuel oil and gasoline	Gas	Wood	Other	Total
		tons	tons	tons	gals.	M cu ft.	cords	$	$
NOVA SCOTIA—									
1919	Quantity	190	23,531	5,321	9,201,677	174	16	.....	.....
	$	1,930	101,010	30,749	409,977	270	117	.....	544,053
1920	Quantity	24	1,954	2,624	6,398,903	795	7	.....	.....
	$	389	10,698	15,205	355,278	139	78	12,145	393,932
1921	Quantity	17	5,090	13,882	15,117,370	.....	9	.....	.....
	$	214	30,756	124,780	755,229	.....	56	.....	911,035
1922	Quantity	39	10,673	4,841	20,171,452	284,365	4	.....	.....
	$	705	30,140	34,852	764,383	70,719	24	.....	900,823
1923	Quantity	34	1,668	.....	12,925,249	1,511,350	14	.....	.....
	$	642	7,856	.....	601,929	100,582	58	.....	771,067
PRINCE EDWARD ISLAND—									
1919	Quantity	.....	26	.....	50	.....	.....	.....	.....
	$	.....	259	.....	21	.....	.....	.....	280
1920	Quantity	.....	32	.....	80	.....	2	.....	.....
	$	.....	358	.....	37	.....	13	.....	408
1921	Quantity	.....	30	.....	50	.....	3	.....	.....
	$	.....	303	.....	22	.....	15	.....	340
1922	Quantity	.....	25	.....	70	.....	3	.....	.....
	$	.....	274	.....	31	.....	20	.....	325
192[illegible]	Quantity	.....	30	.....	75	.....	.....	.....	.....
	$	.....	330	.....	30	.....	.....	.....	360
NEW BRUNSWICK—									
1919	Quantity	108	3,067	.....	1,262	50,483	60	.....	.....
	$	940	22,273	.....	506	16,371	570	36	40,696
1920	Quantity	22	6,296	.....	3,527	2,213	54	.....	.....
	$	460	56,826	.....	1,603	1,282	552	79	60,802
1921	Quantity	18	931	.....	6,767	80	56	.....	.....
	$	345	7,546	.....	2,679	173	590	.....	11,333
1922	Quantity	22	694	.....	260	700	61	.....	.....
	$	328	5,424	.....	101	350	381	.....	6,584
1923	Quantity	28	681	.....	1,528	160	32	.....	.....
	$	442	4,721	.....	429	346	300	.....	6,238
QUEBEC—									
1919	Quantity	861	42,057	12,412	5,962,757	6,607	1,081	.....	.....
	$	10,440	332,717	108,615	320,759	4,364	6,450	298	783,643
1920	Quantity	1,861	40,405	1,827	12,401,823	2,988	1,188	.....	.....
	$	22,040	405,969	16,101	836,820	3,719	7,035	802	1,292,489
1921	Quantity	1,102	49,467	11,214	10,746,136	38,077	918	.....	.....
	$	17,501	550,580	136,869	745,774	28,591	4,599	36	1,492,950
1922	Quantity	1,309	39,024	12,509	11,891,706	226,295	919	.....	.....
	$	16,237	332,041	108,768	592,048	80,709	4,158	445	1,134,406
1923	Quantity	1,281	46,805	755	13,189,998	877,061	804	.....	.....
	$	20,951	402,833	7,949	721,575	61,624	3,765	43	1,218,740
ONTARIO—									
1919	Quantity	1,209	136,839	14,679	16,575,182	625,329	453	.....	.....
	$	12,338	784,000	33,796	930,055	158,470	3,200	114	1,921,973
1920	Quantity	1,669	200,356	18,288	10,279,904	604,506	483	.....	.....
	$	22,806	1,496,084	86,402	1,416,369	247,113	3,517	57,798	3,330,089
1921	Quantity	1,338	189,281	23,192	11,689,391	523,258	553	.....	.....
	$	15,747	1,615,336	166,854	815,906	183,788	3,728	6,423	2,807,782
1922	Quantity	1,095	203,789	27,660	10,133,222	727,285	695	.....	.....
	$	15,000	1,370,415	140,975	670,499	474,337	4,276	38,606	2,714,008
1923	Quantity	900	252,135	14,358	7,686,556	795,697	754	.....	.....
	$	13,373	1,643,599	91,500	537,278	392,950	4,463	78,675	2,761,838
MANITOBA—									
1919	Quantity	731	3,890	93	55	417	60	.....	.....
	$	8,458	33,829	1,158	27	146	515	.....	44,133
1920	Quantity	512	6,147	268	2,060	296	139	.....	.....
	$	7,093	59,635	3,797	919	124	1,181	.....	72,749
1921	Quantity	530	1,596	23	9,066	280	68	.....	.....
	$	7,465	14,521	356	823	97	540	.....	23,802
1922	Quantity	73	1,141	47	130,620	.....	67	.....	.....
	$	1,197	8,608	735	11,761	.....	509	.....	22,810
1923	Quantity	4	1,256	3	179,172	.....	160	.....	.....
	$	89	13,972	34	16,130	.....	732	.....	30,957
SASKATCHEWAN—									
1919	Quantity	32	8,380	1,032	6,144,382	.....	95	.....	.....
	$	303	42,904	7,116	386,120	.....	806	.....	437,249
1920	Quantity	60	5,136	695	7,527,163	.....	94	.....	.....
	$	540	34,752	4,662	989,779	.....	833	78	1,030,644
1921	Quantity	.....	14,253	486	6,868,450	.....	88	.....	.....
	$	.....	104,304	4,687	419,297	.....	655	.....	528,943
1922	Quantity	45	3,229	427	8,598,088	78,556	74	.....	.....
	$	945	19,582	3,620	565,798	24,199	574	.....	614,718
1923	Quantity	2	2,259	363	8,755,478	161,800	48	.....	.....
	$	39	14,554	3,217	551,795	61,385	368	.....	631,358
ALBERTA—									
1919	Quantity	12	731	.....	890	192,585	5	.....	.....
	$	120	3,848	.....	383	43,728	22	8	48,109
1920	Quantity	2	619	35	2,627	6,181	5	.....	.....
	$	16	4,237	525	1,196	1,580	35	112	7,701
1921	Quantity	.....	391	.....	2,915	4,316	2	.....	.....
	$	.....	2,929	.....	1,698	1,347	15	.....	5,439

Table 9.—Fuel Consumption in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923—Concluded

Province		Anthracite coal	Bituminous coal	Coke	Fuel oil and gasoline	Gas	Wood	Other	Total
		Tons	Tons	Tons	Gals	M cu. ft.	Cords	$	$
1922	Quantity	3	622	.....	2,695	2,564	2	.....	.....
	$	27	2,862	.....	1,129	858	14	120	5,010
1923	Quantity	.....	3,557	.....	206,301	185,070	2	.....	.....
	$	.....	9,716	.....	13,242	25,104	12	78	48,152
British Columbia—									
1919	Quantity	.....	1,051	1,974	5,958,523	19,780	45	.....	.....
	$	.....	7,413	2,674	342,638	5,973	277	.....	358,975
1920	Quantity	6	887	4,951	5,195,825	150,324	39	.....	.....
	$	88	7,293	30,887	335,237	45,136	274	2,326	421,241
1921	Quantity	4	1,207	2,152	5,885,288	2,387	55	.....	.....
	$	48	9,633	4,178	425,068	1,051	394	.....	441,272
1922	Quantity	26	1,099	10,640	6,660,285	231,218	11	.....	.....
	$	245	7,136	56,887	335,223	62,678	54	12	462,235
1923	Quantity	.....	863	2,195	5,895,770	249,678	62	.....	.....
	$	.....	6,048	8,809	224,406	64,358	263	13	303,897
CANADA—									
1919	**Quantity**	**3,143**	**219,572**	**35,511**	**43,844,778**	**895,375**	**1,815**	.....	.....
	$	**34,529**	**1,328,253**	**184,108**	**2,390,486**	**229,322**	**11,857**	**456**	**4,179,111**
1920	**Quantity**	**4,156**	**261,833**	**28,688**	**41,811,917**	**767,383**	**2,011**	.....	.....
	$	**53,432**	**2,075,852**	**157,582**	**3,937,238**	**289,093**	**13,518**	**73,340**	**6 30,055**
1921	**Quantity**	**3,009**	**262,249**	**50,949**	**50,325,413**	**568,428**	**73,340**	.....	.....
	$	**41,320**	**2,344,608**	**437,724**	**3,167,166**	**215,027**	**10,592**	**6,459**	**6,222,896**
1922	**Quantity**	**2,612**	**260,296**	**56,124**	**57,586,998**	**1,559,983**	**1,836**	.....	.....
	$	**34,684**	**1,776,482**	**345,837**	**2,940,937**	**713,750**	**10,010**	**39,183**	**5,860,919**
1923	**Quantity**	**2,219**	**309,251**	**17,694**	**48,840,127**	**3,789,816**	**1,876**	.....	.....
	$	**35,536**	**2,103,629**	**111,509**	**2,666,814**	**766,349**	**9,961**	**78,809**	**5,772,607**

Table 10.—Power Equipment in Use in the Manufacture of Non-Metallic Mineral Products in Canada, 1919-1921

Class of Power	1919	1920	1921
	Rated h.p.	Rated h.p.	Rated h.p.
Steam engines and turbines	10,558	10,764	16,021
Gas engines	1,472	1,171	1,243
Oil and gasoline engines	460	1,452	1,703
Hydraulic turbines or water wheels	3	3	9
Electric motors—			
Alternating current	21,827	*33,154	20,261
Direct current	7,512	.....	8,681
Boilers	31,899	37,803	42,850
Generators—			
Alternating	1,886	†2,668	2,942
Direct	902	.....	2,207

*Direct and alternating. †Direct and alternating.

Table 11.—Power Equipment in Use in the Manufacture of Non-Metallic Mineral Products in Canada, by Industries, 1922

Industry	Boilers	Steam engines and turbines	Gas engines	Oil and gasoline engines	Hydraulic turbines or water wheels	Electric motors	
						Operated by power owned	Operated by power purchased
	Rated h. p.	Rated h. p.	Rated h. p.	Rated h. p.	Rated h. p.	Rated h. p.	Rated h. p.
Aerated waters	1,011	243	21	54	14	.....	1,432
Asbestos and allied products	116	.....	.....	2	.....	.....	558
Cement products and sand-lime brick	1,516	998	199	148	30	.....	1,271
Coke and by-products	4,473	3,224	.....	.....	.....	4,660	3,860
Glass	2,085	385	425	.....	.....	195	6,060
Illuminating and fuel gas	9,066	1,467	318	.....	.....	22	1,505
Monumental and ornamental stone	220	242	52	56	36	.....	5,058
Petroleum products	18,260	5,351	7	1,248	.....	2,831	3,085
Miscellaneous products	300	.....	.....	.....	.....	.....	3,913
Total	**37,047**	**11,910**	**1,022**	**1,508**	**80**	**7,708**	**26,742**

Table 12.—Power Equipment in Use in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, in 1922

Province	Boilers	Steam engines and turbines	Gas engines	Oil and gasoline engines	Hydraulic turbines or water wheels	Electric motors	
						Operated by power owned	Operated by power purchased
	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.
Nova Scotia	7,040	2,971	2	1,234	36	6,200	[illegible]
Prince Edward Island	.....	.....	.....	2	.....	.....	10
New Brunswick	170	167	36	15	.....	5	[illegible]
Quebec	5,652	1,150	134	61	.....	688	4,235
Ontario	18,649	5,532	541	191	42	212	16,583
Manitoba	275	358	.....	2	.....	.....	1,195
Saskatchewan	2,271	1,056	.....	3	.....	603	183
Alberta	200	30	307	.....	.....	.....	1,039
British Columbia	2,790	646	2	.....	2	.....	2,060
Canada	**37,047**	**11,910**	**1,022**	**1,508**	**80**	**7,708**	**26,742**

Table 13.—Power Equipment in Use in the Manufacture of Non-Metallic Mineral Products in Canada, by Industries, 1923

Industry	Boilers	Steam engines and turbines	Gas engines	Oil and gasoline engines	Hydraulic turbines or water wheels	Electric motors	
						Operated by power owned	Operated by power purchased
	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.
Aerated waters	919	242	16	110	11	.....	1,426
Asbestos and allied products	100	.....	.....	.....	.....	.....	548
Cement products and sand-lime brick	1,240	604	40	293	.....	.....	1,343
Coke and by-products	4,473	3,224	.....	.....	.....	4,660	3,860
Glass	1,140	235	127	300	.....	175	6,221
Illuminating and fuel gas	9,705	1,244	218	8	.....	52	1,871
Monumental and ornamental stone	185	162	109	64	32	.....	4,899
Petroleum products	19,909	9,619	967	1,050	.....	2,925	4,620
Miscellaneous Non-metallic products	70	.....	.....	.....	.....	.....	4,937
Total	**37,641**	**15,330**	**1,477**	**1,825**	**43**	**7,812**	**29,725**

Table 14.—Power Equipment in Use in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, in 1923

Province	Boilers	Steam engines and turbines	Gas engines	Oil and gasoline engines	Hydraulic turbines or water wheels	Electric motors	
						Operated by power owned	Operated by power purchased
	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.	Rated h.p.
Nova Scotia	7,000	3,134	3	1,027	30	6,287	258
Prince Edward Island	.....	.....	.....	2	.....	.....	10
New Brunswick	220	162	98	1	.....	5	203
Quebec	5,552	4,146	130	128	8	688	5,156
Ontario	17,237	4,824	264	353	3	222	17,843
Manitoba	1,260	303	.....	2	.....	.....	1,615
Saskatchewan	2,066	984	3	.....	.....	606	243
Alberta	1,866	1,108	967	312	.....	4	2,017
British Columbia	2,540	669	12	.....	2	.....	2,380
Canada	**37,641**	**15,330**	**1,477**	**1,825**	**43**	**7,812**	**29,725**

Table 15.—Capital Employed in the Manufacture of Non-Metallic Mineral Products in Canada, by Industries, 1919-1923

Industry	Capital employed as represented by			
	Lands, buildings, machinery and tools	Materials on hand and stocks in process	Cash trading and operating accounts	Total
	$	$	$	$
Aerated Waters—				
1919	4,142,384	1,429,476	973,943	6,545,803
1920	4,303,877	2,332,072	1,623,865	8,259,814
1921	4,826,123	2,298,529	1,112,294	8,236,946
1922	5,232,867	1,915,773	1,056,817	8,205,457
1923	5,526,075	1,878,761	910,553	8,315,389
Asbestos and Allied Products—				
1919	620,992	144,166	113,240	878,398
1920	775,085	242,093	162,923	1,180,101
1921	928,512	336,393	86,373	1,351,278
1922	957,291	378,839	274,570	1,610,700
1923	956,742	353,468	176,379	1,486,589
Cement Products and Sand-Lime Brick—				
1919	1,482,824	237,315	366,480	2,086,619
1920	1,817,813	370,101	466,224	2,654,198
1921	1,987,060	288,534	513,442	2,789,066
1922	1,945,581	261,214	571,173	2,777,968
1923	1,769,874	364,940	572,385	2,707,199
Coke and By-Products—				
1919	2,440,118	1,859,735	228,758	24,528,611
1920	18,590,587	606,147	81,805	19,278,539
1921	19,866,300	.....	.....	19,866,300
1922	19,877,521	486,264	.....	20,363,785
1923	19,639,208	855,234	.....	20,494,442
Glass—				
1919	4,762,092	1,049,056	1,550,376	7,362,124
1920	8,103,035	2,664,843	2,289,285	13,057,183
1921	8,997,720	2,790,586	1,937,176	13,725,482
1922	9,982,154	2,637,704	2,433,469	15,053,327
1923	9,945,874	2,760,170	2,186,328	14,892,372
Illuminating Fuel Gas—				
1919	24,854,256	1,482,749	1,848,649	28,185,654
1920	31,746,659	1,528,857	2,111,175	35,386,691
1921	33,174,400	1,735,750	2,187,130	37,097,280
1922	35,035,750	1,936,406	2,643,609	39,615,765
1923	38,294,289	2,516,210	4,715,996	45,526,495
Monumental and Ornamental Stone—				
1919	1,292,310	837,988	804,522	2,931,836
1920	1,751,893	1,171,087	1,258,690	4,181,670
1921	1,625,055	1,070,129	1,275,988	3,971,172
1922	2,239,391	1,239,994	1,548,550	5,027,935
1923	2,299,552	1,227,392	1,546,674	5,073,618
Petroleum Products—				
1919	30,108,350	13,125,049	1,321,456	44,554,855
1920	32,851,871	17,302,482	2,555,534	52,709,887
1921	37,956,927	18,029,397	1,578,264	57,564,588
1922	41,675,844	19,361,284	1,016,901	62,054,029
1923	47,955,301	12,328,670	743,733	61,027,704
Miscellaneous Manufactured Non-Metallic Products—				
1919	2,306,793	750,327	433,493	3,490,613
1920	3,369,213	1,337,033	758,732	5,464,978
1921	1,043,374	919,883	290,065	2,253,322
1922	3,639,091	1,287,860	1,427,164	6,354,115
1923	4,191,699	1,630,694	1,440,010	7,262,403
Total—				
1919	**92,010,719**	**21,515,861**	**7,640,917**	**121,167,497**
1920	**103,310,653**	**27,554,775**	**11,308,233**	**142,173,061**
1921	**110,405,501**	**27,469,201**	**8,980,732**	**146,855,434**
1922	**120,585,490**	**29,505,338**	**10,972,252**	**161,063,081**
1923	**130,578,614**	**23,915,539**	**12,292,058**	**166,786,211**

Table 16.—Capital Employed in the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province	Capital employed as represented by			
	Lands, buildings, machinery and tools	Materials on hand stocks in process	Cash trading and operating accounts and bills receivable	Total
	$	$	$	$
Nova Scotia				
1919	18,683,809	1,208,567	203,389	20,095,765
1920	18,490,838	1,326,894	145,010	19,962,742
1921	21,064,048	1,685,455	103,474	22,852,977
1922	21,910,005	4,486,738	97,664	26,494,407
1923	21,546,377	3,028,674	290,805	24,865,856
Prince Edward Island—				
1919	26,881	19,075	11,756	57,712
1920	25,431	45,792	13,595	84,818
1921	23,000	1,200	500	24,700
1922	27,150	44,400	9,950	81,500
1923	27,150	53,700	9,950	90,800
New Brunswick—				
1919	905,022	226,963	141,649	1,273,634
1920	602,023	205,541	218,245	1,025,809
1921	226,449	117,120	164,318	507,887
1922	266,930	117,543	158,353	542,826
1923	243,038	99,218	96,347	438,603
Quebec—				
1919	11,523,334	3,516,800	1,007,385	16137,519
1920	15,978,578	4,519,291	1,419,369	21,917,238
1921	16,697,167	4,794,017	1,442,897	22,934,081
1922	18,047,134	5,237,007	2,220,998	25,505,139
1923	20,733,589	5,081,951	3,394,148	29,209,688
Ontario—				
1919	43,103,713	12,496,770	4,812,058	60,412,541
1920	45,621,170	16,482,039	7,928,892	70,032,101
1921	49,238,952	13,218,617	6,110,452	68,568,021
1922	54,258,661	11,950,554	7,518,677	73,727,892
1923	56,501,682	11,319,404	7,523,353	75,344,439
Manitoba—				
1919	2,510,238	446,626	368,938	3,335,802
1920	6,613,464	1,437,400	554,861	8,605,725
1921	5,803,986	1,304,217	488,303	7,596,506
1922	5,483,485	498,722	320,606	6,302,813
1923	5,527,200	493,834	339,221	6,360,255
Saskatchewan—				
1919	4,169,948	1,691,665	207,258	6,068,869
1920	4,435,788	1,421,964	263,004	6,120,756
1921	4,834,897	2,099,850	180,054	7,114,801
1922	5,348,403	2,395,253	177,498	7,921,154
1923	5,405,052	1,131,816	147,913	6,684,781
Alberta—				
1919	1,499,477	453,544	529,235	2,482,256
1920	1,321,595	483,085	518,843	2,323,523
1921	1,430,291	425,287	304,884	2,160,462
1922	3,570,908	414,120	287,120	4,272,148
1923	8,839,198	1,181,310	335,115	10,355,623
British Columbia—				
1919	9,578,299	1,455,851	269,249	11,303,399
1920	10,221,166	1,632,769	246,414	12,100,349
1921	11,086,711	3,823,438	185,850	15,095,999
1922	11,672,814	4,361,001	181,387	16,215,202
1923	11,755,328	1,525,632	155,206	13,436,166
Canada—				
1919	**92,010,719**	**21,515,861**	**7,640,917**	**121,167,497**
1920	**103,310,053**	**27,554,775**	**11,308,233**	**142,173,061**
1921	**110,405,501**	**27,469,201**	**8,980,732**	**146,855,434**
1922	**120,585,490**	**29,505,338**	**10,972,253**	**161,063,081**
1923	**130,578,614**	**23,915,339**	**12,292,058**	**166,786,211**

Table 17.—Summary of Financial Statistics Relative to the Manufacture of Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province	Capital employed	Expenditures					Selling value of products
		Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total expenditures	
	$	$	$	$	$	$	$
Nova Scotia—							
1919	20,095,765	2,115,786	964,322	544,053	6,482,982	10,107,143	10,416,384
1920	19,962,742	2,333,767	991,164	393,932	6,775,349	10,494,212	10,090,646
1921	22,852,977	2,040,928	1,215,005	911,035	8,363,255	12,530,223	13,159,870
1922	26,494,407	1,551,823	1,580,546	900,823	7,013,385	11,046,577	11,854,235
1923	24,865,856	996,346	1,244,182	771,067	7,484,366	10,495,961	10,400,494
Prince Edward Island—							
1919	57,712	10,036	1,123	280	19,233	30,672	45,278
1920	84,818	20,775	6,372	408	63,605	91,160	118,410
1921	24,700	11,046	6,817	340	37,933	56,136	76,777
1922	81,500	19,046	7,563	325	47,680	74,614	98,834
1923	90 800	23,878	10,112	360	77,095	111,445	59,147
New Brunswick—							
1919	1,273,634	288,553	119,180	40,696	272,687	721,116	868,209
1920	1,025,809	388,466	150,613	60,802	435,554	1,034,435	1,116,078
1921	507,887	252,860	173,580	11,333	322,474	760,253	858,071
1922	542,826	228,342	112,272	6,584	210,792	557,990	575,464
1923	438,803	168,116	106,920	6,238	193,464	474,738	523,732
Quebec—							
1919	16,137,519	2,951,260	1,607,568	783,643	7,652,813	12,995,284	15,769,766
1920	21,917,238	4,340,179	2,041,784	1,292,489	11,937,469	19,611,921	22,748,327
1921	22,934,081	4,185,814	2,077,434	1,492,950	9,475,814	17,232,012	20,072,987
1922	25,505,139	4,006,192	2,271,515	1,134,406	9,187,515	16,599,628	20,216,532
1923	29,209,688	4,230,294	2,631,329	1,218,740	12,238,980	20,319,343	23,734,921
Ontario—							
1919	60,412,541	9,122,128	5,771,255	1,921,973	29,774,028	46,589,384	50,527,636
1920	70,032,101	12,421,646	7,905,411	3,320,089	42,388,728	66,038,874	68,849,029
1921	68,568,021	10,117,879	6,264,289	2,807,782	36,176,447	55,366,397	57,459,827
1922	73,727,892	9,927,692	6,150,866	2,714,008	31,325,447	50,118,013	53,808,088
1923	75,344,439	11,193,071	8,088,194	2,761,838	33,603,742	55,646,845	58,179,525
Manitoba—							
1919	3,335,802	433,935	485,980	44,133	989,783	1,953,831	2,175,237
1920	8,605,725	1,131,493	949,675	72,749	2,344,655	4,498,572	4,911,852
1921	7,596,506	856,176	852,150	23,802	2,083,492	3,815,620	4,429,373
1922	6,302,813	722,768	425,036	22,810	1,603,084	2,773,698	2,975,119
1923	6,360,255	566,921	311,322	30,957	1,487,362	2,396,562	2,600,261
Saskatchewan—							
1919	5,068,869	617,511	597,720	437,349	3,731,043	5,383,522	5,052,266
1920	6,120,756	708,054	666,339	1,030,644	5,587,801	7,992,838	10,038,054
1921	7,114,801	753,440	559,780	528,943	5,123,023	6,965,186	8,342,690
1922	7,921,154	789,749	763,406	614,718	5,546,198	7,714,071	9,552,997
1923	6,684,781	697,710	808,039	631,358	4,932,884	7,129,791	8,169,997
Alberta—							
1919	2,482,256	364,181	208,563	48,109	515,868	1,136,721	1,396,652
1920	2,323,523	491,885	232,868	7,701	566,999	1,299,453	1,675,679
1921	2,160,462	257,607	240,942	5,439	470,827	980,815	1,318,010
1922	4,272,148	340,618	293,633	5,019	494,199	1,133,460	1,238,558
1923	10,355,623	1,512,604	429,585	48,152	797,550	2,787,891	1,651,984
British Columbia—							
1919	11,303,399	955,841	568,980	358,975	3,617,187	5,500,983	6,415,184
1920	12,100,349	1,348,845	843,112	421,241	5,745,980	8,359,178	8,801,177
1921	15,035,999	1,325,341	610,998	441,272	6,845,057	9,223,268	9,537,489
1922	16,215,202	1,151,825	720,345	462,235	7,948,962	10,283,367	9,017,627
1923	13,436,166	782,709	825,304	303,897	8,487,441	10,399,351	8,132,951
Canada—							
1919	**121,167,497**	**16,859,231**	**10,324,691**	**4,179,111**	**53,055,623**	**84,418,656**	**93,206,612**
1920	**142,173,061**	**23,185,110**	**13,790,338**	**6,600,055**	**75,846,140**	**119,421,643**	**129,009,252**
1921	**146,855,434**	**19,801,091**	**12,007,001**	**6,222,896**	**68,898,922**	**106,929,910**	**115,255,794**
1922	**161,063,081**	**18,738,855**	**12,325,182**	**5,860,919**	**65,377,282**	**100,301,418**	**109,637,454**
1923	**166,786,211**	**20,171,619**	**14,514,987**	**5,772,607**	**69,302,884**	**109,761,927**	**113,453,612**

Table 18.—Imports into Canada of Non-Metallic Minerals and Their Products, 1919-1923

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$		$
Asbestos	656,037	1,047,031	566,153	411,151		697,319
Asbestos packing lb.			68,434	65,257	167,678	78,009
Magnesia pipe covering			92,427	86,938		141,926
Total	656,037	1,047,031	727,014	563,346		917,254
CLAY AND ITS PRODUCTS						
Bath brick	1,135	1,793	1,315	1,043		1,938
Building brick M	128,876	94,314	126,765	174,321	5,381	140,441
Building blocks	102,107	153,250	120,980	79,689		77,972
Clays—						
China tons	129,652	234,668	138,775	173,988	12,120	242,860
Fire tons	185,156	267,180	148,059	138,995	53,506	223,628
Pipe	922	2,804	866	2,864		1,161
Other clays	46,420	145,988	72,451	65,422		90,515
Drain tile, unglazed	481	5,744	5,815	692		2,041
Drain and sewerpipe	66,727	30,111	41,107	61,397		61,868
Earthen and china ware	2,925,205	5,380,462	5,023,211	4,641,474		5,067,489
Firebrick[1]	906,481	1,388,390	630,132	611,564		970,324
Firebrick, chrome (May 12, 1923)						4,000
Firebrick, n.o.p.	434,505	579,365	445,053	361,338		610,243
Silica brick	[2]157,374	378,759	229,400	131,517		216,642
Paving brick M	77,374	74,515	41,523	45,686	3,243	90,767
Other clay manufactures	144,008	230,995	162,417	117,952		241,320
Total Clay and its Products	5,306,513	8,968,338	7,187,869	6,607,942		8,052,209
COAL AND ITS PRODUCTS						
COAL						
Anthracite coal and anthracite dust[3] tons	31,595,694	36,773,351	40,293,639	23,795,143	5,165,382	46,457,962
Bituminous round and run-of-mine[4], tons	24,750,717	50,808,626	41,000,322	30,171,375	11,933,610	39,511,911
Bituminous slack such as will pass through ¾-in. screen[5] tons	4,814,388	10,451,621	7,630,773	7,215,910	3,888,630	10,387,188
Lignite and lignite dust (May 12, 1923) tons					2,331	12,846
Total Coal	61,160,799	98,033,598	88,924,734	61,182,428		96,369,907
COAL PRODUCTS						
Coal tar, crude, in packages of not less than 16 gallons, and coal pitch gals.	143,099	152,685	235,896	250,316	5,774,256	324,732
Carbolic or heavy oil gals.	68,316	106,242	165,512	908,088	2,813,551	529,558
Coke tons	2,405,740	6,458,596	1,766,101	3,094,042	733,604	5,790,771
Coke, ground, when imported by manufacturers of electric batteries for use in their own factories in the manufacture of such batteries cwt.	26,615	29,970	26,116	35,601	9,354	24,902
Total Coal Products	2,643,770	6,747,493	2,193,625	4,288,047		6,669,963
Total Coal and its Products	63,804,569	104,781,091	91,118,359	65,470,475		103,039,870
GLASS AND GLASSWARE						
Cut, Pressed or Blown Glass						
Glass plates or discs, rough cut or unwrought, for use in the manufacture of optical instruments, when imported by manufacturers of such optical instruments—	56,522	100,638	75,891	55,585		69,253
Glass milk bottles—(From May 24, 1922)				7,810		22,499
Glass carboys or demijohns, bottles decanters, flasks, jars and phials	841,291	1,649,948	809,079	752,317		1,102,279
Glass balls, and cut, pressed or moulded crystal glass tableware, blown glass tableware, and other cut glassware	576,173	1,024,696	642,530	619,430		653,688

[1] Duty free of a kind not made in Canada.
[2] Last 9 months.
[3] Coal anthracite and anthracite coal dust, duty free.
[4] Duty, 35 cents per ton.
[5] Duty, 14 cents per ton.

Table 18.—Imports into Canada of Non-Metallic Minerals and Their Products, 1919-1923—Continued

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
GLASS AND GLASSWARE —Continued.						
CUT, PRESSED OR BLOWN GLASS —Continued.						
Incandescent lamp bulbs and glass tubing for use in the manufacture of incandescent lamps	109,724	472,168	571,742	411,172	.....	513,225
Lamp chimneys, glass shades or globes	280,303	358,071	232,645	272,734	.....	255,290
Lenses, glass, unfinished	174,558	347,972	216,243	164,609	.....	187,982
PLATE SHEET AND WINDOW GLASS						
Common and colourless window glass.....sq.ft.	1,388,520	3,127,772	909,657	1,135,374	22,314,498	1,069,803
Glass, cut to size for the manufacture of dry plates for photographic purposes, when imported by the manufacturers of such dry plates for use exclusively in the manufacture thereof in their own factories	50,034	58,264	28,641	17,521	.....	15,277
Plate glass, not bevelled, in sheets or panes not exceeding 7 sq. ft. each, n.o.p.....sq. ft.	423,823	807,728	429,324	836,358	2,142,853	1,260,883
Plate glass, not bevelled, in sheets or panes exceeding 7 sq. ft. each, and not exceeding 25 sq. ft. each, n.o.p.....sq. ft.	140,293	475,514	193,815	323,021	748,906	437,172
Plate glass, n.o.p.....sq. ft.	310,811	930,675	453,106	815,713	1,115,979	676,047
Plate glass, bevelled, n.o.p.... "	22,397	83,645	17,605	20,769	31,797	18,860
German looking-glass (thin plate), unsilvered or for silvering	.....	.....	1.3	3	.....	541
Glass in sheets and bent plate glass, n.o.p.	141,241	419,337	188,530	216,734	.....	253,607
STAINED, ORNAMENTAL AND SILVERED GLASS						
Lenses, silvered, for automobile lamps	156	1,181	501	166	.....	84
Ornamental, figured and enamelled coloured glass, and memorial or other ornamental window glass, n.o.p.	14,057	21,244	4,275	6,923	.....	18,231
Painted or vitrified, chipped, figured enamelled and obscured white glass	3,657	2,860	4,242	2,157	.....	5,069
Plain, coloured, opaque, stained or tinted or muffled glass in sheets	12,489	16,844	7,528	7,378	.....	6,638
Stained or ornamental glass windows	6,948	10,069	36,150	31,621	.....	27,709
Silvered glass, bevelled or not, framed or not framed	200,730	270,749	184,747	181,712	.....	206,933
OTHER GLASS AND GLASSWARE						
Articles of glass, not plate or sheet designed to be cut or mounted	†801,731	†1,191,172	†346,044	186,099	.....	206,126
Photographic dry plates	26,896	26,202	26,533	25,437	.....	20,656
Spectacles, eye-glasses and ground or finished spectacle or eye-glass lenses	67,284	80,804	42,884	44,410	.....	64,998
Manufactures of glass, n.o.p.	.....	.....	498,821	558,833	.....	539,790
Total Glass and Glassware	5,649,638	11,472,553	5,920,656	6,693,880	.....	7,629,598
GRAPHITE AND ITS PRODUCTS						
Crucibles, plumbago	(‡) 36,717	90,092	23,786	36,961	.....	57,322
Plumbago not ground or otherwise manufactured	6,604	4,352	4,141	1,007	.....	1,661
Plumbago ground and manufactures of, n.o.p.	80,970	102,568	47,463	47,095	.....	70,704
Total Graphite	124,291	197,012	75,390	85,063	.....	129,687
PETROLEUM, ASPHALT AND THEIR PRODUCTS						
ASPHALT AND ITS PRODUCTS						
Asphalt or asphaltum solid.... cwt.	437,711	617,661	531,474	168,744	251,442	267,462
Asphalt, not solid	9,637	24,705	23,219	38,832	.....	17,095
Asphaltum oil	21,668	44,526	50,137	66,403	.....	27,282
Total Asphalt and Products	469,016	686,892	604,830	573,979	.....	311,839

† Includes the manufacture of glass n.o.p., in 1919, 1920 and the first three months of 1921.
‡ Nine months only.

Table 18.—Imports into Canada of Non-Metallic Minerals and Their Products, 1919-1923—Continued

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
PETROLEUM, ASPHALT AND THEIR PRODUCTS—Concluded	$	$	$	$		$
Crude petroleum not in its natural state, ·7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners, to be refined in their own factories (May 12, 1923)..... gals.	.....	.....	.....	.....	15,922	966
Crude petroleum in its natural state, ·7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories..gals.	15,104,287	20,814,899	20,010,091	21,602,247	13,928,5557	17,449,032
Crude petroleum, gas oils other than naptha, benzine and gasoline lighter than ·8235 but not less than ·775 specific gravity at 60 degrees. gals.	23,866	28,869	18,737	76,900	475,842	38,908
Petroleum (not including crude petroleum imported to be refined or illuminating or lubricating oils. ·8235 specific gravity or heavier at 60 degrees temperature.... gals.	4,702,771	7,790,137	3,786,977	3,014,390	108,506,938	4,206,193
Petroleum, imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments..... gals.	1,367	1,344	3,579	4,075	32,960	5,913
KEROSENE AND ILLUMINATING OILS						
Coal oil and kerosene, distilled, purified or refined..... gals.	926,822	2,359,621	790,468	314,514	4,118,943	322,434
Coal oil and kerosene distilled known as "engine distillates" ·725 specific gravity and heavier but not heavier than ·770 specific gravity at 60 degrees temperature.. gals.	.....	.....	.....	.....	8,203	962
Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon. gals.	119,465	127,889	62,323	50,045	42,474	16,296
LUBRICATING OILS						
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon... gals.	289,442	175,478	374,596	720,223	4,295,635	737,053
Lubricating oils, n.o.p..... gals.	1,467,593	2,267,611	1,559,965	1,412,473	3,901,048	1,573,897
OTHER OILS						
Gasoline, under ·725 specific gravity at 60 degrees temperature.....	1,142,855	2,404,488	4,665,200	5,411,972	35,845,251	5,134,286
Gasoline, n.o.p.....	.....	.....	2,946,258	769,309	177,566	32,750
Gasoline ·725 specific gravity but not heavier than ·770 specific gravity at 60 degrees temperature.....	.....	.....	.....	.....	13,927,843	1993,596
Gasoline and oils, Coal and Kerosene, distilled known as engine distillates ·725 specific gravity and heavier but not heavier than ·770 specific gravity, at 60 degrees temperature (FROM MAY 24, 1922) (1).....	.....	.....	.....	2,579,643	.....	.....
All other oils n.o.p.....	128,863	113,681	39,040	60,469	248,888	86,958
OTHER PRODUCTS OF PETROLEUM						
Grease, axle..... Lb.	357,495	467,109	296,971	177,575	2,981,849	176,216
Paraffine wax..... "	108,040	168,521	72,601	51,032	1,034,921	63,695
Paraffine wax candles..... "	59,151	68,173	45,729	30,299	176,487	32,516
Vaseline and all similar preparations of petroleum for toilet, medicinal or other purposes.....	158,037	221,109	219,886	242,743	.....	268,297
Petroleum, products of, n.o.p.. gals.	5,615,622	10,891,302	1,990,496	289,815	1,712,665	299,388
Total Petroleum and its Products, Imported.....	30,205,685	47,900,231	36,882,977	36,816,724	.....	32,439,326
Total—Asphalt, Petroleum and their products.....	3,097,701	48,587,123	37,187,867	37,390,702	.....	32,741,125

(1) Included under gasoline, n.o.p. prior to May 24, 1922.

Table 18.—Imports into Canada of Non-Metallic Minerals and Their Products, 1919-1923—Continued.

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$		$
STONE AND ITS PRODUCTS						
Grindstones	281,066	312,672	448,055	319,941	.....	482,340
Burrstones in blocks, etc..... No.	3,421	1,655	4,844	910	519	6,908
Diamond dust or bort and black diamonds for borers	126,863	290,200	110,182	323,324	.....	244,252
Emery in bulk, crushed or ground	38,106	69,462	44,490	41,943	.....	57,207
Emery and carborundum wheels and manufactures	316,322	471,853	197,049	209,356	.....	151,065
Pumice and pumice stone ground	29,910	57,068	21,528	26,405	.....	28,222
Iron sand or globules for polishing and sawing	10,247	17,000	13,723	11,820	.....	20,855
Sandpaper, emery paper, etc	362,069	560,180	252,804	270,231	.....	293,965
Artificial abrasives	82,866	251,261	74,083	163,542	.....	243,408
Total	1,250,870	2,031,351	1,166,758	1,367,472	.....	1,528,282
Building stone	212,191	346,084	297,292	371,490	.....	403,350
Granite	110,583	161,024	71,245	72,633	.....	158,864
Marble	438,623	475,030	429,512	294,206	.....	293,806
Paving blocks	.....	.....	14	179	.....	61
Refuse stone..... tons	199,528	235,078	129,645	199,397	392,819	225,565
Total	960,925	1,217,216	927,708	937,905	.....	1,081,846
Portland cement..... bbls.	51,314	112,466	75,670	83,037	17,697	75,294
Manufactures of	13,129	18,453	6,945	13,273	.....	86,974
Total	64,443	130,919	82,615	96,310	.....	162,268
Lime..... tons	53,190	48,790	19,512	27,942	4,989	55,820
Slate—						
Roofing..... squares	27,623	73,651	74,385	67,035	5,905	67,507
School-writing	46,342	76,594	93,589	112,885	.....	111,922
Pencils	10,059	19,161	9,462	17,330	.....	9,027
All other	58,953	89,767	90,163	73,974	.....	77,396
Total	142,977	259,173	267,599	271,224	.....	265,852
Gypsum—						
Crude..... tons	22,556	25,477	31,303	21,040	3,654	39,366
Ground..... "	2,695	3,966	2,427	5,592	78	3,283
Plaster of Paris..... "	22,204	48,859	42,325	49,015	3,617	54,531
Total	47,455	78,302	76,055	75,647	7,349	97,180
OTHER STONE PRODUCTS						
Chalk, China or Cornwall stone, cliff stone and mica schist, ground or unground	†13,232	31,455	10,839	18,993	.....	32,693
Chalk, prepared	68,788	108,843	105,599	104,563	.....	110,815
Chalk, China or Cornwall stone, cliff stone, feldspar, fluorspar, magnesite and mica schist, ground or unground	36,420	.....	.....	.....	.....	.....
Curling stones and handles therefor, pair	13,846	46,571	11,057	14,359	1,034	20,199
Feldspar..... tons	15,863	44,390	25,120	31,408	1,701	36,622
Quartz—						
Silex..... tons	13,825	26,097	36,041	25,248	2,303	57,960
Flint..... tons	100,902	170,355	84,761	92,094	6,327	81,704
Hydro-fluo-silicic acid..... tons	747	409	212	15	3·8	662
Fluorspar..... tons	(1)84,702	113,818	43,752	73,343	17,235	199,595
Ganister..... cwt.	877	2,288	509	716	99,063	21,843
Lithographic stones, not engraved	10,698	6,271	6,575	5,652	.....	4,555
Magnesite..... tons	21,734	49,799	8,000	2,198	244	9,275
Magnesite fire brick	120,189	446,445	61,728	56,561	.....	120,455
Phosphate rock..... tons	30,267	114,480	86,530	56,353	15,845	86,192
Sand, silica for glass, etc..... cwt.	111,019	331,944	135,765	224,473	3,351,123	317,259
Sand and gravel..... tons	200,428	267,950	114,575	175,667	355,126	247,398
Whiting, gilder's whiting, and Paris white..... cwt.	214,535	424,169	181,356	193,264	277,958	178,080
Manufactures of stone, n.o.p	40,828	69,821	72,902	41,894	.....	52,043
Total	1,098,906	2,255,105	985,321	1,116,801	.....	1,577,232

† For Jan., Feb., March included under Chalk, China or Cornwall stone, cliff stone, feldspar, fluorspar, magnesite, and mica schist, ground or unground.

(1) Last nine months.

Table 18.—Imports into Canada of Non-Metallic Minerals and Their Products, 1919-1923—Concluded

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$		$
OTHER NON-METALLICS						
Barium peroxide.....tons	23,788	40,986	26,901	26,033	70	10,395
Blanc fixé and satin white.....tons	114,732	102,198	61,624	88,541	1,946	68,502
Barytes.....tons	(1)34,441	74,314	40,374	64,186	2,420	53,670
Total.....	172,961	217,498	128,899	178,760	.....	138,147
Blast furnace slag.....	416	18,343	458	1,506	.....	7,577
Carbons over 3 inches in circumference and not exceeding 35 inches..	644,451	759,573	211,061	333,944	.....	725,931
Carbon electrodes over 35 inches in circumference.....	27,878	66,364	30,077	14,675	.....	12,827
Carbons, electric light, and carbon points, of all kinds, n.o.p.....	37,292	79,529	70,710	43,113	.....	51,672
Diamonds, unset.....	3,351,724	3,531,380	2,790,838	2,099,435	.....	2,348,706
Earths, crude only.....	19,329	10,222	2,885	1,808	.....	847
Foundry facings of all kinds.....	22,700	46,588	16,737	23,261	.....	31,170
Fuller's earth, in bulk only.....	19,793	28,894	12,900	21,396	.....	23,152
Insulators, electric.....	413,423	265,642	746,231	600,765	.....	653,347
Meerschaum, crude or raw.....lb.	.....	.....	.....	1,667	.....	428
Total.....	4,537,006	4,806,535	3,881,897	3,141,570		3,856,564
SALT						
Fine, in bulk[2].....tons	289,109	356,389	294,543	321,380	65,118	217,778
In bags, barrels[3].....tons	467,581	446,671	455,962	596,513	38,799	555,306
All other[4].....tons	553,439	631,627	274,763	355,890	67,941	294,526
Total.....	1,310,129	1,434,687	1,025,268	1,273,783	171,858	1,067,605
Brimstone or sulphur, crude, or in roll or flour.....tons	1,015,223	2,113,713	1,272,619	1,700,604	135,767	1,803,550
Mineral and bituminous substances, n.o.p.....	629,865	1,016,287	497,273	572,601	.....	940,235
Grand Total.....	**117,499,699**	**190,662,724**	**152,848,619**	**127,572,634**	.....	**165,963,416**

[1] Not separately classified previous to April, 1919.
[2] Duty 5 cents per 100 pounds.
[3] Duty 7½ cents per 100 pounds.
[4] Free—Imported for use of sea or gulf fisheries.

Table 19.—Exports from Canada of Non-Metallic Minerals and Their Products, 1919-1923

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$		$
ASBESTOS						
Asbestos ... tons	9,625,695	11,521,536	5,465,311	5,993,570	137,551	7,628,777
Sand and waste ... "	260,775	365,920	215,961	562,223	77,951	931,245
Manufactures ...	232,501	196,067	261,274	95,826	...	72,498
Total ...	10,118,971	12,083,523	5,942,546	6,651,619	...	8,632,520
CLAY AND ITS PRODUCTS						
Building Brick ... M.	52,050	115,627	29,778	31,383	4,069	42,742
Clay—						
Unmanufactured ... cwt.	3,672	2,175	885	1,777	11	52
Manufactures ...	84,953	196,222	80,009	104,933	...	109,957
Earthenware ...	23,579	44,127	135,163	172,955	...	432,092
Total ...	164,254	358,151	245,835	311,048	...	584,843
COAL AND ITS PRODUCTS						
Coal ... tons	12,438,885	18,014,899	13,896,370	11,159,060	1,654,406	10,661,399
Cinders ... "	270	295	256	1,991	...	2,897
Coke ... "	129,703	390,161	256,928	205,627	34,407	433,407
Tar and pitch, coal ... gals.	47,439	481,259	361,621	223,622	4,586,753	582,013
Total ...	12,616,297	18,886,614	14,515,175	11,590,300	...	11,679,806
GLASS AND GLASSWARE						
Glass for lighting ...	...	...	34,871	54,862	...	147,736
Glass and glassware† n.o.p. ...	† 596,613	† 1,099,361	† 353,154	180,517	...	751,638
Total ...	† 596,613	† 1,099,361	† 388,025	235,379	...	899,374
GRAPHITE AND ITS PRODUCTS						
Graphite or plumbago, crude or refined ... tons	72,917	159,817	40,809	16,619	799	36,980
Plumbago manufactures ...	23,970	...	...	...	...	...
Total ...	96,887	159,817	40,809	16,619	799	26 980
MICA AND ITS PRODUCTS						
Mica, total ... tons	[1]100,942	...	...	...	...	...
Cobbed ... "	[2]214,227	55,724	12,942	45,151	85	40,286
Splittings ... "	[3]314,238	725,946	195,479	366,974	502	624,110
Scrap and waste ... "	[3]11,959	33,963	12,061	41,949	4,855	70,866
Plate and manufactures ... "	[3]596	8,474	4,201	10,438	...	22,014
Total ...	641,962	824,107	224,683	464,512	...	757,276
PETROLEUM AND ITS PRODUCTS						
Oil, coal and kerosene, crude ... gals.	40,648	293,325	375,820	288,828	2,384,899	138,381
Oil, coal and kerosene, refined ... "	287,170	205,999	209,282	136,834	1,450,051	139,924
Oil, gasoline and naptha ... "	428,754	59,432	212,638	510,037	1,217,298	263,326
Oil, mineral, n.o.p. ...	...	...	35,890	206,709	1,200,347	223,511
Wax, mineral ... cwt.	626,799	230,172	7,552	45,526	66,274	206,575
Total Petroleum and its Products ...	1,383,371	788,928	841,182	1,187,934	...	971,717
STONE AND ITS PRODUCTS						
Crushed ... tons	12,990	55,994	8,648	80,544	89,434	159,088
Ornamental, rough[2] ... "	7,118	16,941	13,343	32,474	3,165	30,350
Building, rough[4] ... "	23,899	16,246	8,996	13,364	1,302	12,575
Dressed ...	10,108	13,807	26,937	7,870	...	20,227
Total ...	54,115	102,988	57,924	134,252	...	222,240

†Includes glass for lighting for 1919, 1920 and first three months of 1921.
[1]First 3 months.
[2]Last 9 months.
[3]Granite marble unwrought.
[4]Freestone, Limestone, etc., unwrought.

Table 19.—Exports from Canada of Non-Metallic Minerals and their Products, 1919-1923—Concluded

	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$		$
Grindstones, manufactured	38,682	41,705	24,915	17,018	.....	37,101
Stone for the manufacture of grindstones ... tons	.....	.....	2,686	.....	170	1,190
Abrasives—						
Natural, n.o.p. ... cwt.	10,743	236,569	83,773	128,934	111,152	292,079
Artificial, crude, including carborundum ... cwt.	1,040,132	1,579,508	522,531	1,299,818	823,901	2,642,821
Artificial, made up into wheels, stones, etc. ...	14,858	41,138	18,752	14,650	.....	27,127
Corundum ... tons	7,237	115,031	61,996	.....	6	744
Total ...	1,111,652	2,013,951	714,653	1,460,420	.....	3,001,062
LIME, PLASTER AND CEMENT						
Lime ... ton	128,810	381,899	247,112	270,724	24,326	428,286
Cement ... bbl.	465,954	[1] 219,626	650,658	699,738	493,751	824,811
Gypsum—	199,857	413,522	417,502	505,464	397,329	578,859
Crude ... tons	140,235	232,736	80,239	59,534	4,654	92,478
Ground ... "						
Total Gypsum ... "	340,092	646,258	497,741	564,998	401,983	671,337
Total Lime Plaster and Cement ...	934,856	3,221,783	1,395,511	1,535,460	.....	1,924,435
OTHER STONE PRODUCTS						
Feldspar ... tons	104,285	219,744	169,864	170,954	26,476	177,569
Fluorspar (Last 9 months of 1919) ... "	19,616	109,683	51,470	32,914	.....	.....
Magnesite crude ... "	425,892	1,662	5	1,800	.....	.....
Magnesite calcined dead burned ... "	.....	425,048	63,603	21,317	563	14,056
Phosphate Rock ... tons	741	645	.....	.....	.....	.....
Sand and Gravel ... "	131,140	193,503	201,711	116,121	764,521	182,750
Talc ... "	210,150	263,708	112,724	143,938	7,233	99,239
Total Stone and its Products	2,982,447	6,552,715	2,767,465	3,617,176	.....	5,621,351
OTHER NON-METALLIC PRODUCTS						
Carbon electrodes ...	691,747	30,768	.....	837	.....	50,085
Pyrites ...	388,508	63	.....	.....	.....	.....
Sulphur contained in pyrites ... tons	.....	458,340	31,500	.....	9,670	46,514
Salt ... cwt.	14,573	9,181	7,584	10,053	17,220	10,201
Other Non-Metallic Minerals and their Products ...	†47,837	38,158	30,302	55,128	.....	214,862
Total ...	1,142,665	536,510	69,386	66,018	.....	321,662
Grand total ...	**29,743,167**	**41,289,726**	**25,035,106**	**24,149,605**	.....	**29,505,529**

[1] Quantity not recorded but estimated at the rate of 75 cts. per cwt. or $2·62½ per bbl.

† Classified as other Products of the mine for Jan., Feb. and Mar., 1919.

CHAPTER II

THE AERATED WATER INDUSTRY

The aerated water industry is fairly well distributed over the whole Dominion. In 1923 there were 133 plants making carbonated beverages and aerated waters in Ontario; 78 in Quebec; 18 in Nova Scotia; 16 in British Columbia; 15 in New Brunswick; 14 in Alberta; 12 in Saskatchewan; 7 in Manitoba; 2 in Prince Edward Island; 295 plants in all. This was an increase of 12 over the total for 1922 when 283 plants reported which was the lowest number in any year of the five under review.

Many of the smaller plants are really only bottling works. They purchase flavours or extracts from the manufacturers and then carbonate the water and add the flavouring.

In the manufacture of aerated waters cleanliness is the prime requisite. The empty bottles returned from the dealers are thoroughly washed, sometimes with a weak solution of caustic soda, and then rinsed with hot and cold water. The cleansed bottles are placed in a travelling device, which passes under an automatic machine that feeds the required amount of flavouring extract or syrup into each bottle. Carbonated water is then added, the bottles are capped, and placed in boxes ready for shipment or delivery. As all this work can now be done with automatic machinery each bottle of a given size contains the same amount of a uniformly flavoured product.

It is recommended that all water be cleansed by filtering before being carbonated as it is generally conceded that while carbonation helps to kill dangerous bacteria, no manufacturer should depend solely on this factor to make his products pure.

Some years ago the aerated water industry in Canada was largely seasonal in nature and there was very little production during the winter months. Now, due to the persistent advertising of large companies, people have been educated to the fact that carbonated waters are less likely to carry disease germs than some ordinary drinking waters and for this reason carbonated beverages are used to a greater extent throughout the year. But the sultry summer months, promote the more extensive use of all cold carbonated drinks and the summer season is the busy time for all bottling companies in Canada.

Table 20.—Summary of Financial Statistics Relative to the Manufacture of Aerated Waters in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditure					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
1919	320	6,545,803	1,575,339	1,194,249	88,464	3,385,583	6,243,635	7,366,759	3,981,176
1920	330	8,259,814	2,079,421	1,828,357	112,245	4,343,849	8,363,872	9,354,693	5,010,844
1921	320	8,236,946	1,811,983	1,777,617	113,714	3,607,147	7,310,461	9,176,868	5,569,721
1922	283	8,205,457	1,803,364	1,987,193	88,707	2,705,957	6,585,221	6,594,509	3,888,552
1923	295	8,315,389	1,843,531	1,694,547	98,807	2,672,332	6,309,217	6,408,832	3,736,500

Capital Employed.—The aerated water industry in Canada showed a marked increase in the amount of capital employed from the year 1919 to the year 1920. In 1919, there was 6·5 milion dollars invested in lands, buildings, fixtures, machinery and tools, materials on hand, stocks in process and cash, trading and operating accounts. In 1920, this figure stood at 8·2 millions dollars. Since that time there has been very little difference in the amount of capital invested.

Table 21.—Capital Employed in the Manufacture of Aerated Waters in Canada by Provinces, 1919-1923

Province and Year	Capital employed as represented by			
	Lands buildings fixtures, machinery and tools	Materials on hand and stocks in process	Cash trading and operating accounts and bills receivable	Total
Nova Scotia—				
1919	161,792	62,743	88,900	313,435
1920	247,424	69,677	67,924	385,025
1921	158,009	43,347	53,279	254,635
1922	195,474	51,507	58,378	305,359
1923	153,588	48,035	43,404	245,027
Prince Edward Island—				
1919	12,050	15,075	400	27,525
1920	23,031	37,992	525	61,548
1921	23,000	1,200	500	24,700
1922	22,300	39,200	500	62,000
1923		Included	in total for	Canada
New Brunswick—				
1919	407,072	121,060	98,943	627,075
1920	146,056	106,943	83,070	336,063
1921	123,720	72,647	80,846	277,213
1922	104,727	54,935	57,422	217,084
1923	110,154	47,250	61,949	219,353
Quebec—				
1919	1,049,957	408,920	350,968	1,809,845
1920	937,601	348,504	371,051	1,657,156
1921	1,406,536	380,039	388,296	2,174,871
1922	1,376,782	459,135	384,597	2,220,514
1923	1,408,795	474,532	401,796	2,285,123
Ontario—				
1919	1,245,716	336,356	267,788	1,849,860
1920	1,902,544	480,288	794,789	3,177,621
1921	2,001,331	428,335	253,591	2,686,257
1922	2,291,371	507,463	408,010	3,207,844
1923	2,668,064	468,754	257,010	3,393,828
Manitoba—				
1919	863,242	242,210	63,305	1,168,757
1920	599,809	1,036,799	136,337	1,772,945
1921	629,141	1,044,637	155,983	1,829,761
1922	546,584	206,828	18,895	772,307
1923	536,277	208,962	35,434	780,673
Saskatchewan—				
1919	115,904	51,923	37,074	204,901
1920	108,707	55,705	52,465	216,877
1921	130,424	59,414	72,480	262,318
1922	264,148	284,148	69,838	618,434
1923	243,300	232,646	44,801	520,747
Alberta—				
1919	96,508	131,468	46,115	274,091
1920	107,398	125,121	64,251	296,770
1921	116,968	169,173	66,662	352,803
1922	290,278	248,346	33,819	572,443
1923	247,209	277,721	25,064	549,994
British Columbia—				
1919	190,143	59,721	20,450	270,314
1920	231,313	71,043	53,453	355,809
1921	233,994	99,737	40,657	374,388
1922	138,203	63,911	27,358	229,472
1923	136,388	72,361	40,595	249,344
Canada—				
1919	**4,142,384**	**1,429,476**	**973,943**	**6,545,803**
1920	**4,303,877**	**2,332,072**	**1,623,865**	**8,259,81**
1921	**4,826,123**	**2,298,529**	**1,112,294**	**8,236,946**
1922	**5,232,867**	**1,915,773**	**1,056,817**	**8,235,457**
1923	**5,528,075**	**1,878,761**	**910,553**	**8,315,389**

Employees, Salaries and Wages.—The total number of employees, including salaried employees as well as wage-earners, was 2,036 in 1919; this number was reduced to 1,537 in 1922 but in 1923 it was increased to 1,724. The total salaries and wages paid advanced sharply from 1·5 million dollars in 1919 to 2 million dollars in 1920. In the years 1921, 1922 and 1923 there was little change in the total payments, the average being about 1·8 million dollars.

Table 22.—Number of Employees, Salaries and Wages Paid in the Manufacture of Aerated Waters in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	287	63	1,564	122	2,036	437,004	1,138,335	1,575,339
1920	447	71	1,295	100	1,913	774,240	1,305,181	2,079,421
1921	300	49	1,497	86	1,932	578,356	1,233,627	1,811,983
1922	424	69	980	64	1,537	775,182	1,028,182	1,803,364
1923	365	56	1,218	85	1,724	704,047	1,139,484	1,843,531

Table 23.—Number of Wage-Earners Employed in the Manufacture of Aerated Water in Canada, by Months, 1922 and 1923

Month	1922			1923		
	Male	Female	Total	Male	Female	Total
January	809	56	865	870	61	931
February	807	53	860	881	56	937
March	809	56	865	902	66	968
April	896	66	962	978	64	1,042
May	1,086	68	1,154	1,202	85	1,287
June	1,232	78	1,310	1,421	92	1,513
July	1,283	77	1,360	1,514	92	1,606
August	1,216	67	1,283	1,422	95	1,517
September	1,065	64	1,129	1,189	86	1,275
October	915	58	973	1,000	74	1,074
November	833	60	893	879	61	940
December	819	61	880	869	60	929

Fuel.—The value of fuel consumed in this industry is not very great as compared with other industries but over 112 thousand dollars was spent for fuel during the year 1920. This was an increase of 24 thousand dollars from the year 1919. In 1921 a slight increase was noted but in 1922 it fell away to 88·7 thousand dollars; this was increased in 1923 to 98·8 thousand dollars. Anthractie and bituminous coal, fuel oil, and gas were the chief fuels used.

Table 24.—Fuel Used in the Manufacture of Aerated Waters in Canada, 1919-1923

Kind		Anthracite coal	Bituminous coal	Coke	Fuel oil and gasoline	Gas	Wood	Other fuel	Total Value
1919	Quantity	Tons 1,988	Tons 4,050	Tons 74	Gals. 44,132	M. cu. ft. 16,190	Cords 1,338	$	$ .....
	$	22,899	32,073	763	15,887	8,512	7,898	433	88,464
1920	Quantity	1,719	4,025	126	68,022	9,061	1,468	.....	.....
	$	24,863	39,584	1,755	28,917	6,012	9,174	1,940	112,245
1921	Quantity	1,811	4,232	113	89,277	8,674	1,189	.....	.....
	$	23,941	42,054	1,453	32,124	6,627	6,304	611	113,714
1922	Quantity	1,266	4,653	36	53,558	5,927	1,178	.....	.....
	$	17,043	39,832	558	20,834	4,072	5,698	670	88,707
1923	Quantity	1,031	5,897	71	107,279	8,825	1,076	.....	.....
	$	17,042	52,884	960	18,301	3,762	5,644	214	98,807

Table 25.—Power Equipment Installed for the Manufacture of Aerated Waters in Canada, 1919-1923.

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	1,208	1,056	1,122	1,011	919
Engines—					
(a) Steam	329	147	233	243	242
(b) Gas	75	17	12	21	16
(c) Gasoline and Oil	11	132	97	54	110
Hydraulic turbines or water wheels	3	8	9	14	11
Electric Motors—					
Alternating current	568	.....	786	.....	.....
Direct current	179	.....	188	.....	.....
Electric Motors—					
(a) Operated by power generated by establishment	.....	55	.....	.....	.....
(b) Operated by purchased power	.....	1,052	.....	1,432	1,426
Other Power	6	26	.....	.....	.....

Materials Used.—The principal materials used in the aerated water industry are sugar, carbon dioxide gas, syrup and fruit juices and flavouring extracts. In 1919 there was 11·5 million pounds of sugar used valued at 1·4 million dollars and in 1920 over 10 million pounds of sugar valued at 1·7 million dollars, indicating an increase in the net price of sugar from a little over 10 cents to 17 cents a pound. In 1921 a reduction in the price of this commodity was apparent and the price has not varied greatly since that time. Carbon dioxide varied from about 9 cents a pound in 1919 to 16 cents per pound in 1920. In the latter year, 2,068,326 pounds of carbon dioxide gas valued at $329,053 was used and in 1923 the consumption reported was 1,139,564 pounds valued at $117,089. In 1920, flavouring extracts were used to the value of 163 thousand dollars, an increase of 15 per cent over the total reported for the previous year. During 1921, 1922 and 1923 the average amount expended for these materials did not vary greatly from the total for 1920.

The amount expended for materials in this industry was greatest in 1920 when the total was over 4 million dollars. In 1921 the cost of materials was reduced to about 3·6 million dollars and in 1923 a further reduction was reported to a total of 2·6 million dollars.

Table 26.—Materials Used in the Manufacture of Aerated Waters in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Sugar	lb.	11,511,896	10,129,365	11,403,479	6,298,338	7,511,457
	$	1,349,234	1,703,809	1,349,680	546,207	761,120
Saccharine	lb.	4,174	4,201	3,331	1,858	2,319
	$	27,766	20,889	13,595	5,832	5,177
Water (except mineral water)	$	10,660	13,784	15,136	15,821	17,934
Natural Mineral Water	Gal.	.....	365,047	330,978	248,033	582,038
	$	10,777	18,305	16,623	13,807	28,124
Common Salt (Sodium Chloride)	lb.	.....	20,307	16,466	13,733	11,445
	$	469	459	403	554	360
Glauber's Salt (Sodium Sulphate)	$	197	368	227	230	76
Epsom Salts (magnesium Sulphate)	lb.	.....	5,529	1,961	6,251	1,928
	$	258	380	244	250	74
Magnesium Chloride	lb.	.....	229	.....	460	.....
	$	179	31	.....	50	.....
Lithium Salts	$	135	103	736	17	79
Citric Acid	lb.	38,409	35,824	44,879	37,099	35,288
	$	44,201	39,601	33,615	21,953	18,536
Tartaric Acid	lb.	34,348	42,417	28,825	20,453	20,496
	$	29,306	29,201	17,409	7,429	6,359
Carbon dioxide gas (in cylinders)	lb.	1,491,470	2,068,326	1,473,401	1,050,307	1,130,564
	$	125,777	329,053	146,379	110,749	117,089
Alcohol (ethyl or grain)	Proof Gal.	5,006	9,150	12,272	11,814	9,306
	$	42,166	53,495	63,630	42,480	33,875
Beer (any strength)	Gal.	665,774	601,745	349,987	95,684	185,660
	$	332,342	532,595	368,230	88,989	147,493
Cider (fermented or not)	Gal.	198,035	37,689	65,227	76,419	50,945
	$	51,668	19,566	28,217	35,719	22,408
Fruits, all kinds	Bushel	.....	.....	.....	.....	.....
	$	195	1,036	328	537	4,524

Table 26.—Materials Used in the Manufacture of Aerated Waters in Canada, 1919-1923—Concluded

Item	Unit	1919	1920	1921	1922	1923
Syrups and fruit juices	Gal.	40,620	42,092	61,370	274,232	318,526
	$	80,749	88,196	152,420	396,255	425,720
Flavouring extracts and essential oils	Gal.	13,322	14,769	18,447	18,221	19,832
	$	142,277	163,837	164,799	162,417	161,734
Aniline dyes and other colours	$	26,279	27,799	18,062	13,828	7,873
Labels, corks, cups, siphons, etc.	$	341,049	354,040	336,421	302,429	312,984
Bottles, cases, etc.	$	547,039	771,851	679,203	803,494	434,207
All other materials	$	228,860	155,301	201,700	136,910	166,586
Total	$	**3,385,583**	**4,343,849**	**3,697,147**	**2,705,857**	**2,672,332**

Products Made.—The products of the aerated water industry have been somewhat difficult to group as soda water, aerated water and other carbonated beverages are not easily distinguishable. It has been very difficult to correlate the returns of quantity produced as some of the companies reported their products by number of cases without noting whether they contained pint or quart bottles. The figures given for quantities were, however, adjusted to fit the values.

The total value of products manufactured was highest in the year 1920 at 9·3 million dollars. This was an increase of about two million dollars from the year 1919. In 1921 the products were valued at 9·1 million dollars and in 1922 and 1923, at 6·5 million dollars showing that the peak of production was in 1920 and that the low point was reached in 1922 and 1923. Possible causes of the low value of production for 1922 and 1923 were the coolness of these two summers and the marked falling-off in the price of some of the raw materials which enabled the manufacturer to make these beverages more cheaply.

Table 27.—Products of the Aerated Water Industry in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Temperance beer	Gal.	440,022	757,604	461,602	230,188	277,685
	$	583,972	989,767	643,770	195,441	262,449
Cider	Gal.	444,954	328,691	256,398	227,571	134,489
	$	247,926	202,068	184,438	70,573	81,607
Natural mineral water (fortified or not)	Gal.	511,455	348,941	758,821	678,170	414,703
	$	290,484	291,442	131,357	115,247	84,949
Soda water and aerated water	Gal.	3,074,523	3,987,217	3,804,463	4,615,615	6,435,956
	$	2,613,629	3,151,509	3,288,988	3,991,357	3,637,867
Other carbonated beverages (non-alcoholic)	Gal.	3,430,885	5,398,557	4,601,260	2,132,322	1,885,391
	$	3,039,134	4,297,706	4,272,006	1,665,845	1,388,323
Syrups and fruit juices	Gal.	.....	70,056	67,868	173,140	143,117
	$	180,927	175,985	129,448	415,770	382,755
Vinegar	Gal.	.....	4,933	3,075	2,546	5,206
	$	2,358	2,397	1,094	1,862	2,645
All other products	$	408,329	243,819	525,767	138,414	568,237
Total	$	**7,366,759**	**9,354,683**	**9,176,868**	**6,594,589**	**6,498,832**

The following excerpt, taken from the *Report of the Mineral Production of Canada* gives the production of mineral waters in Canada in the years 1888 to 1923 and the production in Canada, imports and exports, during the years 1920, 1921, 1922 and 1923.

Mineral Waters.—Mineral waters produced in Canada during 1923 amounted to 232,451 gallons valued at $16,455 as compared with 221,433 gallons at $14,220 in the previous year. Mineral springs in Ontario and Quebec contributed the total Canadian production.

In the present compilation, there has been included a record of all known shipments of natural mineral waters sold to the general public for medicinal purposes. No record has been kept of the shipments made of ordinary spring waters.

The values given do not take into account any mineral waters used at the springs for drinking or bathing purposes but include only the shipments from the springs in bottles or other containers.

Table 28.—Production of Mineral Waters in Canada, 1888-1922

Year	Gals.	Value	Year	Value	Year	Gals.	Value
		$		$			$
1888	124,850	11,456	1900	75,000	1912		172,465
1889	424,600	37,360	1901	100,000	1913		173,677
1890	561,165	60,031	1902	100,000	1914		134,111
1891	427,485	54,268	1903	100,000	1915		115,274
1892	640,380	75,348	1904	100,000	1916		127,806
1893	725,096	108,347	1905	100,000	1917		145,814
1894	767,460	110,040	1906	100,000	1918		154,468
1895	739,382	126,048	1907	136,020	1919		71,015
1896	706,372	111,736	1908	151,953	1920		24,582
1897	749,691	141,477	1909	175,173	1921	328,273	21,716
1898	555,000	100,000	1910	199,563	1922	221,433	14,220
1899		100,000	1911	223,758	1923	232,451	16,455
					Total		3,775,181

Table 29.—Production in Canada, Imports and Exports of Mineral Water, 1920 1921, 1922 and 1923

	1920	1921		1922		1923	
	Value	Imp. Gals.	Value	Imp. Gals.	Value	Imp. Gals.	Value
	$		$		$		$
Production, by provinces—							
Quebec	10,109	19,626	7,278	12,161	3,692	5,421	2,408
Ontario	14,473	308,647	14,438	209,272	10,528	227,030	14,047
Total	**24,582**	**328,273**	**21,716**	**221,433**	**14,220**	**232,451**	**16,455**
Imports—Mineral and aerated waters	204,907		159,092		156,420		169,473
Exports—Mineral and aerated waters	12,796		44,022		123,555		192,261

CHAPTER III

ASBESTOS AND ALLIED PRODUCTS

The fabrication of asbestos products and other similar materials such as compounds of magnesia and asbestos used for insulating purposes in the protection of hot water and steam lines, boilers, etc., is yet in its infancy in Canada. Most of the Canadian plants making these lines are subsidiaries making only a limited number of products, and marketing all lines produced by the parent company. The close relation between the manufacturing and the jobbing divisions of such concerns made it difficult in some instances to obtain a separation of the data relating to manufacturing operations only. The number of companies reporting to the Bureau under this industry was 5 in 1919 and 11 in 1920, 1921 and 1922. In 1923, the number dropped to 9 including one in Nova Scotia, 2 in Quebec, 5 in Ontario and 1 in British Columbia.

The heat-insulating properties of asbestos have been known for a long time, but it is only in recent years that there has been any great development in the application of this fact; now, however, practically every steam power plant of any size is properly insulated and the practice has been extended to the domestic heating plants. The pipes and conduits are covered with air cell insulating materials and boilers are protected with a preparation of asbestos and magnesia bonded with fireclay or sodium silicate. The manufacturer wants the maximum power delivered for every pound of coal burned and the householder is equally anxious to get the greatest possible amount of heat out of each ton of coal used. The prevention of heat losses is the first step towards the attainment of these ends. Not only is asbestos used to prevent heat losses as just noted, but it is also used in insulation of refrigerating plants with a view to preventing the access of heat to the refrigerating liquids. Other uses are found in the manufacture of brake-linings, building materials such as shingles, roofing felts, flooring sheathing, etc., refractory cements, insulating materials used in electric wiring, fire-proofing materials and packings for pistons and pumps.

There has been a gradual increase in the capital employed in this industry during the past five years with the exception of 1923 when the capital employed was somewhat less than in previous years. Another large company, however, built a plant in 1923, and the addition of this plant to the industry should mean that the production of fabricated asbestos products in Canada will be greatly increased in the immediate future.

Table 30.—Summary of Financial Statistics Relative to the Manufacture of Asbestos and Allied Products in Canada, 1919-1923.

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	5	878,398	158,957	103,351	2,165	214,725	479,198	546,870	332,145
1920	11	1,180,101	248,214	165,601	8,973	432,350	855,138	940,072	507,722
1921	11	1,351,278	273,522	168,181	12,765	385,810	840,278	804,603	418,793
1922	11	1,610,700	189,059	157,165	10,682	271,749	628,655	615,160	343,411
1923	9	1,486,589	176,986	121,896	12,292	260,281	571,455	583,013	322,732

Table 31.—Capital Employed in the Manufacture of Asbestos and Allied Products in Canada by Provinces, 1919-1923

Province and Year	Capital employed as represented by			
	Lands, buildings, fixtures, machinery and tools	Materials on hand stocks in process	Cash trading and operating accounts and bills receivable	Total
	$	$	$	$
Ontario—				
1919	15,402	5,911	4,932	26,245
1920	95,370	112,798	65,352	273,529
1921	280,041	180,298	43,630	503,969
1922	304,294	217,539	206,579	728,412
1923	296,287	188,847	55,159	540,293
Canada—				
1919	620,992	144,166	113,240	878,398
1920	775,985	242,695	162,923	1,180,101
1921	928,512	336,393	86,373	1,351,278
1922	957,291	378,839	274,570	1,610,700
1923	956,742	353,468	176,379	1,486,589

Totals for Canada include data for 1 firm in Nova Scotia, 2 in Quebec and 1 in British Columbia.

Table 32.—Number of Employees, Salaries and Wages Paid in the Manufacture of Asbestos and Allied Products in Canada, 1919-1923

Year	Average number of employees				Total	Salaries and wages		
	Salaried employees		Wage-earners			Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	21	9	82	2	114	81,122	77,835	158,957
1920	26	7	150	18	201	67,102	181,112	248,214
1921	32	11	74	15	132	87,609	185,913	273,522
1922	36	11	101	8	156	91,798	97,261	189,059
1923	34	13	89	9	145	83,518	93,468	176,986

Table 33.—Number of Wage-Earners Employed in the Manufacture of Asbestos and Allied Products in Canada, by Months, 1922 and 1923

Month	1922			1923		
	Male	Female	Total	Male	Female	Total
	No.	No.	No.	No.	No.	No.
January	65	10	75	56	9	65
February	61	9	70	86	9	95
March	68	9	77	91	11	102
April	128	10	138	103	11	114
May	119	9	128	97	10	107
June	115	10	125	92	10	102
July	111	8	119	94	10	104
August	111	8	119	100	8	108
September	114	6	120	101	6	107
October	109	7	116	93	7	100
November	109	9	118	90	7	97
December	105	7	112	55	6	61

Table 34.—Fuel Used in the Manufacture of Asbestos and Allied Products in Canada, 1919-1923

Year	Anthracite coal	Bituminous coal	Coke	Fuel oil and gasoline	Gas	Wood	Other	Total Value
	Tons	Tons	Tons	Gals	M cu. ft.	Cords	$	$
1919.....Quantity	20	300	.....	.....	115	.....	.....	
$	254	1,865	.....	.....	46	.....	.....	2,165
1920.....Quantity	712	390	7	.....	30	.....	.....	
$	4,838	4,075	35	.....	25	.....	.....	8,973
1921.....Quantity	17	859	.....	48,000	.....	.....	.....	
$	293	7,240	.....	5,232	.....	.....	.....	12,765
1922.....Quantity	26	645	.....	46,031	1,000	.....	.....	
$	451	6,027	.....	4,192	12	.....	.....	10,682
1923.....Quantity	28	1,013	.....	41,564	.....	.....	.....	
$	486	7,650	.....	4,156	.....	.....	.....	12,292

Table 35.—Power Employed in the Manufacture of Asbestos and Allied Products in Canada, 1919-1923

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	.....	155	565	116	100
Engines—					
Gas	12	12	.....	.....	
Gasoline	.....	.....	.....	2	.....
Electric motors—					
Alternating current	400	.....	400	.....	
Direct current	5	.....	.....	.....	
Electric motors—					
Operated by purchased power	.....	389	.....	558	548

Materials Used and Products Made.—The chief materials used in this industry are asbestos fibre, asbestos paper, asbestos cloth and yarn, magnesia and magnesite and some bonding materials, such as sodium silicate and clays. During the years under review, the amount spent for materials was greatest in 1920, when $432,550 was so expended. The value of products also was at its greatest in 1920, when $940,072 was reported as the value of these insulating and building materials.

Table 36. Materials Used in the Manufacture of Asbestos and Allied Products in Canada, 1919-1923

Items	1919	1920	1921	1922	1923
	$	$	$	$	$
Asbestos, cloth yarn, paper, etc.	.....	432,350	385,810	147,350	178,286
Other materials, n.o.p.	.....	.....	.....	124,399	81,995
Total	**214,725**	**432,350**	**385,810**	**271,749**	**260,281**

Table 37.—Products of the Asbestos and Allied Products Industry in Canada, 1919-1923

Items	1919	1920	1921	1922	1923
	$	$	$	$	$
Asbestos, lining, packing and pipe covering	.....	348,762	275,780	208,868	367,037
Asbestos building materials	.....	591,310	528,823	228,377	215,976
Other products	.....	.....	.....	87,915	
Total	**546,870**	**940,072**	**804,603**	**615,160**	**583,013**

Asbestos.—The following material has been abstracted from the *Report of the Mineral Production of Canada;* it has been included in this report as of interest to those concerned in the manufacture of asbestos products. This information includes data on the production of asbestos in Canada during 1921, 1922 and 1923 and the exports of Canadian asbestos by countries of destination.

The imports of asbestos, asbestos packing and magnesia pipe covering amounted to $775,328 in the year 1923. In 1922 the corresponding value was $563,346, a reduction from $727,014 in 1921.

From the point of volume of sales, 1923 may be considered the premier year for the asbestos industry in Canada, but the total sales value of this commodity declined very materially. The sales for the year totalled 231,482 tons with a return to the operators of $7,522,506 as compared with 163,706 tons sold in 1922 worth $5,552,723.

Table 38.—Output and Sales of Asbestos in Canada, 1921-1923

Classification	1921			1922			1923		
	Total output	Sold or shipped		Total output	Sold or shipped		Total output	Sold or shipped	
		Quantity	Total sales value at mill		Quantity	Total sales value at mill		Quantity	Total sales value at mill
	Tons	Tons	$	Tons	Tons	$	Tons	Tons	$
Crude No. 1	653	222	273,007	759	433	277,402	1,029	603	275,101
Crude No. 2	1,741	563	334,132	2,190	1,351	447,845	3,066	3,246	794,834
Fiberized Crude	688	141	59,350	120	328	64,506	220	5	1,306
Spinning Stocks	9,914	4,969	1,272,700	11,030	6,739	1,326,920	10,439	11,708	1,456,904
Shingle Stocks	19,325	10,900	1,031,634	18,587	19,647	1,085,174	28,861	25,533	1,215,802
Mill Board Stocks	3,788	3,242	222,343	3,930	4,386	128,164	6,549	7,268	189,200
Paper Stocks	32,595	26,944	1,263,260	43,196	44,135	1,426,533	62,702	69,743	2,292,804
Paper Fillers	27,199	20,262	308,379	35,257	43,275	565,671	67,791	62,689	980,964
By-products (asbestos sand, finish, floats)	27,474	25,428	141,419	42,954	43,412	230,418	56,002	50,687	315,501
Total	**123,377**	**92,761**	**4,906,230**	**158,623**	**163,706**	**5,552,723**	**236,659**	**231,482**	**7,522,506**

Table 39.—Exports of Canadian Asbestos by Countries of Destination, 1921, 1922 and 1923

Commodity and Destination	1921		1922		1923	
	Tons	Value	Tons	Value	Tons	Value
		$		$		$
ASBESTOS—						
Great Britain	4,423	512,009	2,334	271,298	34,592	215,034
United States	43,374	2,878,172	83,562	3,961,811	109,025	5,596,569
Australia	175	21,438	25	6,000	180	9,900
Austria					400	30,000
Belgium	3,524	418,518	4,853	343,491	7,223	411,250
France	1,932	348,504	3,080	282,222	5,016	409,410
Germany	3,437	493,024	6,867	779,808	6,289	575,211
Italy	230	32,100	416	32,566	505	52,882
Japan	1,842	148,430	2,770	159,870	4,936	287,521
Netherlands	3,923	560,873	987	142,499	353	28,275
Spain			50	4,500		
Other countries	480	52,243	170	9,505	165	11,825
Total	**63,340**	**5,465,311**	**105,114**	**5,993,570**	**137,551**	**7,628,777**
SAND AND WASTE—						
Great Britain	141	2,869	139	1,689	1,174	18,925
United States	21,754	209,814	56,266	554,514	75,540	892,360
Other countries	159	3,278	480	6,020	1,237	19,960
Total	**22,054**	**215,961**	**56,885**	**563,223**	**77,951**	**931,245**
ASBESTOS MANUFACTURE INCLUDING ASBESTOS ROOFING—						
Great Britain		7,365		10,184		2,054
United States		77,928		74,430		61,160
British South Africa				821		
France		157,457				2,631
New Zealand				249		193
Other countries		18,524		10,142		6,460
Total		**261,274**		**95,826**		**72,498**

CHAPTER IV

THE CEMENT PRODUCTS INDUSTRY

Portland cement is the best known binder for stone aggregates because of its peculiar setting qualities in that it will harden under water or in the air and for that reason it is adaptable to many kinds of building construction. The use of concrete blocks, sewer pipe, cement drain tile, is being extended annually. In private dwelling construction, the concrete-block house is quite common. The blocks used are hollow, the air space acting as a non-conductor of heat both in winter and in summer.

Concrete lintels, sills, caps for verandah posts, etc., and the manufacture of cement tile for sewer pipe or for sewage and drainage purposes afford new avenues for the use of concrete products. The small circular concrete culvert is sometimes used on highway construction, but one of square or rectangular cross section is usually preferred. Tile or drainage pipe can be moulded into any shape desired, to fit the particular purpose required or they can be manufactured in sections and transported long distances and fitted together on the job.

The cement products industry in Canada includes many small plants which consist only of a gasoline engine and a cement mixer set up near some place where good clean sand and gravel are procurable, but there are also some very large plants making particular products and shipping them to different parts of the country. As local conditions control the output of the smaller plants and as many reported that they manufactured cement blocks, etc., in spare time only, no record of such operations has been included in this report. In 1923, two firms reported from Nova Scotia, 3 from New Brunswick, 14 from Quebec, 99 from Ontario, and 8 from the Western provinces.

Table 40.—Summary of Financial Statistics Relative to the Manufacture of Cement Products in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	91	1,049,868	314,066	149,308	16,379	383,684	863,437	921,478	537,794
1920	93	1,358,712	474,112	195,844	28,304	596,352	1,294,612	1,527,590	931,238
1921	108	1,416,813	406,745	196,032	26,991	555,915	1,185,683	1,433,253	877,338
1922	124	1,553,160	372,268	214,949	21,794	533,335	1,142,346	1,281,004	747,669
1923	118	1,664,580	458,745	244,473	25,242	596,654	1,325,114	1,505,528	908,874

Capital Employed.—In 1923, the total capital employed in the cement products industry was 1·6 million dollars. The trend of investment showed a gradual increase from 1920 at 1·3 million dollars to the maximum in 1923.

Table 41.—Capital Employed in the Manufacture of Cement Products in Canada, 1919-1923

Province and Year	Capital employed as represented by			
	Lands, buildings, fixtures, machinery and Tools	Materials on hand, stocks in process	Cash trading and operating accounts and bills receivable	Total
	$	$	$	$
New Brunswick—				
1919		*Included in total for Canada.*		
1920	54,440	22,132	30,825	107,397
1921	41,918	14,655	52,891	109,464
1922	42,091	11,841	55,704	109,636
1923	47,124	9,766	5,742	62,632
Quebec—				
1919	91,504	17,379	41,710	150,593
1920	114,474	46,431	61,660	222,565
1921	129,649	36,463	54,827	220,939
1922	115,704	31,213	36,339	183,316
1923	143,083	43,372	43,992	230,447
Ontario—				
1919	467,308	161,429	172,850	801,587
1920	545,519	219,710	236,115	1,001,344
1921	658,954	184,195	214,596	1,057,745
1922	764,284	167,399	298,819	1,230,502
1923	764,922	268,606	313,588	1,347,116
Canada—				
1919	**617,658**	**203,565**	**228,705**	**1,049,868**
1920	**731,820**	**294,797**	**332,095**	**1,358,712**
1921	**848,656**	**241,950**	**326,267**	**1,416,813**
1922	**941,284**	**216,762**	**395,111**	**1,553,160**
1923	**970,454**	**327,644**	**366,482**	**1,664,580**

Note.—Totals for Canada include data for Nova Scotia, Saskatchewan and British Columbia.

Table 42.—Number of Employees, Salaries and Wages Paid in the Manufacture of Cement Products in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	50	4	265		319	46,394	267,672	314,066
1920	37	5	344		386	59,952	414,160	474,112
1921	49	5	387		441	74,125	332,620	406,745
1922	71	8	312		391	81,965	290,303	372,268
1923	61	10	350		421	97,987	360,758	458,745

Table 43.—Number of Wage-Earners Employed in the Manufacture of Cement Products in Canada, by Months, 1922-1923

Month	1922	1923
	*No.	*No.
January	196	169
February	191	175
March	218	202
April	269	277
May	416	437
June	451	520
July	410	468
August	379	462
September	361	408
October	364	346
November	274	258
December	213	263

*All male employees.

Table 44.—Fuel Used in the Manufacture of Cement Products in Canada, 1919-1923

Year		Anthracite coal	Bituminous coal	Coke	Fuel oil and gasoline	Gas	Wood	Other	Total Value
		Tons	Tons	Tons	Gals.	M cu. ft.	Cords	$	$
1919	Quantity	85	1,417	26	6,197	682	194		
	$	941	11,354	185	2,187	229	1,483	.....	16,379
1920	Quantity	126	2,151	75	9,125	582	98		
	$	2,004	20,859	777	3,681	239	719	25	28,304
1921	Quantity	127	2,043	31	23,319	692	78		
	$	1,881	16,933	269	6,956	393	559	.....	26,991
1922	Quantity	139	1,616	85	17,634	757	228		
	$	1,907	13,433	735	3,940	438	1,173	168	21,794
1923	Quantity	60	2,220	63	21,276	539	115		
	$	901	16,040	871	6,482	312	636	.....	25,242

Table 45.—Power Equipment Installed for the Manufacture of Cement Products in Canada, 1919-1923

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	359	362	415	316	320
Engines—					
Steam	172	136	151	211	254
Gas	238	46	63	199	40
Gasoline and oil	14	235	198	148	293
Hydraulic turbines and water wheels	.....	.....	.....	30	.....
Electric motors—					
Alternating current	400	.....	294	.....	.....
Direct current	.....	.....	52	.....	.....
Electric motors—					
Operated by power generated by establishment	.....	50	.....	.....	.....
Operated by purchased power	.....	279	.....	354	524
Other power	.....	45	.....	.....	.....

Materials Used.—The main materials used in this industry are portland cement, sand, gravel and crushed stone. It was found a little difficult at times to compute the actual cost of sand and gravel because many of the smaller plants reported that they owned the pits from which the sand and gravel used was taken; for that reason no charge could be made for raw material. Since 1921, however, there has been a gradual increase in the amount expended for raw materials.

Table 46.—Materials Used in the Manufacture of Cement Products in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Portland cement	Ton	.....	.....	18,984	20,203	24,708
	$	.....	364,320	339,841	344,714	355,043
Quicklime	Ton	.....	.....	.....	.....	.....
	$	.....	207	.....	107	1,907
Sand	Ton	.....	.....	37,256	30,179	41,214
	$	.....	93,316	55,586	44,624	64,000
Gravel	Ton	.....	.....	36,251	54,254	55,716
	$	.....	20,299	51,907	79,358	95,548
Crushed stone	Ton	.....	.....	9,309	12,286	12,920
	$	.....	33,832	15,910	22,007	29,987
Other materials	$	.....	83,878	92,671	42,525	50,169
Total		.....	**383,684**	**596,352**	**555,915**	**533,335**	**596,654**

Products.—It was not found feasible to give the number of cement bricks, building blocks, drain pipe, etc., manufactured because of the different sizes made; in some cases also, only the value was reported. The report, therefore, shows only value of the products without giving

the number. In 1920, this value stood at a little over 1·5 million dollars, at which level it remained in the subsequent years under review, with the exception of the year 1922.

Table 47.—Products of the Cement Product Industry in Canada, 1919-1923

Item	Quantity made	1919	1920	1921	1922	1923
Cement brick	$	12,803	.....	11,375	75,742	70,502
Building blocks	$	463,269	852,304	511,283	596,063	652,420
Drain pipe	$	198,963	457,312	76,218	50,873	67,437
Sewer pipe and culvert tile	$	.....	.....	386,873	327,945	365,165
Artificial stone	$	49,079	69,382	71,741	27,725	53,326
Other products	$	197,364	148,592	375,763	202,656	296,678
Total	$	**921,478**	**1,527,590**	**1,433,253**	**1,281,004**	**1,505,528**

Table 48.—Imports into Canada and Exports of Portland Cement and Manufactures of Portland Cement, 1919-1923

Item	1919	1920	1921	1922	1923	
	$ Value	$ Value	$ Value	$ Value	Quantity	$ Value
IMPORTS—						
Portland cement	51,314	112,466	75,670	83,037	17,697 bbls.	75,294
Manufactures of cement	13,129	18,453	6,945	13,273	.....	86,974
Total	**64,443**	**130,919**	**82,615**	**96,310**	.....	**162,268**
EXPORTS—						
Portland cement	465,954	2,193,626	659,658	699,738	493,751 bbls.	824,811

The following extract from the "*Report of the Mineral Production of Canada*," issued annually from the Bureau, dealing with the production of cement gives a fair account of the cement industry in Canada during the last four years.

Cement.—The sales of cement in Canada in 1923 of 7,543,589 barrels exceeded those of the previous year by 599,617 barrels. The total mill output amounted to 7,688,196 barrels, an increase of 1,240,500 barrels from the 1922 total. No puzzolan cement was produced during the year.

Ten plants, having in all a daily capacity of 33,286 barrels, were operated during the year. In addition to these, there were at least thirteen other plants in Canada which were idle during the whole period.

Ontario and Quebec were the principal producing provinces; sales from the former amounted to 3,296,428 barrels averaging $1.78 per barrel and from the latter 3,173,993 barrels at an average price of $2.00. The average selling price f.o.b. plant in the other provinces was as follows: Manitoba, $2.55; Alberta, $2.32; and British Columbia, $3.00, with a Dominion average of $2.13 per barrel.

The consumption of cement in Canada during the year increased approximately 8 per cent over the quantity used in 1922. It may be noted that the consumption in the twelve months under review was 21 per cent less than recorded for 1913.

Exportations in 1923 totalled 493,751 barrels, an increase of 68,614 barrels or 16 per cent over those for 1922. The value of imports of portland cement in the current year showed a slight decrease to $75,294.

Table 49.—Summary Statistics of Cement in Canada, 1920, 1921, 1922 and 1923

Item	1920		1921		1922		1923	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
		$		$		$		$
Made from marl	86,171	.....	10,676	.....	.....	.....	.....	.....
Made from limestone	6,412,379	.....	6,438,980	.....	6,447,696	.....	7,688,196	.....
Total made	**6,498,550**	.....	**6,449,656**	.....	**6,447,696**	.....	**7,688,196**	.....
Sold or used	6,651,980	14,798,070	5,752,885	14,195,143	6,943,972	15,438,481	7,543,589	15,064,661
Stocks Dec. 31	936,173	.....	1,603,215	.....	1,106,939	.....	.....	.....

CHAPTER V

THE SAND-LIME BRICK INDUSTRY

The sand-lime brick industry in Canada is carried on mostly in Ontario. By the addition of hydrated lime to sand in proper proportions, a mixture can be made from which it is possible to produce fairly durable bricks.

The following extract from the *Contract Record*, December 27, 1922, describes the manufacture of sand-lime brick by one of the larger Toronto companies.

"There are four very essential points in producing a high grade sand-lime brick, viz., the thorough hydration of lime before being made into brick form, the proper percentage of lime and sand, the highest pressure to form the brick and the elimination of manual labour to attain these results consistently without any variation.

"The raw lime is hydrated by steam at high pressure by the patented system of the Berg Machinery Co., which consists of small steel boxes each containing 50 pounds of lime, which are placed on rack cars holding 22 boxes on each car; the hydrating cylinder is filled with these cars, sealed tight and subjected to a pressure of 60 pounds for four hours, after which operation the hydrated lime is pulverized to dust and elevated into a large storage tank, which holds two days' supply and is then ready to be mixed with the sand.

"The sand is conveyed from the sand bank by dump cars to the plant, a distance of about 200 feet, and dumped into a large hopper where the sand is fed automatically into a large revolving steam sand dryer which dries the sand practically bone dry. It is then elevated and screened to remove the clay and stone; the dried sand is then discharged into two large storage bins holding six days' supply—this allows the use of cold sand which is preferable to the hot.

"**The Mixing Methods.**—The hydrated lime and dry cold sand are fed by gravity into an automatic proportioning machine, which measures in small quantities the proper percentage and discharges into a continuous mixer mixing these materials in the dry state. The mixture then passes to another mixer where the required amount of moisture is added. A bucket elevator then delivers the material into a four-mold Berg brick press; the pressure on the brick can be regulated at each revolution to give the brick the extreme pressure at all times.

"The bricks are handled by two men and placed on steel cars holding 1,000 bricks each, and when the day's run is finished the cars loaded with green bricks are pushed into a hardening cylinder, 76 inches in diameter and 72 feet long made of ¾-inch steel plate and having hinged doors on each end; when filled and sealed the bricks are subjected to a steam pressure of 125 pounds for ten hours.

"The hardening bricks are taken out of the other end of the cylinder while on the cars and are then ready for shipment, the whole operation being accomplished every 24 hours. The plant is equipped to run every day in the year, winter and summer and in wet as well as dry weather, which insures a definite supply to the customers at all times."

Table 50.—Summary of Financial Statistics Relative to the Manufacture of Sand-Lime Brick in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	8	1,036,751	169,028	65,535	34,766	79,243	348,572	455,005	375,762
1920	11	1,295,486	267,273	116,339	62,036	124,365	570,013	693,641	569,276
1921	10	1,372,253	232,913	119,520	43,320	139,008	534,761	662,744	523,736
1922	11	1,224,808	287,705	112,933	58,258	291,903	750,799	858,807	566,904
1923	8	1,042,619	285,248	112,416	50,810	218,118	666,592	897,960	679,842

Capital Employed.—Eight companies made returns for 1923 and the capital employed was reported at a little more than one million dollars. This was almost the same amount as was reported in 1919. The greatest amount invested in this business was in the year 1921 when about 1·4 million dollars was employed.

Table 51.—Capital Employed in the Manufacture of Sand-Lime Brick in Canada by Provinces, 1919-1923

Province and Year	Capital employed as represented by			
	Lands, buildings, fixtures, machinery and tools	Materials on hand, stocks in process	Cash, trading and operating accounts and bills receivable	Total
	$	$	$	$
Ontario—				
1919	539,944	18,598	93,965	652,507
1920	687,043	44,248	74,064	805,355
1921	763,107	21,424	138,761	923,292
1922	924,330	41,531	160,464	1,126,325
1923	754,420	37,296	199,833	991,549
Canada—				
1919	865,166	33,810	137,775	1,036,751
1920	1,085,993	75,364	134,129	1,295,486
1921	1,138,134	46,584	187,235	1,372,253
1922	1,091,297	44,452	176,059	1,221,808
1923	799,420	37,296	205,903	1,042,619

NOTE.—The totals for Canada includes capital employed by one firm in Manitoba and one in Saskatchewan during the years 1919-1922.

Employees, Salaries and Wages.—In 1923 there were 225 people employed in the manufacture of sand-lime brick in Canada; salaries and wages paid amounted to $285,248. In the three years 1921, 1922 and 1923 the number employed and the salary and wage payments remained at about the same level; in this respect these three years showed a distinct improvement over 1919 and 1920.

As noted in the table showing the number of wage-earners by months, employment in this industry is seasonal in character.

Table 52.—Number of Employees, Salaries and Wages Paid in the Manufacture of Sand-Lime Brick in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	13	1	150	.....	164	17,822	151,206	169,028
1920	15	2	177	.....	194	37,749	229,524	267,273
1921	20	1	202	.....	223	52,917	179,996	232,913
1922	22	2	199	.....	223	54,418	233,287	287,705
1923	19	1	205	.....	225	49,257	235,991	285,248

Table 53.—Number of Wage-earners Employed in the Manufacture of Sand-Lime Brick in Canada, by Months, 1922-1923

Month	1922	1923
	No.*	No.*
January	121	187
February	138	154
March	153	182
April	149	242
May	173	234
June	229	235
July	221	219
August	266	222
September	253	212
October	246	210
November	230	182
December	214	178

*All male employees

Table 54.—Fuel Used in the Manufacture of Sand-Lime Brick in Canada, 1919-1923

Year		Anthracite coal	Bituminous coal	Wood	Total Value
		Tons	Tons	Cords	$
1919	Quantity	.....	5,032	.....	
	$	.....	34,766	.....	34,766
1920	Quantity	60	5,807	65	
	$	540	60,046	550	62,036
1921	Quantity	.....	4,887	29	
	$	.....	43,200	120	43,320
1922	Quantity	.....	6,884	28	
	$	.....	58,117	141	58,258
1923	Quantity	.....	7,579	.....	
	$	.....	50,810	.....	50,810

Table 55.—Power Equipment Installed for the Manufacture of Sand-Lime Brick in Canada, 1919-1923

Class	Total h.p. according to manufacturers' rating				
	1919	1920	1921	1922	1923
Boilers	1,380	1,866	1,800	1,200	920
Engines—					
Steam	905	775	702	787	350
Electric Motors—					
Alternating current	165	.....	555	.....	.....
Direct current	.....	.....	430	.....	.....
Electric motors—					
Operated by purchased power	.....	771	.....	917	819
Other power	.....	205	.....	.....	.....
Generators—					
Alternating	.....	.....	5	.....	.....

Materials Used.—The principal materials used in the manufacture of sand-lime brick are quicklime and sand; in 1923, these materials cost $218,118. In 1922, the sand used amounted th 160,630 tons valued at $183,203; in 1923 practically the same amount of sand was used, but the value given was only $81,638. This was the actual value as reported to the Bureau, showing sand worth about 50 cents per ton on an average as compared with a little over one dollar per ton in 1922. Some companies value the sand from their own pits at a low figure so that the average values given herein do not compare favourably with the prevailing selling price of sand for other industries. The average price paid for quicklime for the five-year period was from $10 to $15 per ton, the highest being in 1920.

Table 56.—Materials Used in the Manufacture of Sand-Lime Brick in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Quicklime	Ton	5,604	6,552	7,503	9,929	11,185
	$	54,063	80,571	98,971	104,479	136,480
Sand	Ton	58,380	90,471	112,169	160,630	160,218
	$	22,994	38,726	34,594	183,203	81,638
Other materials	$	2,186	5,068	5,443	4,221	
Total	**$**	**79,243**	**124,365**	**139,008**	**291,903**	**218,118**

Table 57.—Products of the Sand-Lime Brick Industry in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Sand-Lime Brick	No.	31,623,850	39,264,000	43,457,036	52,749,359	60,080,000
	$	455,005	693,641	662,744	851,007	897,960
Other products	$	.....	.....	.....	7,800	.....
Total	**$**	**455,005**	**693,641**	**662,744**	**858,807**	**897,960**

In order to obtain a comprehensive view of the brick and other clay products industries in Canada the following abstracts have been included from the *Reports of the Mineral Production of Canada*, in which publication data are given on the output of primary mineral industries, including the manufacture of brick and tile.

Table 58.—Production in Canada, Imports and Exports, of Clay Products, 1921-1923

Item	Unit	1921		1922		1923	
		Quantity	Value	Quantity	Value	Quantity	Value
			$		$		$
SALES—							
Common brick	M	220,438	3,567,503	294,919	4,714,658	250,505	3,884,474
Pressed brick	M	80,947	1,738,293	90,578	1,839,549	73,400	1,461,483
Fireproofing	Tons	.....	452,296	.....	542,611	.....	379,805
Hollow building blocks	M	3,627	177,273	4,893	448,674	7,720	620,329
Kaolin	Tons	124	1,888	1,197	17,866	163	2,369
Ornamental brick	M	1,995	50,576	41,852	865,664	64,682	1,355,360
Paving brick	M	.....	.....	151	5,972	.....	.....
Terra-cotta lumber	.....	.....	134,193	.....	188,789	.....	209,471
Pottery	.....	.....	231,262	.....	266,391	.....	229,547
Refractories—							
Fireclay	Tons	2,931	29,851	10,196	55,185	2,685	24,158
Firebrick	M	4,502	242,462	6,705	251,776	6,122	295,037
Other products	M	.....	91,685	.....	67,588	.....	81,345
Sewerpipe	Tons	.....	1,666,584	75,932	1,766,347	70,252	1,616,324
Tile, drain	M	.....	473,952	14,731	407,386	10,599	323,314
Total	.....	.....	**8,857,818**	.....	**11,438,456**	.....	**10,483,016**
IMPORTS—							
Bath brick	.....	.....	1,315	.....	1,043	.....	1,938
Building brick	M	4,269	126,765	7,468	174,321	5,381	140,441
Building blocks	.....	.....	120,930	.....	79,689	.....	77,972
Brick, fire, chromic, May12, 1923	.....	.....	.....	.....	.....	.....	4,000
Clays—							
China, ground and unground	Tons	8,130	138,775	12,898	173,988	12,120	242,860
Fire, " " "	"	31,282	148,059	30,792	138,995	53,506	223,628
Pipe " " "	.....	.....	866	.....	2,864	.....	1,161
Other clays	.....	.....	72,451	.....	65,422	.....	99,515
Drain tile, unglazed	.....	.....	5,815	.....	692	.....	2,041
Drain and sewerpipe	.....	.....	41,107	.....	61,397	.....	61,868
Earthen and chinaware	.....	.....	5,023,211	.....	4,641,474	.....	5,067,489
Firebrick (a)	.....	.....	630,132	.....	611,564	.....	970,324
Firebrick, n.o.p	.....	.....	445,053	.....	361,338	.....	610,243
Magnesite brick	.....	.....	61,728	.....	56,561	.....	120,453
Silica brick	.....	.....	229,400	.....	131,517	.....	216,642
Paving brink	M	1,323	41,523	1,766	45,686	3,243	90,787
Other clay manufactures	.....	.....	162,417	.....	117,952	.....	241,320
Total	.....	.....	**7,249,597**	.....	**6,664,503**	.....	**8,172,662**
EXPORTS—							
Building brick	M	2,136	29,778	2,418	31,383	4,069	42,742
Clay—							
Unmanufactured	Cwt.	2,095	885	2,589	1,777	11	52
Manufactures	.....	.....	80,009	.....	104,933	.....	109,957
Earthenware	.....	.....	135,163	.....	172,955	.....	432,092
Total	.....	.....	**245,835**	.....	**311,048**	.....	**584,843**
CONSUMPTION	.....	.....	15,861,580	.....	17,791,911	.....	18,070,835

(a) Duty free, of a kind not made in Canada.

Pottery (a) From Canadian Clay.—Sales of pottery, made from domestic clay during 1923 were valued at $229,547, a decrease of $36,844 or 13·8 per cent from the previous year's records.

Four firms in Canada produced pottery (using domestic clay) in the year under review. Stoneware, Rockingham ware, flower pots, etc., were made at St. John, New Brunswick, partly

from Nova Scotia clay. Rockingham ware was also produced at Medicine Hat, Alberta, from Saskatchewan clay. Flower pots were produced in the following localities: Medicine Hat, Alberta, from Saskatchewan clay, and Toronto and Hamilton, Ontario, from local clay.

Table 59.—Production of Pottery, from Domestic and Imported Clays, in Canada, by Provinces, 1921, 1922 and 1923

Province	1921		1922		1923	
	Made from		Made from		Made from	
	Domestic clay	Imported clay	Domestic clay	Imported clay	Domestic clay	Imported clay
	$	$	$	$	$	$
New Brunswick	40,000		42,000		26,547	13,273
Quebec		357,571		445,346		425,454
Ontario	69,984	810,304	88,889	740,737	78,000	1,368 079
Alberta	121,278		135,502		125,000	
Canada	**231,262**	**1,167,875**	**266,391**	**1,186,083**	**229,547**	**1,806,806**

Drain Tile and Sewer Pipe (a) **Drain Tile.**—The demand for drain tile in Canada during 1923 being somewhat below normal, there was a consequent decrease in the production of this commodity. Sales during the year totalled 10,599 thousand valued at $323,314, as compared with 14,728 thousand at $407,386.

Imports of drain tile, unglazed, into Canada in 1923 were valued at $2,041.

(b) **Sewerpipe.**—The sales of sewerpipe in Canada during 1923 were valued at $1,616,324 as compared with $1,766,347 in the previous year. Ontario was the principal producer accounting for 57·2 per cent of the total, the other provinces following in order of production—Quebec, Nova Scotia, Alberta and British Columbia.

According to Customs' records, drain and sewerpipe importations were valued at $61,868 in 1923 and $61,397 in 1922.

Table 60.—Production of Drain Tile and Sewer Pipe in Canada, by Provinces, 1921, 1922 and 1923

Province	1921		1922				1923			
	Drain tile	Sewer pipe	Drain tile		Sewer pipe		Drain tile		Sewer pipe	
	$	$	M	$	Tons	$	M	$	Tons	$
Nova Scotia	3,702	213,042	105	3,909	13,174	243,455	62	2,423	10,733	200,707
Quebec	21,362	297,691	318	13,988	12,290	312,737	170	10,312	12,268	294,437
Ontario	397,104	939,463	13,790	368,180	42,679	973,824	9,661	283,662	40,562	925,858
Manitoba							30	1,760		
Saskatchewan	33,000		85	6,200			65	4,550		
Alberta	3,717	161,052	58	3,480	5,448	170,229	103	5,414	0,035	175,168
British Columbia	15,067	54,436	372	11,629	2,343	66,102	508	15,193	654	20,154
Canada	**473,952**	**1,666,584**	**14,728**	**407,386**	**75,932**	**1,766,347**	**10,599**	**323,314**	**70,252**	**1,616,324**

Refractories (a) **Fireclay.**—Sales of fireclay or refractory clay sold as such, in Canada, during 1923, were valued at $24,158. The provinces of Nova Scotia, Ontario, Saskatchewan and British Columbia were the producers of this commodity during the year under review.

(b) **Firebrick.**—The production of firebrick in Canada from domestic clay, during 1923, totalled 6,122 thousand valued at $295,037 as against 6,705 thousand valued at $251,776 in the previous year. The provinces of Nova Scotia and British Columbia were the principal producers, accounting for 76·6 per cent of the Dominion total.

Imports of firebrick into Canada during 1923 were appraised at $1,917,662. These importations consisted of magnesite brick, silica brick, firebrick of a kind not made in Canada, and firebrick, n.o.p.

(c) **Fireproofing and Hollow Porous Blocks.**—The total value of fireproofing and hollow porous blocks produced in Canada during 1923 was $379,805 as compared with $542,611 in 1922. Records for Ontario and Quebec showed an increase in production value, while the Alberta sales fell off very materially.

(d) **Fireclay Blocks and Shapes.**—The total value of fireclay blocks and shapes sold during 1923 was $81,345, an increase of $13,757 or 12 per cent over the sales in the preceding year. These commodities were produced in Nova Scotia, Ontario, Saskatchewan, Alberta and British Columbia, from domestic clays. In addition to this production there are a number of firms in Canada making firebrick, stove linings, etc., from imported American clays.

Table 61.—Production of Refractories, in Canada, by Provinces, 1921

Province	Fireclay		Firebrick			Fireclay blocks and shapes	Fireproofing and hollow porous blocks
	Sold or used		Manufactured	Sold or used			
	Quantity	Value		Quantity	Value	Sold or used	Sold or used
	Tons	$	M	M	$	$	$
Nova Scotia	1,183	5,619	830	598	30,992	150	.....
New Brunswick	60	300	.....	.....	.....	.....	.....
Quebec	40	160	12	12	370	53,519	46,802
Ontario	463	7,756	992	1,094	62,891	17,782	269,047
Manitoba	.....	.....	.....	.....	.....	.....	.....
Saskatchewan	199	1,532	410	304	12,469	.....	.....
Alberta	.....	.....	.....	.....	.....	.....	136,447
British Columbia	986	14,484	2,494	2,494	135,740	20,228	.....
Canada	**2,931**	**29,851**	**4,738**	**4,502**	**242,462**	**91,685**	**452,296**

Table 62.—Production of Refractories, in Canada, by Provinces, 1922

Province	Fireclay		Firebrick			Fireclay blocks and shapes	Fireproofing and hollow porous blocks
	Sold of used		Manufactured	Sold or used			
	Quantity	Value		Quantity	Value	Sold or used	Sold or used
	Tons	$	M	M	$	$	$
Nova Scotia	327	1,746	960	567	42,518	675	3,654
New Brunswick	.....	.....	.....	.....	.....	.....	.....
Quebec	117	580	.....	.....	.....	41,448	160,471
Ontario	275	4,068	948	853	35,064	.....	274,618
Manitoba	.....	.....	.....	.....	.....	.....	27,639
Saskatchewan	417	3,811	392	396	17,010	.....	.....
Alberta	8,075	32,300	.....	.....	.....	.....	76,229
British Columbia	985	12,689	5,436	4,889	157,184	25,465	.....
Canada	**10,196**	**55,183**	**7,736**	**6,705**	**251,776**	**67,588**	**542,611**

Table 63.—Production of Refractories, in Canada, by Provinces, 1923

Province	Fireclay		Firebrick			Fireclay blocks and shapes	Fireproofing and hollow porous blocks
	Sold or used		Manufactured	Sold or used			
	Quantity	Value		Quantity	Value	Sold or used	Sold or used
	Tons	$	M	M	$	$	$
Nova Scotia	1,189	5,448	2,260	1,810	100,700	1,550	.....
New Brunswick	.....	.....	16	19	1,377	.....	.....
Quebec	.....	.....	.....	.....	.....	.....	66,868
Ontario	98	1,475	803	892	44,772	34,618	284,039
Saskatchewan	324	2,729	529	451	17,985	1,180	.....
Alberta	.....	.....	50	65	1,630	3,610	28,898
British Columbia	1,074	14,506	3,554	2,885	128,573	40,387	.....
Canada	**2,685**	**24,158**	**7,208**	**6,122**	**295,037**	**81,345**	**379,805**

Table 64.—Production of Lime in Canada, Showing Purpose for Which Sold or Used, 1922 and 1923

Purpose for which sold or used	1922				1923			
	Quicklime		Hydrated Lime		Quicklime		Hydrated Lime	
	Bushels	Value*	Tons	Value*	Bushels	Value	Tons	Value
		$		$		$		$
Building trade	1,334,769	450,861	34,500	440,433	1,538,188	530,342	27,110	340,746
Chemical works	1,772,786	605,547	2,194	18,697	2,513,848	697,233	1,838	13,108
Glass works					75,716	22,206	300	3,362
Smelters	169,329	69,456			242,366	80,787		
Pulp and paper mills	2,044,777	498,550	3,173	32,513	1,993,101	496,306	2,945	27,672
Sugar refineries	275,685	100,821			446,970	76,100		
Tanneries	43,979	15,145	3	37	52,544	20,749	25	250
Agricultural uses (fertilizers)	38,671	4,456	1,083	10,384	38,557	3,794	1,033	9,501
Dealers (uses unspecified)	1,363,309	621,493	3,418	37,948	1,130,676	530,624	18,371	230,785
Other consumers	654,723	250,409	252	2,267	526,353	180,748	143	2,295
Total sold or used	**7,698,028**	**2,622,726**	**44,623**	**542,279**	**8,556,319**	**2,638,889**	**51,765**	**627,719**

*Total selling value at kiln.

Sand and Gravel.—The production of sand and gravel in Canada during 1923 totalled 12,752,515 tons, valued at $3,016,518 as against 11,666,374 tons at $3,502,935 in the previous year. The increase in quantity was 1,086,141 tons or 9 per cent while the value decreased $486,417 or 13·9 per cent.

The imports of sand and gravel into Canada during the year were 355,126 tons,an increase of nearly 5,000 tons over those recorded for 1922. Importations of silica sand, for the manufacture of glass and carborundum, and for use in foundries totalled 167,556 tons or 55 per cent more than in the preceding twelve months.

Production by Railway Companies.—The sand and gravel produced by railway companies in Canada accounted for 58 per cent of the total production; statistics relating to this production have been tabulated separately from data regarding other producers. It will be noted in the table below that 80·5 per cent of the total output was utilized as railway ballast. In addition to this quantity 1,414,828 tons was produced for use in the road-building and construction industries, and an appreciable quantity was also consumed as blast, core and engine sands.

Table 65.—Production of Sand and Gravel by Other Operators in Canada, 1921, 1922 and 1923

Kind	1921		1922		1923	
	Tons	Value	Tons	Value	Tons	Value
		$		$		$
PRODUCTION—						
Glass sand	135	100			958	171
Moulding sand	91,680	70,254	159,369	107,738	154,711	111,537
Building sand and sand for concrete roadwork, etc	1,755,086	596,980	1,464,112	903,037	1,739,915	706,079
Other sand (including blast, core and engine sands)	49,915	23,051	165,352	49,916	101,695	72,980
Sand and gravel for railway ballast	6,971,874	981,277	6,099,560	1,066,716	6,149,789	800,496
Sand and gravel for concrete, road building, etc	2,035,957	802,133	3,591,515	1,198,156	4,115,260	1,050,504
Crushed gravel	70,215	63,454	186,466	117,372	490,487	274,751
Total	**11,574,862**	**2,537,249**	**11,666,374**	**3,502,935**	**12,752,515**	**3,016,518**
IMPORTS—						
Sand, silica for glass and carborundum manufacture, etc	40,455	135,765	107,873	224,473	167,556	317,250
Sand and gravel, n.o.p	165,489	114,575	350,992	175,667	355,126	247,388
Total	**211,944**	**250,340**	**458,865**	**400,140**	**522,682**	**564,638**
EXPORTS	1,396,728	201,711	683,709	116,121	764,521	182,750

CHAPTER VI

THE COKE AND BY-PRODUCTS INDUSTRY

The coke industry in Canada is carried on at widely separated points, the location of which is controlled by the demands of smelting operations wherever these occur in Canada.

Coke is produced by the destructive distillation of bituminous coal and is made in two kinds of ovens, the by-product and the beehive types. From the by-product oven, as the name implies, are recovered coke, breeze, gas, ammonia liquor, which may be made into ammonium sulphate, and light oils, such as toluol, benzol, motor oil, etc. The beehive type is designed to produce coke only; and no provision is made for the recovery of the by-products.

Metallurgical coke is made in Canada by (a) British Empire Steel Corporation at Sydney, N.S., (b) Steel Co. of Canada at Hamilton, Ont., (c) Algoma Steel Co. at Sault Ste. Marie, Ont. (d) Crow's Nest Pass Coal Co. and (e) International Coal & Coke Co., who operate along the Crow's Nest Pass Railway in British Columbia and Alberta, (f) Granby Consolidated Mining and Smelting Company at Anyox, B.C., and (g) Canadian Collieries (Dunsmuir) Ltd., Vancouver Islands, B.C.

The by-product type of oven is operated by all companies with the exception of the Crow's Nest Pass, the International Coal & Coke Co. and the Canadian Collieries, who as yet have not considered it good business to instal the newer type of oven.

In general, by-product coke is made by charging bituminous coal of a good coking quality into a fire-brick chamber called a retort. This chamber is narrow and long, approximately 20 inches wide by 35 feet long and 6 feet high. On each end are iron doors that are opened for discharging the coke and which are luted up while the coking is going on. The coal is distilled by the gas produced from a previous charge, this gas having been washed and led to a storage tank. The air that is admitted with the gas to increase the temperature around the oven is pre-heated. Two sets of burners operate intermittently, so that the burning gas may pass first in one direction and then in an opposite direction around the retort. This insures a more even heating of the oven and results in better coking conditions. The length of time of coking is about 24 hours From 70 to 80 per cent of the coal used is recovered in the form of coke, which includes the breeze or fine coke.

Since, in the coking of the coal, all the gas recovered is not used to heat the retorts, the remaining gas may be used for other heating purposes. While most of the coke made is used in smelters, the demand at the present time for domestic heating purposes is becoming greater. Ammonia is recovered and sold in the form of crude ammonia liquor, from which are prepared anhydrous ammonia and ammonium salts; in a few plants it is sold in the form of ammonium sulphate for fertilizing purposes. The tar recovered may be worked up into various marketable products; when it is distilled it breaks up into light and heavy oils, and pitch. The pitch is used for road binders or in the manufacture of fuel briquettes.

Table 66.—Summary of Financial Statistics Relative to the Manufacturing of Coke and By-Products in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	7	24,528,611	1,631,268	832,308	100,942	11,007,882	13,572,400	13,145,228	2,137,346
1920	6	19,278,539	1,696,088	792,636	70,772	13,409,921	15,969,417	15,589,615	2,170,694
1921	5	19,866,300	1,222,789	436,768	38,638	12,295,797	13,993,992	14,214,728	1,918,931
1922	6	20,363,785	716,893	259,279	291,225	6,130,628	7,398,025	7,336,627	1,205,999
1923	5	20,494,442	842,376	69,511	211,515	11,437,863	12,561,265	13,901,445	2,463,582

Capital Employed.—The capital employed in the coke and by-products manufacturing industry in Canada amounts to over 20 millions of dollars, most of which is tied up in lands, buildings and fixtures, machinery and tools. The stocks on hand vary considerably according to the condition of the iron and steel industry with which the coke industry is so closely related. In the tables, total capital employed is given for the Dominion only, owing to the fact that publication of provincial totals would reveal the business of individual concerns.

Table 67.—Capital Employed in the Manufacture of Coke and By-Products in Canada 1919-1923

Year	Capital employed as represented by			
	Lands, buildings, fixtures, machinery and tools	Materials on hand, stocks in process	Cash trading and operating accounts and bills receivable	Total
	$	$	$	$
Canada—				
1919	22,449,118	1,859,735	228,758	24,528,611
1920	18,599,587	606,147	81,895	19,278,539
1921	19,866,300	.....	.....	19,866,300
1922	19,877,521	486,264	.....	20,363,785
1923	19,639,208	655,234	.....	20,494,442

NOTE.—The total for Canada includes data for Nova Scotia, Ontario and British Columbia.

Table 68.—Number of Employees, Salaries and Wages Paid in the Manufacture of Coke and By-Products in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	54	2	854	.....	910	127,566	1,503,702	1,631,268
1920	49	6	820	.....	875	117,854	1,578,234	1,696,088
1921	94	1	552	.....	647	283,554	939,235	1,222,789
1922	38	.....	495	.....	533	99,865	617,028	716,893
1923	33	.....	565	.....	598	86,979	755,397	842,376

Wage-Earners.—In the table which gives the number of wage-earners by months, the seasonal character of the work is not so noticeable as in other Canadian industries.

Table 69.—Number of Wage-Earners Employed in the Manufacture of Coke and By-Products in Canada, by Months, 1922 and 1923.

Month	1922		1923	
	Male	Total	Male	Total
January	493	493	542	542
February	519	519	556	556
March	515	515	568	568
April	511	511	575	575
May	481	481	598	598
June	469	469	629	629
July	523	523	493	493
August	506	506	607	607
September	480	480	585	585
October	477	477	545	545
November	479	479	541	541
December	488	488	539	539

Fuel.—The table under fuel used in this industry includes only the coke and bituminous coal used in the making of steam and for heating purposes around the plant and does not include bituminous coal for coke making.

Table 70.—Fuel used in the Manufacture of Coke and By-Products in Canada, 1919-1923

Year		Bituminous coal	Coke	Fuel Oil and gasoline	Gas	Other	Total Cost
		Tons	Tons	Gals.	M cu. ft.	$	$
1919	Quantity	22,497	141	.....	19,709	.....	.....
	$	94,188	841	.....	5,913	.....	100,942
1920	Quantity	1,612	3,018	.....	150,220	.....	.....
	$	7,598	18,108	.....	45,066	.....	70,772
1921	Quantity	5,492	.....	.....	.....	.....	.....
	$	32,978	.....	.....	.....	5,660	38,638
1922	Quantity	13,722	12,302	184,785	231,452	.....	.....
	$	51,632	70,022	13,108	131,037	25,426	291,225
1923	Quantity	1,707	780	113,064	1,559,383	.....	.....
	$	7,672	4,080	3,972	167,524	27,667	211,515

Table 71.—Power Equipment Installed for the Manufacture of Coke and By-Products in Canada, 1919-1923

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	5,124	4,849	9,727	4,473	4,473
Engines—					
Steam	2,173	2,169	7,254	3,224	3,224
Electric motors—					
Alternating current	2,392	.....	2,397	.....	.....
Direct current	5,945	.....	5,753	.....	.....
Operated by power generated by establishment	.....	7,232	.....	4,660	4,660
Operated by purchased power	.....	.....	.....	3,800	3,860
Generators—					
Alternating current	.....	.....	1,000	.....	.....

Materials Used.—Both imported and domestic coals are used in the coke-making industry in Canada. In 1919 the cost of Canadian coal for coke-making was $3,862,976; foreign coal used cost $5,165,761. In 1920 the values were more nearly equal at $5,211,982 for Canadian coal and $5,651,652 for foreign coal. In the following year there was a marked decrease in the value of Canadian coal used to a total of $3,305,922, but the value of foreign coal increased to $7,351,428. In 1922, when production was much curtailed, the consumption of Canadian coal was a little more than half of that used in 1921, and the foreign coal used was slightly less than half of the 1921 consumption. The value of Canadian coal used in 1923 was only slightly more than in 1921, and the value of foreign coal amounted to $6,071,461, or a million dollars less than in 1921.

Table 72.—Materials Used in the Manufacture of Coke and By-products in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Coal—						
Canadian bituminous slack coal	Short ton	220,972	373,306	95,922	146,563	103,437
	$	1,278,218	2,445,642	495,019	825,106	913,106
Foreign bituminous slack coal	Short ton	214,151	272,839	656,459	234,785	226,603
	$	1,000,541	1,332,878	5,503,275	1,352,678	1,490,646
Canadian bituminous lump coal	Short ton	.....	586,842	.....	327,155	560,273
	$	.....	2,766,340	.....	717,372	2,101,765
Foreign bituminous lump coal	Short ton	410,259	704,525	254,386	328,711	737,954
	$	2,440,852	4,318,774	1,848,153	2,079,650	4,631,263
Canadian bituminous run-of-mine coal	Short ton	629,333	.....	490,263	14,189	13,168
	$	2,584,758	.....	2,810,063	115,303	105,532
Foreign bituminous run-of-mine coal	Short ton	391,296	.....	.....	2,000	5,652
	$	1,715,368	.....	.....	15,600	39,552
Total Canadian Coal	**Short ton**	**850,305**	**960,148**	**586,185**	**487,907**	**736,818**
	$	**3,862,976**	**5,211,982**	**3,305,922**	**1,657,835**	**3,120,403**
Total Foreign Coal	**Short ton**	**1,015,706**	**977,364**	**910,845**	**565,196**	**970,206**
	$	**5,165,761**	**5,651,652**	**7,351,428**	**3,447,928**	**6,071,461**
Total Coal	**Short ton**	**1,866,101**	**1,937,512**	**1,497,030**	**1,053,403**	**1,707,024**
	$	**9,028,737**	**10,863,634**	**10,657,350**	**5,105,763**	**9,191,864**
Other Materials—						
Sulphur	Short ton	.....	.....	.....	.....	1,274
	$	.....	.....	.....	.....	28,027
Sulphuric acid	Pounds	13,036,477	30,124,142	27,018,740	11,134,359	21,245,341
	$	145,561	333,301	339,563	114,309	170,495
All other materials	$	7,456	44,964	67,100	15,996	20,188
Total other materials		153,017	378,265	406,663	130,305	218,710
Total	$	9,181,754	11,241,899	11,064,013	5,236,068	9,410,574
Intermediate products used as materials	$	1,826,128	2,168,022	1,231,784	894,560	2,027,289
Total Value of Materials Used	$	11,007,882	13,409,921	12,295,707	6,130,628	11,437,863

Products (a) **Made for Sale.**—The amount of coke manufactured in 1919 was 1,276,443 tons valued at $9,821,998. In 1920 the value increased to $11,442,885. A slight falling-off was noticed in 1921, and in 1922 the value of coke manufactured was about half of that made in 1921. A remarkable recovery occurred in 1923, when the value of the coke manufactured was about double that in 1922 and equal to the 1921 production. The value of tar and tar products made rose from $156,615 in 1919 to $233,445 in 1921. The 1922 production was about the same as 1919, but in 1923 it increased to $222,497. Some ammonia liquor was sold in 1922 and 1923. The production of ammonium sulphate, for use in the fertilizer industry, reached its highest value in 1920 at $1,435,418. In 1922 production was much curtailed, but in 1923 the value once more crossed the million dollar mark.

A large amount of gas is made in the manufacture of coke and where by-product coke ovens are used, the gases can be utilized.

(b) **Used.**—Most of the gas from by-product ovens is used either to heat the oven or in the associated steel plants; some gas is occasionally sold elsewhere. The ammonia liquor manufactured in the plant is usually made into ammonium sulphate and marketed as such. The coke breeze, which is too fine for use in the blast furnaces, is used in the retorts for the making of coke.

Imports and Exports.—In the table of imports, coke occupies a very important place. In 1923 coke to the extent of 733,604 tons valued at $5,790,771 was imported into Canada. In 1922 the quantity imported was much less; in this respect the imports and domestic production of coke showed the same trend. In 1921, imports were again very low, there being only 228,030 tons imported valued at $1,766,101, but in 1920, the banner year for most Canadian industries, imports of coke reached a high level of 586,406 tons valued at $6,458,596. The following year showed a decline, but the importations gradually increased during 1922 and 1923.

Exports of coke and of coal tar and pitch during the five years under review reached a maximum in 1923, when these items contributed more than one million dollars' business to the export trade.

Table 73.—Products of the Coke and By-Products Industry in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
MADE FOR SALE—						
Coke	Short ton	1,276,443	1,219,252	949,963	667,799	1,144,189
	$	9,821,998	11,442,885	10,914,351	5,489,047	10,142,500
Gas sold	M Cu. Ft.	.....	.....	816,689	155,000	102,090
	$	.....	.....	245,006	41,850	27,564
Tar and tar products	Imp. Gal.	7,710,120	9,625,603	9,320,760	6,285,499	9,734,491
	$	155,615	186,723	233,445	150,955	222,407
Ammonia liquor	Lb. NH_3	.....	.....	.....	85,652	194,428
	$	.....	.....	.....	3,421	20,226
Ammonium sulphate	Lb.	35,018,152	37,760,723	32,606,248	22,285,232	37,495,062
	$	1,248,132	1,435,418	1,122,382	553,159	1,108,707
Light oils (toluol, benzol, motor oil, etc.)	Gals.	.....	.....	1,179,427	.....	1,393,814
	$	.....	396,854	391,614	143,686	279,409
Coke breeze	Short ton	.....	13,343	13,557	15,112	20,607
	$	.....	40,713	74,482	53,949	73,253
All other products	$	92,355	.....	1,664	.....	.....
Total	**$**	**11,319,100**	**13,412,593**	**12,982,944**	**6,442,067**	**11,874,156**
MADE FOR USE—						
Gas used in ovens or retorts	M Cu. Ft.	8,842,659	834,602	.....	490,175	2,280,466
	$	1,216,920	236,942	.....	132,347	496,077
Gas otherwise used in plants or otherwise accounted for but not sold	M Cu. Ft.	2,561,521	8,220,657	6,151,372	4,358,712	8,796,553
	$	194,124	1,372,217	620,740	353,045	971,673
Gas not accounted for	M Cu. Ft.	607,315	106,442	1,666,087	1,069,876	3,619,748
	$	134,335	27,720	335,062	197,256	346,692
Tar and tar products	Imp. Gals	3,905,234	2,797,809	1,937,443	1,330,934	.....
	$	280,749	294,296	154,489	83,023	.....
Ammonia liquor	Lb. NH_3	.....	.....	.....	2,091,821	.....
	$	.....	.....	.....	71,117	.....
Light oils	$	.....	72,336	60,957	37,110	130,161
Coke breeze	Short ton	.....	37,721	11,006	17,187	5,[illegible]
	$	.....	40,493	60,536	17,187	20,[illegible]
Sulphuric acid	Lb.	.....	.....	.....	.....	7,491,[illegible]
	$	.....	.....	.....	.....	61,[illegible]
All other products	$	.....	124,018	.....	2,575	.....
Total	**$**	**1,826,128**	**2,168,022**	**1,231,784**	**894,560**	**2,027,289**
Total Value of Products Made for Use and Products Made for Sale	**$**	**13,145,228**	**15,580,615**	**14,214,728**	**7,336,627**	**13,901,445**

Table 74.—Imports into Canada and Exports of Coal Products, 1919-1923

Item	1919 Value	1920 Value	1921 Value	1922 Value	1923	
					Quantity	Value
IMPORTS—	$	$	$	$		$
Coal tar crude in packages of not less than 16 gallons and coal pitch	143,099	152,685	235,896	250,316	Gals. 5,774,256	324,732
Carbolic or heavy oil	68,316	106,242	165,512	908,088	Gals. 2,813,551	529,558
Coke	2,405,740	6,458,596	1,766,101	3,094,042	Tons 733,604	5,790,771
Coke ground when imported by manufacturers of electric batteries for use in their own factories in the manufacture of such batteries	26,615	29,970	26,116	35,601	Cwt. 9,354	24,902
Total	**2,643,770**	**6,747,493**	**2,193,625**	**4,288,047**	.....	**6,669,963**
EXPORTS—						
Coke	129,703	390,161	256,928	205,627	Tons 34,407	433,497
Coal tar and pitch	47,439	481,259	361,621	223,622	Gals. 4,586,753	582,013
Total	**177,142**	**871,420**	**618,549**	**429,249**	.....	**1,015,510**

Table 75.—Production in Canada, Imports and Exports of Ammonium Sulphate 1919-1923

Year	Production		Imports		Exports	
	Lb.	Value	Lb.	Value	Lb.	Value
		$		$		$
1919	38,644,152	1,423,545	203,408	12,120	38,331,200	1,846,713
1920	38,912,723	1,475,542	624,659	31,495	36,658,500	1,896,660
1921	34,680,248	1,183,776	313,354	11,513	29,296,100	784,628
1922	27,201,332	667,934	826,000	24,659	20,570,000	532,983
1923	43,037,062	1,268,146	517,629	18,577	34,640,000	1,044,681

CHAPTER VII

THE GLASS INDUSTRY

This report of the glass industry in Canada covers the manufacture of pressed and blown glass and window glass, the bevelling, cutting and bending of imported glass—there being no plate glass manufactured in Canada—and the manufacture of leaded art glass, and glass cutting.

In the pressed and blown glass and window glass industry there were 11 plants operating in 1923, including 7 in Ontario, 3 in Quebec, and 1 in Alberta. Plants which cut and bevelled plate glass, manufactured cut glass and made ornamental glass numbered 35 in the Dominion in the same year. Of these, 9 operated in Quebec, 19 in Ontario, 3 in Manitoba and 4 in British Columbia.

It is not recorded when the first glass was made. As the earliest known specimens are Egyptian, its invention may be attributed to that people. The centre of the glass industry, which was at one time within the Roman Empire, swung to Constantinople when the Roman Empire declined, and later to Venice and thence to Paris. Very little is known of glass-making in England before the 16th century, and it was a rare thing to have houses equipped with glass windows during the time of Queen Elizabeth's reign.

Since that time, the process of manufacture has been gradually developed until now there are many very large glass manufacturing plants, particularly in the United States, Belgium, Germany and Great Britain.

Glass is produced by the fusion of silica, lime or lead, and sodium or potassium salts. Oxides of other metals are sometimes introduced into the melt, but only for some particular purpose, such as for colouring, toughening or lowering or raising its fusibility. White Arsenic $As_2 O_3$ is almost always used. It is reduced first to metallic arsenic, which then volatilizes and is said to make a much clearer glass. The silica used is supplied in the form of sand, which is required practically free from iron oxide for the finer glass, but for the more common ware such as bottle glass, a small percentage of iron is permissible.

The lime is supplied in the form of ground limestone, which should be free from magnesia and iron. The magnesia raises the melting point and also makes the glass very hard. Burnt lime and hydrated oxide of lime are also used. Lead is added as litharge or red lead. The higher oxide is preferred because of the oxygen liberated, which asists in oxidizing any iron present and also prevents the lead from being reduced to the metallic state. Sodium is added either as the carbonate or as the sulphate. When the latter is used, carbon is also added as a reducing agent. Potassium carbonate in the form of pearl ash is the chief source of potash. Other metallic oxides are sometimes introduced to impart a particular colour to the glass.

Glass is made by introducing into a carefully made fireclay pot or tank the required amount of raw materials and fusing by means of a flame free from smoke. Good dry hardwood was originally used for fuel, but high-grade coal and gas or, more particularly, natural gas, are being utilized at the present time.

Generally speaking, there are two kinds of furnaces: the pot furnace and the tank furnace. The tank furnace is more economical when a large amount of the same kind of glass is required. The fireclay for the pot furnace is mixed with old ground-up pots, wetted and kneaded until the whole becomes plastic, allowed to age and then built into pots by hand. The tank furnace consists of a fireclay hearth or tank with a silica-brick arch and the heat is applied to the top of the charge. A bridge or wall of fireclay is placed across the hearth. The charge is introduced at one end and as the glass melts, it flows under the partition and is drawn off at the other end without interrupting the process.

In making window glass by hand the workman collects a quantity of molten glass on the end of a hollow iron blow-pipe and then by blowing and manipulation he is able to make a long cylinder of glass. This cylinder is laid on a table and cut along the longer axis, after which it is placed in the "flattening oven" with the cut on the upper side. In some plants the cylinder is cut into two semi-cylinders before flattening. The temperature is slightly raised

and the cylinder gradually opens until it lies perfectly flat. It is then passed slowly through an annealing oven which is hot at one end and cool at the other. The gradual cooling of the glass prevents the setting-up of internal stresses. When the glass leaves this last oven it is ready to be cut into commercial sizes.

Bottles, lamp chimneys and other similar hollow-ware are made by blowing the molten glass into a mould; mechanical devices make it possible to produce many of these moulded products at one operation.

For the manufacture of plate glass, the molten glass is poured on to a perfectly flat table and rolled to the desired thickness. After careful annealing, it is polished first by abrasion with coarse sand, then with finer abrasive materials, and finally with felt and rouge.

Cut glass is nearly always lead glass which has been either blown or pressed into moulds of the desired shape. The blank is cut by being held against a fast revolving wheel of steel or sandstone fed with some abrasive material and water.

Coloured glass is made by adding the oxides of different metals, the choice of oxide being governed by the effect required.

Table 76.—Summary of Financial Statistics Relative to the Manufacture of Glass in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	32	7,962,124	3,163,148	1,206,808	668,989	2,741,564	7,780,509	8,324,718	5,583,154
1920	52	13,057,183	4,867,520	1,491,205	1,354,101	4,604,534	12,317,360	13,795,690	9,191,156
1921	48	13,725,482	3,621,768	2,173,873	1,485,165	3,974,358	11,255,164	11,461,932	7,487,574
1922	45	15,053,327	3,369,854	1,145,633	1,064,974	3,287,091	8,867,552	8,842,588	5,555,497
1923	46	14,892,372	3,778,802	1,752,846	1,365,903	3,714,515	10,612,066	11,098,026	7,383,511

Capital Employed.—The capital employed in the glass industry as a whole in Canada as represented by the cost of land, buildings, fixtures, machinery and tools, etc., the value of stocks on hand and the balance of cash accounts, has increased very considerably in the five years under review. Including the primary manufacturers of glass and those companies cutting, bevelling, or otherwise working glass, the number of firms in the industry has grown from 32 in 1919 to 46 in 1923, and the capital employed has advanced from 7.9 million dollars to 14.8 million dollars invested in active plants.

Table 77.—Capital Employed in the Manufacture of Glass in Canada by Provinces, 1919-1923

Province and Year	Capital employed as represented by			
	Lands, buildings, fixtures, machinery and tools	Materials on hand, stocks in process	Cash trading and operating accounts and bills receivable	Total
	$	$	$	$
Quebec—				
1919	668,965	237,047	331,527	1,237,539
1920	2,873,852	740,840	431,968	4,046,660
1921	3,545,607	996,311	513,611	5,055,529
1922	3,624,137	1,047,123	761,926	5,433,186
1923	3,621,696	960,261	711,468	5,293,425
Ontario—				
1919	3,398,369	1,253,996	977,835	5,630,200
1920	4,260,549	1,726,020	1,568,984	7,555,553
1921	4,410,109	1,593,813	1,200,250	7,204,172
1922	5,351,288	1,534,147	1,448,813	8,334,248
1923	5,779,277	1,654,419	1,273,115	8,706,811
Manitoba—				
1919				
1920	54,930	23,676	21,866	100,481
1921	53,850	16,456	45,893	116,199
1922	34,503	9,860	6,744	50,907
1923	10,121	11,204	4,662	26,077
British Columbia—				
1919				
1920	2,110	5,081	700	7,891
1921	4,197	47,761	31,444	83,402
1922	2,000	1,700	3,280	6,980
1923	2,944	29,837	7,059	39,840
Canada—				
1919	**4,762,692**	**1,649,056**	**1,550,376**	**7,962,124**
1920	**8,103,055**	**2,864,843**	**2,289,285**	**13,057,183**
1921	**8,997,720**	**2,790,586**	**1,937,176**	**13,725,482**
1922	**9,982,154**	**2,637,701**	**2,433,469**	**15,053,327**
1923	**9,945,874**	**2,760,170**	**2,186,328**	**14,892,372**

NOTE.—The total for Canada includes data for Alberta, 1919 return for New Brunswick, and 1919 return for British Columbia.

Table 78.—Number of Employees, Salaries and Wages Paid in the Manufacture of Glass in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	135	37	2,583	244	**2,999**	345,181	2,817,967	**3,163,148**
1920	210	61	3,438	330	**4,039**	519,267	4,348,253	**4,867,520**
1921	230	61	2,562	244	**3,097**	548,012	3,073,756	**3,621,768**
1922	245	68	2,499	172	**2,984**	569,961	2,799,893	**3,369,854**
1923	219	60	2,836	235	**3,350**	559,403	3,219,399	**3,778,802**

Table 79.—Number of Wage-Earners Employed in the Manufacture of Glass in Canada, by Months, 1922-1923

Month	1922			1923		
	Male	Female	Total	Male	Female	Total
January	2,176	170	2,346	2,753	202	2,955
February	2,499	202	2,701	2,847	213	3,060
March	2,537	202	2,739	2,815	223	3,038
April	2,603	186	2,789	2,789	284	3,073
May	2,725	187	2,912	2,885	283	3,168
June	2,553	193	2,746	2,972	256	3,228
July	2,626	196	2,822	2,432	216	2,648
August	2,235	166	2,401	2,562	204	2,766
September	2,252	158	2,410	2,831	203	3,034
October	2,422	166	2,588	2,926	228	3,154
November	2,585	168	2,753	3,112	253	3,365
December	2,766	176	2,942	3,053	249	3,302

Table 80.—Fuel Used in the Manufacture of Glass in Canada, 1919-1923

Year		Anthracite coal	Bituminous coal	Coke	Fuel oil and gasoline	Gas	Wood	Other	Total Value
		Tons	Tons	Tons	Gals.	M cu. ft.	Cords	$	$
1919	Quantity	273	56,000	.....	980,266	782,725	93	.....	
	$	2,850	381,494	.....	86,000	197,646	999	.....	668,989
1920	Quantity	301	85,177	24	2,209,935	601,748	101	.....	
	$	3,040	807,208	417	306,387	235,033	1,026	.....	1,354,101
1921	Quantity	408	96,866	32	1,683,165	534,365	51	.....	
	$	6,105	1,039,554	412	239,860	198,462	772	.....	1,485,165
1922	Quantity	380	68,461	950	1,302,024	603,081	13	.....	
	$	4,914	549,318	5,722	133,801	371,069	150	.....	1,064,974
1923	Quantity	477	106,048	175	2,137,981	431,027	12	.....	.....
	$	7,578	859,973	674	203,238	275,112	148	19,180	1,365,903

Table 81.—Power Equipment Installed for the Manufacture of Glass in Canada, 1919-1923

Class	Total h.p. according to manufacturers' rating				
	1919	1920	1921	1922	1923
Boilers	839	1,921	1,416	2,985	1,140
Engines—					
Steam	35	220	100	385	235
Gas	965	940	940	425	127
Gasoline	.....	.....	.....	.....	300
Electric Motors—					
Alternating current	4,292	.....	5,453	.....	.....
Direct current	664	.....	1,375	.....	.....
Electric Motors—					
Operated by power generated by establishment	.....	640	.....	195	175
Operated by purchased power	.....	5,774	.....	6,060	6,221
Generators—					
Alternating current	500	.....	500	.....	.....
Direct current	333	.....	600	.....	.....
Other power	.....	29	.....	.....	.....

Materials Used.—The materials used in the manufacture of pressed and blown glass include silica, sand, soda ash, nitrate of soda, burnt lime, white arsenic and other materials mentioned in the table. A large amount of sand for glass-making is imported; in 1923 the imports amounted to 3,351,123 cwt., valued at $317,250. The chief sources of supply are the United States and Belgium, sand from the latter country being brought in as ballast by returning vessels. In the five years under review, the greatest amount of plate glass for bevelling, and glass for ornamental work, etc., was reported in 1920, when the total value of such materials was given as 1.3 million dollars.

Table 82.—Materials Used in the Manufacture of Glass in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Plate, Cut and Ornamental Glass—Includes plate glass, sheet glass, figured glass, blanks for cutting, and other materials	$	473,878	1,336,131	874,260	770,255	910,405
Silica sand (quartz or glass sand)	Ton	49,536	67,949	56,779	51,597	65,821
	$	222,421	391,771	354,445	284,258	328,075
Soda ash	Ton	16,007	23,028	20,073	19,134	24,844
	$	745,132	1,002,827	1,006,998	872,303	1,001,893
Salt cake	Ton	.....	30	.....	408	223
	$	.....	872	630	9,243	4,906
Nitrate of soda	Ton	288	498	577	659	660
	$	27,953	42,148	57,709	41,373	40,065
Limestone (raw)	Ton	4,547	6,825	3,607	9,872	2,579
	$	37,787	30,509	14,860	30,477	10,462
Lime (burnt)	Ton	1,899	3,052	3,408	3,330	3,247
	$	21,117	46,342	46,223	36,626	52,057
Bone ash (calcium phosphate)	Pound	.....	.....	584	3,826	3,878
	$	.....	.....	68	360	339
Cullet	Pound	12,454,584	41,727,399	27,315,243	19,010,628	14,171,990
	$	50,197	212,832	141,303	66,789	108,541
Feldspar	Ton	40	57	73	92	191
	$	987	2,046	1,349	2,395	5,000
Cryolite	Pound	58,397	67,540	45,355	67,651	56,474
	$	6,760	7,096	5,988	8,559	5,709
Charcoal, coal or coke (not fuel)	Pound	32,336	58,530	141,822	114,005	11,512
	$	588	1,060	1,834	1,979	377
Litharge	Pound	187,732	240,773	222,375	80,431	123,590
	$	19,711	33,793	24,733	8,275	12,146
White arsenic	Pound	91,243	246,055	275,553	229,522	258,035
	$	10,713	35,665	28,452	19,036	30,476
Manganese dioxide	Pound	41,677	39,866	930,718	3,650	25,515
	$	2,318	2,534	9,819	244	1,704
Sulphur	Pound	11,423	32,074	31,212	12,809	10,716
	$	381	1,191	1,312	494	543
Glass tubing, for vials, etc.	$	.....	20,952	14,078	15,019	12,941
Boxes, cases, etc.	$	448,767	637,124	712,861	506,558	459,069
Other materials	$	672,854	739,641	677,645	611,888	729,807
Total	$	**2,741,564**	**4,604,534**	**3,974,358**	**3,287,091**	**3,714,515**

Table 83.—Products of the Glass Industry in Canada, 1919-1923

Item	1919	1920	1921	1922	1923
	$	$	$	$	$
Glass products, including the bevelling, bending and cutting of plate and window glass, and the manufacture of mirrors, art glass and cut glass	1,153,712	2,785,338	1,888,475	1,584,962	1,896,466
Pressed and blown glass and window glass made	7,171,006	11,010,352	9,573,457	7,257,626	9,201,560
Total	**8,324,718**	**13,795,690**	**11,461,932**	**8,842,588**	**11,098,026**

Table 84.—Imports into Canada and Exports of Glass and Glassware in 1919-1923

Item	1919	1920	1921	1922	1923	
	$	$	$	$	Quantity sq. ft.	$
IMPORTS—						
Cut, Pressed or Blown Glass—						
Glass plates or discs, rough cut or unwrought, for use in the manufacture of optical instruments, when imported by manufacturers of such optical instruments	56,522	100,638	75,891	55,585	.....	69,253
Glass milk bottles. (From May 24, 1922)	.....	.....	.....	7,810	.....	22,499
Glass carboys or demijohns, bottles, decanters, flasks, jars and phials	841,291	1,649,948	809,079	752,317	.....	1,102,279
Glass bulls, and cut, pressed or moulded crystal glass tableware, blown glass tableware, and other cut glassware	576,173	1,024,696	642,530	619,430	.....	653,688
Incandescent lamp bulbs and glass tubing for use in the manufacture of incandescent lamps	109,724	472,168	571,742	411,172	.....	513,225
Lamp chimneys, glass shades or globes	280,303	358,071	232,645	272,734	.....	255,220
Lenses, glass, unfinished	174,558	347,972	216,243	164,609	.....	187,982
Total	2,038,571	3,953,493	2,548,180	2,283,657	.....	2,804,146
Plate, Sheet and Window Glass—						
Common and colourless window glass	1,388,520	3,127,772	909,657	1,135,374	22,314,498	1,069,803
Glass, cut to size for the manufacture of dry plates for photographic purposes, when imported by the manufactures of such dry plates for use exclusively in the manufacture thereof in their own factories	50,034	58,264	28,641	17,521	.....	15,277
Plate glass, not bevelled, in sheets or panes not exceeding 7 sq. ft. each, n.o.p.	423,823	802,728	429,324	836,358	2,142,853	1,260,883
Plate glass, not bevelled, in sheets or panes exceeding 7 sq. ft. each and not exceeding 25 sq. ft. each, n.o.p.	140,293	475,514	193,815	323,021	748,906	437,172
Plate glass, n.o.p.	310,811	930,675	453,106	815,713	1,115,979	676,047
Plate glass, bevelled, n.o.p.	22,397	83,645	17,605	20,769	31,797	18,860
German looking-glass (thin plate), unsilvered or for silvering	.....	.....	123	3	.....	541
Glass in sheets and bent plate glass, n.o.p.	141,241	419,337	188,530	216,734	.....	253,607
Total	2,477,119	5,897,935	2,220,801	3,365,493	.....	3,732,190
Stained, Ornamental and Silvered Glass—						
Lenses, silvered, for automobile lamps	156	1,181	501	166	.....	54
Ornamental, figured and enamelled coloured glass, and memorialor other ornamental window glass, n.o.p.	14,057	21,244	4,275	6,923	.....	15,261
Painted or vitrified, chipped, figured, enamelled and obscured white glass	3,657	2,860	4,242	2,157	.....	5,009
Plain, coloured, opaque, stained or tinted, or muffled glass in sheets	12,489	16,844	7,528	7,378	.....	6,638
Stained or ornamental glass windows	6,948	10,069	36,150	31,621	.....	27,799
Silvered glass, bevelled or not, framed	200,730	270,749	184,747	181,712	.....	206,933
Total	238,037	322,947	237,443	229,957	.....	261,694
Other Glass and Glassware—						
Articles of glass, not plate or sheet, designed to be cut or mounted (includes manufacturers of glass, n.o.p.)	801,731	1,191,172	346,044	186,099	.....	206,126
Photographic dry plates	26,896	26,202	26,533	25,437	.....	20,656
Spectacles, eye-glasses and ground or finished spectacle or eye-glass lenses	67,284	80,804	42,884	44,410	.....	64,996
Manufactures of glass, n.o.p.	.....	.....	498,821	558,833	.....	539,790
Total	895,911	1,298,178	914,282	814,779	.....	831,568
Total	**5,649,638**	**11,472,553**	**5,920,656**	**6,693,886**	.....	**7,629,598**
EXPORTS—						
Glass for lighting	.....	.....	34,871	54,862	.....	147,736
Glass and Glassware	* 596,613	*1,099,361	* 353,154	180,517	.....	751,638
Total	**596,613**	**1,099,361**	**388,025**	**235,379**	.....	**899,374**

*Includes glass for lighting for 1919, 1920 and first three months of 1921.

CHAPTER VIII

THE ILLUMINATING AND FUEL GAS INDUSTRY

The illuminating and fuel gas industry in Canada includes the manufacture of coal gas, carburetted water gas, Pintsch gas—for the illumination of railway coaches—and acetylene gas. Natural gas is purchased and re-sold by some gas companies. The by-products of the industry include ammonia, coal tar, light oils, such as benzol, toluol, drip oil, etc. The number of plants engaged in the manufacture of illuminating and fuel gas does not vary greatly from year to year, the largest number in the five-year period under review being 52, reported in 1920. In 1921 there were 50, in 1922 the number was reduced to 48, and in 1923 a still further reduction brought the total to 45 plants. Of this number, 1 was located in Nova Scotia; 2 in New Brunswick; 4 in Quebec; 22 in Ontario; 8 in Manitoba; 2 in Saskatchewan; 1 in Alberta, and 5 in British Columbia. Straight coal gas was made in 10 plants; both coal gas and carburetted water gas were made in 12 plants; Pintsch gas was made in 9 different towns, and acetylene gas in 5 different places. As illuminating and fuel gas may be made by several different methods and as the manufacture of straight coal gas and carburetted water gas are the most important, a short description of their manufacture is herewith given.

Coal Gas is prepared by the destructive distillation of bituminous coal, and water gas is made by the action of steam on incandescent coke or anthracite coal. Straight water gas, being non-luminous, is mixed or rather carburetted with gases derived from oils which are rich in hydrocarbons. This enhances both the heating values and lighting properties of the gas. Many straight coal gas plants are also equipped to make carburetted water gas, in which process the by-product coke from the coal gas process can be utilized.

Straight Coal Gas.—In the manufacture of coal gas, a coal with a high volatile content is charged into fireclay retorts heated externally by direct fire or by producer gas made from by-product coke. There are three types of retorts in use—the horizontal, the inclined and the vertical. The inclined and vertical retorts may be operated continuously, but the horizontal retorts are intermittent in operation.

In the operation of the vertical retort, the coal is charged from a hopper at the top and is distilled by the heat from the burning producer gas which surrounds it. The coke is drawn off from a hopper at the bottom. The products of distillation, gases, ammonia, tars, etc., are led off by a vertical pipe from the top of the retorts. Thence it is led to the foul main, and from the foul main to the primary condenser, and then to the exhauster.

The exhauster is the controlling factor and its function is to draw the gases from the retorts through the different mains and primary condensers and then act as a pump to force them through the remaining parts of the plant.

The gases are forced from the exhauster to a secondary condenser and then through the tar exhauster, after which they are led to a scrubber and washer machine, for the removal of the ammonia.

From the scrubbers and washers the gas passes through purifying boxes containing hydrated ferric oxide, which absorbs the sulphur compounds. It then goes through the plant meter to the gas holder, from which it is delivered through the mains to the users.

Carburetted Water Gas.—In the manufacture of water gas, anthracite coal or by-product coke is charged into a large cylindrical holder called a generator and is heated up to white heat by means of an air blast.

The gases given off while this operation is being carried on are led in at the top of an adjoining circular chamber called a carburettor which is filled with firebrick staggered to allow the free passage of the gas. By means of another blast of air entering also at the top of these chambers, partial combustion of the gases is effected and the small pieces of fire-brick are raised to a white heat. The remaining gases are led to another similar chamber called a superheater, which is also filled loosely with firebrick. Another air blast led in at the bottom promotes the combustion of the remaining gases and these heat the firebrick to a red heat; any gases not burned are led off at the top of the superheater to the open air. When the carburettor and superheater have reached the necessary temperature the air blast is cut off and steam is

forced into the generator, where it is decomposed and with the aid of carbon, forms hydrogen and carbon monoxide. While this non-illuminating gas is passing into the carburettor, oil in an atomized form is forced in against the white hot firebrick and is broken up into a gas rich in hydro-carbons. The oil gases and the water gas mix, and pass through the superheator, where they are fixed and made non-condensable.

The gas thus formed is passed into a storage tank, and from there it is drawn through the purifying apparatus.

Table 85.—Summary of Financial Statistics Relative to the Manufacture of Illuminating and Fuel Gas in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures				Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Cost of materials	Total		
1919	39	28,185,654	2,683,679	1,252,423	6,112,354	10,048,456	11,967,264	5,854,910
1920	52	35,386,691	3,679,235	1,729,158	9,851,981	15,260,374	17,758,401	7,006,420
1921	50	37,097,280	3,984,976	2,041,374	9,279,697	15,306,047	18,772,285	9,492,588
1922	48	39,615,765	3,974,705	1,869,141	8,580,208	14,424,054	19,089,170	10,508,962
1923	45	45,526,495	3,801,832	1,768,574	9,024,084	14,594,490	19,605,340	10,581,256

Capital Employed.—The capital employed in the gas industry has shown a marked increase annually. It is one of the industries which did not show any reaction after 1920, and the amount invested increased from 35 million dollars in that year to over 45 million dollars in 1923.

Table 86.—Capital Employed in the Manufacture of Illuminating and Fuel Gas 1919-1923.

Province and Year	Capital employed as represented by			
	Land, buildings, fixtures, machinery and tools	Materials on hand, stocks in process	Cash trading and operating accounts and bills receivable	Total
	$	$	$	$
Quebec—				
1919	2,409,317	245,350	31,270	2,685,937
1920	2,670,030	92,159	37,138	2,799,327
1921	2,653,350	97,498	71,325	2,822,173
1922	2,816,352	73,902	129,529	3,019,843
1923	4,880,867	731,682	1,415,589	7,028,138
Ontario—				
1919	17,558,509	1,027,389	1,703,493	20,289,301
1920	19,523,332	1,106,218	1,878,395	22,507,945
1921	20,752,028	1,273,852	1,918,139	23,944,019
1922	21,930,156	1,428,154	2,284,150	25,651,460
1923	22,860,780	1,343,714	3,097,865	27,302,359
Manitoba—				
1919	688,461	16,874	9,714	715,049
1920	4,504,721	91,988	81,495	4,678,204
1921	4,358,325	99,916	76,192	4,534,433
1922	4,395,925	92,730	87,749	4,576,404
1923	4,550,474	142,982	119,584	4,813,040
British Columbia—				
1919	Included in total for Canada.			
1920	3,579,119	212,920	75,399	3,867,438
1921	3,942,650	237,051	100,087	4,279,788
1922	4,402,544	316,980	121,358	4,840,882
1923	4,613,957	293,890	82,336	4,990,183
Canada—				
1919	24,854,256	1,482,749	1,848,649	28,185,654
1920	31,745,659	1,528,857	2,111,175	35,386,691
1921	33,174,400	1,735,750	2,187,130	37,097,280
1922	35,035,750	1,936,406	2,643,609	39,615,765
1923	38,291,289	2,516,210	4,715,996	45,526,495

NOTE.—Total for Canada includes data for Nova Scotia, New Brunswick, Saskatchewan and Alberta, and, in 1919 for British Columbia.

Table 87.—Number of Employees, Salaries and Wages Paid in the Manufacture of Illuminating and Fuel Gas in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	372	214	1,922	13	2,521	563,271	2,120,408	2,683,679
1920	459	267	2,384	4	3,114	827,564	2,851,671	3,679,235
1921	486	265	2,067	.....	2,818	904,942	3,080,034	3,984,976
1922	506	255	2,344	2	3,107	943,434	3,031,271	3,974,705
1923	554	306	2,161	.....	3,021	1,094,241	2,707,591	3,801,832

Table 88.—Number of Wage-Earners Employed in the Manufacture of Illuminating and Fuel Gas in Canada, by Months, 1922 and 1923

Month	1922			1923	
	Male	Female	Total	Male	Total
January	2,245	3	2,248	1,893	1,893
February	2,259	3	2,262	1,846	1,846
March	2,240	3	2,243	1,899	1,899
April	2,302	3	2,305	2,128	2,128
May	2,429	2	2,431	2,293	2,293
June	2,457	2	2,459	2,314	2,314
July	2,433	2	2,435	2,311	2,311
August	2,391	2	2,393	2,297	2,297
September	2,370	2	2,372	2,269	2,269
October	2,369	2	2,371	2,245	2,245
November	2,345	3	2,348	2,249	2,249
December	2,284	2	2,286	2,225	2,225

Table 89.—Power Equipment Installed for the Manufacture of Illuminating and Fuel Gas in Canada, 1919-1923

Class	Total h. p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	7,646	8,971	10,212	9,066	9,705
Engines—					
Steam	164	853	1,749	1,467	1,244
Gas	15	81	173	318	218
Gasoline	76	.....	.....	.....	8
Hydraulic turbines and water wheels	.....	.....	1	.....	.....
Electric motors—					
Alternating current	689	.....	1,179	.....	.....
Direct current	2	.....	10	.....	.....
Electric motors—					
Operated by power generated by establishment	.....	247	.....	22	52
Operated by purchased power	.....	781	.....	1,505	1,871
Other power	.....	5	.....	.....	.....

Materials Used.—For all other industries a separate table has been prepared showing the amount of fuel used. In the gas industry this information was asked for and was returned to the Bureau under the item of "materials used." Bituminous coal having good gas-making qualities is the principal raw material used in this industry. In 1923 more than 5.6 million dollars was paid for bituminous coal for gas making. Gas oil is another important raw material, and in 1921, 1922 and 1923 the cost of this item was in the neighbourhood of one million dollars. The items in the table are placed so that an analysis can be made of the amount used for gas, boiler fuel and for retorting purposes.

Products Made.—The products of the gas industry include the gas, coke and other products made for sale and also a number of intermediate products used in the operation of the plant. To make the statistics clear the tables have been compiled so as to show (a) the total materials used, including purchased materials and intermediate products used; (b) the consumption of intermediate products; (c) the production of gas and other products.

Table 90.—Materials Used in the Manufacture of Illuminating and Fuel Gas in Canada, 1919-1923

Item	Unit of Measure	1919	1920	1921	1922	1923
Bituminous coal for gas making (not for fuel)	Short ton	581,750	648,618	655,789	641,875	728,011
	$	3,532,044	5,493,387	5,887,380	5,459,269	5,660,184
Anthracite coal for gas making (not for fuel)	Short ton	10,178	40,051	22,519	21,957	22,760
	$	99,611	428,121	322,084	289,483	284,988
Coke for gas making (not for fuel)	Short ton	3,420	2,196	90,599	77,649	196,096
	$	28,891	27,369	564,674	523,636	562,615
Oil (gas oil) for gas making (not for fuel)	Imp. gal.	10,761,060	12,028,309	10,465,503	10,700,850	10,847,666
	$	963,250	1,563,140	1,281,423	957,456	1,029,634
Calcium carbide	Pounds	361,300	472,920	487,865	341,917	348,950
	$	14,871	21,812	24,375	20,369	15,708
Lime	Pounds	.....	.....	.....	104,660	36,985
	$	356	3,047	1,958	1,580	5,565
Water	$	3,438	5,971	7,535	11,558	11,318
Oxide or purifying materials	Short ton	2,698	2,930	3,499	4,731	.....
	$	18,105	21,229	28,210	28,651	33,303
Boiler fuel—						
Bituminous coal	Short ton	25,274	24,755	29,005	35,886	58,025
	$	164,797	207,464	255,781	296,111	435,585
Coke	Short ton	225,627	246,051	33,485	31,872	83,075
	$	1,223,236	1,937,628	215,403	189,888	174,380
Coke breeze	Short ton	2,694	.....	10,484	47,020	.....
	$	18,684	.....	41,132	245,623	.....
Oil	Gals.	191,200	148,542	.....	.....	.....
	$	10,895	11,332	.....	.....	.....
Retort or bench fuel—Coke	Short ton	.....	2,708	76,475	74,994	117,234
	$	.....	15,597	608,136	546,310	804,609
Tar	Gals.	165,000	1,246,438	5,500	171,180	.....
	$	3,300	81,102	581	6,069	.....
All other materials used	$	30,876	34,782	41,025	4,205	6,195
Total	$	6,113,354	9,851,981	9,279,697	8,583,208	9,624,084
Intermediate products used as materials included in above	$	1,208,847	2,047,522	1,315,516	1,345,353	1,372,916

Table 91.—Consumption of Intermediate Products in the Manufacture of Illuminating and Fuel Gas, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Coke	Short tons	223,602	246,051	194,786	212,144	218,835
	$	1,205,547	1,937,628	1,288,915	1,321,753	1,360,035
Tar and tar products—						
(a) From coal gas	Gals.	40,000	1,126,861	15,500	79,700	.....
	$	800	78,290	581	2,992	.....
(b) From water or oil gas	Gals.	125,000	119,577	19,048	20,000	.....
	$	2,500	2,812	1,023	400	.....
Coke breeze	Short tons	.....	.....	4,963	4,339	.....
	$	.....	.....	24,878	20,208	.....
All other products	$	.....	28,792	119	.....	3,881
Total intermediate products used	$	1,208,847	2,047,522	1,315,516	1,345,353	1,372,916

Table 92.—Products of the Illuminating and Fuel Gas Industry in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
GAS PRODUCTION—						
Straight coal gas	M cu. ft.	5,881,048	7,191,737	7,398,541	7,404,253	8,138,611
Carburetted water gas (blue gas)	"	4,151,486	5,281,311	4,805,914	5,037,242	5,276,101
Mixed coal and water gas not separately metred or reported above	"	39,860	162,683	119,422	111,693	106,575
Oil gas by vaporizing distillate	"	64,512	64,015	65,050	58,731	70,808
Acetyline gas	"	1,540	1,987	1,977	1,648	1,534
Total gas made	"	10,138,446	12,701,733	12,390,904	12,613,567	13,595,429
Total gas purchased (natural)	"	3,706	604,716	558,461	551,990	585,848
Total gas available for distribution	"	**10,142,152**	**13,306,449**	**12,949,365**	**13,165,557**	**14,181,277**
GAS DISTRIBUTION—						
Gas used in plant or otherwise accounted for but not sold	"	75,514	74,559	75,860	100,963	85,539
Gas not accounted for	"	792,180	1,144,516	1,088,915	1,095,975	1,311,673
Gas sold—Quantity	"	9,274,458	12,087,374	11,784,590	11,962,619	12,784,065
Income from gas sold	$	9,190,369	13,385,951	15,241,640	15,041,864	15,260,683
BY-PRODUCTS—						
Coke	Ton	398,589	431,352	445,787	527,498	492,046
	$	2,251,744	3,835,305	3,031,528	3,468,427	3,670,049
Tar and tar products—						
(a) From coal gas	Gals.	5,366,619	674,669	6,017,605	6,230,864	6,968,444
	$	223,140	316,210	271,949	300,334	342,366
(b) From water or oil gas	Gals.	1,190,086	1,242,808	1,071,442	1,074,779	1,036,695
	$	38,043	46,306	43,261	45,394	46,811
Ammonia in liquor and as sulphate	lb. NH_3	1,722,145	1,476,016	1,634,941	2,042,075	2,155,879
	$	261,044	133,476	152,586	207,898	254,498
Light oils (toluol, benzol, drip oil etc.)	Gals.	.....	.....	3,402	2,840	2,006
	$	.....	.....	849	980	501
Breeze	tons	.....	.....	6,365	5,050	5,367
	$	.....	.....	30,286	24,273	25,911
All other by-products	$	2,924	41,153	195	.....	4,521
Total value of by-products	$	2,776,895	4,372,450	3,530,645	4,047,306	4,344,657
Total income from sales of gas and by-products	$	**11,967,264**	**17,758,401**	**18,772,285**	**19,089,170**	**19,605,340**

CHAPTER IX

THE MONUMENTAL AND ORNAMENTAL STONE INDUSTRY

The cutting of monumental and building stone is an industry that is well distributed throughout the whole Dominion. In some places suitable stone is available locally but in other places the necessary stone must be imported. There are sections of the province of Ontario where a very good grade of granite is obtainable, but the quarrying of this material is an expensive operation and unless the demand is great near the quarry, the return on the required investment in many cases is hardly enough to recompense the operator. In foreign countries where this industry has been developed to a greater extent and where the demand for the product is much larger, the cost of quarrying has been reduced to a minimum so that the surplus stocks can be exported to other countries and sold there at a price that competes with the locally quarried stone. The importation of stone and quarry products into Canada from certain parts of the United States in recent years has been the subject of much concern on the part of the government authorities in both countries; some stone was found to be infested with the brown-tail or gypsy moth which is particularly destructive. Now, all stone for export from these areas, is examined by officials of the United States Department of Agriculture; if the stone is free from traces of the objectionable moths the officer signs a clearance certificate, without which the stone can not be brought into Canada. Both granite and marble, rough and dressed, are brought into Canada regularly. The monumental and ornamental stone industry in Canada in 1923 included 12 plants in Nova Scotia, 1 in Prince Edward Island, 10 in New Brunswick, 42 in Quebec, 114 in Ontario, 11 in Manitoba, 7 in Saskatchewan, 5 in Alberta and 8 in British Columbia.

Table 93.—Summary of Financial Statistics Relative to the Manufacture of Monumental and Ornamental Stone in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacture
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	156	2,934,820	1,166,597	456,883	12,824	1,084,757	2,721,061	3,158,552	2,073,795
1920	176	4,181,670	1,088,242	618,262	18,571	1,781,031	4,106,106	5,205,886	3,424,855
1921	173	3,971,172	1,652,837	619,544	15,857	1,478,097	3,766,335	4,540,028	3,061,931
1922	208	5,027,935	1,809,444	707,765	19,532	1,844,548	4,381,289	4,908,487	3,123,939
1923	210	5,073,618	1,842,963	703,774	20,170	1,683,126	4,250,033	5,025,003	3,341,877

Table 94.—Capital Employed in the Manufacture of Monumental and Ornamental Stone in Canada, by Provinces, 1919-1923

Year and Province	Capital employed as represented by			
	Land, buildings, fixtures, machinery and tools	Material on hand, stocks in process	Cash, trading and operating accounts and bills receivable	Total
	$	$	$	$
Nova Scotia—				
1919	10,660	8,067	8,710	27,430
1920	20,660	13,050	14,536	48,246
1921	14,100	10,998	8,551	33,649
1922	22,290	14,674	8,557	45,521
1923	30,940	17,698	11,008	59,646
New Brunswick—				
1919	31,865	30,758	28,098	90,721
1920	32,345	26,950	41,620	100,915
1921	39,340	20,335	30,581	99,256
1922	98,641	49,862	45,227	193,731
1923	64,289	41,404	28,656	134,349
Quebec—				
1919	322,076	177,813	134,229	634,118
1920	553,161	224,000	281,158	1,058,319
1921	296,451	182,451	293,937	772,839
1922	586,027	203,501	376,289	1,165,817
1923	610,335	214,015	335,433	1,159,783
Ontario—				
1919	688,207	437,978	385,799	1,511,984
1920	806,063	664,580	576,078	2,046,721
1921	926,874	601,344	625,304	2,153,522
1922	1,044,562	656,122	765,841	2,466,525
1923	1,224,501	667,056	807,745	2,699,302
Manitoba—				
1919	91,054	66,901	105,261	263,216
1920	218,782	144,612	180,244	543,638
1921	224,598	114,974	178,610	518,182
1922	329,304	139,012	207,218	675,534
1923	220,229	107,215	173,471	500,915
Saskatchewan—				
1919	69,295	75,313	88,955	233,563
1920	48,349	41,281	87,461	177,091
1921	44,679	44,135	58,473	147,287
1922	51,562	61,494	86,102	199,158
1923	61,101	61,061	93,921	216,083
Alberta—				
1919	12,402	27,771	27,275	67,448
1920	17,341	35,027	44,512	96,880
1921	48,052	74,911	70,034	192,997
1922	46,065	92,149	27,679	165,893
1923	40,768	97,294	66,106	204,168
British Columbia—				
1919	51,020	9,394	14,839	76,153
1920	52,792	13,787	20,011	86,590
1921	30,961	11,981	10,498	53,440
1922	56,090	17,979	22,187	96,256
1923	42,539	16,449	20,884	79,872
Canada—				
1919	**1,292,310**	**837,988**	**804,522**	**2,934,820**
1920	**1,751,893**	**1,171,687**	**1,258,690**	**4,181,670**
1921	**1,625,055**	**1,070,129**	**1,275,988**	**3,971,172**
1922	**2,239,391**	**1,239,894**	**1,548,550**	**5,027,935**
1923	**2,299,552**	**1,227,392**	**1,546,674**	**5,073,618**

NOTE.—Total for Canada includes data for Prince Edward Island.

Table 95.—Number of Employees, Salaries and Wages Paid in the Manufacture of Monumental and Ornamental Stone in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	$	$	$	$
1919	143	13	730	2	888	275,620	890,977	1,166,597
1920	158	15	990	3	1,166	354,873	1,333,369	1,688,242
1921	159	18	1,024	6	1,207	369,190	1,283,647	1,652,837
1922	212	24	1,033	4	1,273	459,896	1,349,548	1,809,444
1923	198	26	1,054		1,278	464,823	1,378,140	1,842,963

Table 96.—Number of Wage-earners Employed in the Manufacture of Monumental and Ornamental Stone in Canada, by Months, 1922-1923

Month	1922			1923	
	Male	Female	Total	Male	Total
January	741	4	745	771	771
February	748	4	752	779	779
March	924	4	928	917	917
April	1,006	4	1,010	1,005	1,005
May	1,069	4	1,073	1,077	1,077
June	1,180	4	1,184	1,070	1,070
July	1,151	3	1,154	1,135	1,135
August	1,184	3	1,187	1,154	1,154
September	1,180	3	1,183	1,138	1,138
October	1,157	4	1,161	1,136	1,136
November	1,102	4	1,106	1,060	1,060
December	949	4	953	986	986

Table 97.—Fuel Used in the Manufacture of Monumental and Ornamental Stone in Canada, 1919-1923

Year		Anthracite coal	Bituminous coal	Coke	Fuel Oil and gasoline	Gas	Wood	Other	Total Value
		Tons	Tons	Tons	Gals.	M cu. ft.	Cords	$	$
1919	Quantity	332	249	230	3,360	1,787	183	.....	.....
	$	4,478	2,811	2,151	1,363	501	1,497	23	12,824
1920	Quantity	443	454	91	5,843	350	158	.....	.....
	$	6,632	5,894	1,199	2,252	821	1,352	421	18,571
1921	Quantity	214	704	66	5,028	1,051	300	.....	.....
	$	3,374	7,328	889	1,881	199	2,150	36	15,857
1922	Quantity	289	708	88	5,780	1,042	301	.....	.....
	$	4,176	7,812	1,333	2,040	646	2,453	1,072	19,532
1923	Quantity	259	1,388	68	7,472	280	487	.....	.....
	$	4,211	8,138	999	2,841	861	3,120	.....	20,170

Table 98.—Power Equipment Installed for the Manufacture of Monumental and Ornamental Stone in Canada, 1919-1923

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	20	20	113	220	185
Engines—					
Steam	.....	.....	10	242	162
Gas	74	40	47	52	109
Gasoline	15	61	55	56	64
Hydraulic turbines and water wheels	.....	.....	.....	36	32
Electric motors—					
Alternating current	2,180	.....	2,904	.....	.....
Direct current	472	.....	757	.....	.....
Electric Motors—					
Operated by power generated by establishment	.....	445	.....	.....	.....
Operated by purchased power	.....	3,545	.....	5,058	4,899
Generators—					
Direct current	.....	.....	1,350	.....	.....
Other power	.....	30	.....	.....	.....

Materials Used.—The table showing materials used has been compiled to show Canadian and foreign raw materials; also raw materials in the rough separately from those in prepared form. Foreign materials in most cases was used to a greater extent than the product from the Canadian quarries.

Products.—The products of the industry find their market either as monuments or as stone for building purposes. Statistics of production in Table 100 show the value of stone for use in these two fields.

Table 99.—Materials Used in the Manufacture of Monumental and Ornamental Stone in Canada, 1919-1923

Item	1919	1920	1921		1922		1923	
			Canadian	Foreign	Canadian	Foreign	Canadian	Foreign
	$	$	$	$	$	$	$	$
Granite: (1) Rough			164,370	105,973	263,670	94,691	261,644	97,198
(2) Finished			247,788	61,893	264,485	99,591	268,810	122,790
Marble: (1) Rough			41,887	259,514	37,981	223,324	16,519	216,660
(2) Finished			6,253	30,241	10,968	33,647	34,564	29,296
Limestone			103,172	310,058	112,951	539,268	78,226	422,242
Other stone			38,237	19,361	28,646	18,319	9,274	36,332
All other materials			58,530	30,220	72,992	44,015	84,741	4,821
Total			**660,237**	**817,860**	**791,693**	**1,052,855**	**753,787**	**929,339**
Total	**1,084,757**	**1,781,631**	**1,478,097**		**1,844,548**		**1,683,126**	

Table 100.—Products of the Monumental and Ornamental Stone Industry in Canada, 1919-1923

Item	1919	1920	1921	1922	1923
	$	$	$	$	$
Granite: (a) Monumental			1,338,886	1,536,246	1,538,354
(b) For building purposes			254,985	168,641	341,072
Marble: (a) Monumental			496,918	426,402	353,702
(b) For building purposes			517,306	539,805	545,853
Marble chips and dust			5,946	10,891	14,549
Limestone: (a) Monuments and bases			174,581	129,249	137,125
(b) For building purposes			978,252	1,294,626	1,383,464
Finished monuments, lettered only			553,102	605,914	646,824
Other products			220,052	256,711	163,970
Total	**3,158,552**	**5,295,886**	**4,540,028**	**4,968,487**	**5,025,003**

Primary Production.—Statistics on the production of stone as given in the *Annual Report of the Mineral Production of Canada, 1923*, have been included here to complete the survey. For more detailed information and for comparative data for back years, the reader is referred to previous issues of the report named above.

Stone.—The production of stone in Canada during 1923 totalled 4,111,334 tons valued at $5,903,289 as against 3,637,182 tons at $5,974,993 in 1922. The increase in production amounted to $474,152 tons or 13 per cent, while the value declined $71,704 or 1·2 per cent. Ontario was the leading producer, accounting for 64 per cent of the total quantity, and Quebec followed with 27 per cent. The other provinces in order of tonnage produced were: British Columbia, Nova Scotia, Manitoba and New Brunswick.

The kinds of stone quarried included granite (traprock, syenite and other igneous rock), limestone, sandstone and marble.

The quantity of limestone quarried and used in the manufacture of lime by the operator has been omitted from the mineral production record; the quantity and value of lime made therefrom are shown instead.

Table 101.—Production of Stone in Canada, by Kinds, 1919-1923

Kind	1919	1920	1921	1922	1923
	$	$	$	$	$
Limestone	3,074,815	5,665,693	5,155,046	4,175,941	4,475,921
Sandstone	86,577	165,149	78,036	80,908	66,547
Granite	850,563	1,508,916	937,804	1,486,250	1,159,303
Marble	213,982	240,593	172,720	231,894	201,518
Total	**4,225,937**	**7,580,351**	**6,343,696**	**5,974,993**	**5,903,289**

Table 102.—Production of Stone in Canada by Kinds, Showing Purposes for Which Used, 1923

Item	Granite		Limestone		Marble		Sandstone	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		$		$		$		$
Building—								
Dressed	10,666	92,049	54,430	224,512	159	7,076	2,158	18,130
Rough	4,440	119,437	13,971	451,082	1,625	188,935	.....	.....
Monumental and ornamental—								
Rough	9,796	150,575	128	1,258	.....	.....	.....	.....
Dressed	3,319	164,137	13	388	.....	.....	.....	.....
Flagstone	.....	.....	200	1,000	.....	.....	554	4,429
Curbstone	3,411	26,307	12	168	.....	.....	2,167	13,978
Paving blocks	24,226	255,568	1,117	671	.....	.....	940	8,767
Limestone, for flux	.....	.....	158,072	146,563	.....	.....	.....	.....
Limestone for sugar factories, chemical works, etc	.....	.....	192,583	217,050	.....	.....	.....	.....
Rubble and riprap	68,218	76,393	88,097	107,042	.....	.....	4,008	6,918
Crushed	274,356	274,837	3,179,040	3,326,187	689	5,507	12,939	14,325
Total	**398,432**	**1,159,303**	**3,687,663**	**4,475,921**	**2,473**	**201,518**	**22,766**	**66,547**

Table 103.—Production of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1923

Item		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	British Columbia	Total for Canada
Building—								
Rough	Tons	2,108	50	16,923	38,962	2,498	6,872	**67,413**
	$	17,600	530	106,790	151,499	17,589	47,759	**341,767**
Dressed	Tons	.....	450	16,297	1,289	2,000	.....	**20,036**
	$	.....	14,630	675,682	26,035	43,107	.....	**759,454**
Monumental and Ornamental—								
Rough	Tons	60	452	5,196	4,151	65	.....	**9,924**
	$	900	8,074	127,896	14,250	713	.....	**151,833**
Dressed	Tons	450	1,100	381	441	.....	960	**3,332**
	$	20,500	73,014	22,875	14,336	.....	33,800	**164,525**
Flagstone	Tons	.....	.....	.....	754	.....	.....	**754**
	$	.....	.....	.....	5,429	.....	.....	**5,429**
Curbstone	Tons	.....	99	3,174	2,167	.....	150	**5,590**
	$	.....	1,835	22,140	13,978	.....	2,500	**40,453**
Paving blocks	Tons	.....	215	14,717	11,351	.....	.....	**26,283**
	$	.....	24,565	124,625	115,816	.....	.....	**265,006**
Limestone, for flux	Tons	117,162	.....	1,298	29,160	.....	10,452	**158,072**
	$	98,500	.....	1,263	34,800	.....	12,000	**146,563**
Limestone for sugar factories, chemical works, etc	Tons	1,000	10,034	71,917	106,313	.....	3,259	**192,583**
	$	4,250	19,481	73,770	112,265	.....	7,284	**217,050**
Rubble and riprap	Tons	17,742	200	12,642	65,560	12,863	51,316	**160,323**
	$	35,220	99	10,859	86,184	15,084	42,907	**190,353**
Crushed	Tons	100	9,848	960,331	2,370,776	33,878	92,091	**3,467,024**
	$	120	23,855	1,166,021	2,284,560	41,784	103,616	**3,620,856**
Total	**Tons**	**138,682**	**22,448**	**1,102,876**	**2,630,924**	**51,304**	**165,100**	**4,111,334**
	$	**177,090**	**166,083**	**2,332,821**	**2,859,152**	**118,277**	**249,866**	**5,903,289**
Per cent of total	Quantity	3·4	0·5	27·0	64·0	1·1	4·0	100
	Value	3·0	2·8	39·5	48·5	2·0	4·2	100

Table 104.—Production of Stone in Canada, by Kinds and by Provinces, 1923

Province	Granite		Limestone		Marble		Sandstone	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		$		$		$		$
Nova Scotia	17,296	54,892	118,222	102,750	.....	.....	3,164	19,448
New Brunswick	11,509	143,473	10,689	21,981	.....	.....	250	629
Quebec	29,240	436,902	1,057,284	1,671,309	2,473	201,518	13,879	23,092
Ontario	188,998	293,454	2,430,453	2,542,320	.....	.....	5,473	23,378
Manitoba	.....	.....	51,304	118,277	.....	.....	.....	.....
British Columbia	151,389	230,582	13,711	19,284	.....	.....	.....	.....
Canada	**398,432**	**1,159,303**	**3,687,663**	**4,475,921**	**2,473**	**201,518**	**22,766**	**66,547**

Table 105.—Imports into Canada of Building, Paving and Monumental Stone, 1919-1923

Item	1919	1920	1921	1922	1923	
	$	$	$	$	Tons	$
Building stone	212,191	346,084	297,292	371,490	.....	403,550
Granite	110,583	161,024	71,345	72,633	.....	158,864
Marble	438,623	475,030	429,512	294,206	.....	293,806
Paving blocks	.....	.....	14	179	.....	61
Refuse stone	199,528	235,078	129,645	199,397	392,819	225,565
Total	**960,925**	**1,217,216**	**927,708**	**937,905**	.....	**1,081,846**

Table 106.—Exports from Canada of Crushed Stone, Rough Ornamental Stone, Rough and Dressed Building Stone, 1919-1923

Item	1919	1920	1921	1922	1923	
	$	$	$	$	Tons	$
Crushed stone	12,990	55,994	8,648	80,544	89,434	159,088
Ornamental (rough)	7,118	16,941	13,343	32,474	3,165	30,350
Building (rough)	23,899	16,246	8,996	13,364	1,032	12,575
Dressed stone	10,108	13,807	26,937	7,870	.....	20,227
Total	**54,115**	**102,988**	**57,924**	**134,252**	.....	**222,240**

CHAPTER X

THE PETROLEUM PRODUCTS INDUSTRY

The petroleum products industry in Canada includes (a) the refining of crude oil for the production of gasoline, kerosene, lubricating oils, waxes and petroleum coke; (b) the manufacture of commercial lubricants consisting wholly or in part of mineral oils. Some companies distilling crude oil also produce lubricating compounds, so that for convenience the output figures for both sections of the industry have been included in a combined table of products.

In the petroleum refining section there were 14 plants in operation during 1923. Of these, 4 were located in Ontario, 4 in Alberta, 2 in British Columbia and one each in the provinces of Nova Scotia, Quebec, Manitoba and Saskatchewan. Six other plants reporting to the Bureau made lubricating oils and greases as their principal product; 2 of these were in Quebec and 4 in Ontario. There were also several concerns jobbing imported oils which made small quantities of lubricating greases as a side line. No report of this production was obtained. The total cost of materials used by these combined industries in 1923 amounted to 36·8 million dollars, a decrease of 2 million dollars from the total for 1922, but about the same as in 1921. Raw materials cost 39 million dollars in 1920.

There was a marked decline in the output value of refinery products in 1923, the total being reported as 46 million dollars. This compared with 57 million dollars in 1922, a total of 53 million dollars in 1921, and the maximum value of 59 million dollars reached in 1920. The value reported for 1919 was the lowest during the period under review and amounted to only 44·5 million dollars.

The production of crude oil from newly-developed fields in the United States during the past few years has had a very disturbing effect upon the petroleum refining industry. The new producers, marketing their output under highly competitive conditions, were compelled to sell their oil at a very low price, and refineries obtaining this cheap oil were able to put gasoline on the market at such reduced prices that many refineries in the United States, unable to meet the competition, were compelled to close down. Refiners who had made long term contracts for their supply of crude oil were forced to meet the competition set up by those who had bought cheap oil and as a result the refinery output in Canada, as well as in the United States, has had a much lower unit value during the past few years than might have been expected under normal conditions.

Owing to the increase in the consumption of gasoline in the internal combustion engine, the petroleum refining industry has become one of great industrial importance. For this reason a brief description of the processes used has been included for the information of the general reader.

Petroleum Refining.—Petroleum is an oily liquid, which is found widely distributed throughout the earth's crust. The origin of this remarkable and useful substance has been the subject of controversy among scientists for a long time. Some believe that petroleum was formed as the product of chemical reactions among inorganic substances, while others contend that it has resulted from the decomposition of animal and vegetable matter.

Petroleum as it comes from the earth is generally spoken of as "crude" and it is divided into two main classes, (a) paraffin base oil and (b) asphaltic base oil. There is no sharp line of demarcation, as oils from some districts contain both asphalt and paraffin.

The Canadian oils from the Petrolia field are paraffin base oils having a high sulphur content.

The refining of petroleum means the breaking-up of the crude oil into its marketable products, which are gasoline, kerosene, fuel and gas oils, lubricating oils, tar, petroleum jelly and wax, and petroleum coke. This breaking-up is done by what is known as "fractional distillation." The crude oil is led into large horizontal cylindrical stills set in brick-work and properly insulated. Heat is applied by burning gas, oil or coal. On the top of the still is a dome connected with the condensers by a large pipe 12 to 16 inches in diameter. The condenser pipes from the still are immersed in cooling tanks through which cold water is continually circulated so that the vapours in the pipes are condensed to a liquid which is then drawn off for further treatment.

The products from the crude still are naphtha, kerosene, gas oil, wax distillates and residual coke. The naphtha is led to a steam still where gasoline and benzenes are separated, the gasoline being run into an agitator where it is washed with sulphuric acid and the benzenes being treated in a similar way in another agitator. The gas oils are either sold for the enrichment of coal or water gas or are cracked into fuel oil and gasoline. The wax distillates are put through a refrigerating and pressing process for the extraction of crystalline waxes; the remaining oil is further fractionated for the production of various grades of lubricants.

Table 107.—Summary of Financial Statistics Relative to the Manufacture of Petroleum Products in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	19	44,554,855	5,301,879	4,730,325	3,133,239	27,076,751	40,242,194	44,554,581	17,477,830
1920	19	52,709,887	6,551,826	5,852,030	4,712,189	39,168,692	56,284,737	59,573,448	20,404,756
1921	16	57,564,588	6,182,514	4,168,070	4,439,651	36,629,576	51,419,811	52,932,415	16,302,839
1922	19	62,054,029	5,492,683	4,898,453	4,231,787	38,413,191	53,036,114	57,035,563	18,622,372
1923	20	61,027,704	5,648,320	5,522,765	3,897,272	36,816,696	51,885,053	46,280,534	9,463,838

Capital Employed.—The capital employed in petroleum refining and in the manufacture of greases, etc., has shown an upward trend since the year 1919. In 1919, the investment in lands, buildings, fixtures, machinery and tools stood at about 30 million dollars; in 1921 there was an increase of 7 million dollars; in 1922 the total amounted to 41 million dollars, and in 1923 it had increased again to about 48 million dollars, thus showing the importance and rapid growth of this large Canadian industry. The total capital employed in 1923 amounted to 61 million dollars, a slight decrease from that reported in 1922 due to a decrease in the cost of the materials on hand and in process, and also in the amounts available in cash, trading and operating accounts and bills receivable; otherwise the total capital employed has shown the same upward trend as that in the lands, buildings, fixtures, etc.

Table 108.—Capital Employed in the Manufacture of Petroleum Products in Canada, by Provinces, 1919-1923

Year and Province	Capital employed as represented by			
	Land, buildings, fixtures, machinery and tools	Materials on hand, stocks in process	Cash, trading and operating accounts and bills receivable	Total
	$	$	$	$
Quebec—				
1920	7,782,571	2,638,966	47,467	10,469,004
1921	7,915,213	2,495,288	50,420	10,460,921
1922	7,879,976	2,883,956	59,399	10,823,331
1923	8,190,537	1,994,107	57,955	10,242,599
Ontario—				
1919	10,517,066	7,151,467	813,883	18,482,416
1920	11,924,344	10,864,654	2,227,647	25,016,645
1921	12,260,073	8,471,851	1,455,293	22,187,217
1922	12,742,333	6,029,200	925,765	19,697,298
1923	12,929,239	4,727,722	385,723	18,042,684
Alberta—				
1919	593,220	127,473	210,028	930,721
1922	2,204,039	27,724	12,916	2,264,679
1923	7,979,085	701,552	53,921	8,734,558
Canada—				
1919	30,108,350	13,125,019	1,321,456	44,554,855
1920	32,851,871	17,302,482	2,555,534	52,709,887
1921	37,956,927	18,929,395	1,678,264	57,564,588
1922	41,675,844	19,361,284	1,016,901	62,054,029
1923	47,955,301	12,328,670	743,733	61,027,704

Note.—Totals for Canada include data for Nova Scotia, Quebec for 1919, Manitoba, Saskatchewan, Alberta for 1920 and 1921, and British Columbia.

Table 109.—Number of Employees, Salaries and Wages Paid in the Manufacture of Petroleum Products in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	276	77	3,550	16	**3,919**	551,366	4,750,513	**5,301,879**
1920	376	104	3,653	20	**4,153**	972,952	5,578,874	**6,551,826**
1921	307	72	3,609	26	**4,011**	836,870	5,345,644	**6,182,514**
1922	328	67	3,133	27	**3,555**	832,935	4,659,748	**5,492,683**
1923	363	69	3,801	24	**4,257**	910,379	4,737,941	**5,648,320**

Table 110.—Number of Wage-Earners Employed in the Manufacture of Petroleum Products in Canada, by Months, 1922-1923

Month	1922			1923		
	Male	Female	Total	Male	Female	Total
January	3,116	14	**3,130**	3,393	27	**3,420**
February	3,027	19	**3,046**	3,388	22	**3,410**
March	3,158	25	**3,183**	2,777	24	**2,801**
April	3,434	26	**3,460**	3,564	21	**3,585**
May	3,331	29	**3,360**	4,328	18	**4,346**
June	3,348	28	**3,376**	4,437	19	**4,456**
July	3,218	26	**3,244**	4,836	17	**4,853**
August	3,169	24	**3,193**	4,442	18	**4,460**
September	3,029	29	**3,058**	4,061	23	**4,084**
October	3,032	34	**3,066**	3,595	33	**3,628**
November	2,931	35	**2,966**	3,491	33	**3,524**
December	2,793	32	**2,825**	3,293	33	**3,326**

Fuel.—The principal fuels used in this industry are bituminous coal and fuel oil. A large amount of heat is required for distillation purposes and the location of the plant determines the type of fuel to be used. In the years under review, more money was spent for fuel oil than for coal; in 1923, fuel oil cost $2,423,883 as compared with $1,021,643 for coal. The greatest fuel consumption reported was in 1920 when 4·7 million dollars was given as the total cost under this item; since then the cost of fuel has been less, and in 1923 it amounted to 3·9 million dollars.

Table 111.—Fuel Used in the Manufacture of Petroleum Products in Canada, 1919-1923

Year		Anthracite coal	Bituminous coal	Coke	Fuel Oil and gasoline	Gas	Wood	Other	Total Value
		Tons	Tons	Tons	Gals.	M cu. ft.	Cords	$	$
1919	Quantity	3	116,891	35,040	42,810,808	37,855	4	.....	
	$	35	663,887	180,168	2,285,044	4,079	26	.....	**3,133,239**
1920	Quantity	17	136,233	25,127	39,512,268	2,943	7	.....	
	$	209	913,722	132,123	3,594,583	563	35	70,954	**4,712,189**
1921	Quantity	26	142,282	50,707	48,474,687	23,224	.....	.....	
	$	359	1,114,636	434,701	2,880,912	9,043	.....	.....	**4,439,651**
1922	Quantity	7	156,153	42,577	55,878,017	706,850	7	.....	
	$	102	993,694	266,244	2,754,936	205,498	37	11,276	**4,231,787**
1923	Quantity	9	172,905	16,361	46,369,951	1,780,039	4	.....	
	$	148	1,021,495	101,774	2,423,883	318,196	28	31,748	**3,897,372**

Table 112.—Power Equipment Installed for the Manufacture of Petroleum Products in Canada, 1919-1923

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	14,473	17,549	17,205	18,260	19,909
Engines—					
Steam	6,183	5,957	5,752	5,351	9,619
Gas	...	...	8	7	967
Gasoline	420	1,018	1,353	1,248	1,050
Electric motors—					
Alternating current	8,513	...	5,785	...	...
Direct current	...	...	19	...	...
Operated by power generated by establishment	...	6,326	...	2,831	2,925
Operated by purchased power	...	2,537	...	3,085	4,620
Generators—					
Alternating current	1,376	1,196	1,437	...	...
Direct current	517	...	242	...	...
Other power	...	2,742	2,742	...	...

Materials Used.—To date Canada has had to depend on foreign production for her supply of crude oils. In 1923, the value of Canadian crude oil used was less than one-half million dollars whereas the cost of imported crude oil used was more than 33 million dollars. This feature is very important as it exemplifies the fact that the discovery of oil in Canada in large quantities would put this country in a more independent position. Most other materials used were for the purpose of refining crude oils. In an industry such as this, the consumption of containers, cooperage stock, etc., is of considerable importance and in 1923 amounted to $885,000 in value; the practice in the trade is to charge the consumer for some containers and to allow a rebate when the containers are returned. The total amount spent for materials was greatest in 1920, when the total was about 39 million dollars. In 1921 there was a reduction to 36 million dollars. In 1922, an increase to 38 million dollars was reported, and in 1923 a slight reduction carried the total back to 37 million dollars.

Table 113.—Materials Used in the Manufacture of Petroleum Products in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
Crude oil (Canadian)	Imp. gal.	8,210,537	6,711,070	6,089,217	5,849,442	5,906,028
	$	753,052	835,870	546,820	514,746	458,609
Crude oil (imported)	Imp. gal.	292,796,016	288,865,457	367,380,201	388,289,613	402,904,711
	$	23,671,208	34,586,671	32,998,553	34,538,969	33,184,017
Sulphuric acid	Pound	52,136,334	48,001,510	57,839,800	86,398,728	65,922,858
	$	880,695	547,503	674,855	1,058,230	690,152
Sulphur (not used in acid manufacture)	Pound	30,232	66,666	1,035,420	84,260	61,814
	$	1,166	2,242	3,165	2,407	1,733
Caustic soda	Pound	2,505,802	2,738,824	3,563,907	3,761,499	3,084,651
	$	97,310	107,207	167,550	175,592	128,421
Litharge	Pound	84,195	204,423	360,758	518,291	328,185
	$	9,932	25,244	34,191	44,906	28,794
Clay	Pound	392,976	251,065	223,432	159,840	480,375
	$	5,201	3,812	3,123	2,733	7,929
Rapeseed oil	Gal.	...	...	3,312	4,502	5,439
	$	...	...	6,303	7,892	8,373
Soda ash	Pound	78,000	...	140,550	793,097	661,089
	$	2,985	...	3,682	18,314	14,911
Vegetable pulp	Pound	...	...	19,948	22,026	38,328
	$	...	...	27,449	22,056	28,908
Corn oil	Gal.	...	...	25,820	50,421	...
	$	...	...	34,439	45,571	...
Fatty acid	Pound	...	...	312,437	392,757	512,191
	$	...	...	38,463	43,255	58,741

Table 113.—Materials Used in the Manufacture of Petroleum Products in Canada, 1919-1923—Concluded.

Item	Unit	1919	1920	1921	1922	1923
Candle material	$	45,040	.....	.....	48,106	17,135
Animal oils	Gals.	.....	.....	24,743	40,356	.....
	$	.....	.....	13,766	48,161	117,521
Oil for further refining and blending	Gal.	.....	.....	.....	1,711,405	.....
	$	720,349	1,653,045	810,635	376,340	836,108
Fuller's Earth	Pound	.....	.....	.....	523,952	341,014
	$	.....	.....	.....	7,665	4,286
Co-operage stock	$	269,239	407,074	122,194	186,751	171,745
Packages, labels, etc.	$	.....	615,119	618,284	673,787	885,900
All other materials	$	620,524	384,905	526,104	597,710	173,413
Total	$	**27,076,751**	**39,168,682**	**36,629,576**	**38,413,191**	**36,816,696**

Products Made.—The production of gasoline in Canadian refineries has increased during the past five years from 86 million gallons in 1919 to 124 million gallons in 1923, but the total value of production in these two years was, respectively, 22·9 and 22·1 million dollars. Thus, while the volume of production has been growing steadily, reaching a maximum in 1922 of 143·9 million gallons, the decline in the unit price of the refined product, so noticeable in 1923, kept the total value of the output for that year close to the 1919 level. The average price of gasoline at the refinery in 1922, when the maximum output was attained, was 24 cents per gallon; in 1923 the selling value of gasoline, f.o.b. refining plant, was 17·5 cents per gallon. The drop in price was largely due to the great increase in the available supply of crude oil resulting from the tremendous production from new fields in the United States.

Kerosene is still an important product. The production of 67·3 million gallons in 1923 showed a decrease from the 1922 output of 76·5 million gallons but was higher than that reported in any of the three years prior to 1922. The value of the output, which was 8·7 million dollars in 1923, was less than in 1922 or in 1920 but greater than the totals reported for 1919 or 1921. The maximum value of kerosene output was reached in 1920 with a total of 10·8 million dollars.

Production of fuel and gas oils reached a total of 95·2 million gallons valued at 5·6 million dollars in 1923; the total production value was higher in 1920 at 6·7 million dollars, but the quantity produced in that year was only 56·9 million gallons. Production of fuel and gas oils has varied considerably in the five years under review. The increasing cost of coal and the difficulty experienced by many consumers in obtaining adequate supplies in recent years have been factors which promoted the use of fuel oil both for industrial and domestic heating.

The production of asphalt in 1923 was much greater than in any of the other years under review. The output was used largely in road construction work and in the manufacture of roofing preparations.

Table 114.—Products of the Petroleum Products Industry in Canada, 1919-1923

Item	Unit	1919	1920	1921	1922	1923
(a) Made for Sale—						
Gasoline	Imp. gals.	86,565,896	86,173,471	119,865,388	143,948,530	124,139,966
	$	22,985,859	28,266,884	31,021,291	34,425,284	22,150,183
Petroleum spirits	Imp. gals.	4,506,372	2,447,489	2,055,227	3,124,828	1,038,625
	$	878,855	577,028	431,649	561,498	144,484
Kerosene	Imp. gals.	54,833,486	54,136,501	59,076,310	76,512,173	67,383,335
	$	8,195,673	10,884,355	7,536,822	9,627,722	8,772,812
Fuel and gas oils	Imp. gals.	96,433,483	56,956,340	81,256,101	51,228,569	95,270,835
	$	5,835,969	6,749,183	3,733,514	3,399,746	5,656,498
Lubricating oils	Imp. gals.	18,284,280	25,099,798	24,246,320	18,051,600	17,121,896
	$	4,070,916	6,327,134	5,221,487	3,551,478	3,237,526
Grease	Pounds	6,838,456	7,695,701	6,674,262	8,670,016	13,999,391
	$	552,565	545,174	269,679	231,673	289,420
Tar	Pounds	Included in fuel and gas oils	14,424,634	18,971,400	21,365,521	112,924
	$		94,073	142,285	114,948	12,144
Petroleum coke	Short tons	56,928	23,231	27,980	41,583	27,738
	$	426,025	192,187	204,543	346,659	243,277
Wax and candles	Pounds	9,090,993	10,398,127	10,777,994	12,063,768	10,484,436
	$	927,555	973,805	310,267	329,147	484,416
Naphtha	Gals.	.....	.....	.....	116,094	42,493
	$	.....	.....	.....	31,942	13,447
Asphalt	Gals.	7,678,029	10,639,957	7,127,350	16,653,523	20,498,386
	$	488,953	1,165,575	743,025	1,918,858	1,593,863
Other materials	$	192,211	3,936	284	174,967	860,674
Total	.....	**44,554,581**	**55,779,314**	**49,614,846**	**53,813,922**	**43,458,744**
(b) Intermediate Products made for use (chiefly as fuel) in the Manufacture of Petroleum Products in Canada, 1919-1923—						
Gasoline	Imp. gals.		20,193	22,225	11,363	16,414
	$		6,018	4,845	2,905	3,071
Kerosene	Imp. gals.	Not available	19,154	6,483	9,387	15,339
	$		3,617	648	1,082	1,559
Fuel and gas oils	Imp. gals.		39,506,443	48,459,944	55,747,407	44,411,735
	$		3,392,763	2,877,747	2,743,181	2,317,268
Petroleum coke	Short tons		10,345	37,415	28,839	6,282
	$		105,233	417,369	251,147	57,247
Acid coke	Short tons		14,706	13,216	13,738	10,079
	$		15,549	15,991	15,097	44,527
Still gas	M cu. ft.		.....	.....	706,840	605,249
	$		.....	969	205,498	297,287
Other materials	$		70,954	.....	2,731	100,911
Total	.....	.....	**3,794,134**	**3,317,569**	**3,221,641**	**2,821,799**
Total Value of Products Made	.....	**44,554,581**	**59,573,448**	**52,932,415**	**57,035,563**	**46,280,534**

Primary Production.—The following section has been abstracted from the *Annual Report of the Mineral Production of Canada, 1923.*

The production of crude petroleum in Canada in 1923 was 170,169 barrels valued at $522,018 as compared with 179,068 barrels at $611,176 in the previous year, a decline of approximately 9,000 barrels. The average values per barrel received by operators in the producing provinces in 1923 were as follows: New Brunswick, $4.04; Ontario, $3.00, and Alberta, $4.23.

Canadian producers continued to be paid a bounty of 1½ cents per gallon on all oil of a specific gravity above 0·8235. Owing to the light character of the crude petroleum produced in Alberta, only a small part of the output earns the bounty.

A section from "An Act respecting the payment of Bounties on Petroleum," as enacted on June 30, 1923, which is administered by the Department of Trade and Commerce, is given here, as important changes have been made in the duration and the rates of payment:

"The said bounty shall be paid during the periods and at the rates following, that is to say:—

On such crude petroleum produced on or before the thirtieth day of June, one thousand nine hundred and twenty-four, a bounty of one and one-half cents per imperial gallon shall be paid;

On such crude petroleum produced on or after the first day of July, one thousand nine hundred and twenty-four, and not later than the thirtieth day of June, one thousand nine hundred and twenty five, a bounty of three-quarters of one cent per imperial gallon shall be paid;

On such crude petroleum produced on or after the first day of July, one thousand nine hundred and twenty-five, no bounty shall be paid."

Table 115.—Production of Crude Petroleum in Canada, by Provinces, 1920-1923

Province	Year	Barrels (35 imp. gal.)	Value less bounty	Bounty paid	Total value	Value per barrel (including bounty)
		No.	$	$	$	$
New Brunswick	1920	5,148	17,682	2,281	19,963	3 88
	1921	7,479	29,094	3,928	33,022	4 41
	1922	7,778	28,359	4,373	32,732	4 20
	1923	8,826	31,992	3,650	35,642	4 04
Ontario	1920	180,071	630,867	95,419	726,286	4 04
	1921	172,859	468,449	90,749	559,198	3 24
	1922	164,732	439,832	86,484	526,316	3 20
	1923	159,460	394,910	83,239	478,149	3 00
Alberta	1920	11,032	75,986	.....	75,986	6 89
	1921	7,203	49,313	.....	49,313	6 85
	1922	6,559	51,882	246	52,128	7 95
	1923	1,943	8,126	101	8,227	4 23
Canada	**1920**	**196,251**	**724,535**	**97,700**	**822,235**	**4 19**
	1921	**187,541**	**546,856**	**94,677**	**641,533**	**3 42**
	1922	**179,068**	**520,073**	**91,103**	**611,176**	**3 41**
	1923	**170,169**	**435,028**	**86,990**	**522,018**	**3 06**

Table 116.—Exports from Canada of Petroleum and its Products, 1919-1923

Item	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$	Gals.	$
Oil, coal and kerosene, crude	40,648	293,325	375,820	288,828	2,384,809	138,381
Oil, coal and kerosene, refined	287,170	205,999	209,282	136,834	1,450,051	139,924
Oil, gasoline and naphtha	428,754	59,432	212,638	516,037	1,217,298	263,326
Oil, mineral, n.o.p.	.....	.....	35,896	206,709	1,200,347	223,511
					Cwt.	
Wax, mineral	626,799	230,172	7,552	45,526	66,274	206,575
Total	**1,383,371**	**788,928**	**841,182**	**1,187,934**	.....	**971,717**

Table 117.—Imports into Canada of Petroleum, Asphalt and their Products, 1919-1923

Item	1919	1920	1921	1922	1923	
	Value	Value	Value	Value	Quantity	Value
	$	$	$	$	Cwt.	$
Asphalt and Its Products						
Asphalt or asphaltum, solid	437,711	617,661	531,474	468,744	251,442	267,462
Asphalt, not solid	9,637	24,705	23,219	38,832	.....	17,095
Asphaltum oil	21,668	44,526	50,137	66,403	.....	27,282
Total Asphalt and its Products	469,016	686,892	604,830	573,979	.....	311,839
Petroleum Oils, Crude, Fuel and Gas						
					Gals.	
Crude petroleum (not in its natural state), ·7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories. (May 23, 1923)	.....	.....	.....	.....	15,922	966
Crude petroleum (in its natural state), ·7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories	15,104,287	20,814,899	20,010,091	21,602,247	392,185,557	17,449,032
Crude petroleum, gas oils other than naphtha, benzine and gasoline lighter than ·8235 but not less than ·775 specific gravity at 60 degrees	23,866	28,869	18,737	76,900	475,842	38,908
Petroleum (not including crude petroleum imported to be refined, or illuminating or lubricating oils) ·8235 specific gravity or heavier at 60 degrees temperature	4,702,771	7,790,137	3,786,977	3,014,390	108,506,938	4,206,193
Petroleum, imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments	1,367	1,344	3,579	4,075	32,960	5,913
Kerosene and Illuminating Oils						
Coal oil and kerosene, distilled, purified or refined	926,822	2,359,621	700,468	314,514	4,118,943	322,434
Coal oil and kerosene, distilled, known as "engine distillates", ·725 specific gravity and heavier, but not heavier than ·770 specific gravity at 60 degrees temperature	.....	.....	.....	.....	8,203	962
Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon	119,465	127,889	62,323	50,045	42,474	16,206
Lubricating Oils						
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon	289,442	175,478	374,596	720,223	4,205,635	737,053
Lubricating oils, n.o.p.	1,467,593	2,267,611	1,559,965	1,412,473	3,901,048	1,573,897
Other Oils						
Gasoline under ·725 specific gravity at 60 degrees temperature	1,142,855	2,404,488	4,665,200	5,411,972	35,845,251	5,134,286
Gasoline, n.o.p.	.....	.....	2,946,258	769,300	177,566	32,750
Gasoline, ·725 specific gravity, but not heavier than ·770 specific gravity at 60 degrees temperature	.....	.....	.....	.....	13,927,843	1,993,596
Gasoline and oils, coal and kerosene, distilled, known as engine distillates, ·725 specific gravity and heavier, but not heavier than ·770 specific gravity at 60 degrees temperature. (From May 24, 1922) (a)	.....	.....	.....	2,579,643	.....	.....
All other oils, n.o.p.	128,863	113,681	39,040	60,469	248,888	86,968
Other Petroleum Products						
					Lb.	
Grease, axle	357,495	467,109	206,971	177,575	2,981,849	176,216
Paraffine wax	108,049	168,521	72,661	51,032	1,034,921	63,695
Paraffine wax candles	59,151	68,173	45,720	39,299	176,487	32,516
Vaseline and all similar preparations of petroleum for toilet, medicinal or other purposes	158,037	221,109	219,886	242,743	.....	268,267
					Gals.	
Petroleum, products of, n.o.p.	5,615,622	10,891,302	1,990,496	289,815	1,712,665	299,388
Total Petroleum and its Products	30,205,685	47,900,231	36,882,977	36,816,724	.....	32,439,326
Total Asphalt and Petroleum	**30,674,701**	**48,587,123**	**37,487,807**	**37,390,703**	.....	**32,751,165**

(a) Included under gasoline, n.o.p., prior to May 24, 1922.

CHAPTER XI

MISCELLANEOUS NON-METALLIC MINERAL INDUSTRIES

Under this heading are included the industries making (a) artificial abrasives and abrasive products; (b) graphite products such as artificial graphite, and graphite and carbon electrodes; (c) plaster casts and models, such as gypsum blocks, etc., and the manufacture of hard wall plaster and patent plaster and (d) products of the mica trimming shops. The total value of products from these industries in 1923 amounted to $8,147,331. The artificial abrasives industry was reported for 1919, 1920 and 1921 in the bulletin on "Chemicals and Allied Products," but the references in this report cover the five-year period. Short descriptive notes on the manufacture of refined graphite, gypsum products, artificial abrasives and abrasive products and products of the mica trimming shops have been included after the following general tables relating to all the industries in this group.

Table 118.—Summary of Financial Statistics Relative to the Manufacturing of Miscellaneous Non-Metallic Mineral Products in Canada, 1919-1923

Year	Number of plants	Capital employed	Expenditures					Selling value of products	Value added by manufacturing
			Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total		
		$	$	$	$	$	$	$	$
1919	28	3,490,613	695,270	333,501	121,343	969,080	2,119,194	2,826,157	1,857,077
1920	44	5,464,978	1,633,179	1,000,906	232,864	1,533,065	4,400,014	4,579,216	3,046,151
1921	23	2,253,322	411,044	306,022	46,795	553,517	1,317,378	1,256,938	703,421
1922	26	6,354,115	722,080	972,671	73,960	1,318,652	3,087,363	3,015,539	1,696,887
1923	38	7,262,403	1,492,846	2,524,185	90,596	2,879,015	6,986,642	8,147,331	5,268,316

Table 119.—Capital Employed in the Manufacture of Miscellaneous Non-Metallic Mineral Products in Canada, by Provinces, 1919-1923

Province and Year	Capital employed as represented by			
	Land, buildings, fixtures, machinery and tools	Materials on hand, stocks in process	Cash, trading and operating accounts and bills receivable	Total
	$	$	$	$
Quebec—				
1919	30,150	200,150	50,281	280,581
1920	421,249	331,160	105,011	857,420
1921	120,644	450,693	27,738	599,075
1922	1,015,764	381,898	404,928	1,802,590
1923	1,238,286	499,711	306,695	2,044,692
Ontario—				
1919	1,066,760	347,929	216,603	1,631,292
1920	1,711,301	845,548	507,468	3,064,317
1921	913,435	463,505	260,888	1,637,828
1922	2,623,327	905,962	1,022,236	4,551,525
1923	2,953,413	1,130,983	1,133,315	5,217,711
Canada—				
1919	**2,306,793**	**750,327**	**433,493**	**3,490,613**
1920	**3,369,213**	**1,337,033**	**758,732**	**5,464,978**
1921	**1,043,374**	**919,883**	**290,065**	**2,253,322**
1922	**3,639,091**	**1,287,860**	**1,427,164**	**6,354,115**
1923	**4,191,699**	**1,630,694**	**1,440,010**	**7,262,403**

NOTE.—Totals for Canada include data for Nova Scotia for 1919, New Brunswick for 1919 and 1920, and for Manitoba 1919-1921.

Employees, Salaries and Wages.—The number of persons employed in these industries in 1923 was 2,917, comprising 118 male and 44 female employees on salary; 874 male and 1,881 female employees on wages. In the mica trimming shops, the work is not heavy; girls are employed to split the mica in preparation for its marketing. The total amount paid out during 1923 for salaries and wages amounted to $1,492,846.

Table 120.—Employees, Salaries and Wages Paid in the Manufacture of Miscellaneous Non-Metallic Mineral Products in Canada, 1919-1923

Year	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
	No.	No.	No.	No.	No.	$	$	$
1919	69	20	512	882	1,483	127,761	567,509	695,270
1920	108	41	854	2,299	3,302	241,570	1,391,609	1,633,179
1921	56	11	181	654	902	123,365	287,679	411,044
1922	79	27	422	843	1,371	175,073	546,107	722,080
1923	118	44	874	1,881	2,917	250,218	1,242,628	1,492,846

Table 121.—Number of Wage-Earners Employed in the Manufacture of Miscellaneous Non-Metallic Mineral Products in Canada, by Months, 1922-1923

Month	1922			1923		
	Male	Female	Total	Male	Female	Total
January	186	808	994	728	1,505	2,233
February	209	813	1,022	755	1,697	2,452
March	215	809	1,024	808	1,772	2,580
April	274	810	1,084	893	1,711	2,604
May	367	834	1,201	941	1,798	2,739
June	427	812	1,239	946	1,901	2,847
July	485	816	1,301	955	2,016	2,971
August	555	830	1,385	947	2,040	2,987
September	543	843	1,386	924	1,869	2,793
October	572	898	1,470	864	1,842	2,706
November	601	934	1,535	852	2,013	2,865
December	651	910	1,561	825	2,040	2,865

Table 122.—Fuel Used in the Manufacture of Miscellaneous Non-Metallic Mineral Products in Canada, 1919-1923

Year		Anthracite coal	Bituminous coal	Coke	Fuel oil and gasoline	Gas	Wood	Other	Total Value
		Tons	Tons	Tons	Gals.	M cu. ft.	Cords	$	$
1919	Quantity	442	13,136	.....	15	36,312	3	.....	.....
	$	3,072	105,810	.....	5	12,396	54	.....	121,343
1920	Quantity	778	25,983	220	6,719	2,369	114	.....	.....
	$	10,406	215,876	3,168	1,418	1,334	662	.....	232,864
1921	Quantity	406	4,834	.....	1,937	422	114	.....	.....
	$	5,367	40,085	.....	201	303	687	152	46,795
1922	Quantity	503	7,454	86	98,269	874	81	.....	.....
	$	6,091	56,617	1,223	8,122	978	358	571	73,960
1923	Quantity	385	10,497	176	41,540	723	182	.....	.....
	$	5,170	78,907	1,551	3,941	582	385	.....	90,396

Table 123.—Power Equipment Installed for the Manufacture of Miscellaneous Non-Metallic Mineral Products in Canada, 1919-1923

Class	Total h.p. according to manufacturer's rating				
	1919	1920	1921	1922	1923
Boilers	1,050	1,055	275	300	70
Engines—					
Steam	582	507	...	...	...
Gas	32	35	...	...	...
Gasoline	...	6	...	...	...
Electric motors—					
Alternating current	2,228	...	517	...	...
Direct current	101	...	97	...	...
Operated by power generated by establishment	...	42	...	...	...
Operated by purchased power	1,195	5,602	...	3,913	4,935
Generators—					
Alternating current	10	...	...	...	...
Direct current	52	...	15	...	...
Other power	...	1,000	...	...	...

The Artificial Abrasives and Abrasive Products Industry.—Corundum is a natural abrasive which was extensively used at one time but in recent years carborundum and other artificial abrasives, products of the electric furnace, have replaced the natural product to a very great extent.

Carborundum is a silicon carbide, SiC, made as the result of reaction at high temperatures between silica and carbon.

A charge is made up of the required amount of silica, and carbon in the form of coke, and a small amount of sawdust and salt. The sawdust tends to make the charge porous, thus allowing the gases to escape; the salt reacts with the iron and aluminium oxides forming volatile chlorides. The ingredients are thoroughly mixed and are charged to an especially constructed electric resistance furnace made up of fire brick and so built that the bottom of the furnace and the end walls holding the electrodes are permanent; the sides are loosely built to permit the escape of the gases.

After the charge has been placed in the furnace up to the level of the electrodes, a core of graphite is laid through from one end of the furnace to the other; this acts as the current carrier and also as the resistor or heating element. The remainder of the charge is then laid on top and the current is turned on.

At the end of the operation the carborundum in crystal form is found surrounding the core. Around this is a layer of uncrystallized carbide which is known as fire sand and is used as a low grade refractory for some furnace linings. The outside layer is made up of silicous material and part of the unreduced charge.

The carborundum is broken up and sent to the crushers, where it is ground to the required sizes. Any impurities are then removed and the material is sized, preparatory to being made into wheels. The making of abrasive wheels has reached a high degree of perfection. The composition of a wheel depends on the purpose for which it is to be used and the selection and composition of the proper materials to ensure good results are often subjects of considerable research, particularly when new applications of the artificial abrasive are contemplated. After the wheel is moulded it is burnt in a specially built kiln. The kiln is coal fired and the hot gases pass down through the piles of wheels which have been previously placed in fire clay containers called "saggers." When the burning operation has been completed, the wheels are removed from the kiln and each is finished up ready for market. Each wheel is sized on a specially constructed lathe, steel dressing tools being used. The bushings are fitted and the testing begins. Perfect balance, soundness, proper size and exactness as to grade and composition are all ensured by a series of careful tests, before the completed wheel is passed for shipment. Failure to detect even minor flaws in an abrasive wheel might result in a very serious accident as the wheels, when in use, are rotated at high speeds; to understand why the greatest precautions are essential in the examination of these wheels, one has only to think what might happen if such a wheel were to fly to pieces while in use in a shop filled with workmen.

In the manufacture of abrasive cloth and sand paper, natural abrasives such as garnet, sand, emery and corundum are used as well as the artificial abrasives. The materials are carefully sized so that all ranges of abrasive papers can be obtained.

Artificial Abrasives.—In 1923 there were 5 firms in Canada making artificial abrasives, 1 in Quebec and 4 in Ontario. The total capital employed amounted to $4,028,810, of which 2·7 million dollars was invested in lands, buildings, fixtures, machinery and tools. The total amount spent in salaries was $90,330 paid to 58 people. There were also 582 wage-earners who received $742,426.

Materials used included silica sand, petroleum, coke and bauxite chiefly, which with other materials, cost $1,840,533 in 1923.

The products include abrasive wheels made of silicon carbide fused alumina, etc., and other minor products having in all a selling value of $5,330,604 showing the value added by manufacturing to be $3,490,071.

Table 124.—Materials Used and Products Made in the Manufacture of Artificial Abrasives and Abrasive Products in Canada, 1919-1923

Industry and Item	1919*	1920*	1921*	1922	1923
	$	$	$	$	$
ARTIFICIAL ABRASIVES—					
Materials used, including corundum, silica sand, bauxite, electrodes, coke, and other raw materials	1,200,384	1,531,741	422,986	758,931	1,840,533
Products made, including crude carborundum or silicon carbide, ferro-silicon, fire sand, etc	3,012,669	3,958,899	987,217	1,545,317	5,330,604
ABRASIVE PRODUCTS—					
Materials used, including abrasive materials, whiting, silicate of soda, bonding clay, etc	62,940	204,974	69,901	98,014	234,123
Products made, including abrasive wheels, tiles, grain, etc	232,970	499,669	170,949	284,071	600,226

*The manufacture of artificial abrasives was formerly classified under "Chemicals and Allied Products" and the data for 1919-1921 have been repeated here only for convenience of reference; they have not been included in the general tables for this group of industries for the years mentioned.

Abrasive Products.—The abrasive products industry, or the manufacture of artificial abrasives into grinding wheels, etc., was carried on by 6 plants in the province of Ontario in 1923. About 1·5 million dollars was employed as capital in these plants. There were 34 salaried employees to whom salaries amounting to about $57,000 were paid and 88 wage-earners whose earnings totalled $102,000.

The materials used were artificial abrasives, natural corundum, emery, flint and garnet and the products were grinding wheels, emery cloth, sand paper, etc.

Primary Production.—The following notes on abrasives have been taken from the *Annual Report of the Mineral Production of Canada, 1923.*

Corundum.—Corundum is found in Canada in an area embracing several townships in Renfrew and Hastings counties, in the province of Ontario. The industry made its appearance there in 1900, the production reaching a maximum in 1906. From 1907 to 1913 the yearly production was smaller, but fairly uniform. Operations were indefinitely suspended during August, 1918, but were renewed again in 1919. During 1919, 1920 and 1921 old tailings were treated for the recovery of grain corundum.

In 1921 grain corundum amounting to 403 tons valued at $55,965 was exported to the United States. No shipments of grain corundum were reported during 1922 and 1923.

Garnets.—A deposit of garnets in Ashby township, Ontario, was operated during 1923, by the Bancroft Mines Syndicate. The total production of garnet concentrates and crude garnets amounted to 1,250 tons valued at $100,000. This product was shipped to the Carborundum Company, Limited, Niagara Falls, New York, for use as an abrasive material. On November 1, 1923, the mill of the Bancroft Mines Syndicate in Ashby township was destroyed by fire.

Grindstones, Pulpstones and Scythestones.—The production of grindstones, pulpstones and scythestones in Canada in 1923 amounted to 2,014 tons valued at $80,083. Of this quantity, quarries in New Brunswick accounted for 1,758 tons, while Nova Scotia contributed the balance or 256 tons. In 1921, sales totalled 1,005 tons valued at $43,742.

Tripolite.—Shipments of tripolite in 1923 amounted to 130 tons valued at $3,250 as against 219 tons at $5,871 in the previous twelve months.

Tripolite is a silicious material closely related to quartz and is used extensively as an abrasive. It is usually given a preliminary calcine in rotary furnaces before shipment. The entire Canadian production is derived from a deposit of this commodity at Silica Lake, Colchester county, Nova Scotia; this property was worked by the Oxford Tripolite Company from May to September, 1923.

Table 125.—Production in Canada, Imports and Exports of Grindstones, etc., 1921, 1922 and 1923

	1921		1922		1923	
	Quantity	Value	Quantity	Value	Quantity	Value
PRODUCTION—		$		$		$
Nova Scotia.....Tons	183	6,990	102	3,692	256	7,906
New Brunswick..... "	1,098	57,077	903	40,050	1,758	72,177
Total	**1,281**	**64,067**	**1,005**	**43,742**	**2,014**	**80,083**
IMPORTS—						
Grindstones		448,055		319,941		482,340
Burrstones in blocks, etc.....No.	668	4,844	400	910	519	6,908
Emery in bulk, crushed or ground		44,490		41,943		57,267
Emery and carborundum wheels and manufactures		197,049		209,356		151,065
Pumice and pumice stone ground		21,528		26,405		28,222
Iron sand or globules for polishing and sawing		13,723		11,820		20,855
Sandpaper, emery paper, etc		252,804		270,231		293,965
Artificial abrasives		74,083		163,542		243,408
Total		**1,056,576**		**1,044,148**		**1,284,030**
EXPORTS—						
Grindstones, manufactured		24,915		17,018		37,101
Stone for the manufacture of grindstones.....Tons	91	2,686			170	1,190
Abrasives—						
Natural, n.o.p.....Cwt.	34,285	83,773	52,752	128,934	111,152	292,079
Artificial, crude, including carborundum.....Cwt.	139,146	522,531	266,526	1,299,818	823,901	2,642,821
Artificial, made up into wheels, stones, etc		18,752		14,650		27,127
Total		**652,657**		**1,460,420**		**3,000,318**

The Artificial Graphite and Electrodes Industry.—When amorphous carbon, in certain form, is subjected to the high temperature attainable in the electric furnace, artificial graphite results.

Anthracite coal has been found to be the best form of raw carbonaceous material, because the impurities contained assist in making carbides, which is a transition stage between the carbon and the graphite. It was while experiments were being carried on with silicon carbide (carborundum) that graphite was discovered and it was found that at extremely high temperature obtainable by means of the electric arc, the silicon was volatilized leaving the graphite behind. When a form of carbon other than anthracite coal, such as petroleum coke, is used as a raw material, oxide of iron or some other carbide forming substance is added to the mix.

When it is desired to make electrodes or slabs (rectangular-sections) petroleum coke is generally used. Coke, iron oxide and a suitable binder, all finely ground, are mixed and put through an extruding machine which forms the required sizes. These are then baked and afterwards graphitized.

The furnace is similar to that used for making carborundum. The slabs or electrodes are placed at right angles to the longitudinal axis of the furnace; the piles are separated by ground coke or coal to increase the resistance sufficiently to ensure the heating of the furnace to the proper reaction temperature. When electrodes of circular section are made it is not necessary to place coke around them as the point of contact between them is small and the resistance offered is sufficient. The charge is covered with a layer of sand and coke and the current is turned on. As the charge becomes graphitized the resistance falls; when minimum resistance is reached the operation is complete.

Graphite electrodes are used extensively in electric furnace work as their electrical conductivity is about four times that of amorphous carbon; the size required, therefore, for a given piece of work is proportionately smaller than if carbon electrodes were used. An economical feature of the graphite electrodes is the ease with which they can be machined. As an electrode is fed into the furnace and burns away, another is screwed on to the threaded end and the whole of the first electrode may then be used. Amorphous carbon electrodes cannot be machined and the waste is far greater than when graphite electrodes are used.

Because of this fact that graphite can be machined, sawed, drilled, etc., it is adaptable to a variety of uses. From it are made discs, bushings, washers and moulds for casting precious metals and high temperature alloys. Ground graphite is used as a lubricant.

Primary Production—(From the *Annual Report of the Mineral Production of Canada, 1923*).—The market for natural graphite in 1923 showed a considerable improvement over conditions prevailing in the previous year. The total quantity mined in Canada during the year was 1,400 tons, while shipments amounted to 1,113 tons valued at $67,873.

The Black Donald Graphite Company, Ltd., the Quebec Graphite Company, and the Canadian Graphite Corporation were the only firms that reported shipments. The mill owned by the Ontario company at Calabogie was operated throughout the year and treated some 1,025 tons.

There was no appreciable increase in the production of graphite in the United States during 1923 notwithstanding the imposition of the following tariff on imported graphite—crude or refined, amorphous—10 per cent ad valorem; crystalline, lump, chip or dust—20 per cent ad valorem; and crystalline flake—1½ cents per pound. An excerpt from the *Engineering and Mining Journal-Press* regarding the market for graphite during 1923 follows:

"Of the foreign countries Madagascar dominated and largely regulated the world's markets. After payment of duty, the best flake was sold in New York for about 4c. per pound—less than the cost of production of domestic flake. Importations of Ceylon graphite were greater in 1923 than during the preceding year, but the increasing substitution of flake graphite for Ceylon lump and flake, both in Europe and the United States, is having an adverse effect upon the Ceylon industry. An average of the prevailing New York prices, including duty, was: lump, 6c.; chip, 4¾ to 5c.; and dust, 3 to 3½c.

The outlook in the graphite industry seems promising and in each of the past three years sales have shown a continued increase which points to a better demand for the product.

Table 126.—Production in Canada, Imports and Exports of Graphite, 1921, 1922 and 1923

Item	1921		1922		1923	
	Tons	Value	Tons	Value	Tons	Value
		$		$		$
Ore milled	1,500	.....	1,800	.....	1,400	.....
Output, milled graphite	.....	.....	.....	.....	.....	.....
PRODUCTION (shipments)—						
No. 1 Flake						
No. 2 Flake	149	29,187	597	31,353	1,113	67,873
No. 3 Flake and Dust	788	36,675				
Total	**937**	**65,862**	**597**	**31,353**	**1,113**	**67,873**
IMPORTS—						
Crucibles, plumbago	.....	23,786	.....	39,061	.....	57,322
Plumbago, not ground or otherwise manufactured	.....	4,141	.....	1,007	.....	1,661
Plumbago, ground and manufactures of, n.o.p.	.....	47,463	.....	47,095	.....	70,704
EXPORTS—						
Graphite or plumbago, crude or refined	614	40,809	452	16,619	799	36,980

Table 127.—Artificial Graphite Made in Canada, 1908-1923

Year	Pounds	Year	Pounds	Year	Pounds
1908	428,540	1914	1,234,239	1920	207,180
1909	513,436	1915	497,271	1921	376,508
1910	2,442,166	1916	525,048	1922	724,524
1911	2,172,098	1917	1,096,173	1923	1,554,376
1912	2,302,625	1918	1,808,698		
1913	2,184,472	1919	358,524		

The Gypsum Products Industry.—Pure gypsum is a hydrous calcium sulphate ($CaSO_4 2H_2O$). It is seldom found pure in nature; clay, limestone, silica, etc., are generally present in varying quantities. When pure the colour is white, but it may be grey, yellow or perhaps blue depending on the nature and quantity of the impurities.

The commercial variety is massive in form and generally occurs interbedded with sedimentary rocks.

Beds of gypsum occur in nearly all the provinces of Canada and many deposits have been worked for a long time.

Many companies quarry, crush and calcine right at the mine. Crude gypsum is used as a fertilizer, as a retarder in portland cement, for crayon manufacture and in certain paints.

When it is calcined or partly dehydrated it goes under the trade name of "Plaster of Paris," for which there are many uses, some of the more common being for moulds, dental work, surgical casts and plaster ornaments.

It is used also for wall plasters, but when used alone it sets so quickly that the workmen find it difficult to handle; the addition of a retarder, or substance which temporarily absorbs the water required for the crystallization or setting, slows up the process so that the work can be done properly.

Another use is in the manufacture of gypsum board, which is made by mixing the finely ground calcined gypsum with sawdust, moulding it into boards and allowing it to dry. The boards can be cut and nailed on the walls as required.

Ground calcined gypsum mixed with whiting and suitably coloured is used extensively as a water paint.

The gypsum products industry in Canada is confined to the manufacture of wallboard, gypsum board, wall coating and plaster of paris models. In 1923 there were 6 plants in operation with a total capital investment of about $500,000. Salaried employees numbered 31 and salaries totalled $43,443, and $106,403 was paid to 107 wage-earners. The fuel consumption was not large. The cost of materials amounted to $292,641, and the resultant products were valued at $733,227, making a value added by manufacturing of $440,586.

Table 128.—Materials Used and Products Made in the Manufacture of Gypsum Products in Canada, 1919-1923

Item	1919	1920	1921	1922	1923
	$	$	$	$	$
Materials used, including glue, gypsum, clay whiting, colours, plaster of paris	456,140	630,763	263,777	177,617	292,641
Products made, including wall-coating, gypsum board, wall board, plaster castings, statues, etc.	1,393,187	2,042,182	545,037	445,065	733,227

Primary Production—Gypsum.—The total shipments of gypsum from Canadian deposits during 1923 amounted to 578,301 tons valued at $2,243,100 as compared with 559,265 tons worth $2,160,898 in the previous year. The production was made up of lump, crushed, fine ground and calcined gypsum sold; there was also included the calcined gypsum used in the calcining plants for the production of wall plaster, wall board, alabastine and other gypsum products. The average values, by grades received by operators were as follows: lump, $1.81; crushed, $1.90; fine ground, $6.14; and calcined, $11.28 per ton.

The output of gypsum rock totalled 558,853 tons, of which quantity 152,036 tons or 27 per cent was calcined. Provincial quarry outputs were as follows: Nova Scotia, 325,574 tons; New Brunswick, 81,549 tons; Ontario, 112,004 tons; Manitoba, 39,236 tons; and British Columbia, 490 tons.

For statistical purposes the production of gypsum is considered to be the sum of the quantities disposed of in the different marketable forms, care being taken to avoid duplication; the values used are those at point of shipment.

Exports of Canadian crude gypsum principally to the United States totalled 397,329 tons. Ground gypsum and prepared wall plaster exported during the year amounted to 4,654 tons; United States and New Zealand were the principal importers of these materials.

Table 129.—Summary of Statistics on Gypsum in Canada, 1921, 1922 and 1923

Item	1921		1922		1923	
	Tons	Value	Tons	Value	Tons	Value
		$		$		$
Ore mined	434,545		484,629		558,853	
Ore calcined	121,878		145,954		152,036	
PRODUCTION BY GRADES—						
Lump	195,456	347,189	350,650	534,160	217,414	394,217
Crushed	66,893	171,567	68,181	154,197	232,899	443,431
Fine ground	7,000	24,029	5,769	35,880	7,452	45,719
Calcined	117,181	1,242,762	134,665	1,436,661	120,536	1,359,733
Total	**386,550**	**1,785,538**	**559,265**	**2,160,898**	**578,301**	**2,243,100**
PRODUCTION BY PROVINCES—						
Nova Scotia	206,831	511,883	332,404	580,148	341,705	747,934
New Brunswick	54,030	360,220	82,462	517,668	104,740	564,689
Ontario	84,790	433,053	110,227	621,668	99,958	542,317
Manitoba	40,859	480,282	34,072	440,914	31,575	386,554
British Columbia	40	100	100	500	323	1,615
Total	**386,550**	**1,785,538**	**559,265**	**2,160,898**	**578,301**	**2,243,100**
EXPORTS—						
Crude	230,011	417,502	325,354	505,464	397,329	578,859
Ground	4,509	80,239	3,186	59,534	4,654	92,478
Total	**234,520**	**497,741**	**328,540**	**564,998**	**401,983**	**671,337**
IMPORTS—						
Crude	2,952	31,303	2,872	21,040	3,654	39,356
Ground	41	2,427	148	5,592	78	3,253
Plaster of Paris	2,635	42,325	3,657	49,015	3,617	54,591
Total	**5,628**	**76,055**	**6,677**	**75,647**	**7,349**	**97,180**

The Mica Trimming Industry.—The mica industry in Canada is centred in the provinces of Ontario and Quebec.

Many mining companies operate their own trimming shops. Smaller operators sell the rough cobbed material to operators who do the trimming in shops located some distance from the mines but close to an abundant labour supply. As much of the work is not heavy, girls are employed who become expert in the work of trimming, splitting and sizing of mica.

The equipment necessary for the trimming and splitting of mica is not extensive. Much labour is saved by first running the rough material through a screen of about 2-in. mesh, to shake out the dirt and the small pieces of rock.

The mica is then separated roughly into different grades for trimming and splitting. The larger sizes are the most expensive and at one time the smaller sizes 1 x 1 in. and 1 x 2 in. were discarded as scrap. It has since been found that thin sheets can be stuck together with shellac and built up into a mica board of any desired thickness. In this way small irregular pieces can be utilized and the scrap or waste from these shops is sold to operators of grinding mills who in turn sell their product to patent roofing companies, manufacturers of lubricants, and rubber companies.

The mica industry is almost wholly dependent on the electrical apparatus industry and fluctuations in the production of electrical supplies are soon reflected in the market for mica.

There were 19 plants in Ontario and Quebec who did trimming and culling of mica in 1923. The total capital invested was reported as being over $570,000. Salaries amounting to $41,000 were paid to 25 people. Among the wage-earners in this industry, female help predominates, and in 1923 there were, on an average, 46 males and 786 females on full time who received $159,931 in wages. In addition to this there were 1,089 female piece-workers who received $57,455 for their work. The total value of materials used, which were rough-cobbed mica and thumb-trimmed mica for splitting, amounted to $334,295; the value of the resultant products was $862,230.

Table 130.—Materials Used and Products Made in the Manufacture of Mica Products in Canada, 1919-1923

Item	1919	1920	1921	1922	1923
	$	$	$	$	$
Materials used, including uncalled mica, thumb-trimmed mica, scrap, etc.	300,000	380,950	136,184	180,257	334,295
Products made, including splittings, cut mica, ground mica, etc.	600,000	911,552	232,459	300,960	862,230

Primary Production—Mica.—The improvement noted in the mica industry during 1922 continued throughout 1923. Sales totalled 3,525 tons at $326,974 as against 3,349 tons worth $152,263 in 1922. Shipments of the thumb-trimmed grades (from 1 in. x 1 in. to 5 in. x 8 in.) were higher than in 1922, amounting to 419,130 pounds. The quantity of scrap mica marketed was slightly lower. This material, when ground, is used very extensively in the manufacture of prepared roofings.

The deposits of phlogopite mica in the Lièvre-Gatineau district, Quebec, and in Frontenac county, Ontario, continued to supply nearly the entire Canadian production.

It will be noted that the stated value of the exports of Canadian mica exceeded by a considerable amount the value placed on shipments reported by operators. An explanation of this lies in the fact that the exportation consisted principally of mica splittings, shipped from large trimming shops, situated in Ontario and Quebec, while most of the shipments by the mines were of mica in its rough-cobbed form.

Under the United States "New Tariff Act" the duties on the different grades of mica are as follows: Mica, unmanufactured, valued at not above 15 cents per pound, 4 cents per pound, valued above 15 cents per pound, 25 per centum ad valorem; mica, cut or trimmed and mica splittings, 30 per centum ad valorem; mica plates and built-up mica, and all manufactures of mica, of which mica is the component material of chief value, 40 per centum ad valorem; ground mica, 20 per centum ad valorem. For exports from Canada, see Table 19, page 27.

Table 131.—Production of Mica in Canada by Grades, 1922 and 1923

Grade	1922			1923		
	Pounds	Value f. o. b. shipping point	Price per pound	Pounds	Value f. o. b. shipping point	Price per pound
		$	$		$	$
Rough cobbed	186,470	22,305	0·12	280,767	26,926	0·10
Thumb-trimmed	95,702	25,837	0·27	419,130	87,769	0·21
Splittings only	112,778	72,303	0·64	210,056	176,785	0·84
Scrap	6,302,157	31,818	0·005	6,139,076	35,494	0·005
Total	**6,697,107**	**152,263**	**0·02**	**7,049,029**	**326,974**	**0·047**

PART TWO.—DIRECTORY OF FIRMS IN THE INDUSTRIES CLASSIFIED UNDER THE "MANUFACTURES OF NON-METALLIC MINERAL PRODUCTS".

Aerated Waters

Name of Firm	Head Office Address	Location of Plant
PRINCE EDWARD ISLAND		
Morris, J. & T.	75 Water St., Charlottetown	Charlottetown.
Simmons, G. H.	Spring Park Rd., Charlottetown	Charlottetown.
NOVA SCOTIA.		
Bigelow & Hood, Ltd	Box 44, Truro	Truro.
Bridgewater Bottling Works	Box 366, Bridgewater	Bridgewater.
Chambers, James	Main St., Trenton	Trenton.
Chapman, Joe	241 Church St., Amherst	Amherst.
Colley, Frank	Regent St., North Sydney	North Sydney.
Daveno, Alfred N.	184 Argyle St., Halifax	Halifax.
Donovan, W. H.	41-45 Granville St., Halifax	Halifax.
Fraser, James E.	Springhill	Springhill.
Havelock Bottling Co., Ltd.	112-114 York St., Sydney	Sydney.
Home Bottling Co., Ltd.	Drawer 814, Commercial St., North Sydney	North Sydney.
Kempton, T. S.	Milton	Milton.
Laurentian Laboratories, Ltd.	230 DeCourcelles St., St. Henry, Montreal, Que.	Halifax.
McAllister, Patrick	Esplanada, Sydney	Sydney.
McCann, John	Water St., Yarmouth	Yarmouth.
McKinley & Sons	McKay's Corners, C. B.	McKay's Corners, C.B.
Pink, Joseph	Main St., Yarmouth	Yarmouth.
Roué, James	53-55 Upper Water, Halifax	Halifax.
Whelan & Ferguson, Ltd.	675-677 Barrington St., Halifax	Halifax.
Yarmouth Fruit Co.	Brown St., Yarmouth	Yarmouth.
NEW BRUNSWICK		
Blue Ribbon Beverage Co.	80-82 Elm St., St. John	St. John.
Bosca & Burgalia	Box 281, Bathurst	Bathurst.
Campbellton Ginger-Ale Works	Campbellton	Campbellton.
Capitol Bottling Co.	313 Queen St., Fredericton	Fredericton.
Cassidy, Charles	Chatham	Chatham.
Driscoll, John J.	124 Prince Edward St., St. John	St. John.
Havelock Mineral Spring Co., Ltd.	240 Botsford St., Moncton	Moncton.
International Drug Co., The	St. Stephen	St. Stephen.
Moncton Bottling Works	432 Main St., Moncton	Moncton.
National Drug & Chemical Co.	54 St. Gabriel St., Montreal, Que	St. John, N.B.
Sussex Beverage Co.	Court St., Sussex	Sussex.
Sussex Mineral Springs Co., Ltd.	Pleasant Ave., Sussex	Sussex.
Terris, J. J.	51 City Rd., St. John	St. John.
Vital, H. Albert	Church St., Edmundston	Edmundston.
Woodstock Bottling Works	85 King St., Woodstock	Woodstock.
QUEBEC		
Abenakis Springs Co., Ltd.	Abenakis Springs	Abenakis Springs.
Allan's Ltd	86 Dorchester St. west, Montreal	Montreal.
Archambault & Frere	Bout de l'Isle, Montreal	Bout de l'Isle, Montreal.
Begin, C. E.	Beauceville	Beauceville.
Belanger, Arthur	Papineauville	Papineauville.
Blackburn, Henry	80 Papineau St., Hull	Hull.
Brissette, J. L.	St. Antoine St., Ste. Agathe des Monts	Ste. Agathe des Monts.
Brodeur, Arthur	35 Frontenac St., Montreal	Montreal.
Brunelle & Metines	87 St. Jean Baptiste St., Victoriaville	Victoriaville.
Caisse, C. O.	28 Sophie St., Sorel	Sorel.
Chevalier, Jos.	61 Mercier St., Shawinigan Falls	Shawinigan Falls.
Christin, J., & Cie, Ltd.	21 Ste. Julie St., Montreal	Montreal.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont	37 Vallee St., Montreal Que.
Coca-Cola Co., The	90 Broadview Ave., Toronto, Ont	15 des Prairies St., Quebec.
Cote, Roch	Pierreville	Pierreville.
Coulombe, Ed.	112 Dalhousie, Quebec	56 rue Morin St., Quebec.
Cousineau, Avila	Vaudreuil Village	Vaudreuil Village.
Crystal Soda Water Co.	108a Demontigny St. E., Montreal	Montreal.
Crystal Spring Bottling Works, The	Waterloo	Waterloo.
De La Boissiere,	Roberval, Box 325	Roberval.
Desilets & Grenier	236 St. Maurice St., Grand Mere	Grand Mere.
Desjardins, Leon	Ste. Therese de Blainville	Ste. Therese de Blainville.
Desormeaux & Freres	6 Richard St., Joliette, Box 100	Joliette.
Desormeaux, S.	33 St. Louis St., St. Jerome	St. Jerome.
Dominion Soda Water Co., Ltd.	502 Cadieux St., Montreal	Montreal.
Dorville, Harvey	Murray Bay	Murray Bay.
Dufresne & Frere	129 Bonaventure St., Three Rivers	Three Rivers.
Fluet, F. A.	65 Des Prairies, Quebec	Quebec.
Forand, Hormidas	Eastern Ave., Waterloo	Waterloo.
Fortier, Elzear Ltee.	123 St. Dominique, Quebec	Quebec.

Aerated Waters—Continued

Name of Firm	Head Office Address	Location of Plant
QUEBEC—Concluded		
Fortier, J. F.	10 rue Niverville, Three Rivers	Three Rivers.
Frisco Soda Water Co.	1514 Clarke St., Montreal	Montreal.
Gagnon, E. G.	St. Charles de Bellechasse	St. Charles de Bellechasse.
Gagnon, L. J.	Beauce Junction	Beauce Junction.
Goulet, Calixte	872 Ontario St. E., Montreal	Montreal.
Gurd, Chas. & Co., Ltd.	76 Bleury St., Montreal	Montreal.
Houde, J. L. H.	Nicolet	Nicolet.
Ideal Soda Water Co., Ltd.	135 Lafrance St., Montreal	Montreal.
Kel-Ola Co. Regd.	496 Chateaubriand Ave., Montreal	Montreal.
Lachapelle, Pierre	St. Barthelemi	St. Barthelemi.
La Cie d'Eau Minerale	148 Concorde St., St. Hyacinthe	St. Hyacinthe.
Lafontaine, Donat	St. Laurent, Louiseville	Louiseville.
Laframboise, Victor	St. Clet	St. Clet.
Lafrance, Noel	3 St. Germain St., St. Hyacinthe	St. Hyacinthe.
Lanciault & Frere	Box 294, Sorel	Sorel.
Lamel, Theophile	Ellice St., Valleyfield	Valleyfield.
Leclerc, Joseph	St. Evariste Station	St. Evariste Station.
Lemyre, Amable, Jr.	rue Notre Dame, Yamachiche	Yamachiche.
Levasseur, Victor	761—1 rue, Shawinigan Falls	Shawinigan Falls.
Levesque, Jos.	Cabana	Cabana.
MacKimmie, J. P. & Son	Foundry St., Lachute	Lachute.
Massicotte, J. E.	St. Tite	St. Tite.
Menard, Edouard	Box 194, St. Jean	St. Jean.
Miller, Robt.	206 Chatham St., Montreal	Montreal.
Milloy, P. A.	119 and 121 St. Andre, Montreal	Montreal.
Moison, Alfred	Lake Megantic	Lake Megantic.
Morrissette, Adelard	25 rue Baby, Joliette	Joliette.
National Bottling Works	330 Clarke St., Montreal	Montreal.
New Carlisle Bottling Works	New Carlisle	New Carlisle.
Ouellette, Benoit	Jonquieres	Jonquieres.
Parent, Leonard	3 d. Guévremont, Sorel	Sorel.
Paquet, Wilfrid	397 St. Catherines, Grand Mere	Grand Mere.
Pellerin, Albert	rue de l'eglise, St. Barnabé Nord	St. Barnabé Nord.
Pelletier, Z.	St. Jerome	St. Jerome.
Peloquin, J. H.	Coaticook	Coaticook.
Poulin, P.	St. Camille	St. Camille.
Prevost, Jos.	7 rue St. Etienne, Montmagny	Montmagny.
Pye, M.	Windsor Mills	Windsor Mills.
Reina Mineral Water Co., Ltd.	101 Duvernay St., Montreal	Montreal.
Robillard, '& Cie Ltee..,	Montreal	Montreal.
Roy, Cyprien	St. Germain de Kamouraska	St. Germain de Kamouraska.
St. Pierre, Ernest	rue Yamaska, Farnham	Farnham.
Silver Spring Bottling Works	65 Depot St., Sherbrooke	Sherbrooke.
Stewart Bottling Co., Ltd.	297 William St., Montreal	Montreal.
Theberge and Langlois	Armagh	Armagh.
Thibault, J. A.	24-26 rue Fraser, Riviere du Loup	Riviere du Loup.
Timmons, M., & Son	92 Côté d'Abraham, Quebec	Quebec.
Tourangeau & Champagne	Buckingham	Buckingham.
Trottier, & Cie	St. Casimir	St. Casimir.
Turmell, A. Irenee	372 Wellington St., Sherbrooke	Sherbrooke.
Union Soda Water Co.	424 Cadieux St. W., Montreal	Montreal.
Veillet & Co., D.	Ste. Genevieve de Batiscan	Ste. Genevieve de Batiscan.
White, The Robt Co., Ltd.	638 Craig E., Montreal	Montreal.
ONTARIO		
Beaupre & Co.	266 Princess St., Kingston	Kingston.
Birnbaum, S. J.	Toronto	Toronto.
Boon & Nowell	Rear 509 Concord Avenue, Toronto	Toronto.
Bottum, W. H. & Son	354 Pinnacle St., Belleville	Belleville.
Brighton Coca-Cola Bottling Works	Main St., Brighton	Brighton.
Brown, John D.	5 Bay St., Gravenhurst	Gravenhurst.
Burke Mineral Water Co.	19 Colborne St., Brantford	Brantford.
Burkholder, D. C.	New Liskeard	New Liskeard.
Caledonia Springs Co.	2716 St. Urbain St., Montreal	Caledonia Springs.
Carrigan, Charles	58 Riddell St., Woodstock	Woodstock.
Chambers, F. S.	Killarney St., Humberstone	Humberstone.
Clurian, Jas.	South Porcupine	South Porcupine.
Cobalt Aerated Water Co.	45 Presley St., Cobalt	Cobalt.
Coca-Cola Co.	90 Broadview Avenue, Toronto	118 Secord St., Port Arthur.
Coca-Cola Co.	90 Broadview Ave., Toronto	Gravenhurst.
Coca-Cola Co.	90 Broadview Avenue, Toronto	65-67 Bellwoods Ave., Toronto.
Coca-Cola Co.	90 Broadview Avenue, Toronto	327-329 Church St., Belleville.
Coca-Cola Co.	90 Broadview Ave., Toronto	340 Queen St., Ottawa.
Coca-Cola Co.	90 Broadview Ave., Toronto	55 Vine St., Hamilton.
Coca-Cola Co.	90 Broadview Ave., Toronto	430 McDougal St., Windsor.
Coca-Cola Co.	90 Broadview Ave., Toronto	60 Rideau St., Kingston.
Coca-Cola Co.	90 Broadview Ave., Toronto	649 Colborne St., London.

Aerated Waters—Continued

Name of Firm	Head Office Address	Location of Plant
ONTARIO—Continued		
Coca-Cola Co	90 Broadview Ave., Toronto	190 George St., Peterborough.
Coca-Cola Bottling Works	44 Bond St., Oshawa	Oshawa.
Cochrane Bottling Works	P. O. Box 239, Cochrane	Cochrane.
Collingwood Ginger-ale Works	Robinson St., Collingwood	Collingwood.
Colonial Bottling Works	23 Kent St., Simcoe	Simcoe.
Conlin, F	65 McGill St., Smiths Falls	Smiths Falls.
Cooke, Thos. & Son	Port Perry, Box 251	Port Perry.
Cornwall Bottling Works	Amelia St., Cornwall	Cornwall.
Cronmeller, John H	Fraser St., Pt. Colborne	Pt. Colborne
Crown Bottling Works	Port Hope	Port Hope.
Cunningham, D. K	Elgin St., Arnprior	Arnprior.
Dawe & Peterson	38 Church St., Chatham	Chatham.
Denault, Ferrier	Bourget	Bourget.
Dey, Henry	32 McAnnany St., Belleville	Belleville.
Dominion Soda Water Co	105 Manning Ave., Toronto	Toronto.
Dominion Soda Water Co	58 Rodman St., St. Catharines	St. Catharines.
Dominion Soda Water Mfg. Co	308 John St. W., Hamilton	Hamilton.
Duntield, Samuel	Bridge St., Carleton Place	Carleton Place.
Empire Bottling Works	Espanola	Espanola.
Estel's, Ltd	138 Pears Ave., Toronto	Toronto.
Eveleigh, Wm. & Co	9 O'Hara Ave., Toronto	Toronto.
Farmer, Richard	373 Cannon St. E., Hamilton	Hamilton.
Fauman, G	11 Caerbowell St., Toronto	Toronto.
Finnish Bottling Works	326 Bloor St., Sault Ste. Marie	Sault Ste. Marie.
Fort William Bottling Works	131 N. Archibald St., Ft. William	Fort William.
Gauvreau, A	Mattawa	Mattawa.
Goderich Mineral Water Co	West St., Goderich	Goderich.
Grady, Patrick J	583 Water St., Peterboro	Peterboro.
Gray, W. J	Collingwood	Collingwood.
Hanlon & Hicks	Tecumseh Rd., Windsor	Windsor.
Harris, Geo. & Paparoni	10 Park St., Welland	Welland.
Heller & Witts	223 Drouillard Rd., Ford	Ford.
Hinds, F. P. & Son	20 Front St. S., Orillia	Orillia.
Hinds, Matthew C	308 King St., Midland	Midland.
Hires, Charles E. Co., Ltd	47 Davies Ave., Toronto	Toronto.
Hoag, Smith A	774 Ferry St., Niagara Falls	Niagara Falls.
Horne, S. V	148 Ontario St., Kingston	Kingston.
Horsman, Chas. I.	Palleser St., Campbellford	Campbellford.
Imperial Bottling Works	Box 44, Dundas	Dundas.
International Bottling Works	157 Machar Ave., Pt. Arthur	Port Arthur.
International Bottling Works, The	North Cobalt	North Cobalt.
International Soda Water Co	11 Baldwin St., Toronto	Toronto.
Italian Bottling Works	33 Wellington St., Sault Ste. Marie	Saulte Ste. Marie.
Jersey Creme Co	5-9 Van Horne St., Toronto	Toronto.
Kenora Bottling Works	119 Main St., Kenora	Kenora.
King & Dalton	103 Duchess St., Toronto	Toronto.
Knox Soda Water Co	384 Queen St., Peterboro	Peterboro.
La-Kola Co	22 Macaulay St., Hamilton	Hamilton.
Lepofsky, A	230 Augusta Ave., Toronto	Toronto.
Lowe, Richard	43 Park St., Chatham	Chatham.
Mack Mineral Springs Co	111 Welland Ave., St. Catharines	St. Catharines.
Maedel, C. E	Talbot St., Essex	Essex.
Marinacci, E., Bottling Works	Timmins	Timmins.
Martin, Frank E	48 Ontario St., Oshawa	Oshawa.
Martin, R. H	67 King St., Lindsay	Lindsay.
McDonald & Son	North Bay	North Bay.
McLaughlin, J. J., Ltd	145-155 Sherbourne St., Toronto	Toronto.
Meehan, F. F	Chapel St., Cobourg	Cobourg.
Mirault, Eugene	317 Rideau St., Ottawa	Ottawa.
Montgomery Mineral Water Co	257 Colborne St., Brantford	Brantford.
Morrison, M. J	King St. E., Ingersoll	Ingersoll.
Murray Bottling Works	139 Market Sq., Windsor	Windsor.
New Ontario Bottling Works, Ltd	227 Minto St., Sudbury	Sudbury.
Niagara Falls Bottling Works	19 Centre St., Niagara Falls	Niagara Falls.
Nipigon Bottling Works	Box 35, Nipigon	Nipigon.
Northern Springs	Ridgeway	Ridgeway.
Norton, C. H. & Co	393 King St. E., Kitchener	Kitchener.
Nurmi Bros	256 Regent St., Sudbury	Sudbury.
Oakville Aerated Beverage Co	Wilson St., Oakville	Oakville.
O'Dair, Laurence	Cornwall	Cornwall.
Oges, Henry	Crystal Beach	Crystal Beach.
Orange Crush Bottlers, Ltd	London	London.
Orange Crush Bottlers, Ltd	100 Claremont St., Toronto	Toronto.
Orange Crush Bottlers, Ltd	100 Claremont St., Toronto	45 Wellington St. N., Hamilton.
Parisian Refreshment Co	396 Sandwich St., Sandwich	Sandwich.
Paris Soda Water Mfg. Co., The	237½ Horton Ave., London	London.
Penetang Bottling Co	Penetanguishene	Penetanguishene.
Perry, O. R	Renfrew	Renfrew.
Perth Bottling Works	Perth	Perth.
Peterboro Aerated Water Co	Cor. Sherbrooke and Aylmer St., Peterborough	Peterborough.
Pure Springs Co	102 Baldwin St., Ottawa	Ottawa.
Raphael, M	233 St. Catharine St. W., Hamilton	Hamilton.
Reid, Henry W	Parry Sound	Parry Sound.
Reinhart, Albert J	243 Dundas Rd., Guelph	Guelph.

Aerated Waters—Continued

Name of Firm	Head Office Address	Location of Plant
ONTARIO—Concluded		
Rittenberg, N.	Rear 230 Augusta Ave., Toronto	Toronto.
Riverdale Bottling Works	34 Eaton Ave., Toronto	Toronto.
Robertson, Alex	Queen St., Mount Forest	Mount Forest.
Rosenberg, H.	31 Vine St., St. Catharines	St. Catharines.
Royal Bottling Works, The	130 First St., Fort Frances	Fort Frances.
St. Lawrence Bottling Co.	38 Water St., Brockville	Brockville.
St. Thomas Soda Water Works	219 Talbot St., St. Thomas	St. Thomas.
Sanitaris Limited	Corner John and William Sts., Arnprior	Arnprior.
Seal Bottling Works	820 Mercer St., Windsor	Windsor.
Sharpe & Kirkpatrick	118 Victoria St., Sarnia	Sarnia.
Silver Foam Bottling Works	Box 1480, Sudbury	Sudbury.
Standard Bottling Works	234 Minto St., Sudbury	Sudbury.
Star Beverage Co., The	11 Federal St., Toronto	Toronto.
Stinson, E. H. & Co	St. Paul St., Alexandria	Alexandria.
Stratford Soda Water Works	235 William St., Stratford	Stratford.
Stratton & Monenger	Wallaceburg	Wallaceburg.
Sugarman, H. H.	291 Besserer St., Ottawa	Ottawa.
Sutherland Limited	12 and 14 Jarvis St., Hamilton	Hamilton.
Tallo-Ho Pure Water Co.	224 Bank St., Ottawa	Ottawa.
Taylor, Wm. & Son, Ltd	957 Fourth Ave. E., Owen Sound	Owen Sound.
Thomas Bros.	45 Dickson, St. Galt	Galt.
Thompson, George	294 Princess St., Kingston	Kingston.
Thompson & Wilson	Glen Williams	Glen Williams.
1000 Islands Mineral Water Co.	58 Brock St., Brockville	Brockville.
Twin City Bottling Works	819 Minnesota St., Ft. William	Ft. William.
Union Soda Water Co., Ltd	30 St. Patrick St., Toronto	Toronto.
Vitality Aerated Water Co.	Petawawa	Petawawa.
Walker & Co.	Church St., Orangeville	Orangeville.
Walsh, G. R.	Box 295, Barrie	Barrie.
Wentworth Mineral Water Co., Ltd., The	Rear 542 Main St. E., Hamilton	Hamilton.
Whistle Bottling Works	Sarnia	Sarnia.
Wilson, Charles, Limited	517-519 Sherbourne St., Toronto	Toronto.
Wise, C. W.	66 Avon St., Welland	Welland.
Wright & Biggar	819 Arthur St., Windsor	Windsor.
MANITOBA		
Bennett, H. E.	The Pas	The Pas.
Boroditsky Bros.	1087 Selkirk Ave., Winnipeg	Winnipeg.
Coca-Cola Co.	90 Broadview Ave., Toronto	Bannatyne & Dagmar, Winnipeg.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	20-12th St., Brandon.
Green River, Ltd.	187 Sutherland Ave., Winnipeg	Winnipeg.
Portage Soda Water Works	60 Tupper St., Portage la Prairie	Portage la Prairie.
Whistle Bottling Co. of Winnipeg	251 Jarvis Ave., Winnipeg	Winnipeg.
SASKATCHEWAN		
Chippewa Water Co.	1225-4th St., Estevan	Estevan.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	265 Third Ave. N., Saskatoon.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	1742 Cornwall St., Regina.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	276 River St. W., Moose Jaw.
Electric Bottlers and Cider Mfg. Co., The	1340 Hamilton St., Regina	Regina.
Gold Seal Limited	Cor. Ave. C and 19 St., Saskatoon	Saskatoon.
Pachal Bottling Works	Agricultural Ave., Yorkton	Yorkton.
Prince Albert Mineral Water Co., Ltd.	1125-3rd Ave. W., Prince Albert	Prince Albert.
Quality Beverage Mfgrs.	Moose Jaw	Moose Jaw.
Standard Mineral Water Works	1371 George St., North Battleford	North Battleford.
Swift Current Bottling Works	401 Railway St. E., Swift Current	Swift Current.
Thompson Bottling Co.	561 Home St. W., Moose Jaw	Moose Jaw.
Watt, G. & J.	2023 Ottawa St., Regina	Regina.
Weyburn Bottling Works	Box 514, Weyburn, Sask.	Weyburn.
ALBERTA		
Alberta Aerated Water	124 Lansdowne St., Wetaskiwin	Wetaskiwin.
Blue Label Bottling Co.	508-3rd Ave. W., Calgary	Calgary.
Bradley, E. F.	Rear Assiniboia Hotel, Medicine Hat	Medicine Hat.
Dominion Bottling Works	10172-94th St., Edmonton	Edmonton.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	126-4th Ave. W., Calgary.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	10345-102nd St., Edmonton.
Coca-Cola Co.	90 Broadview Ave., Toronto, Ont.	314-8th St. S., Lethbridge.
McLaughlin, J. J., Ltd.	9641-102a Ave., Edmonton	Edmonton.
Peace River Bottling Works	Peace River	Peace River.
Polar Aerated Water Works	1301-11th Ave. E., Calgary	Calgary.
Prairie Rose Mfg. Co.	9539-106 Ave., Edmonton	Edmonton.
Purity Bottling Works	327-3rd St. S., Lethbridge	Lethbridge.
Standard Bottling Co.	Box 800, Medicine Hat	Medicine Hat.
United Mfg. Co.	354-11th Ave. W., Calgary	Calgary.

Aerated Waters—Concluded

Name of Firm	Head Office Address	Location of Plant
British Columbia		
Acme Soda Water and Bottling Works	208 Simpson St., New Westminster	New Westminster.
Bowness Export Co., Ltd	Van Horn, Cranbrook	Cranbrook.
Coca-Cola Co	90 Broadview Ave., Toronto, Ont	326 Selby St., Nanaimo.
Coca-Cola Co	90 Broadview Ave., Toronto, Ont	898 Richard St., Vancouver.
Clapp's Bottling Works	Box 577, Prince Rupert	Prince Rupert.
Cross & Co., Ltd	38 Lansdowne Ave. E., Vancouver	Vancouver.
Crystal Spring Water Supply	1244 Richardson St., Victoria	Victoria.
Fairall's Limited	420-422 William St., Victoria	Victoria.
Gold Star Bottling Works	Courtenay	Courtenay.
Harper, James	Columbia Ave., Rossland	Rossland.
Henley, Joseph	717 Princess St., New Westminster	New Westminster.
McCulloch, A. Co	201 Coldstream St., Vernon	Vernon.
Nanaimo Bottling Works	Mill St., Nanaimo	Nanaimo.
Rumming, William E	199 Wallace St., Nanaimo	Nanaimo.
Salmon Arm Aerated Water Co	Box 40, Salmon Arm	Salmon Arm.
Tilley, J. A. S	Box 69, Kelowna	Kelowna.
Van Bros., Ltd	1502 Venables St., Vancouver	Vancouver.
Vancouver Botanic Beverage Co	28-27th Ave. W., Vancouver	Vancouver.
Victoria Botanic Beverage Co	2620 Cedar Hill Road, Victoria	Victoria.

Asbestos and Allied Products

Nova Scotia		
Guilford and Sons	649 Barrington St., Halifax	Halifax.
Quebec		
Asbestos Manufacturing Co., Ltd., The	17 St. James St., Quebec	Lachine.
Atlas Asbestos Co., Ltd	34 St. Peter St., Montreal	Montreal.
Ontario		
Canadian Raybestos Co., Ltd	Peterborough	Peterborough.
Garlock Packing Co	200 Queen St. North, Hamilton	Hamilton.
Heal, T. Sanitary Floor Co. of Toronto	544 King St. W., Toronto	Toronto.
Sterne, G. F. & Sons	124 Bruce St., Brantford	Brantford.
Turner, C. B	894 Bathurst St., Toronto	Toronto.
British Columbia.		
Baillie, Hugh	144 Alexander St., Vancouver	Vancouver.

Cement Products

Nova Scotia		
La Have Concrete Co., Ltd	West La Have	West La Have.
Middleton Cement Product Co., Ltd	Middleton	Middleton.
New Brunswick		
Canada Lock Joint Pipe Co., Ltd	65 Pleasant Blvd., Toronto, Ont	St. John.
Concrete Builders Ltd	Box 641, Fredericton	Fredericton.
Hartland Cement Block Co	Hartland	Hartland.
Moncton Cement Product Works	Robinson St., Moncton	Moncton.
Quebec.		
Bremner, Alex., Ltd	100 Bleury St., Montreal	Outremont.
Canadian Concrete Products Co., Ltd	521 People's Gas Bldg., Chicago, Ill., U.S.A.	St. Lambert.
Canadian Siegwart Beam Co., Ltd	103 St. Fr.-Xavier, Montreal	Three Rivers.
Dugas, Isaie	163 Baby St., Montreal	Montreal.
Dutrisac, Alfred	133 Sir George Etienne, Cartier Square, Montreal	Montreal.
Faille, Aime	131 St. Jerome St., Montreal	Montreal.
Genest, Jos	St. Basile	St. Basile.
Gibault Freres & Cie Inc	Ste. Elizabeth	Ste. Elizabeth.
Giguere & Paiement	828 Beaubien, St., Montreal	Montreal.
Groulx, I	1273 Crawford St., Verdun	Verdun.
Hetu, Samuel	St. Simon	St. Simon.
Jacques, Pierre	Rue St. Jacques, Grand Mere	Grand Mere.
Laflamme, C. E	St. Jerome	St. Jerome.
Melançon, J. T. H	Grand Mere	Grand Mere.
Taillefer, Elie	St. Polycarpe	St. Polycarpe.

Cement Products—Continued

Name of Firm	Head Office Address	Location of Plant
ONTARIO		
Andrews, S. J.	Queen St., Clinton	Clinton.
Anthistle, W. J.	309 Cromwell St., London	London.
Art Granite Co.	Box 311, Essex	Essex.
Ashman, T. J.	520 Grosvenor St., London	London.
Banks, John	755 Queens Ave., London	London.
Bawden, Frederick W.	Langhall St., Exeter	Exeter.
Bell, John T.	R. R. 4, Brussels	Brussels.
Beuglas, Jas.	Bright	Bright.
Bierwagen, Robt. & Sons	213 Waterloo St., Kitchener	Kitchener.
Bosman, L. H.	Bluevale	Bluevale.
Bowers, E. G.	Cottam	Cottam.
Boyd Bros.	Osgoode	Osgoode.
Bradnock, Thos. & Jenkins	Blyth	Blyth.
Brigden, Henry	Port Elgin	Port Elgin.
Brown, D. L.	197 Cedar St., Sudbury	Sudbury.
Burger, Harold	Box 47, Tillsonburg	Tillsonburg.
Burkholder, Geo.	Whitevale	Whitevale.
Burwell, C. A.	Tillsonburg	Tillsonburg.
Calder, James	Fergus	Fergus.
Canadian Concrete Products Co., Ltd.	521 People's Gas Bldg., Chicago Ill., U.S.A.	Chatham.
Cast-Stone Blocks and Machinery Co., Ltd.	1436 Howard Ave., Windsor	Windsor.
Chatham Cement, Tile and Block Co., Ltd.	Richmond St., Chatham	Chatham.
Christie Concrete Products	Angeline St., Lindsay	Lindsay.
Concrete Pipe and Products Ltd.	211 Balsam Ave. S. Hamilton	Hamilton.
Corinthian Stone Co.	20 Durham St., Guelph	Guelph.
Corlett, A. S.	Talbot St., W. Leamington	Leamington.
Cross Builders Supply Co., Ltd.	924 Windsor Ave., Windsor	Windsor.
Deline, L.	Enterprise	Enterprise.
Devitt, W. J.	R. R. 1, Locust Hill	Locust Hill.
Dillon, John	Seeley's Bay	Seeley's Bay.
Doak, Robt.	Goderich	Goderich.
Doidge, J. A.	261 Ottawa St., Hamilton	Hamilton.
Dominion Concrete Co.	Kemptville	Kemptville.
Eldridge, Geo.	326 Durand St., Sarnia	Sarnia.
Elliott, J. A.	R. R. 1, Dunsford	Dunsford.
Fletcher, J. H. & Sons	R. R. 1, Ridgeville	Ridgeville.
Flowers, Wm.	Box 175, Caledonia	Caledonia.
Frost, Rupert	Seaforth	Seaforth.
Fulton, John	Pakenham	Pakenham.
Garnett, Thos. & Sons	Barrett St., Port Hope	Port Hope.
Gendreau, W.	935 Pierre Ave., Windsor	Windsor.
Gillis, Alfred	Hespeler Rd., Galt	Galt.
Goodwin, W. J.	R. R. 1, Selkirk	Selkirk.
Granite Concrete Block Co., Ltd.	832 Weston Rd., Toronto	Toronto.
Hall, John Warren	677 Water St., Peterborough	Peterborough.
Hare, John	Mount Joy	Mount Joy.
Henson & Co.	405 Gorge Rd., Victoria	Victoria.
Hewitt, A. B. & Son	Princeton	Princeton.
Hooper Bros.	Middlemiss	Middlemiss.
Howe, H. & Nott, J. H.	Niagara Falls South	Ridgeway.
Hunt, J. W. & Sons	Mount Forest	Mount Forest.
Hyndman, John	Gorrie	Gorrie.
Ideal Concrete Block Mfg. Co.	Port Arthur	Port Arthur.
Independent Concrete Pipe Co., Ltd.	198 Riddell St., Woodstock	Woodstock.
Ingroville, Stephen	Metcalfe St., Strathroy	Strathroy.
Jacques Cement Block Factory, The	570 Goyeau St., Windsor	Windsor.
Kilbourne, H. & Son	1451 Wharncliffe Rd., London	London.
Kingston Cement Products	69 Patrick St., Kingston	Kingston.
Kinzel Bros.	Box 332, Preston	Preston.
Lawrence Bros.	Stoney Creek	Stoney Creek.
Lefebvre, Jos.	710 Pierre Ave., Windsor	Windsor.
Lesperance, Peter J.	184 Albert Road, Ford City	Ford City.
Lishman, W. H.	Box 100, Cayuga	Cayuga.
McAllister, Robt.	R. R. 2, Goderich	Goderich.
McArthur Concrete Pile and Foundation Co.	10 Cathcart St., Montreal, Que.	Sault Ste. Marie.
McQueen, Alex.	Moorefield	Moorefield.
Miller, Thomas	711 Peter St., Sandwich	Sandwich.
Mitchell, Ralph R.	17-6th St., Niagara Falls	Niagara Falls.
Morse, W. O.	Campbellville	Campbellville.
Oakes, Sam	Box 306, Burlington	Burlington.
Oestricher, Daniel	Crediton	Crediton.
Oil Springs Tile and Cement Co.	Oil Springs	Oil Springs.
Oliver, Wm.	Grand Bend	Grand Bend.
Ord, John A.	R. R. 3, Guelph	Guelph.
Osterhout, Peter	61 Pitt St. E., Windsor	Windsor.
Page, George Leslie	R. R. 3, Lucknow	Lucknow.
Paige, Fred	Grand Bend	Grand Bend.
Palm, Jacob	Mildmay	Mildmay.
Pettypiece, Limited	Amherstburg	Amherstburg.
Pfaff, W. E.	Queen St., Hensall	Hensall.
Pfeiffer, Charles	West Lorne	West Lorne.
Ratcliffe, E. B., Ltd.	Kenilworth Ave. and G.T.R., Hamilton	Hamilton.
Ridgeville Concrete Works	Ridgeville	Ridgeville.
Robidoux, Henry	Box 323, Amherstburg	Amherstburg.
Robinson, Edward	R. R. 3, Mitchell	Mitchell.

Cement Products—Concluded

Name of Firm	Head Office Address	Location of Plant
ONTARIO—Concluded		
Ross, Charles & Son	Dunnville	Dunnville.
Russello, Howard	Box 8, Leamington	Leamington.
St. Onge, Hormidas	1072 Wyandotte St., Windsor	Windsor.
Sebringville Cement Brick Tile & Block Co.	Sebringville	Sebringville.
Schade, John	West Monkton	West Monkton.
Schmidt, J. T.	R. R. 1, Waterloo	Waterloo.
Shoemaker, Allen	R. R. 4, Kitchener	Kitchener.
Showel Bros.	R. R. 6, Owen Sound	Owen Sound.
Smith, Allan G. C.	Box 197, Acton	Acton.
Smithson, F.	Erie St., N. Leamington	Leamington.
Somerville, W. G. & Son	Division St., Welland	Welland.
Stanley, J.	Stanley's Corners	Stanley's Corners.
Stinson, R. H.	Omemee	Omemee.
Sydenham Block and Tile Co.	Box 438, Wallaceburg	Wallaceburg.
Tambling, A. L.	Dunnville	Dunnville.
Telford, Peter	Holland Centre	Holland Centre.
Theaker, William	Bartonville	Bartonville.
Tigert, John	Port Albert, Ont.	Goderich.
White, Homer & Co.	Spring St., Picton	Picton.
White, Sidney	R. R. 4, St. Catharines	Homer.
Whitlock, Peter	R. R. 1, Hensall	Hensall.
Williams, Geo. C.	Wheatley	Wheatley.
Winchester Cement Block and Tile Mfg. Co.	Winchester	Winchester.
Word, John	149 Simcoe St. E., Hamilton	Hamilton.
Young, John & Son	Ridgeway	Ridgeway.
SASKATCHEWAN		
Adams, Arthur E.	325 1st Ave., N. Saskatoon	Saskatoon.

Sand-Lime Brick

ONTARIO		
Caledon Brick Co., Ltd.	Room 24, Imperial Bank Bldg., 171 Yonge St., Toronto	Caledon East.
Canadian Sand-Lime Pressed Brick Co.	28 Symes Rd., Toronto, W.	Toronto, W.
Don Valley Brick Works, Ltd.	Dominion Bank Bldg., Toronto	Toronto.
Harbour Brick Co., Ltd.	Lumsden Bldg., Toronto	Bathurst St. Dock, Toronto.
Toronto Brick Co., Ltd.	60 Victoria St., Toronto	Scarboro.
Toronto Brick Co., Ltd.	60 Victoria St., Toronto	Swansea.
West Lake Brick and Products Co., Ltd.	392 East Genesee St., Buffalo, N.Y.	West Lake.
Willcox Lake Brick Co., Ltd.	Richmond Hill	Richmond Hill.
York Sandstone Brick Co., Ltd.	Cor. Gerrard St. and Victoria Park Ave., Toronto	Toronto.
MANITOBA.		
Winnipeg Brick Co., Ltd.	Osborne St., Winnipeg	Winnipeg.
SASKATCHEWAN		
Saskatoon Brick and Supply Co. Ltd., The	18th St., Saskatoon	Saskatoon.

Coke and By-Products

NOVA SCOTIA		
British Empire Steel Corporation	Sydney	Sydney.
ONTARIO		
Algoma Steel Corporation, Ltd.	Sault Ste. Marie	Sault Ste. Marie.
Steel Company of Canada, Ltd.	Hamilton	Hamilton.
ALBERTA		
International Coal and Coke Co.	Coleman	Coleman.
BRITISH COLUMBIA		
Canadian Collieries (Dunsmuir) Ltd.	Victoria	Cumberland, Lady Smith and Union Bay
Crow's Nest Pass Coal Co., Ltd.	Fernie	Fernie.
Granby Consolidated Mining, Smelting and Power Co.	718 Granville St., Vancouver	Anyox.

Glass (Pressed and Blown)

Name of Firm	Head Office Address	Location of Plant
QUEBEC		
Consumer's Glass Co., Ltd	P.O. Box 40, Montreal	Montreal.
Dominion Glass Co., Ltd	285 Beaver Hall Hill, Montreal	Point St. Charles, Montreal.
Dominion Glass Co., Ltd	285 Beaver Hall Hill, Montreal	Delorimier Ave., Montreal.
ONTARIO		
Beaver Flint Glass Co. of Toronto, Ltd	547 Parliament St., Toronto	Toronto.
Canadian Libbey-Owens Sheet Glass Co., Ltd.	Kenilworth Ave., Hamilton	Hamilton.
Dominion Glass Co., Ltd	285 Beaver Hall Hill, Montreal, Que	Chapelle St., Hamilton.
Dominion Glass Co., Ltd	285 Beaver Hall Hill, Montreal, Que	Toronto.
Dominion Glass Co., Ltd	285 Beaver Hall Hill, Montreal, Que	Wallaceburg.
Jefferson Glass Co., Ltd	288 Carlaw Ave., Toronto	Toronto.
Pilkington Bros., Ltd	St. Catharines	Thorold.
Richards Glass Co., Ltd	66 Temperance St., Toronto	Toronto.
ALBERTA		
Dominion Glass Co., Ltd	285 Beaver Hall Hill, Montreal, Que	Redcliffe.

Glass Products (Including the bevelling, bending and cutting of plate and window glass, and the manufacture of mirrors, art glass and cut glass)

QUEBEC		
La Cie Ceramo-Vitrail Inc	1410 Blvd. St. Laurent, Montreal	Montreal.
Colonial Art Works, Ltd	112 St. Peter St., Montreal	Montreal.
Consolidated Plate Glass Co	241 Spadina Ave., Toronto, Ont	30 St. Sulpice, Montreal.
Grimson, Geo	76-78 St. Antoine St., Montreal	Montreal.
Hobbs Mfg. Co., Ltd	444 St. James St., Montreal	Montreal.
Montreal Art Glass Works	2014 St. Lawrence Blvd., Montreal	Montreal.
O'Shea, J. P. & Co	15 Perrault Lane, Montreal	Montreal.
Phillips, Geo. & Co., Ltd	585 St. Timothee, St., Montreal	Montreal.
Ramsay, A. Frank	964 St. Paul St. W., Montreal	Montreal.
ONTARIO		
Bullas Glass Co., J	Kitchener	Kitchener.
Canadian Tumbler Co	83-85 King St. E., Toronto	Toronto.
Cassidy's, Ltd	47 St. Paul St., Montreal, Que	16 Front St. W., Toronto.
Central Ornamental Glass Co	83 McCaul St., Toronto	Toronto.
Colonial Glass Co	Queen St., Lakefield	Lakefield.
Colonial Art Glass Co	586 Bank St., Ottawa	Ottawa.
Consolidated Plate Glass Co. of Canada, Ltd.	241 Spadina Ave., Toronto	Toronto.
Dominion Stained Glass Co	380 Adelaide St., Toronto	Toronto.
Excelsior Plate Glass Co., Ltd	189 Queen St. E., Toronto	Toronto.
Glass and Mirrors, Ltd	175 King St., Stratford	Stratford.
Gundy-Clapperton Co., Ltd	61 Albert St., Toronto	Toronto.
Hardie Cut Glass Co	80 Duchess St., Toronto	Toronto.
Hobbs Manufacturing Co., Ltd	444 St. James St., Montreal, Que	304 Ridout St., London.
Horwood Glass Mfg. Co., Ltd	402 Bank St., Ottawa	Ottawa.
Luxfer Prism Co., Ltd	162 Parliament St., Toronto	Toronto.
Lynn, N. T., Glass Co., Ltd	141 Church St., Toronto	Toronto.
McCausland, Robt., Ltd	141-143 Spadina Ave., Toronto	Toronto.
Pringle & London	146 Jarvis St., Toronto	Toronto.
Sovereign Cut Glass Co	143 Adelaide St. E., Toronto	Toronto.
Tait Plate Glass Co	Victoria and Edward Sts., Kitchener	Kitchener.
Toronto Plate Glass Imp'g Co., Ltd	91 Don Roadway, Toronto	Toronto.
Wallaceburg Cut Glass Works	Wallaceburg	Wallaceburg.
MANITOBA		
Canadian Community Cut Glass, Ltd	146 Princess St., Winnipeg	Winnipeg.
Consolidated Plate Glass Co	375 Balmoral St., Winnipeg	Winnipeg.
Hobbs Mfg. Co., Ltd., The	444 St. James St., Montreal, Que	360 Princess St., Winnipeg.
ALBERTA		
Capital Glass Works	9801-9803 Jasper Ave., Edmonton	Edmonton.
BRITISH COLUMBIA		
Bogardus Wickens, Ltd	1000 Homer St., Vancouver	Vancouver.
Fox, Geo. "Regal Leaded Art Glass Co."	1471 Broadway, Vancouver	Vancouver.
Townley, James	385 Kingsway, Vancouver	Vancouver.
Western Glass Co., Ltd	158 Cordova St. W., Vancouver	Vancouver.

Illuminating and Fuel Gas

Name of Firm	Head Office Address	Location of Plant
Nova Scotia		
Nova Scotia Tramways & Power Co., Ltd., The	Tramway Bldg., Box 770, Halifax	Halifax.
New Brunswick		
New Brunswick Power Co	St. John	St. John.
Pintsch Compressing Co	New Haven, Conn., U.S.A	McAdam Jct.
Quebec		
City of Sherbrooke Gas Dept	Sherbrooke	Sherbrooke.
Montreal Gas Co	Power Bldg., Montreal	Montreal.
Pintsch Compressing Co	New Haven, Conn., U.S.A	67 Lusignan St., Montreal.
Quebec Railway Light, Heat and Power Co., Ltd	Quebec Railway Bldg., Quebec	Quebec.
Ontario		
Barrie Gas Co., Ltd	16 Owen St., Barrie	Barrie.
Belleville Gas Dept	Belleville	Belleville.
Board of Light and Heat Commission	Guelph	Guelph.
Brockville Public Utilities Commission	Brockville	Brockville.
City Gas Co	215 Dundas St., London	London.
City of St. Thomas Gas Dept	St. Thomas	St. Thomas.
Consumers Gas Co. of Toronto	19 Toronto St., Toronto	Toronto.
Hydro-Electric Power Commission of Ontario	190 University Ave., Toronto	Cobourg.
Hydro-Electric Power Commission of Ontario	190 University Ave., Toronto	Oshawa.
Hydro-Electric Power Commission of Ontario	190 University Ave., Toronto	Peterborough.
Kingston Civic Utilities	Kingston	Kingston.
Kitchener Light Commissioners	169 King St. W., Kitchener	Kitchener.
Ottawa Gas Co	35 Sparks St., Ottawa	Ottawa.
Pintsch Compressing Co	New Haven, Conn., U.S.A	Fort William.
Pintsch Compressing Co	New Haven, Conn., U.S.A	North Bay.
Pintsch Compressing Co	New Haven, Conn., U.S.A	John St., Toronto.
Port Hope Gas Co	John St., Port Hope	Port Hope.
Public Utilities Commission of Owen Sound	1062-2nd Ave. E., Owen Sound	Owen Sound.
Stormont Electric and Power Co	Cornwall	Cornwall.
Stratford Gas Co	51 Downie St., Stratford	Stratford.
United Gas and Fuel Co. of Hamilton, Ltd	Hamilton	Hamilton.
Waterloo Water and Light Commission Gas Dept	Waterloo	Waterloo.
Manitoba		
Acetylene Construction Co	611 Power Bldg., Montreal, Que	Morris.
Canada Gas and Electric Corporation	243-10th St., Brandon	Brandon.
Carberry Gas Co., Ltd	Carberry	Carberry.
Deloraine Gas Co., Ltd	611 Power Bldg., Montreal, Que	Deloraine.
Hamiota Gas Plant	611 Power Bldg., Montreal, Que	Hamiota.
Manitou Gas Co., Ltd	611 Power Bldg., Montreal, Que	Manitou.
Pintsch Compressing Co	New Haven, Conn., U.S.A	Sutherland Ave., Winnipeg.
Souris Consumers Gas Co., Ltd	Souris	Souris.
Winnipeg Electric Railway Co	Winnipeg	Winnipeg.
Saskatchewan		
Moosomin Gas Co., Ltd	Acetylene Construction Co., Power Bldg., Montreal, Que	Moosomin.
Pintsch Compressing Co	New Haven, Conn., U.S.A	Moose Jaw.
Alberta		
Pintsch Compressing Co	New Haven, Conn., U.S.A	10354-108th St., Edmonton.
British Columbia		
City of Nelson	Front St., Box 1058, Nelson	Nelson.
Cunningham Hardware Co., Gas Manufacturers	751 Columbia St., New Westminster	New Westminster.
Pintsch Compressing Co	New Haven, Conn., U.S.A	Vancouver.
Vancouver Gas Co., Ltd	425 Corrall St., Vancouver	Vancouver.
Victoria Gas Co	Victoria	Victoria.

Monumental and Ornamental Stone

Name of Firm	Head Office Address	Location of Plant
Prince Edward Island		
Chandler & Bell	160 Kent St., Charlottetown	Charlottetown.
Nova Scotia		
Bear River Granite Works	Bear River	Bear River.
Colonial Granite Co., Ltd	New Glasgow	New Glasgow.
Dauphinee, A. T	Shelburne	Shelburne.
Goudey, Robt. H	Horton St., Yarmouth	Yarmouth.
Hoyt, C. M	Middleton	Middleton.
Kelly, George J	Bridgewater	Bridgewater.
McKay, H. D	Main St., River John	River John.
Myatt, Albert H	Oxford	Oxford.
Purvis, James	Windsor	Windsor.
Rottler, Albert A	Kentville	Kentville.
Steele, John D	Commercial St. N., Sydney	North Sydney.
Tingley Granite and Marble Works	3 Lansdowne Ave., Amherst	Amherst.
Truro Granite and Marble Works	Truro	Truro.
New Brunswick		
Kinsella, P. & Son	Kanes Corner E., St. John	St. John.
Lawlor & Williams	Chatham	Chatham.
Meating Epps Co., Ltd	St. George	St. George.
Milne Coutts & Co., Ltd	St.George	St. George.
Nelson Bros	Lower Cape	Lower Cape.
O'Brien & Baldwin	Box 80, St. George	St. George.
Pelletier, Alfred B	St. Basil	St. Basil.
Price, Alfred, Estate (St. Stephens Granite Works)	Queen St., St. Stephen	St. Stephen.
Seaton, John S	75 Queen St., St. John	St. John.
Sherrard, Thos. F. and Son	135 Victoria St., Moncton	Moncton.
Quebec		
Anglin-Norcross, Ltd	65 Victoria, Montreal	Montreal.
Aberdeen Granite and Marble Works	160-166 Bleury St., Montreal	Montreal.
Beebe Monument Co	Beebe	Beebe.
Brandford, John	10 Drummont St., Granby	Granby.
Brault, Z	1 Champlain St., Valleyfield	Valleyfield.
Brodies Ltd	128 Rue Bleury, Montreal	Montreal.
Brunet, G	Ormstown	Ormstown.
Brunet, J., Ltd	675 Chemin-de-la Cote-des-Neiges, Montreal	Montreal.
Chaussé, Edouard	66 Cascades St., St. Hyacinthe	St. Hyacinthe.
Coté, Victor	187 1st Ave., Limoilou, Quebec	Quebec.
Courtemanche Bros	Waterloo	Waterloo.
Daleeggio, Francois	726 Chemin Cote-des-Neiges, Montreal	Montreal.
Deaudelin & Baron	92 St. Antoine St., St. Hyacinthe	St. Hyacinthe.
Ducharme, Z	41 Note Dame, Victoriaville	Victoriaville.
Genser, E	1000 St. Lawrence Blvd., Montreal	Montreal.
Gignac, Agnrias	St. Alban	St. Alban.
Gosselin et Fils	Beauceville Est	Beauceville Est.
Guerrette, Joseph	St. Philippe	St. Philippe.
Hambly, Richard	Coaticook	Coaticook.
Hazelton, Wm	Beebe	Beebe.
Hill, Clayton J	Richmond	Richmond.
Holmes, J. H	Sutton	Sutton.
Iberville Granite Works	97 Stevenson, St., Iberville	Iberville.
Jacques, Olivier	18 rue Shaw, Levis	Levis.
Laforce & Frs	308½ St. Joseph St. Québec	Quebec
Lefebvre, J. A	78—3rd Rue Limoilou, Quebec	Quebec.
Lemay, Alcide	Des Chaillons	Deschaillons.
McKenny, V. B	Bedford	Bedford.
Perron, Godfroy	Coaticooke	Coaticooke.
Perusse, Alcide	St. Marc des Carrieres	St. Marc des Carrieres
Poulin, P. A	72½ Champlain St. St. John	St. John.
Roberge, T	69 Blvd., Langelier, Quebec	Quebec.
Robertson, Fred	Beebe Junction	Beebe Junction.
Roche, Gingras	Ste. Foy	St. Foy.
Rolland, J. A	1285 Rue St. Valier, Quebec	Quebec.
Savard, J. Bte	St. Anne de la Perade	St. Anne de la Perade.
Shore, Thomas	Box 182, Shawville	Shawville.
Smith Bros., of Montreal, Ltd	458 Bleury St., Montreal	Montreal.
Smith Marble and Construction Co., Ltd	145 Van Horne Ave., Montreal	Montreal.
Stanstead Granite Quarries Co., Ltd	Beebe	Beebe.
Thompson, T. C	270 Wellington St. S. Sherbrooke	Sherbrooke.
Xavier, Jean	St. Fabien	St. Fabien.
Ontario		
Adams, Geo	561-563 Dundas St., Woodstock	Woodstock.
Aitken, David	514 Coxwell Ave., Toronto	Toronto.
Allan, Wm	Brampton	Brampton.
Alpaugh, J	St. Andrews St., Fergus	Fergus.
Arnprior Marble and Granite Works	Arnprior	Arnprior.
Beal, J. R. & Son	Pembroke	Pembroke.
Borland, S	Collingwood	Collingwood.

Monumental and Ornamental Stone—Continued

Name of Firm	Head Office Address	Location of Plant
ONTARIO—Continued		
Bounsall, E. R.	Division St., Bowmanville	Bowmanville.
Boyer, H. & Son	Box 28, Bracebridge	Bracebridge.
Braun, Casper	295 King St. W. Kitchener	Kitchener.
Brown & Nettleship	R. R. 4, St. Catharines	St. Catharines.
Brown, Robert	376 Sparks St., Ottawa	Ottawa.
Brown, Wm	340—19th St. W. Owen Sound	Owen Sound.
Campbell, John	Trenton	Trenton.
Cater & Worth	153 Main St. E. Galt	Galt.
Central Canada Stone Co., Ltd	Point Edward	Point Edward.
Central Marble & Granite Works	Maxville	Maxville.
de Carle, Chas. W. and Victor	R. R. 3, Brockville	Brockville.
Chapman, Wm. E.	Box 24, Seaforth	Seaforth.
Colby, C.H.	Chatham	Chatham.
Corbett, A. J.	Main St., Mt. Forest	Mt. Forest.
Corley, A. C.	Main St., Brighton	Brighton.
Coughlin, John	216 Hunter St., Peterborough	Peterborough.
Coughlin, Michael	269 Erskine Ave., Toronto	Toronto.
Craig, Andrew	Klock Ave., North Bay	North Bay.
Creber Bros.	204 Kingston Rd., Toronto	Toronto.
Creber Son & Company	1333 St. Clair Ave., W. Toronto	Toronto.
Cresswell, W. H.	Box 462, Lindsay	Lindsay.
Cullen, Colin A.	Leamington	Leamington.
Cunningham & Pryde	Exeter	Exeter.
Delanty, Patrick E.	Cobourg	Cobourg.
Dillon, Joseph	Gananoque	Gananoque.
Doan & Panther	20 Elgin St., St. Thomas	St. Thomas.
Doyle, Jno. E.	209—8th St., East Owen Sound	Owen Sound.
Durward, John	Box 312, Kincardine	Kincardine.
Duvall, George R.	Elgin St., Alexandria	Alexandria.
Excelsior Marble and Granite Works	37 Pitt St., E. Windsor	Windsor.
Fallon Bros.	139 Clergy St., Kingston	Kingston.
Fronts, Geo. H. & Co.	Renfrew	Renfrew.
George, John J.	Pt. Elgin	Pt. Elgin.
Gibson, J. G. Marble and Granite Co., Ltd.	50 Winchester St., Toronto	Toronto.
Gould, A. J.	Uxbridge	Uxbridge.
Halladay, B. S.	Chesley	Chesley.
Hamilton & Sons	228 Woolwich St., Guelph	Guelph.
Hayes Bros. Co.	Sudbury	Sudbury.
Herbert, T. H.	66 Wentworth St., Hamilton	Hamilton.
Hibberd, Arthur	195 Melita Ave., Toronto	Toronto.
Hill, William	Maxville	Maxville.
Hodge Marble Co. Ltd.	34 Price St., Toronto	Toronto.
Hurst & Rogers	1193 Queen St. W., Toronto	Toronto.
Isaac, Jas. & Son	30 Dupont St., Toronto	Toronto.
Jackson, J. H.	South Shaftsburg Ave. and C.P.R. tracks, Toronto	Toronto.
Johnston, T. & Son	Paisley	Paisley.
Jones & Stevens	277 Rideau St., Ottawa	Ottawa.
Jones, Thomas C.	Listowel	Listowel.
Jones, W. A.	Main St., W. Pictou	Pictou.
Leeder, W. J.	Gananoque	Gananoque.
Lindsay Monumental Works	11 Cambridge St., N. Lindsay	Lindsay.
Lippert, F. & Sons	Durham St., Walkerton	Walkerton.
Lloyd, T.	Main St., Prescott	Prescott.
London Marble and Granite Co.	493 Richmond St., London	London.
Lucsby, George W.	Cor. Main & Queen St., Newmarket	Newmarket.
Martel & Cummings	Vankleek Hill	Vankleek Hill.
Matheson, John T.	Whitby	Whitby.
McCallum Granite Co., Ltd.	397 Princess St., Kingston	Kingston.
McDowell, Wm.	184 George St., Brantford	Brantford.
McElroy, H. J.	154 Woolwich St., Guelph	Guelph.
McIntosh Granite Co., Ltd. of Toronto	1623 Yonge St., Toronto	Toronto.
McKay, Alexander	2 Browns Ave., Toronto	Toronto.
McMillan Granite Co., Ltd.	198 Victoria St., Sarnia	Sarnia.
Middleton Marble and Granite Co., Ltd.	122 Main St. E., Hamilton	Hamilton.
Minna, Charles	Box 35 B, Wardsville	Wardsville.
Moore, Chas. B.	404 Front St., Belleville	Belleville.
Moore, John	Stirling	Stirling.
Moss, Jno. O.	Box 412, Newmarket	Newmarket.
Napanee Marble and Granite Works	Napanee	Napanee.
Nicholson, T. G.	1117 Yonge St., Toronto	Toronto.
Nobbs, A. & E.	Cor. William and C.P.R., London	London.
Oakley, Geo. & Son, Ltd.	278 Booth Ave., Toronto	Toronto.
Ontario Marble Co., Ltd.	Maria St., Peterborough	Peterborough.
Ottawa Cut Stone Co.	135 Nelson St., Ottawa	Ottawa.
Perrott, Joseph	Alliston	Alliston.
Pollard, James	715 Queen St., Sault Ste. Marie	Sault Ste. Marie.
Porterfield & Colquhoun	Mitchell	Mitchell.
Price & Ashton	18 West St., Orillia	Orillia.
Rhodes, Thomas	Cayuga	Cayuga.
Richardson, Robt. Harvey	Hanover	Hanover.
Ritchie, Jas.	51 Catherine St., Ottawa	Ottawa.
Ritchie Cut Stone Co., Ltd.	191 Grant Ave., Hamilton	Hamilton.
Ruch, T. J. & Son	Wellington St., St. Marys	St. Marys.
Rutledge, S. H.	Orangeville	Orangeville.
Rutter, Wm.	Ontario St., Port Hope	Port Hope.
Sanderson, R. J. Marble Co.	33 Peter St., Orillia	Orillia.

Monumental and Ornamental Stone—Concluded

Name of Firm.	Head Office Address	Location of Plant
ONTARIO—Concluded		
Sarnia Granite and Marble Works	156 Victoria St., Sarnia, Ont	Sarnia, Ont.
Scott, John F	176 E. Main St., Galt	Galt.
Scott Bros	38 McGee St., Toronto	Toronto.
Sherwood & King	551 Bethune St., Peterborough	Peterborough.
Simcoe Marble Works	20 Owen St., Barrie	Barrie.
Skelton, E. J. & Son	Walkerton	Walkerton.
Smith, R. B	Merrickville	Merrickville.
Smyth, Frank W	344 Wellington St., London	London.
Snider, L. R	Humberstone	Humberstone.
Stead, Arthur	148 Central Ave., Hamilton	Hamilton.
Steiner, J	409 Dundas St., Toronto	Toronto.
Stubbs & Gibson	Winchester	Winchester.
Thake, H. W	Westport	Westport.
Thatcher & Co	30 Market Square, Chatham	Chatham.
Thomson Monument Co., Ltd	862 Dupont St., Toronto	Toronto.
Twin City Marble and Granite Co	380 Brock St., E. Fort William	Fort William.
Vokes, John	884 Dupont St., Toronto	Toronto.
Wardell Monumental Works	2696 Dundas St., W. Toronto	Toronto.
Webb, George	448 Summerhill Ave., Toronto	Toronto.
Widdicombe, Benjamin	5 Bond St., St. Catharines	St. Catharines.
Wideman, L. C. & Son	Stouffville	Stouffville.
Williamson, W. A. & Son	Gananoque	Gananoque.
Williscroft, B. S	229—9th St., Owen Sound	Owen Sound.
MANITOBA		
Allen & Grant	Youville St., St. Boniface	St. Boniface.
Brook & Sons, J. H	266 Main St., Winnipeg	Winnipeg.
Campbell, R. M	90 Hespeler St., Winnipeg	Winnipeg.
Gillis, Aug. & Son	Spruce and Richard Sts., Winnipeg	Winnipeg.
Guinn & Simpson Co., Ltd	Box 511, Portage la Prairie	Portage la Prairie.
Hooper Marble and Granite Co., Ltd	537 Portage Ave., Winnipeg	Winnipeg.
Johnston, James J	525 Cordyon Ave., Winnipeg	Winnipeg.
Marble and Tile Co. of Canada, Ltd	La Verandrye and St. Jean Baptiste Sts., St. Boniface	St. Boniface.
Pirotton, N	St. Boniface	St. Boniface.
Somerville & Co	1417 Rosser Ave., Brandon	Brandon.
Western Stone Co	St. Boniface	St. Boniface.
Wheeldon & Sons	1055 Main St., Winnipeg	Winnipeg.
Winnipeg Marble and Tile Co., Ltd	199 Main St., Winnipeg	Winnipeg.
SASKATCHEWAN		
Moose Jaw Marble and Granite Works, Ltd	706 Athabasca St. E., Moose Jaw	Moose Jaw.
Regina Marble and Tile Ltd	826 Dewdney Ave., Regina	Regina.
Sask. Marble & Construction Co., Ltd	117 Eighth St. E., Prince Albert	Prince Albert.
Saskatoon Granite & Marble Co., Ltd	131 Ave. A North, Saskatoon	Saskatoon.
Western Granite Marble & Stone Co., Ltd	714-716-2nd Ave. N., Saskatoon	Saskatoon.
Vaughan, William J	Box 434, Yorkton	Yorkton.
Young, Alex., Ltd	Cor. Fourth Ave. and Angus St., Regina	Regina.
ALBERTA		
Alberta Granite, Marble & Stone Co., Ltd	10034-105th Ave., Edmonton	Edmonton.
Hart, Albert J	1831-2nd St. East., Calgary	Calgary.
Lethbridge Monumental Works	315-8th St. S., Lethbridge	Lethbridge.
North West Granite & Marble Co	8537-109th St., Edmonton	Edmonton.
Somerville Co	2313-2nd St. E., Calgary	Calgary.
BRITISH COLUMBIA		
Campbell & Ritchie	507 Front St., Nelson	Nelson.
Continental Marble Co., Ltd	502 Rogers Bldg., Vancouver	Vancouver.
Independent Monument Co	20th Ave. E. and Windsor St., Vancouver	Vancouver.
Keast & Allan	880 Beach Ave., Vancouver	Vancouver.
Malaspina Marble Co., Ltd	915 Credit Foncier Bldg., Vancouver	Vancouver.
Mortimer, John & Son	720 Courtenay St., Victoria	Victoria.
Newall, Jno. B	Cor. Fraser and 36th Ave., Vancouver	Vancouver.
Phillips Stone Works	1502 Fairfield Rd., Victoria	Victoria.
Stewart Monumental Works, Ltd	1401 May St., Victoria	Victoria.
Vermont Marble Co	Peterborough, Ont	Vancouver.

Petroleum Products (a) Lubricating Oils

QUEBEC		
Economic Products, Ltd	1040 Durocher St., Montreal	Montreal.
Three in One Oil Co	165 Broadway, New York	21 Mount Royal Hotel, Montreal.
ONTARIO		
Cataract Refining Co., Ltd	1 Sherbourne St., Toronto	Toronto.
Dominion Oil Co., Ltd	Owen Sound	Owen Sound.
Galena-Signal Oil Co	134 Royce Ave., Toronto	Toronto.
Ontario Lubricating Co., Ltd	115 Melbourne St., Hamilton	Hamilton.
Peterson Core Oil & Mfg. Co. of Canada, Ltd	1111 West Washington St., Chicago, Ill., U.S.A.	Harmony Ave., Hamilton.

(b) Petroleum Refining

Name of Firm	Head Office Address	Location of Plant
NOVA SCOTIA		
Imperial Oil, Ltd.	Sarnia, Ont.	Dartmouth.
QUEBEC		
Imperial Oil, Ltd.	Sarnia, Ont.	5250 Notre Dame St. E. Montreal.
National Oil Refineries, Ltd.	Montreal	Montreal.
ONTARIO		
British American Oil Co., Ltd.	1306 Royal Bank Bldg., Toronto	Toronto.
Canadian Oil Companies, Ltd.	707 Excelsior Life Bldg., Toronto	Petrolia.
Cities Service Oil Co., Ltd.	35 Shaftesbury Ave., Toronto	Wallaceburg.
Imperial Oil, Ltd.	445 S. Christina St., Sarnia	Sarnia.
MANITOBA		
North Star Oil & Refining Co.	705-710 Notre Dame Investment Bldg., Winnipeg	St. Boniface.
SASKATCHEWAN		
Imperial Oil, Ltd.	Sarnia, Ont.	Regina.
ALBERTA		
Canada Southern Oil & Refining Co., Ltd.	Alberta Corners, Black Diamond	Black Diamond.
Imperial Oil, Ltd.	Sarnia, Ont.	Calgary.
Royalite Oil Co., Ltd.	239 Sixth Ave. W., Calgary	Black Diamond.
Southern Alberta Refineries, Ltd.	407 Grain Exchange, Calgary	Okotoks.
BRITISH COLUMBIA		
Imperial Oil, Ltd.	Sarnia, Ont.	Toco.
Union Oil Co. of Canada, Ltd.	Port Moody	Port Moody.

Miscellaneous Non-Metallic Mineral Products

(a) Artificial Abrasives

QUEBEC		
Canadian Carborundum Co., Ltd.	P.O. Box 536, Niagara Falls, N.Y.	Shawinigan Falls.
ONTARIO		
Abrasive Co. of Canada, Ltd.	Burlington St. and Harvey Lane, Hamilton	Hamilton.
Canadian Carborundum Co., Ltd.	P.O. Box 536, Niagara Falls, N.Y.	Niagara Falls, Ont.
Exolon Co.	110 Brookline Ave., Boston, Mass.	Thorold.
Norton Company	New Bond St., Worcester, Mass., U.S.A.	Chippewa.

(b) Abrasive Products

ONTARIO		
Abrasives Ltd.	Canal Rd., Brantford	Brantford.
Brantford Grinding Wheel Co. of Canada, Ltd.	188 Pearl St., Brantford	Brantford.
Canadian Hart Wheels, Ltd.	800 Burlington St. E., Hamilton	Hamilton.
Caunt, W. A.	P.O. Box 1379, Detroit, Mich., U.S.A.	Walkerville.
Dominion Abrasive Wheel Co., Ltd.	Main St., Mimico	Mimico.
Norton Company of Canada, Ltd.	3 Beach Rd., Hamilton	Hamilton.

(c) Artificial Graphite and Electrodes

ONTARIO		
Acheson Graphite Co.	Niagara Falls, N.Y., U.S.A.	Cor. Buttrey Ave. and Swinyard St., Niagara Falls.
Electro Metallurgical Co. of Canada	Welland	Welland.

(d) Gypsum Products

Name of Firm	Head Office Address	Location of Plant
QUEBEC		
Alluisi, Arthur	2115 rue St. Laurent, Montreal	Montreal.
Keystone Wall Plaster Co	126 Laurier Ave. E., Montreal	Ste. Therese.
Petrucci, T. Carli	316-320 Notre Dame E., Montreal	Montreal.
ONTARIO		
Alabastine Co., Ltd	Paris	Paris.
Canadian Nu-Art Marble Co	7 Hunter St. E., Peterborough	Peterborough.
Ebsary Gypsum Co., Ltd	Box 1295, Scottsville, N.Y., U.S.A	Caledonia.
Hynes, W. J., Ltd	858 Dupont St., Toronto	Toronto.
Ontario Gypsum Co	Paris	Caledonia

(e) Mica Trimming

QUEBEC		
Loughborough Mining Co., Ltd	Sorel	Yamaska.
Loughborough Mining Co., Ltd	Sorel	St. Casimir.
Loughborough Mining Co., Ltd	Sorel	Pont Rouge.
Loughborough Mining Co., Ltd	Sorel	Pierreville.
Loughborough Mining Co., Ltd	Sorel	Sorel.
Loughborough Mining Co., Ltd	Sorel	St. Aime.
Loughborough Mining Co., Ltd	Sorel	St. Raymond.
Loughborough Mining Co., Ltd	Sorel	Nicolet.
Loughborough Mining Co., Ltd	Sorel	St. Ours.
Mica Co. of Canada, Ltd	2 Lois St., Hull	Hull.
Mica Insulator Co	Victoriaville	Manseau.
Mica Insulator Co	68 Church St., New York, U.S.A. (Can. Head Office, Victoriaville, Que.)	Lyster.
Mica Insulator Co	Victoriaville	Plessisville.
Mica Insulator Co	Victoriaville	St. Agapit.
Mica Insulator Co	Victoriaville	Deschaillons.
Mica Insulator Co	Victoriaville	Victoriaville.
Mica Insulator Co	Victoriaville	Daveluyville.
Mica Insulator Co	Victoriaville	Ste. Marie.
Mineral Products Co	8 Wellington St. E., Toronto, Ont	Hull.
ONTARIO		
Fillion, S. O	86-88 Duke St., Ottawa	Ottawa.
Laurentide Mica Co., Ltd	Box 911, Pittsburgh, Pa., U.S.A	Rockland.
O'Brien & Fowler	17 Beech St., Ottawa	Ottawa.