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DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

CHEMICALS AND ALLIED PRODUCTS

1919 AND 1920

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PREFACE

A special survey of Canada's chemical industries was undertaken by the Bureau as a section of the Industrial Census with two principal objects: (1) to provide a directory of Canadian Chemical Industries and their products for the use of the trade; and (2) to assemble data regarding raw materials used, products and by-products manufactured, imports and exports, etc., thus indicating not only the importance of the industry and the progress which it has made in Canada, but also possible new and profitable trade openings in industrial chemical lines.

The Directory of Chemical Industries was issued in 1919, and the entire supply was exhausted within a few weeks. A second edition, revised and enlarged was prepared and printed in 1921.

The present report is the result of the first comprehensive survey of the production of chemicals and allied products in Canada, referred to above as the second phase of the Bureau's work on this important group of industries. Under the classification plan used in the Bureau, industries are grouped by classes according to the principal component materials of their products; on this principle, the present study was carried out in ten main groups as shown in the table on the next following page. Summary statistical tables have also been prepared and are included in the introductory review.

The report was prepared 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 of the Bureau, by Mr. H. C. Barlow, B.A.

The thanks of the Bureau are hereby extended to the officers of the companies reporting, whose unfailing courtesies have done much to promote the progress of the Bureau's work in this field.

R. H. COATS,

Dominion Statistician.

DOMINION BUREAU OF STATISTICS,

OTTAWA, August 1, 1922.

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TABLE OF CONTENTS

	Page
List of Publications	Inside front cover
Preface	3
Summary Statistics:	
Chemicals and Allied Products in Canada, 1919-20-21	6
Introduction and Summary	7
General Tables for 1919	10
General Tables for 1920	16
Chapter One—	
Coal Tar and Its Products	22
(1) Coal Tar Distillation	22
(2) Disinfectants	27
Chapter Two—	
Acids, alkalies, salts and compressed gases	32
(1) Acids, alkalies and salts	32
(2) Compressed gases	39
Chapter Three—	
Explosives, Ammunition, Fireworks and Matches	49
(1) Explosives, Ammunition and Fireworks	52
(*a*) Explosives	52
(*b*) Ammunition	58
(*c*) Fireworks	62
(2) Matches	66
Chapter Four—	
Fertilizers	72
Chapter Five—	
Medicinal and Pharmaceutical Preparations	81
Chapter Six—	
Paints, Pigments and Varnishes	91
Chapter Seven—	
Soaps, Perfumes, Cosmetics and Toilet Preparations	101
(1) Soaps	101
(2) Washing Compounds	107
(3) Perfumery, Cosmetics and Toilet Preparations	111
Chapter Eight—	
Inks, Dyes and Colours	119
Chapter Nine—	
Wood Distillates and Extracts	126
(1) Wood Distillation	126
(2) Wood Extracts	133
Chapter Ten—	
Miscellaneous Chemical Industries	135

SUMMARY STATISTICS

Chemicals and Allied Products in Canada for the Years 1919, 1920, 1921

Year	Number of Plants	Capital	Employees	Salaries and Wages	Cost of Materials	Selling Value of Products
COAL TAR AND ITS PRODUCTS						
		$		$	$	$
1919	11	1,099,000	128	146,000	353,000	847,000
1920	11	1,385,000	160	217,000	615,000	2,035,000
1921	10	1,007,000	107	139,000	248,000	863,000
ACIDS, ALKALIES, SALTS AND COMPRESSED GASES						
1919	43	26,556,000	2,700	3,550,000	3,753,000	13,540,000
1920	50	32,473,000	3,479	5,444,000	4,813,000	18,729,000
1921	49	31,470,000	1,825	2,943,000	2,757,000	10,749,000
EXPLOSIVES, AMMUNITION, FIREWORKS AND MATCHES						
1919	18	20,198,000	2,815	2,387,000	4,720,000	10,631,000
1920	21	14,690,000	2,631	2,858,000	5,772,000	12,703,000
1921	19	13,094,000	1,487	1,819,000	3,926,000	8,664,000
FERTILIZERS						
1919	15	3,546,000	367	354,000	1,461,000	2,541,000
1920	16	3,840,000	402	437,000	2,389,000	3,788,000
1921	15	3,347,000	321	353,000	1,936,000	3,104,000
MEDICINAL AND PHARMACEUTICAL PREPARATIONS						
1919	97	11,828,000	2,776	2,594,000	5,854,000	13,740,000
1920	100	12,191,000	2,838	2,965,000	7,030,000	15,728,000
921	98	11,940,000	2,153	2,576,000	5,582,000	12,545,000
PAINTS, PIGMENTS AND VARNISHES						
1919	46	17,852,000	2,234	2,525,000	10,937,000	19,523,000
1920	48	20,321,000	2,568	3,431,000	15,919,000	26,939,000
1921	48	18,628,000	2,203	3,108,000	7,959,000	15,143,000
SOAP, PERFUMERY, COSMETICS AND TOILET PREPARATIONS						
1919	55	12,949,000	1,830	1,789,000	12,641,000	18,858,000
1920	58	16,239,000	1,996	2,267,000	12,925,000	19,805,000
1921	58	14,829,000	1,942	2,088,000	7,652,000	13,614,000
INKS, DYES AND COLOURS						
1919	24	1,550,000	331	419,000	1,151,000	2,362,000
1920	25	1,932,000	412	613,000	1,644,000	3,289,000
1921	23	1,713,000	335	579,000	961,000	2,372,000
WOOD DISTILLATES AND EXTRACTS						
1919	17	6,005,000	485	432,000	1,718,000	2,998,000
1920	17	4,247,000	605	701,000	2,153,000	4,982,000
1921	13	2,756,000	354	341,000	1,014,000	2,148,000
MISCELLANEOUS CHEMICAL INDUSTRIES						
1919	103	10,179,000	1,937	2,187,000	5,705,000	11,424,000
1920	110	11,524,000	2,192	2,802,000	6,810,000	13,688,000
1921	111	10,441,000	1,562	1,907,000	4,168,000	8,546,000
ALL INDUSTRIES						
1919	429	111,760,000	15,603	16,384,000	48,294,000	96,464,000
1920	456	118,841,000	17,283	21,736,000	60,069,000	121,687,000
1921	444	109,225,000	12,289	15,853,000	36,203,000	77,748,000

DOMINION BUREAU OF STATISTICS, CANADA

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CHEMICALS AND ALLIED PRODUCTS IN CANADA

IN 1919 AND 1920

INTRODUCTION AND SUMMARY

The production of chemicals and allied products in Canada in 1919 and 1920 was studied under ten groups, namely: Coal tar and its products; acids, alkalies, salts and compressed gases; explosives, ammunition, fireworks and matches; fertilizers; medicinal and pharmaceutical preparations; pigments, paints and varnishes; soaps, perfumery, cosmetics and other toilet preparations; inks, dyes and colour compounds; wood distillates and extracts; miscellaneous chemical industries. The industries coming under these items in 1920 comprised 456 establishments, employing more than 17,000 hands. A total of nearly $120,000,000 was employed as capital, and products aggregating nearly $122,000,000 in value were made. Pigments, paints and varnishes were easily the leading group. Soaps, perfumery, cosmetics and other toilet preparations came second, with acids, alkalies, salts and compressed gases a close third. Medicinal and pharmaceutical preparations; explosives, ammunition, fireworks and matches; wood distillates and extracts; fertilizers; inks, dyes and colour compounds; and coal tar and its distillation products followed in the order named.

Closely following production, the trend in imports and exports of chemicals and allied products showed a gradual but steady increase in value, particularly during the past twenty years. The earliest figures presently available are those for 1895, when a total of $3,469,200 worth was imported, made up of $1,174,408 from the United Kingdom, $1,614,921 from the United States and $679,871 from all other countries. The first figures now available for exports of chemicals and allied products date back to 1892, when a total of $760,800 was reached. Of this nearly $600,000 worth went to the United Kingdom and about $100,000 worth to the United States.

Tables have been prepared showing the values of these imports by countries of origin and of the exports by countries of destination from the first year for which data are available down to date.

The continuous advance which represented normal conditions before the war was much accentuated in the last four war years, and it is encouraging to note that during the past two fiscal years the export trade has been maintained at a level very considerably above what the normal pre-war rate of increase would have produced.

Table 1.—Imports into Canada, Chemicals and Allied Products, during the Fiscal Years ending March 31, 1895-1922.

Fiscal Years	United Kingdom	United States	Other Countries	Total Imports
	$	$	$	$
1895	1,174,408	1,614,921	679,871	3,469,200
1896	1,276,645	1,761,582	802,579	3,840,806
1897	1,205,029	1,853,837	745,691	3,804,557
1898	1,311,441	2,199,559	995,061	4,506,061
1899	1,479,598	2,450,280	1,046,541	4,976,419
1900	1,743,473	2,674,519	1,007,355	5,425,347
1901	1,770,468	2,927,679	994,417	5,692,564
1902	1,601,971	3,373,581	1,268,421	6,243,973
1903	1,849,785	3,757,950	1,376,794	6,984,529
1904	1,828,884	3,830,826	1,443,799	7,103,509
1905	1,988,784	4,106,188	1,467,730	7,562,702
1906	2,395,823	4,358,284	1,497,271	8,251,378
1907	2,422,444	3,502,662	1,134,719	7,059,825
1908	3,345,643	5,030,924	1,537,668	9,914,235
1909	3,016,650	5,096,238	1,308,063	9,420,951
1910	3,236,106	6,141,469	1,394,134	10,771,709
1911	3,553,692	6,981,961	1,954,123	12,489,776
1912	3,860,127	7,940,071	2,130,729	13,930,927
1913	4,411,455	10,220,001	3,011,005	17,642,461
1914	4,293,412	9,583,462	3,227,519	17,104,393
1915	3,061,189	9,907,278	1,418,379	14,386,846
1916	2,957,776	15,192,511	1,108,039	19,258,326
1917	4,183,090	23,151,423	1,338,485	28,672,998
1918	3,316,961	23,262,817	1,260,798	27,840,576
1919	3,397,095	28,719,765	2,165,787	34,282,647
1920	4,154,345	23,854,300	1,877,457	29,886,102
1921	6,048,717	26,766,364	3,509,531	36,334,612
1922	3,238,465	17,688,482	3,114,938	24,041,885

Table 2.—Exports of Canadian Products, Chemicals and Allied Products, during the Fiscal Years ending March 31, 1892-1922.

Fiscal Years	United Kingdom	United States	Other Countries	Total Exports
	$	$	$	$
1892	573,568	111,502	75,730	760,800
1893	257,541	115,766	87,467	460,774
1894	217,284	83,829	66,797	367,910
1895	204,089	199,876	58,306	462,271
1896	240,574	182,026	59,061	481,661
1897	142,329	157,802	82,810	382,941
1898	120,834	172,360	99,614	392,808
1899	172,782	197,723	129,402	499,907
1900	232,025	114,388	110,517	456,930
1901	245,905	377,982	168,088	791,975
1902	240,375	581,741	181,308	1,003,424
1903	213,173	653,954	268,217	1,135,344
1904	178,779	707,603	324,977	1,211,359
1905	292,171	777,721	332,725	1,402,617
1906	411,925	902,430	470,445	1,784,800
1907	327,688	712,524	320,991	1,361,203
1908	343,776	1,052,636	592,043	1,988,455
1909	358,472	1,073,620	612,376	2,044,468
1910	527,404	1,483,934	656,169	2,667,507
1911	543,300	1,684,008	673,071	2,900,379
1912	504,691	1,606,411	863,473	2,974,575
1913	613,595	2,270,631	934,196	3,818,422
1914	496,469	3,169,015	968,057	4,633,541
1915	649,334	3,749,631	893,016	5,291,981
1916	7,640,515	6,757,005	1,550,960	15,948,480
1917	32,593,751	15,137,772	4,861,412	52,592,935
1918	27,856,626	17,576,572	3,697,886	49,131,084
1919	20,176,855	30,671,606	5,951,338	56,799,799
1920	3,595,936	13,803,067	5,182,046	22,581,049
1921	3,225,947	11,694,858	4,661,246	19,582,051
1922	939,529	5,937,114	2,394,384	9,271,027

Summary statistics have been prepared in tabular form, and the table forming the frontispiece to this report shows the principal data regarding this group of industries for each of the past three years.

The other general tables are in two main groups: one for 1919 and the other for 1920. The nine tables in each group permit of a broad general survey being made both of the industrial groups in the series and of the provincial distribution for each section covered such as capital, labour, wages, cost of materials, value of products, etc., etc.

Following the general tables there are ten chapters each treating in detail a separate group, and presenting in easily accessible form the statistical data regarding every phase of the industry required by the student of economics and statistics, and by the business man seeking new avenues of development in his own or related lines of endeavour. The aim throughout has been to compile the available information in a way that might be easily read. For this reason, little mention has been made in the text of such data as may more readily be found in the tables.

Changing conditions following the war were reflected in the chemical industries of the country much as in other industrial activities throughout the Dominion. The most noticeable falling off of the industries with which indusrial chemistry had to do was, of course, in munitions. With the armistice the need for their products collapsed, the various plants were closed, and in many cases were immediately dismantled and sold. Raw materials stocked by these concerns were thrown on the market, and for a time the glut thus produced caused established and permanent industries much concern. That period, though trying, has come to an end, and market conditions are becoming more settled and trustworthy.

The firms continuing to manufacture explosives are in several instances expanding their interests, and are going into manufacture of fine chemicals on a modest scale. Medicinals are still being produced, but the prospects are somewhat uncertain in this field. The paint and varnish industry is advancing by leaps and bounds, and shows every prospect of becoming one of the most successful of Canadian developments. Canada still imports considerable quantities of soap, but the Canadian manufacturers are able to take care of an ever-increasing share of the domestic market and at the same time meet competition in certain lines in the exports field. In wood distillation there is much room for advance, and laboratories will have plenty to do for some time, but the application of scientific control of processes and plants is having its effect.

Data regarding production, imports and exports of all commodities are regularly compiled for Canada by the Dominion Bureau of Statistics at Ottawa. Production statistics are issued annually — in some cases monthly; imports and exports, as compiled from customs data, are printed monthly. Of interest particularly to chemists is the establishement within the past year of the Mining, Metallurgical and Chemical branch of the bureau, whose particular task is to collect and compile data relating to the chemical and mining industries of Canada, and to publish reports thereon. These data will be found of value as a barometer showing the rise or fall of production, and possibly as a guide to profitable new developments.

Progress in the manufacture of chemicals and allied products in recent years has been rapid and the results attained have more than justified the ventures made. The professional chemist and the chemical manufacturers have combined to advance the common weal, and a feeling of optimism dominates and leads the industry. Opportunities for the development of Canadian chemical industries are being sought out by careful research, and while Canada may not lead the world, there still are some of the chemical industries in which her influence will be strongly felt.

Table 3—Number of Plants with the Character and Distribution of their Ownership, Engaged in the Manufacture of Chemicals and Allied Products in Canada in 1919, by Industries

Industry	Total number of Plants operated in Canada	Character of Ownership			Distribution of Ownership				
		Number of individual or partnership	Number of incorporated companies	Total number of manufacturers	Par Value of Stocks and Bonds issued by incorporated Companies and held by Residents of the Countries indicated				
					Canada	Great Britain	United States	Other Countries	Total
					$	$	$	$	$
Coal tar and its products	11	1	10	11	77,169	694,431	349,500	.....	1,121,100
Acids, alkalies, salts and compressed gases	43	3	28	31	7,781,467	5,366,233	19,290,512	444,500	32,882,712
Explosives, ammunition, fireworks, matches	18	2	10	13*	2,617,600	6,901,400	5,438,700	44,600	15,002,300
Fertilizers	15	4	11	15	704,950	16,500	33,000	.....	754,450
Medicinal and pharmaceutical preparations	97	28	67	95	3,338,443	491,725	21,650,860	37,950	25,518,978
Pigments, paints and varnishes	46	9	33	42	9,868,528	340,600	10,415,500	9,600	20,634,228
Soap, perfumery, cosmetics and other toilet preparations	55	21	31	52	2,456,131	3,323,972	29,182,540	4,041	34,966,684
Inks, dyes and colour compounds	24	12	12	24	125,900	253,000	1,384,900	16,600	1,780,400
Wood distillates and extracts	17	2	8	10	2,642,050	4,321,383	.....	.....	6,963,433
Miscellaneous chemical industries	103	48	52	100	2,292,825	160,225	33,876,708	25,800	36,355,558
Total	429	130	262	393	31,905,063	21,869,469	121,622,220	583,091	175,979,843

*Two plants are operated by the Dominion Government.

Table 4.—Capital Employed in the Manufacture of Chemicals and Allied Products in Canada, by Provinces, in 1919

Industry	*Capital	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total for Canada
		$	$	$	$	$	$	$	$	$	
Coal tar and its products	Fixed assets	260,060	.....	.....	224,129	178,434	380	.....	.....	.....	663,003
	Liquid "	142,759	.....	.....	115,353	146,180	31,250	.....	.....	.....	435,542
	Total	402,819	.....	.....	339,482	324,614	31,630	.....	.....	.....	1,098,545
Acids, alkalies, salts and compressed gases	Fixed assets	132,045	.....	.....	5,955,683	11,995,348	157,710	.....	.....	744,354	18,985,140
	Liquid "	39,547	.....	.....	2,252,405	4,952,433	60,514	.....	.....	265,818	7,570,717
	Total	171,592	.....	.....	8,208,088	16,947,781	218,224	.....	.....	1,010,172	26,555,857
Explosives, ammunitions, fireworks matches	Fixed assets	.....	.....	.....	4,625,015	4,883,919	.....	.....	.....	3,746,638	13,255,572
	Liquid "	.....	.....	.....	4,599,142	1,494,319	.....	.....	.....	848,936	6,942,397
	Total	.....	.....	.....	9,224,157	6,378,238	.....	.....	.....	4,595,574	20,197,969
Fertilizers	Fixed assets	377,165	.....	121,787	20,000	227,673	.....	.....	.....	6,765	753,390
	Liquid "	1,125,891	.....	977,281	122,782	562,550	.....	.....	.....	3,660	2,792,164
	Total	1,503,056	.....	1,099,068	142,782	790,223	.....	.....	.....	10,425	3,545,554
Medicinal and pharmaceutical preparations	Fixed assets	19,387	.....	.....	412,803	1,823,123	308,493	.....	.....	3,739	2,567,545
	Liquid "	333,931	.....	.....	1,860,227	5,230,803	1,777,558	.....	.....	57,531	9,260,050
	Total	353,318	.....	.....	2,273,030	7,053,926	2,086,051	.....	.....	61,270	11,827,595
Pigments, paints and varnishes	Fixed assets	.....	.....	.....	3,761,914	1,605,763	510,464	.....	.....	405,162	6,283,303
	Liquid "	396,424	.....	.....	6,296,682	3,368,552	854,466	.....	.....	652,749	11,568,873
	Total	396,424	.....	.....	10,058,596	4,974,315	1,364,930	.....	.....	1,057,911	17,852,176
Soap, perfumery, cosmetics and other toilet preparations	Fixed assets	.....	.....	.....	105,452	535,718	3,281,681	652,139	864	158,150	184,380	4,918,384
	Liquid "	.....	.....	.....	450,010	581,423	5,760,010	612,801	700	270,391	354,902	8,030,237
	Total	.....	.....	.....	555,462	1,117,141	9,041,691	1,264,940	1,564	428,541	539,282	12,948,621
Inks, dyes and colour compounds	Fixed assets	.....	.....	.....	2,500	157,151	334,984	22,913	.....	.....	3,062	520,610
	Liquid "	.....	.....	.....	400	261,611	725,529	32,213	.....	.....	9,574	1,029,327
	Total	.....	.....	.....	2,900	418,762	1,060,513	55,126	.....	.....	12,636	1,549,937
Wood distillates and extracts	Fixed assets	.....	.....	.....	98,035	1,344,095	1,852,941	.....	.....	.....	.....	3,295,071
	Liquid "	.....	.....	.....	129,096	2,239,326	341,084	.....	.....	.....	.....	2,709,506
	Total	.....	.....	.....	227,131	3,583,421	2,194,025	.....	.....	.....	.....	6,004,577
Miscellaneous chemical industries	Fixed assets	21,002	.....	.....	5,954	1,301,968	4,088,822	800	500	4,575	200	5,423,821
	Liquid "	17,315	.....	.....	12,277	1,446,145	3,254,714	19,836	500	2,780	1,800	4,755,367
	Total	38,317	.....	.....	18,231	2,748,113	7,343,536	20,636	1,000	7,355	2,000	10,179,188
Total	Fixed assets	809,659	.....	333,728	18,338,476	30,272,688	1,652,899	1,364	162,725	5,094,300	56,665,839
	Liquid "	2,055,867	.....	1,569,064	19,775,096	25,836,174	3,388,638	1,200	273,171	2,194,970	55,094,180
	Total	2,865,526	.....	1,902,792	38,113,572	56,108,862	5,041,537	2,564	435,896	7,289,270	111,760,019

*Included in "Capital" are value of the fixed assets such as lands, buildings, machinery, tools, etc. The liquid assets comprise the value of stocks and materials on hand at the end of the year with the balance of cash, trading accounts, etc.

Table 5.—Number of Employees and Wages Paid in the Manufacture of Chemicals and Allied Products in Canada in 1919, by Industries

Industry	Average number salaried employees		Average number wage-earners		Total Employees (Yearly Average)			Total Salaries	Total Wages	Total Salaries and Wages
	Male	Female	Male	Female	Male	Female	Total	$	$	$
Coal tar and its products	22	6	91	9	113	15	128	40,435	105,914	146,349
Acids, alkalies, salts and compressed gases	384	76	2,230	10	2,614	86	2,700	740,752	2,808,949	3,549,701
Explosives, ammunition, fireworks, matches	179	22	1,817	797	1,997	818	2,815	383,585	2,003,905	2,387,490
Fertilizers	71	21	272	3	343	24	367	124,593	228,985	353,578
Medicinal and pharmaceutical preparations	538	250	814	1,174	1,352	1,424	2,776	1,307,274	1,286,885	2,594,159
Pigments, paints and varnishes	530	168	1,330	206	1,860	374	2,234	1,272,067	1,253,077	2,525,144
Soap, perfumery, cosmetics and other toilet preparations	318	128	938	446	1,256	574	1,830	757,069	1,032,306	1,789,375
Inks, dyes and colour compounds	92	30	161	48	253	78	331	244,697	174,576	419,273
Wood distillates and extracts	32	2	449	2	481	4	485	42,786	389,056	431,842
Miscellaneous chemical industries	373	131	1,088	345	1,461	476	1,937	760,945	1,426,573	2,187,518
Total	2,539	834	9,190	3,040	11,730	3,873	15,603	5,674,203	10,710,226	16,384,429

Table 6.—Number of Employees and Wages Paid in the Manufacture of Chemicals and Allied Products in Canada in 1919, by Provinces

All Industries	Average Number salaried employees		Average Number wage-earners		Total Employees			Total Salaries	Total Wages	Total Salaries and Wages
	Male	Female	Male	Female	Male	Female	Total	$	$	$
Nova Scotia	62	14	237	32	299	46	345	104,311	223,060	327,371
Prince Edward Island										
New Brunswick	33	8	134	19	167	27	194	60,705	119,791	180,496
Quebec	728	205	3,531	1,191	4,259	1,396	5,655	1,680,780	3,692,283	5,373,063
Ontario	1,431	535	4,608	1,653	6,040	2,187	8,227	3,287,963	5,952,063	9,240,026
Manitoba	154	37	195	103	349	140	489	269,203	250,727	519,930
Saskatchewan			3		3		3		3,000	3,000
Alberta	10	4	35	11	45	15	60	23,654	39,145	62,799
British Columbia	121	31	447	31	568	62	630	247,587	430,157	677,744
Total	2,539	834	9,190	3,040	11,730	3,873	15,603	5,674,203	10,710,226	16,384,429

Table 7.—Fuel Consumption in the Manufacture of Chemicals and Allied Products in Canada in 1919, by Industries

Industry	Canadian				Foreign				Total value of all fuel used
	Coal			All other fuel value	Coal			All other fuel value	
	Anthracite	Bituminous	Value		Anthracite	Bituminous	Value		
	Tons	Tons	$	$	Tons	Tons	$	$	$
Coal tar and its products		3,779	22,260	6,950	19	4,717	30,082		59,292
Acids, alkalies, salts and compressed gases	60	4,840	41,808	3,436	1,942	79,389	444,521	41,380	531,145
Explosives, ammunition, fireworks, matches	2,054	204	16,578	29,425	9,817	23,168	193,900	65,360	305,263
Fertilizers		4,705	31,371	2,983	50	1,128	7,980		42,334
Medicinal and pharmaceutical preparations		1,058	9,024	5,357	535	5,062	44,507		58,888
Pigments, paints and varnishes		6,095	56,598	34,472	520	7,026	58,770	15,530	165,370
Soap, perfumery, cosmetics and other toilet preparations		7,063	53,755	15,164	1,438	36,393	257,623	133	326,675
Inks, dyes and colour compounds		259	2,149	1,331	336	784	10,191		13,671
Wood distillates and extracts		2,766	19,467	32,802		45,511	338,487		390,756
Miscellaneous chemical industries		975	7,479	3,117	563	13,953	103,333	2,203	116,132
Total	2,114	31,744	260,489	135,037	15,220	217,131	1,489,394	124,606	2,009,526

Table 8.—Fuel Consumption in the Manufacture of Chemicals and Allied Products in Canada in 1919, by Provinces

All Industries	Canadian				Foreign				Total value of all fuel used
	Coal			All other fuel value	Coal			All other fuel value	
	Anthracite	Bituminous	Value		Anthracite	Bituminous	Value		
	Tons	Tons	$	$	Tons	Tons	$	$	$
Nova Scotia		9,507	62,013	2,312	15		232		64,557
Prince Edward Island									
New Brunswick		5,548	39,683	1,712	50		750		42,145
Quebec		13,955	124,709	51,517	10,216	48,021	415,165	30,044	618,435
Ontario				65,134	3,630	167,748	1,047,281	51,469	1,163,884
Manitoba		817	8,835	4,349	1,279	1,362	25,582	6	38,772
Saskatchewan				25	30		384		409
Alberta		1,087	6,629	49					6,678
British Columbia	2,114	830	21,620	9,939				43,087	74,646
Total	2,114	31,744	260,489	135,037	15,220	217,131	1,489,394	124,606	2,009,526

Table 9.—Power Equipment Used in the Manufacture of Chemicals and Allied Products in Canada in 1919, by Industries

Industry	Boilers rated H.P.		Engines rated H.P.				Hydraulic turbines or water wheels rated H.P.	Electric motors rated H.P.		Other power rated H.P.	Total rated H.P. of prime movers (exclusive of boilers)	Generators or dynamos		Air compressors number
	Fired by hand	Fired mechanically	Steam	Steam turbines	Gas	Oil		Alternating current	Direct current			Alternating current K.V.A.	Direct current K.W.	
Coal tar and its products	1,550	.....	62	.....	.....	.....	.....	358	.....	.....	420	.....	.....	.....
Acids, alkalies, salts and compressed gases	2,345	4,574	7,007	.....	95	.....	6,500	11,910	1,689	4,150	31,351	4,650	4,763	
Explosives, ammunition, fireworks, matches	8,148	.....	4,591	1,170	18	300	653	6,037	969	.....	13,738	1,000	.....	2
Fertilizers	1,995	.....	970	.....	.....	.....	.....	255	408	.....	1,633	.....	40	.....
Medicinal and pharmaceutical preparations	1,025	300	447	.....	3	.....	.....	918	536	.....	1,904	100	13	2
Pigments, paints and varnishes	2,114	.....	1,437	.....	.....	.....	100	1,993	672	70	4,272	.....	387	9
Soap, perfumery, cosmetics and other toilet preparations	3,498	4,370	754	.....	15	7	.....	1,507	365	16	2,664	1	527	5
Inks, dyes and colour compounds	601	.....	.....	.....	.....	.....	.....	483	120	.....	603	.....	.....	.....
Wood distillates and extracts	6,340	400	665	.....	.....	6	.....	810	20	.....	1,501	145	15	3
Miscellaneous chemical industries	1,427	900	385	.....	5	.....	.....	2,807	313	15,575	19,085	.....	1	9
Total	29,043	10,544	16,318	1,170	136	313	7,253	27,078	5,092	19,811	77,171	5,896	5,746	58

Table 10.—Summary of Financial Statistics Relative to the Manufacture of Chemicals and Allied Products in Canada in 1919, by Industries

Industry	Invested Capital	Wages and Salaries	Miscellaneous Expenses	Fuel	Cost of Materials	Total Expenditures	Selling Value of Products
	$	$	$	$	$	$	$
Coal tar and its products	1,098,545	146,349	89,201	59,292	352,896	647,738	847,091
Acids, alkalies, salts and compressed gases	26,555,857	3,549,701	3,865,555	531,145	3,753,395	11,699,796	13,540,376
Explosives, ammunition, fireworks, matches	20,197,969	2,387,490	2,512,720	305,263	4,719,762	9,925,235	10,631,024
Fertilizers	3,545,554	353,578	440,655	42,334	1,461,291	2,297,858	2,541,097
Medicinal and pharmaceutical preparations	11,827,595	2,594,159	3,288,116	58,888	5,854,106	11,795,269	13,739,776
Pigments, paints and varnishes	17,852,176	2,525,144	2,774,561	165,370	10,947,181	16,412,256	19,523,086
Soap, perfumery, cosmetics and other toilet preparations	12,948,621	1,789,375	1,716,724	326,675	12,640,787	16,473,561	18,857,657
Inks, dyes and colour compounds	1,549,937	419,273	422,369	13,671	1,151,315	2,006,628	2,361,587
Wood distillates and extracts	6,004,577	431,842	277,677	390,756	1,718,221	2,818,496	2,998,028
Miscellaneous chemical industries	10,179,188	2,187,518	2,279,908	116,132	5,704,858	10,288,416	11,424,266
Total	111,760,019	16,384,429	17,667,486	2,009,526	48,303,812	84,365,253	96,463,988

Table 11.—Summary of Financial Statistics Relative to the Manufacture of Chemicals and Allied Products in Canada in 1919, by Provinces

All Industries	Invested Capital	Wages and Salaries	Miscellaneous Expenses	Fuel	Cost of Materials	Total Expenditures	Selling Value of Products
	$	$	$	$	$	$	$
Nova Scotia	2,865,526	327,371	350,256	64,557	878,945	1,621,129	1,985,572
Prince Edward Island							
New Brunswick	1,902,792	180,496	161,255	42,145	1,246,055	1,629,951	1,994,418
Quebec	38,113,572	5,373,063	5,721,127	618,435	15,394,365	27,106,990	31,512,643
Ontario	56,108,862	9,240,026	10,177,349	1,163,884	26,282,579	46,863,838	53,239,190
Manitoba	5,041,537	519,930	559,239	38,772	2,192,840	3,310,781	3,809,135
Saskatchewan	2,564	3,000	2,822	409	3,630	9,861	11,048
Alberta	435,896	62,799	51,664	6,678	376,662	497,803	492,147
British Columbia	7,289,270	677,744	643,774	74,646	1,928,736	3,324,900	3,419,835
Total	111,760,019	16,384,429	17,667,486	2,009,526	48,303,812	84,365,253	96,463,988

GENERAL TABLES FOR 1920—TABLES 12-20 INCLUSIVE

Table 12.—Number of Plants with the Character and Distribution of their Ownership, Used in the Manufacture of Chemicals and Allied Products in Canada in 1920, by Industries

Industry	Total number of Plants operated in Canada	Character of Ownership			Distribution of Ownership				
		Number of individual owners or partnerships	Number of incorporated companies	Total number of manufacturers	Par Value of Stocks and Bonds issued by Incorporated Companies and held by residents of the Countries indicated				
					Canada	Great Britain	United States	Other Countries	Total
					$	$	$	$	$
Coal tar and its products	11	.....	10	10	140,187	929,912	348,200	.....	1,418,299
Acids, alkalies, salts and compressed gases	50	2	39	41	12,489,866	4,735,332	20,694,016	298,300	38,217,514
*Explosives, ammunition, fireworks, matches	21	3	10	*14	2,828,309	8,041,004	7,626,096	88,891	18,584,300
Fertilizers	16	5	11	16	742,950	16,500	33,000	.....	792,450
Medicinal and pharmaceutical preparations	100	27	72	99	4,200,086	234,675	19,855,285	722,625	25,012,671
Pigments, paints and varnishes	48	7	38	45	11,567,673	381,110	12,016,775	300	23,965,858
Soap, perfumery, cosmetics and other toilet preparations	58	17	39	56	2,030,951	3,323,702	32,066,749	3,251	37,424,653
Inks, dyes and colour compounds	25	11	14	25	225,530	33,000	1,741,090	27,880	2,027,500
Wood distillates and extracts	17	2	6	8	2,842,050	4,321,383	.....	.....	7,163,433
Miscellaneous chemical industries	110	46	61	107	1,862,410	1,401,310	34,779,858	80,000	38,123,578
Total	456	120	300	421	38,930,012	23,417,928	129,161,069	1,221,247	192,730,256

* Two plants are operated by the Dominion Government.

Table 13.—Capital Employed in the Manufacture of Chemicals and Allied Products in Canada, by Provinces, in 1920

Industry	*Capital	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total for Canada
		$	$	$	$	$	$	$	$	$	$
Coal tar and its products	Fixed assets	259,526	.....	.....	209,359	223,985	.....	.....	.....	.....	692,870
	Liquid assets	313,194	.....	.....	146,501	232,447	.....	.....	.....	.....	692,142
	Total	572,720	.....	.....	355,860	456,432	.....	.....	.....	.....	1,385,012
Acids, alkalies, salts and compressed gases	Fixed assets	152,126	.....	.....	6,026,977	15,694,579	229,679	.....	80,186	887,888	23,071,435
	Liquid assets	129,904	.....	.....	3,059,843	5,829,683	146,262	.....	57,531	178,358	9,401,581
	Total	282,030	.....	.....	9,086,820	21,524,262	375,941	.....	137,717	1,066,246	32,473,016

Explosives, ammunition, fireworks, matches	Fixed assets	.....	.....	.....	3,379,861	2,602,395	.....	.....	.....	2,144,707	8,126,963
	Liquid assets	.....	.....	.....	4,499,944	973,903	.....	.....	.....	1,088,698	6,562,545
	Total	.....	.....	.....	7,879,805	3,576,298	.....	.....	.....	3,233,405	14,689,508
Fertilizers	Fixed assets	375,409	.....	128,024	34,800	202,810	.....	.....	.....	7,850	748,893
	Liquid assets	1,210,764	.....	1,001,065	165,567	709,001	.....	.....	.....	4,633	3,091,030
	Total	1,586,173	.....	1,129,089	200,367	911,811	.....	.....	.....	12,483	3,839,923
Medicinal and pharmaceutical preparations	Fixed assets	19,387	.....	700	431,293	2,119,969	377,267	.....	.....	1,079	2,949,695
	Liquid assets	335,121	.....	1,600	2,088,291	4,670,175	2,136,262	.....	.....	10,011	9,241,460
	Total	354,508	.....	2,300	2,519,584	6,790,144	2,513,529	.....	.....	11,090	12,191,155
Pigments, paints and varnishes	Fixed assets	.....	.....	.....	4,173,348	1,877,629	487,930	.....	.....	480,175	7,019,082
	Liquid assets	.....	.....	.....	7,292,536	4,221,297	1,018,383	.....	.....	769,553	13,301,769
	Total	.....	.....	.....	11,465,884	6,098,926	1,506,313	.....	.....	1,249,728	20,320,851
Soap, perfumery, cosmetics and other toilet preparations	Fixed assets	.....	.....	116,283	599,417	4,156,586	673,168	.....	160,391	193,272	5,899,117
	Liquid assets	.....	.....	479,318	1,188,333	7,209,312	714,083	.....	367,944	380,809	10,339,799
	Total	.....	.....	595,601	1,787,750	11,365,898	1,387,251	.....	528,335	574,081	16,238,916
Inks, dyes and colour compounds	Fixed assets	.....	.....	2,550	160,399	355,637	22,892	.....	500	4,080	546,058
	Liquid assets	.....	.....	220	399,797	942,373	31,587	.....	225	11,445	1,385,647
	Total	.....	.....	2,770	560,196	1,298,010	54,479	.....	725	15,525	1,931,705
Wood distillates and extracts	Fixed assets	.....	.....	98,030	1,344,096	1,836,607	.....	.....	.....	.....	3,278,733
	Liquid assets	.....	.....	122,094	418,713	427,557	.....	.....	.....	.....	968,364
	Total	.....	.....	220,124	1,762,809	2,264,164	.....	.....	.....	.....	4,247,097
Miscellaneous chemical industries	Fixed assets	21,406	.....	18,107	1,491,809	4,084,394	6,247	400	4,500	540	5,627,403
	Liquid assets	13,130	.....	20,915	1,608,224	4,222,129	24,708	200	400	6,605	5,896,311
	Total	34,536	.....	39,022	3,100,033	8,306,523	30,955	600	4,900	7,145	11,523,714
Total for Canada	Fixed assets	827,854	.....	363,694	17,851,359	33,154,591	1,797,183	400	245,577	3,719,591	57,960,249
	Liquid assets	2,002,113	.....	1,625,212	20,867,749	29,437,877	4,071,285	200	426,100	2,450,112	60,880,648
	Total	2,829,967	.....	1,988,906	38,719,108	62,592,468	5,868,468	600	671,677	6,169,703	118,840,897

*Included in "Capital" are value of the fixed assets such as lands, buildings, machinery, tools, etc. The liquid assets comprise the value of stocks and materials on hand at the end of the year with the balance of cash, trading accounts, etc.

Table 14.—Number of Employees and Wages Paid in the Manu facture of Chemicals and Allied Products in Canada in 1920, by Industries

Industry	Average Number Salaried Employees		Average Number Wage Earners		Total Employees (Yearly Average)			Total Salaries	Total Wages	Total Salaries and Wages
	Male	Female	Male	Female	Male	Female	Total			
								$	$	$
Coal tar and its products	22	6	123	9	145	15	160	52,418	164,496	216,914
Acids, alkalies, salts and compressed gases	465	93	2,881	40	3,346	133	3,479	1,019,444	4,424,531	5,443,975
Explosives, ammunition, fireworks, matches	180	17	1,699	735	1,879	752	2,631	429,307	2,429,105	2,858,412
Fertilizers	76	17	306	3	382	20	402	137,940	299,498	437,438
Medicinal and pharmaceutical preparations	575	268	949	1,046	1,524	1,314	2,838	1,493,296	1,471,526	2,964,822
Pigments, paints and varnishes	556	196	1,590	226	2,146	422	2,568	1,737,154	1,693,910	3,431,064
Soap, perfumery, cosmetics and other toilet preparations	370	105	1,014	507	1,384	612	1,996	908,840	1,358,212	2,267,052
Inks, dyes and colour compounds	104	29	210	69	314	98	412	340,864	272,220	613,084
Wood distillates and extracts	41	5	558	1	599	6	605	73,778	627,332	701,110
Miscellaneous chemical industries	401	154	1,293	344	1,694	498	2,192	962,693	1,839,568	2,802,261
Total	2,790	890	10,623	2,980	13,413	3,870	17,283	7,155,734	14,580,398	21,736,132

Table 15.—Number of Employees and Wages paid in the Manufacture of Chemicals and Allied Products in Canada, by Provinces, in 1920

All Industries	Average number salaried employees		Average number wage-earners		Total employees (yearly average)			Total salaries	Total wages	Total salaries and wages
	Male	Female	Male	Female	Male	Female	Total			
								$	$	$
Nova Scotia	57	17	296	30	353	47	400	114,803	288,330	403,133
Prince Edward Island										
New Brunswick	39	5	123	16	162	21	183	70,637	134,899	205,536
Quebec	789	224	3,739	1,308	4,528	1,532	6,060	2,139,717	4,481,617	6,621,334
Ontario	1,635	578	5,690	1,438	7,325	2,016	9,341	4,213,432	8,530,954	12,744,386
Manitoba	108	33	235	112	343	145	488	261,476	384,960	646,436
Saskatchewan			1	1	1	1	2		2,400	2,400
Alberta	20	4	38	9	58	13	71	38,051	52,297	90,348
British Columbia	142	29	501	66	643	95	738	317,618	704,941	1,022,559
Total	2,790	890	10,623	2,980	13,413	3,870	17,283	7,155,734	14,580,398	21,736,132

Table 16.—Fuel Consumption in the Manufacture of Chemicals and Allied Products in Canada in 1920, by Industries

Industry	Canadian				Foreign				Total value of all fuel used
	Coal			All other fuel value	Coal			All other fuel value	
	Anthracite	Bituminous	Value		Anthracite	Bituminous	Value		
	Tons	Tons	$	$	Tons	Tons	$	$	$
Coal tar and its products	.....	4,279	25,677	16,402	2	3,157	35,112	.....	77,191
Acids, alkalies, salts and compressed gases	.....	22	306	21,468	3,859	123,442	966,578	84,056	1,072,408
Explosives, ammunition, fireworks, matches	464	1,350	21,975	21,121	8,495	23,792	254,104	75,649	372,849
Fertilizers	.....	5,035	34,464	5,539	134	1,346	10,913	520	51,436
Medicinal and pharmaceutical preparations	.....	942	11,909	5,072	735	5,546	62,607	.....	79,588
Pigments, paints and varnishes	.....	12,377	128,183	54,689	1,086	10,624	111,401	26,374	320,947
Soap, perfumery, cosmetics and other toilet preparations	.....	7,295	60,532	5,507	2,865	26,308	259,588	12,873	438,500
Inks, dyes, and colour compounds	.....	186	2,928	349	114	923	12,238	551	16,066
Wood distillates and extracts	.....	613	4,456	48,511	.....	60,937	570,126	.....	623,093
Miscellaneous chemical industries	.....	2,438	24,752	6,282	1,133	19,241	193,980	21,025	246,039
Total	464	34,537	315,482	184,940	18,423	285,316	2,576,647	221,048	3,298,117

Table 17.—Fuel Consumption in the Manufacture of Chemicals and Allied Products in Canada in 1920, by Provinces.

All Industries	Canadian				Foreign				Total value of all fuel used
	Coal			All other fuel value	Coal			All other fuel value	
	Anthracite	Bituminous	Value		Anthracite	Bituminous	Value		
	Tons	Tons	$	$	Tons	Tons	$	$	$
Nova Scotia	.....	9,639	62,834	1,483	449	.....	4,705	.....	69,022
Prince Edward Island	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Brunswick	.....	3,542	26,175	3,504	25	.....	462	.....	30,141
Quebec	.....	18,697	199,583	73,522	10,443	53,456	562,609	25,901	861,615
Ontario	.....	.....	.....	91,359	5,264	230,552	1,972,597	130,041	2,193,997
Manitoba	.....	735	7,889	1,956	2,110	1,293	34,234	202	44,281
Saskatchewan	.....	45	500	.....	.....	.....	.....	.....	500
Alberta	.....	729	3,816	724	50	.....	650	.....	5,190
British Columbia	464	1,150	14,685	12,392	82	15	1,390	64,904	93,371
Total	464	34,537	315,482	184,940	18,423	285,316	2,576,647	221,048	3,298,117

Table 18.—Power Equipment Used in the Manufacture of Chemicals and Allied Products in Canada in 1920, by Industries

Industry	Boilers rated H.P.	Engines Rated H.P.			Hydraulic turbines or water wheels rated H.P.	Electric motors rated H.P.	Other power rated H.P.	Total rated H.P. of prime movers (exclusive of boilers)
		Steam	Steam turbines	Internal combustion				
Coal tar and its products	870	75	.....	.....	.....	253	.....	328
Acids, alkalies, salts and compressed gases	8,772	5,417	.....	.....	4,900	20,222	110,160	140,699
Explosives, ammunition, fireworks, matches	4,707	757	1,205	12	595	4,734	.....	7,303
Fertilizers	1,720	925	.....	84	75	737	.....	1,821
Medicinal and pharmaceutical preparations	1,717	190	.....	8	.....	1,153	.....	1,351
Pigments, paints and varnishes	1,965	1,242	.....	.....	100	3,126	10	4,478
Soap, perfumery, cosmetics and other toilet preparations	6,548	619	.....	56	.....	1,555	16	2,246
Inks, dyes and colour compounds	500	.....	.....	.....	.....	884	.....	884
Wood distillates and extracts	6,040	673	.....	6	.....	830	.....	1,509
Miscellaneous chemical industries	2,332	300	.....	13	.....	4,159	128,289	132,761
Total	35,171	10,198	1,205	179	5,670	37,653	238,475	293,380

Table 19.—Financial Summary.—Summary of Financial Statistics Relative to the Manufacture of Chemicals and Allied Products in Canada in 1920, by Industries

Industry	Invested capital	Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total expenditures	Selling value of products
	$	$	$	$	$	$	$
Coal tar and its products	1,385,012	216,914	234,148	77,191	615,363	1,143,616	2,035,034
Acids, alkalies, salts and compressed gases	32,473,016	5,443,975	4,476,165	1,072,408	4,812,534	15,805,082	18,729,209
Explosives, ammunition, fireworks, matches	14,689,508	2,858,412	1,812,267	372,849	5,771,692	10,815,220	12,702,843
Fertilizers	3,839,923	437,438	597,200	51,436	2,388,818	3,474,892	3,788,027
Medicinal and pharmaceutical preparations	12,191,155	2,964,822	3,212,739	79,588	7,029,594	13,286,743	15,728,224
Pigments, paints and varnishes	20,320,851	3,431,064	3,857,502	320,947	15,931,923	23,541,436	27,042,096
Soap, perfumery, cosmetics and other toilet preparations	16,238,916	2,267,052	2,692,239	438,500	12,924,863	18,322,654	19,804,815
Inks, dyes and colour compounds	1,931,705	613,084	605,233	16,066	1,643,991	2,878,374	3,288,664
Wood distillates and extracts	4,247,097	701,110	547,138	623,093	2,153,005	4,024,346	4,982,283
Miscellaneous chemical industries	11,523,714	2,802,261	3,018,592	246,039	6,810,244	12,877,136	13,688,141
Total	118,840,897	21,736,132	21,053,223	3,298,117	60,082,027	106,169,499	121,789,336

Table 20.—Financial Summary.—Summary of Financial Statistics Relative to the Manufacture of Chemicals and Allied Products in Canada in 1920, by Provinces

All Industries	Invested capital	Wages and salaries	Miscellaneous expenses	Fuel	Cost of materials	Total expenditures	Selling value of products
	$	$	$	$	$	$	$
Nova Scotia	2,829,967	403,133	559,616	69,022	1,180,730	2,212,501	3,000,997
Prince Edward Island							
New Brunswick	1,988,906	205,536	197,542	30,141	1,619,379	2,052,598	2,252,581
Quebec	38,719,108	6,621,334	6,634,318	861,615	20,831,135	34,948,402	40,037,576
Ontario	62,592,468	12,744,386	12,031,073	2,193,997	30,719,809	57,689,265	65,649,468
Manitoba	5,868,468	646,436	622,101	44,281	2,545,597	3,858,415	4,712,330
Saskatchewan	600	2,400	1,096	500	998	4,994	6,600
Alberta	671,677	90,348	93,481	5,190	423,482	612,501	631,827
British Columbia	6,169,703	1,022,559	913,996	93,371	2,760,897	4,790,823	5,497,957
Total	118,840,897	21,736,132	21,053,223	3,298,117	60,082,027	106,169,499	121,789,336

CHAPTER ONE

COAL TAR AND ITS PRODUCTS

In the industrial group "Coal Tar and its Products" there are included all firms engaged in the distillation of tar or in the manufacture of commodities such as disinfectants, made from coal tar distillation products. The group is reviewed in two sections: (1) Coal Tar Distillation, (2) Disinfectants. Summary statistics covering both industries are included in the table given below:—

Summary of Statistics, 1919 and 1920

	1919	1920
Number of plants	11	11
Capital employed	$ 1,098,545	1,385,012
Value of products	$ 847,091	2,035,034
Cost of raw materials	$ 352,896	615,363
Cost of fuel used	$ 59,292	77,191
Miscellaneous expenses	$ 89,201	234,148
Salaries and wages	$ 146,349	216,914
Average number of employees	128	160

SECTION ONE—COAL TAR DISTILLATION

General Review

Many by-products from industries have become the source of valuable products after having been a source of trouble for years. Such was the case with coal tar which accumulated in large quantities in the early days of gas making. It was considered only a nuisance by the manufacturers, and since there was no sale for it, its only use was in burning under the retorts where it is said one part could be burnt with about four parts of coke. But the condition was altered by the discovery in distillates from coal tar, of a number of important substances used as intermediates for the preparation of explosives, aniline dyes, synthetic perfumes and essences, disinfectants and medicinal preparations. This discovery gave rise to great industries which have grown enormously.

Coal tar is used for preserving timber, making tar-paper, and tarred felt, protective paint, cement for acid pipes and for certain furnace linings. Medium soft pitch, the residue after coal-tar distillation, is also used as a cement in preparing briquettes from coal dust for fuel. It is now the usual practice to distil off the lighter constituents and leave the residual pitch or tar of sufficient consistency to be used for all ordinary purposes, after obtaining the valuable distillates. The residual tar is used also for a binder in asphalt pavements.

To some extent tar has been burnt in brick ovens built in conjunction with chambers in which the fine soot is deposited. In order to drive out tarry matter this soot is refined by heating in iron pans with luted lids. The refined soot is sold as lampblack, and is used in the paint and printing ink industries.

Formerly coal tar was obtained chiefly from illuminating and fuel gas manufacture, but the advent and general use of by-product coke ovens has given rise to an enormous increase in the output of coal tar. By far the greater part of the Cana-

dian production is derived from the latter source, 11,615,354 gallons of crude tar having been thus produced in 1919 as against only 6,391,705 gallons from the illuminating and fuel gas industry in the same year.

The yield of tar depends on the variety of coal used and the temperature of its destructive distillation. In the gas industry the chief aim is to obtain a large yield of gas, hence a high retort temperature is used, resulting in the "cracking" of some of the oils to form a permanent gas. Thus although the tar produced has a higher percentage of pitch and heavy constituents the total yield is less than in the coke industry where a lower temperature is used, giving a larger quantity of tar containing less pitch and more oils and ammonia liquor.

The tar is usually first separated from ammoniacal liquors which would cause frothing in the stills. It is heated by steam coils in tanks until the tar becomes thin enough to allow the admixed liquors to rise to the top. When the separation is complete the liquors are run off or the tar is drawn off from beneath. The tar is then ready for distillation. The first distillation results in a rough separation into fractions which are themselves complex mixtures. These fractions may or may not be further separated, according to the uses to which they are to be put.

Generally speaking, the different fractions and the constituents in each depend quantitatively on the origin of the tar. As mentioned previously, that produced from the illuminating and fuel gas industry is low in oil content, while the tar from by-product coke is high in oils but contains a relatively smaller percentage of pitch. In either case if the distillation is carried on until the anthracene and anthracene oils are distilled off a hard pitch results; if some of these heavy oils are allowed to remain the pitch is soft.

In European practice the first distillation is said to result in the following fractions:—

1. First runnings, up to 105°C. or 110°C., 2·5 per cent.
2. Light oil, up to 210°, 5 per cent.
3. Carbolic oil (for carbolic acid and naphthalene), up to 240°, } 27·5 per cent.
4. Creosote oil, up to 270°. }
5. Anthracene oil, above 270°, 10 per cent.
6. Pitch (with this yield the pitch is hard), 55 per cent.

American practice, given in the Manual of Industrial Chemistry (Rogers) in a chapter by F. E. Dodge, chemist for the Barrett Company, results as follows:—

1. Light oil, or crude naphtha. Till oil sinks in water; about 200°C.
2. Heavy oil, dead oil, or creosote oil, 200°C. to pitch.
3. Pitch—Residuum.

These fractions are further separated to obtain products as needed.

Coal Tar Distillation in Canada

In 1919 four plants in Canada produced tar distillates as a principal product, three throughout the year and one for five months only, the latter being a war-time industry, which was discontinued a few months after the armistice was signed. In 1920 there were four plants whose major product was refined tar and tar distillates. The additional plant reported in this industry for 1920 was one which had previously been principally engaged in the manufacture of ammonia compounds.

Capital Investment.—Capital invested in the three plants in this industry in Canada at the end of 1919 amounted to $951,591, of which land, buildings, fixtures and equipment were valued at $643,129, or 67.6 per cent of the total. Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand represented 23·8 per cent, or $226,091; while the balance, 8·6 per cent, or $82,371, was the amount of cash, trading and operating accounts, and bills receivable.

At the end of 1920 the total capital employed had increased to $1,272,153, the additional investment being largely accounted for in the value of stocks and supplies on hand, and in cash and trading account balances.

Table 1 shows the distribution of capital investment in each year, but does not include the plant mentioned above which was operated for only a few months in 1919. In all other tables for 1919 the data refer to the four plants.

Table 1.—Capital Employed in the Coal Tar Distillation Industry in 1919 and 1920

Kind	1919	1920
	$	$
Land, buildings, fixtures, machinery and tools	643,129	674,618
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	226,091	334,937
Cash, trading and operating accounts and bills receivable	82,371	262,598
Total	951,591	1,272,153

Products.—Conforming to the increase in capital investment in the tar distillation industry in 1920 over 1919 the selling value of the products made in the industry also increased, and even to a greater extent, rising in value from $687,189 in 1919 to $1,817,831 in 1920. The principal increase in production was in the manufacture of creosote oils, although the value of the naphthalene produced was nearly double and the value assigned to the pitch made was about three times as high as in the preceding year.

Table 2 shows the products of the industry itemized as to kind, quantity and selling value for each of the two years 1919 and 1920.

Table 2.—Products of the Coal Tar Distillation Industry, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Selling value	Quantity	Selling value
			$		$
Creosote oils	Gals.	2,680,943	355,965	4,402,960	770,453
Naphthalene	Lbs.	1,972,486	40,788	2,888,527	74,530
Pitch	Lbs.	52,067,728	190,974	56,722,700	637,071
Benzene, naphtha, toluene, road tars and other products			99,462		*335,777
Total			687,189		1,817,831

*In 1920 refined tar, road tars, tarred papers and felts included in addition to the various other products.

Materials Used.—The total cost of materials used in 1919 was $299,521 of which $259,399, or 87% of the total, was paid for 9,606,565 gallons of crude coal tar. The balance, $40,122, or 13.4%, was paid for sulphuric acid, caustic soda, oils, and various other miscellaneous materials not separately listed. In 1920 the crude tar used amounted to 12,171,234 gallons, valued at the plant at $361,295, or 74.9% of the total cost of materials. All other materials such as those mentioned above and including building paper and felt amounted in value to $121,332, or 25.1% of the total which was $482,627.

Employees, Salaries and Wages.—During 1919 salaried employees received a total payment of $27,743 as compared with $38,750 paid to such employees in the following year.

The average number of wage-earners in this industry in 1919 was 81, while in 1920 it had increased to 111. Wages paid in the two years amounted to $87,616, and $144,088 respectively.

Table 3 gives the distribution of salaried employees and wage-earners as on December 15th, or on the nearest day of normal operations. In 1919 the distribution for one plant was given as on May 31st, the last day of normal operation. For this reason the works sub-total in Table 3 is slightly greater than the number of wage-earners shown in Table 4 for December 1919.

Table 3.—Number of Employees by Classes, Coal Tar Distillation Industry as on December 15, or the Nearest Representative Day, 1919 and 1920

Kind	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried Employees:						
Officers, superintendents and managers	5	.....	5	7	.....	7
Clerks, stenographers, salesmen and other salaried employees	10	4	14	7	4	11
Office sub-total	15	4	19	14	4	18
Wage-earners, receiving per week:						
Less than $10	8	.....	8	8	.....	8
$10 but less than $15	1	.....	1	12	.....	12
$15 but less than $20	14	.....	14	10	.....	10
$20 but less than $26	20	.....	20	13	.....	13
$26 but less than $30	8	.....	8	20	.....	20
$30 and over	33	.....	33	66	.....	66
Works sub-total	84	.....	84	129	.....	129
Grand Total	99	4	103	143	4	147

Table 4 shows the number of wage-earners by months, according to the pay-rolls on the 15th of each month, or the nearest representative working day. No female wage-earners were employed.

Table 4.—Number of Wage-Earners by Months, Coal Tar Distillation Industry, 1919 and 1920

Month	1919	1920
January	100	113
February	91	72
March	99	87
April	106	111
May	91	143
June	78	145
July	71	103
August	65	93
September	62	95
October	61	101
November	66	144
December	76	129
Average	81	111

Fuel and Power.—The cost of fuel used as given in the following table included freight, duty and handling charges and was the cost as laid down at the plant.

Table 5.—Fuel Used in the Coal Tar Distillation Industry in 1919 and 1920

	Year	Canadian		Foreign	
		Quantity	Cost	Quantity	Cost
		Tons	$	Tons	$
Bituminous coal, run of mine	1919	3,779	22,260	4,707	29,749
	1920	4,279	25,677	3,149	34,984
Oil, tar and pitch	1919	.....	6,935	.....	.....
	1920	.....	16,402	.....	.....
Sub totals	1919	.....	29,195	.....	29,749
	1920	.....	42,079	.....	34,984
Total cost of fuel used	1919				$58,944
	1920				77,063

The power equipment and quantity of power actually employed is shown in the following table. The greater portion of the power used is supplied from boilers since a large amount of steam is necessary in connection with the distilling operations of the industry.

Table 6.—Power Employed in the Coal Tar Distillation Industry, 1919 and 1920

	Year	No. of units	Total H.P. according to manufacturers' rating	Total H.P. actually used
Boilers	1919	10	1,550	1,385
	1920	8	870	870
Steam engines	1919	6	62	62
	1920	8	75	75
Electric motors	1919	9	358	118
	1920	6	223	119

Miscellaneous Expenses.—Miscellaneous expenditures are listed in Table 7, and a summary of expenditures is given in Table 8.

Table 7.—Miscellaneous Expenses Chargeable to Manufacturing in the Coal Tar Distillation Industry in 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	3,525	3,547
Cost of purchased power	972	1,505
Insurance (premium for year only)	7,284	11,645
Provincial and municipal taxes, excess profits, etc.	2,394	8,943
Advertising expenses	260	646
Travelling expenses	2,136	5,902
Repairs to buildings and machinery	14,050	34,724
All other sundry expenses (not including salaries, wages, fuel and cost of materials used)	22,708	125,582
Total miscellaneous expenditures	53,329	192,494

Table 8.—Summary of Expenditures

	1919	1920
	$	$
Salaries	27,743	38,750
Wages	87,616	144,088
Fuel	58,944	77,063
Materials	299,521	482,627
Miscellaneous expenses	53,329	192,494
Total expenditures	527,153	935,022

Table 9.—Value Added by Manufacturing

	1919	1920
	$	$
Selling value of products	687,189	1,817,831
Cost of materials	299,521	482,627
Value added by manufacturing	387,668	1,335,204

SECTION TWO.—DISINFECTANTS

General Review

The extensive use of coal tar products in the manufacture of disinfectants has led to this report being included under the general heading "Coal Tar and Its Products."

The true meaning of the term "disinfectant" is very frequently misunderstood. The Dictionary of Applied Chemistry (Thorpe) defines disinfectants as "bodies that will kill, by one of many different means, germs or other living organisms (either of animal or vegetable nature) which are capable, by contagion or otherwise, of acting injuriously on the higher forms of life." In this sense disinfectants differ from antiseptics, such as alcohol and borax which merely prevent putrefaction. The relative values of disinfectants is discussed at considerable length in the Dictionary of Applied Chemistry. From experiments it has been shown that disinfectants may have widely varying effects according to conditions, and different quantities have to be used according to the amount of harmless material with which they may react. This is particularly true of permanganates which are powerful disinfectants but are so easily reduced that they are often wasted on harmless matter. Mercuric chloride is probably the most powerful disinfectant known, being a certain germicide, but care has to be exercised in its use owing to its extreme poisonous quality. The halogens, particularly chlorine and bromine, are also recognized as powerful disinfectants. Cresol and the higher homologues of phenol are important disinfectants for ordinary purposes but their use should be with careful consideration since there is every chance for them to be rendered useless by dilution with other hydrocarbons or tar oils with little or no disinfecting powers.

Manufacture of Disinfectants in Canada

In 1919 disinfectants constituted the principal product made by seven establishments in Canada, five being in Ontario and one in each of the provinces of Quebec and Manitoba. In the following year the firm in Manitoba had discontinued making disinfectants as a major product but a new plant had been opened in Quebec so that there were still seven plants reporting in the industry.

Capital Invested.—The total capital invested at the end of 1918 amounted to $67,942. By the end of 1919 the capital employed was $146,942, an increase of 116.3% over the preceding year, but in 1920 there was a decline to a total of $112,859.

Table 1 shows the distribution of capital employed at the end of each of the three years, 1918, 1919 and 1920.

Table 1.—Capital Employed in the Manufacture of Disinfectants in 1918, 1919, 1920

Item	1918		1919		1920	
	$	Per cent of total	$	Per cent of total	$	Per cent of total
Lands, buildings, fixtures, machinery and tools	14,564	21	19,874	14	18,252	16
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	39,906	59	72,340	49	64,605	57
Cash, trading and operating accounts and bills receivable	13,472	20	54,740	37	30,002	27
Total	67,942	100	146,954	100	112,859	100

Products.—All products and by-products obtained in 1920 had a total selling value of $217,203 as compared with $159,902 in 1919, and $116,083 in 1918. The products have not been listed in detail since in several instances a given product was made by one plant alone and under the Statistics Act, publication of statistics divulging the operations of individual concerns is not permitted.

In 1919 the selling value of disinfectants was $72,200, or 45.2% of the total value of products while in 1920 similar products were valued at $69,361, or 31.9% of the total for that year.

Table 2 shows comparable values for the several classes of products made in each year. Although the principal product made by each firm in this industrial group was disinfectants, the variety of minor products made, and the extent of the business done in these small lines is shown in the last item of the table.

Table 2.—Products Made, Disinfectants Industry, 1919 and 1920

Products	1919		1920	
	Quantity	Selling value at Works	Quantity	Selling vaule at Works
	Gal.	$	Gal.	$
Disinfectants	.....	72,200	64,911	69,361
Liquid soaps	38,151	28,163	45,682	27,583
Polishes and machine oils	.....	15,984	.....	9,351
All other products *	.....	43,555	.....	110,908
Total	.....	159,902	.....	217,203

*Includes paper towels, insecticides, embalming fluid, pharmaceutical preparations, etc.

Materials Used.—The materials used in 1920 cost at the factories $132,736 as compared with $53,375 in 1919 and $44,760 in 1918. With the exception of the materials for the manufacture of polishes the greater portion entered into disinfectants, and disinfected products. Extensive use was made of hydrocarbons, both the aliphatic of the paraffin series and the aromatic from coal tar. Metal salts, such as lead nitrate

and zinc chloride, with distinctive disinfecting properties were also used. Many of the materials were used in such small quantities that a detailed list is not given here, a rough grouping only being made in Table 3.

Table 3.—Materials Used in the Manufacture of Disinfectants in Canada in 1919 and 1920

Kind	1919	1920
	Cost at Works	Cost at Works
	$	$
Petroleum oils and products	2,942	5,944
Coal tar and coal tar oils	11,898	14,088
Essential oils	3,055	3,866
Containers (boxes, bottles, etc.)	11,806	13,745
All other materials	23,674	95,093
Total	53,375	132,736

Employees, Salaries and Wages.—There was a considerable increase in the total salaries and wages paid during 1919. Whereas in 1918 seven salaried employees received only $6,112 and an average of 9 employees on wages received a total wage of $6,657, in 1919, nine employees on salary received $12,692 during the year, while employees on wages, the average number of whom was 19, received a total of $18,298.

In 1920 ten salaried employees received $13,668 of which $9,400 went to 6 officers, superintendents and managers. The average number of wage-earners was 21, and the sum paid in wages during the year amounted to $20,408.

Table 4 shows the distribution of both salaried employees by sex and occupation and of wage earners according to their weekly rates of pay as on December 15th, or the nearest representative working day, 1919 and 1920.

Table 4.—Number of Employees by Classes in the Disinfectants Industry as on December 15, 1919 and 1920

Kind	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees:						
Officers, superintendents and managers	6	.....	6	5	1	6
Clerks, stenographers and other salaried employees	1	2	3	3	1	4
Office sub-total	7	2	9	8	2	10
age Earners: receiving per week,						
Less than $10	1	.....	1	2	1	3
$10 but less than $15	.....	6	6	1	4	5
$15 but less than $20	5	2	7	1	2	3
$20 but less than $26	5	1	6	5	.....	5
$26 but less than $30	4	.....	4	.....	.....	.....
$30 and over	4	.....	4	.....	.....	.....
Works sub-total	19	9	28	9	7	16
Grand total	26	11	37	17	9	26

Table 5 shows the number of employees on the pay-rolls for the whole industry on the fifteenth day of each month in 1919 and 1920.

Table 5.—Number of Wage-Earners by Months and by Sex, Disinfectants Industry, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	5	10	15	9	7	16
February	9	10	19	19	8	27
March	7	10	17	9	7	16
April	8	9	17	8	7	15
May	8	10	18	9	7	16
June	9	10	19	19	8	27
July	5	10	15	9	7	16
August	10	10	20	9	12	21
September	14	8	22	19	13	32
October	12	8	20	19	13	32
November	14	9	23	9	12	21
December	19	9	28	9	7	16
Monthly average	10	9	19	12	9	21

Fuel.—Only a small quantity of fuel was used in the disinfectant industry, the total quantity used during 1919 costing only $348, of which $333, was paid for anthracite and bituminous coal. The balance of $15 was paid for gas. In 1920 the total cost of fuel used was only $128, all of which was paid for imported coal.

Miscellaneous Expenses.—Miscellaneous expenses chargeable to manufacturing during 1919 and 1920 are given in Table 6 and a summary of the principal expenditures in the industry are itemized in Table 7.

Table 6.—Miscellaneous Expenses Chargeable to Manufacturing in the Disinfectants Industry in 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	3,604	4,531
Cost of purchased power	721	844
Insurance (premium for year only)	1,095	701
Provincial, municipal and business tax, etc.	682	801
Advertising expenses	11,770	3,395
Travelling expenses	4,507	5,268
Repairs to buildings and machinery	449	464
All other sundry expenses (not including fuel cost, materials used, salaries and wages)	13,044	25,650
Total miscellaneous expenses	35,872	41,654

Table 7.—Summary of Expenditures in the Disinfectants Industry in 1919 and 1920

	1919	1920
	$	$
Salaries	12,692	13,068
Wages	18,298	20,408
Fuel	348	128
Materials used	53,375	132,736
Miscellaneous expenses	35,872	41,654
Total expenditures	120,585	208,594

Table 8.—Value Added by Manufacturing

—	1919	1920
	$	$
Value of products	159,902	217,203
Cost of materials	53,375	132,736
Value added by manufacturing	106,527	84,467

Names of the Manufacturers in Canada of Coal Tar and its Products in 1920, Arranged by Provinces

SECTION 1.—COAL TAR DISTILLATION

SECTION 2.—DISINFECTANTS

NOVA SCOTIA—

Section 1—Dominion Tar & Chemical Co., Ltd., Sydney.

QUEBEC—

Section 1—Canadian Tar Products Co., Ltd., Box 11, Station S, Montreal.

Section 2—Robert W. Rowe, Ltd., 133 Youville Square, Montreal.
West Disinfecting Co., 301 Casgrain street, Mile End, Montreal.

ONTARIO—

Section 1—Dominion Tar and Chemical Co., Ltd., Sault Ste. Marie.
Hamilton Tar and Ammonia Co., Ltd., Caroline and Mulberry streets, Hamilton.

Section 2—Canadian Germicide Co., Ltd., 1 Howard Park avenue, Toronto.
Norman C. Hayner Co., 235 College street, Toronto.
McCrimmon's Chemicals, Ltd., 2 Johnson Lane, Toronto.
Polusterine Products Co. of Canada, Ltd., 168-70 Ontario street, Toronto.
Rosealene Products, Ltd., 417 Queen street west, Toronto.

The report for 1919 covered the same Ontario firms manufacturing disinfectants, but Canadian Sundries, Limited, 392 Notre Dame street, Winnipeg, Man., was included. The West Disinfecting Co., Montreal, was the only Quebec firm reporting in 1919.

CHAPTER TWO

ACIDS, ALKALIES, SALTS AND COMPRESSED GASES

Employing upwards of 3,000 men and making products valued at almost $19,000,000 annually the firms engaged in the manufacture of industrial chemicals other than coal tar products including such heavy chemicals as sulphuric, nitric and hydrochloric acids, caustic soda and salt cake and calcium carbide, and compressed gases such as oxygen, hydrogen, ammonia and acetylene dissolved in acetone—have made rapid strides in recent years, until at the end of 1920 there were in all 50 plants in Canada engaged in this industry. The report of production is in two sections: (1) acids, alkalies and salts; (2) compressed gases It is to be observed that the report of the industry producing heavy chemicals includes only those firms whose major product places them in this category. Summary statistics for the whole industry follows:

Summary Statistics for 1919 and 1920

—		1919	1920
Number of plants		43	50
Capital employed	$	26,555,857	32,473,016
Value of products	$	13,540,376	18,729,209
Cost of raw materials	$	3,753,395	4,812,534
Cost of fuel used	$	531,145	1,072,408
Miscellaneous expenses	$	3,865,555	4,476,165
Salaries and wages	$	3,549,701	5,443,975
Average number of employees		2,700	3,479

SECTION ONE.—ACIDS, ALKALIES AND SALTS

General Review

The principal heavy chemicals occupy a place of importance in the commercial ventures of any nation but it is not often that the exceptional utility of these commodities is fully appreciated by the general public. Acids, alkalies and salts do not appear in the finished products of commerce in the formation of which they have played a great part, at least they do not appear in the same sense that iron does in a piece of machinery and so it is that the true value of the heavy chemical industry is thought of only by the few. A further reason for this seeming indifference is due to the fact that the production of the necessary heavy chemicals for use in further manufacture is often most profitably carried out nearby the main plant, owing usually to the high costs of transportation and as well, in part, the difficulty and sometimes the danger of handling large quantities of such products without endangering the lives of those employed.

Capital Employed.—The manufacture of industrial chemicals in Canada in 1920 involved a total capital investment of $28,439,000 and included the value of land, buildings, fixtures, machinery and tools, the cost of materials on hand, stocks in process, finished products and supplies on hand and the balance of cash, trading and operating accounts. The growth of the industry was reflected in the fact that the investment in the preceding year comprising the same items amounted to $24,272,000 so that approximately four and one-quarter million dollars more money was employed in this industry in 1920 than in the preceding year.

The industry is centered in Ontario where the capital employed in such plants in 1920 amounted to $19,395,000. Over $8,250,000 was invested in similar plants in Quebec and $792,000 in British Columbia. In Ontario and Quebec the capital employed showed an increase over the preceding year but in British Columbia it was slightly less than in 1919. Table 1 shows the details of the capital investment in the manufacture of industrial chemicals by provinces in 1919 and 1920.

Table 1.—Capital Employed in the Acids, Alkalies and Salts Industry in Canada, 1919 and 1920

	Quebec		Ontario		British Columbia		Total Dominion	
	1919	1920	1919	1920	1919	1920	1919	1920
	$	$	$	$	$	$	$	$
Cost of lands, buildings, fixtures, machinery and tools	5,689,048	5,494,527	11,377,765	14,461,356	707,213	711,407	17,774,026	20,667,290
Materials on hand, stocks in process, fuel and miscellaneous supplies on hand	957,868	1,715,069	2,302,309	2,750,383	109,183	76,809	3,369,360	4,542,261
Cash, trading and operating accounts and bills receivable	1,212,556	1,041,841	1,811,510	2,183,647	105,058	4,300	3,129,124	3,229,788
Totals	7,859,472	8,251,437	15,491,584	19,395,386	921,454	792,516	24,272,510	28,439,339

Products.—It has not been found possible to list the quantity and value of each product made as in a number of instances the total production of a given commodity was made in one plant. The principal items have been tabulated and explanatory notes following the table will possibly prove of value.

Table 2.—Products of the Acids, Alkalies and Salts Industry in Canada in 1919 and 1920

Products	Unit of measure	1919		1920	
		Quantity	Selling value	Quantity	Selling value
			$		$
Acids—					
Hydrochloric 20° Bé	lbs.	9,006,915	173,894	10,696,000	177,282
Nitric 100%	"	547,270	77,491	1,211,580	150,470
Sulphuric 66° Bé	tons	48,809	1,035,246	72,863	1,483,753
Calcium carbide	"	62,802	3,776,268	59,664	3,597,257
Calcium cyanamide	"	59,245	4,065,749	62,862	5,087,000
Sodium sulphate—					
(Glauber's salt)	"	1,417	45,731	1,781	50,336
(Salt cake)	"	3,191	56,937	3,979	74,903
Other sodium and potassium compounds[1]			1,342,398		3,561,243
All other products[2]			1,496,214		2,553,824
Total			12,069,928		16,736,068

[1]Includes arsenates, benzoates, bisulphites, carbonates, chlorates, citrates, cyanides, hydroxides and iodides.

[2]Includes acetic acid, 28 per cent made by Graselli Chemical Co., Ltd., acetic glacial made by Canadian Electro Products Co., Ltd., calcium hypochlorite (bleach), made by Canadian Salt Co., Ltd., phosphorus, made by Electric Reduction Co., Ltd., soda ash made by Brunner, Mond Canada Limited, and various other products and by-products.

Ontario was the principal producing province in this group with Quebec second and British Columbia, third. The values of the outputs reported from the three provinces are given in the next table.

Table 3.—Production of Acids, Alkalies and Salts by Provinces, 1919 and 1920

Provinces	1919	1920
	$	$
Quebec	3,486,254	4,597,076
Ontario	8,440,863	11,705,844
British Columbia	142,811	433,148
Total for Canada	12,069,928	16,736,068

Materials Used.—A certain grouping of materials has been made in the following table with a view to presenting the facts as clearly as possible without divulging data supplied by individual concerns.

This arrangement has only been adopted after careful compilation of the data and it is hoped the plan adopted will meet with approval.

Table 4.—Materials Used in the Acids, Alkalies and Salts Industry in 1919 and 1920

Materials	Unit of measure	1919		1920	
		Quantity	Cost	Quantity	Cost
			$		$
Acids—					
Hydrochloric	lbs.	55,061	1,316	122,910	3,342
Nitric	"	13,925	1,557	39,800	3,550
Sulphuric 66° Bé	"	1,970,136	28,128	1,654,260	29,633
Other acids[1]			16,863		12,258
Ethyl alcohol	gals.	3,496	6,500	29,701	38,012
Ammonium compounds[2] and ammonia liquor			47,539		62,336
Barium compounds[3]			17,979		18,158
Calcium carbonate (limestone)	tons	135,685	334,710	200,713	442,107
Calcium chloride	lbs.	431,770	5,216	15,100	233
Calcium oxide and hydroxide (quick and slaked lime)	tons	48,231	319,063	45,035	416,568
Coke	"	74,272	688,069	75,367	790,059
Carbon electrodes			416,676		454,759
Copper sulphate	lbs.	28,330	2,714	99,213	7,923
Pyrites (iron and copper)	tons	48,193	293,310	38,616	210,812
Sodium carbonate	lbs.	1,001,191	21,324	3,029,534	91,383
Sodium chloride including brine			149,560		157,820
Sodium hydroxide	lbs.	125,345	5,941	137,552	7,107
Sodium nitrate	tons	898	74,320	1,315	101,026
Other sodium and potassium compounds[4]			73,893		25,754
Sulphur	tons	709	17,218	11,495	279,121
All other materials[5]			979,576		1,296,909
Total materials			3,501,472		4,448,870

[1]Includes acetic, acetic glacial, arsenious, boric, carbolic, citric, cresylic, hydrofluoric, phosphoric, salicylic, tartaric.

[2]Includes carbonate, chloride, nitrate and sulphate.

[3]Includes chloride and peroxide.

[4]Includes sodium arsenate, bicarbonate, bichromate, bisulphite, cyanide, nitrite, phosphate, sulphate, sulphide, and sodium potassium tartrate, potassium carbonate, chloride, permanganate and sulphate.

[5]Includes acetylene, calcium acetate, chlorine, calcium fluoride, crude iodine, mercury, petroleum, phosphate rock, containers, and other miscellaneous materials.

Table 5.—Cost of Materials Used in the Acids, Alkalies and Salts Industry, by Provinces.

Provinces	1919	1920
	$	$
Quebec	1,369,098	1,926,123
Ontario	2,056,748	2,360,669
British Columbia	75,626	162,078
Total for Canada	3,501,472	4,448,870

Employees, Salaries and Wages.—Salaries and wages, in the ratio of about 1 to 7, paid in 1920 in this industry amounted in all to nearly five million dollars and paid for the services of more than 2,600 employees, nearly all of whom were men.

Table 6 provides a classification of the employees: the office staff by nature of duties, and wage earners by weekly rates of pay. The improvement in employment in 1920 corresponding to the increased output is shown in Table 7, while Table 8 shows for each year the trend in employment in this industry in each province as determined from the number on the pay-rolls on the fifteenth day of each month.

Table 6.—Number of Employees by Classes in the Acids, Alkalies and Salts Industry in 1919 and 1920

	1919			1920		
	Male	Female	Salaries	Male	Female	Salaries
			$			$
Salaried Employees—						
Officers, superintendents and managers	47		182,404	46	2	184,292
Clerks, stenographers and salesmen and other salaried employees	255	41	386,775	278	49	553,442
Office sub-total	302	41	569,179	324	51	737,734
	Male	Female	Total	Male	Female	Total
Wage-earners receiving per week—						
Under $10	41	2	43	7	34	41
$10 but under $15	46	11	57	47	7	54
$15 but under $20	233	1	234	47	1	48
$20 but under $26	875	1	876	374	6	380
$26 but under $30	525		525	579	1	580
$30 and over	576		576	1,304		1,304
Works sub-total	2,296	15	2,311	2,358	49	2,407
Grand total	2,598	56	2,654	2,682	100	2,782

Table 7.—Number of Wage-Earners by Months and by Sex, in the Acids, Alkalies and Salts Industry, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	2,456	8	2,464	2,430	38	2,468
February	2,102	9	2,111	2,373	40	2,413
March	2,181	10	2,191	2,459	41	2,500
April	1,935	8	1,943	2,547	39	2,586
May	1,955	9	1,964	2,605	40	2,645
June	1,867	9	1,876	2,810	40	2,850
July	1,781	9	1,790	2,941	40	2,981
August	1,749	9	1,758	2,837	36	2,873
September	1,831	9	1,840	2,792	42	2,834
October	2,021	12	2,033	2,723	43	2,766
November	2,142	13	2,155	2,556	45	2,601
December	2,151	15	2,166	2,339	41	2,380
Average	2,014	10	2,024	2,618	40	2,658

Table 8.—Number of Wage-Earners in the Acids, Alkalies and Salts Industry by Provinces for 1919 and 1920

Month	Quebec		Ontario		British Columbia		Total Dominion	
	1919	1920	1919	1920	1919	1920	1919	1920
January	941	797	1,468	1,604	55	67	2,464	2,468
February	817	774	1,235	1,573	59	66	2,111	2,413
March	886	793	1,248	1,637	57	70	2,191	2,500
April	783	864	1,103	1,656	57	66	1,943	2,586
May	860	863	1,056	1,721	48	61	1,964	2,645
June	776	899	1,055	1,888	45	63	1,876	2,850
July	715	933	1,039	1,987	36	61	1,790	2,981
August	535	890	1,191	1,924	32	59	1,758	2,873
September	562	886	1,249	1,883	29	65	1,840	2,836
October	536	829	1,472	1,872	25	65	2,033	2,766
November	592	686	1,543	1,850	20	65	2,155	2,601
December	612	560	1,536	1,760	18	60	2,166	2,380
Average	718	814	1,266	1,780	40	64	2,024	2,658

Table 9.—Salaries and Wages Paid in the Acids, Alkalies and Salts Industry by Provinces for 1919 and 1920

Province	Salaries		Wages		Total	
	1919	1920	1929	1920	1919	1920
	$	$	$	$	$	$
Quebec	146,050	157,031	741,370	813,856	887,420	970,887
Ontario	394,894	567,764	1,771,470	3,131,367	2,166,364	3,699,131
British Columbia	28,235	12,939	48,491	91,898	76,726	104,837
Total Dominion	569,179	737,734	2,561,331	4,037,121	3,130,510	4,774,855

Fuel and Power.—There was a remarkable increase in the consumption of fuel by this industry in 1920 as compared with the records for the previous year; the cost was more than doubled and amounted to more than a million dollars, most of which sum was paid out for imported fuel. Tables have been prepared to show an analysis

of the fuel requirements of the industry; Table 10 shows the quantities and cost of the different kinds of fuel according to origin; Table 11 shows the consumption of fuel by kinds and by provinces. Table 12 gives an analysis of the power equipment of the operating plants.

Table 10.—Fuel Used in the Acids, Alkalies and Salts Industry in 1919 and 1920, by Grades and Origins

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at Works	Quantity	Cost at Works
				$		$
Bituminous Coal—						
Slack	1919	Short tons			48,705	251,958
	1920	"			53,897	386,584
Lump	1919	"	138	581	5,222	28,206
	1920	"			40,861	315,847
Run of mine	1919	"	4,493	38,327	23,795	138,312
	1920	"			26,452	199,037
Anthracite Coal—						
Lump	1919	"	60	446	54	560
	1920	"			2,093	20,415
Dust of slack	1919	"			1,722	11,440
	1920	"			1,152	7,344
Lignite Coal, run of mine	1919	"				
	1920	"	48	376		
Coke	1919	"	8	94	2,914	31,049
	1920	"	294	4,124	5,037	73,689
Gasoline	1919	Imp. gals			211	92
	1920	"	11,494	4,597	365	153
Oil, fuel	1919	"			4,519	263
	1920	"	30,722	2,453		
Wood	1919	Cords	1,200	2,344		
	1920	"	885	2,711		
Gas	1919	M cu. ft	842	829		
	1920	"	360	447		
Other fuel	1919					323
	1920					577
Sub-totals	1919			42,621		462,203
	1920			14,708		1,003,646
Total cost of fuel used	1919					$ 504,824
	1920					1,018,354

Table 11.—Value of Fuel Used in the Acids, Alkalies and Salts Industry in 1919 and 1920

Kind	Year	Quebec	Ontario	British Columbia	Total Dominion
		$	$	$	$
Bituminous coal—					
Slack	1919	9,370	242,588	.....	251,958
	1920	43,005	343,579	.....	386,584
Lump	1919	.....	28,206	581	28,787
	1920	17,539	298,308	.....	315,847
Run of mine	1919	89,319	87,320	.....	176,639
	1920	64,416	134,621	.....	199,037
Anthracite coal—					
Lump	1919	224	336	446	1,006
	1920	441	19,974	.....	20,415
Dust of slack	1919	2,808	8,632	.....	11,440
	1920	7,260	84	.....	7,344
Lignite coal: run of mine	1919	.....	.....	.....	.....
	1920	.....	.....	376	376
Coke	1919	1,238	29,905	.....	31,143
	1920	1,385	76,428	.....	77,813
Gasoline	1919	92	.....	.....	92
	1920	153	4,597	.....	4,750
Oil, fuel	1919	.....	.....	263	263
	1920	1,625	828	.....	2,453
Wood	1919	2,093	.....	251	2,344
	1920	1,370	948	393	2,711
Gas	1919	464	365	.....	829
	1920	447	.....	.....	447
Other fuel	1919	.....	323	.....	323
	1920	.....	577	.....	577
Total	1919	105,608	397,675	1,541	504,824
	1920	137,641	879,944	769	1,018,354

Table 12.—Power Employed in the Acids, Alkalies and Salts Industry in 1919 and 1920

	Number of Units		Total H.P. according to Manufacturers rating		Total H.P. used	
	1919	1920	1919	1920	1919	1920
Boilers—						
Fired by hand	23	37	1,845	8,022	1,123	5,000
Fired mechanically	11		4,574		3,210	
Engines—						
Steam	37	28	6,887	5,282	2,377	1,607
Gas	2	.....	95	.....	70	.....
Hydraulic turbines or water wheels	5	6	6,500	4,900	3,930	3,175
Electric motors—						
Alternating	805	941	10,222	16,776	7,112	8,378
Direct	122		1,621		1,249	
Generators—						
Alternating	8	.....	4,650 (K.V.A.	.....	2,225 (K.V.A.)	.....
Direct	19	.....	4,363 (K.W.)	.....	1,223 (K.W.)	.....
Other power	2	.....	4,000	110,010*	2,000	64,599*

*In 1920 power used in electric furnaces and electric processes was reported.

Table 13.—Miscellaneous Expenses in the Acids, Alkalies and Salts Industry in 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	9,683	15,955
Cost of purchased power	834,902	785,241
Insurance (premium for year only)	92,924	135,164
Taxes:—		
Excise	11,456	15,259
Excess profits	364,262	128,515
Provincial and municipal	71,138	56,981
Royalties, use of patents, etc	19,924	35,159
Advertising expenses	7,371	35,266
Travelling expenses	20,893	23,654
Repairs to buildings and machinery	898,496	1,253,973
All other sundry expenses	1,146,047	1,456,529
Total	3,477,096	3,941,696

Table 14.—Summary of Expenditures

	1919	1920
	$	$
Salaries	569,179	737,734
Wages	2,561,331	4,037,121
Fuel	504,824	1,018,354
Miscellaneous expenses	3,477,096	3,941,696
Materials used	3,501,472	4,448,870
Total expenditures	10,613,902	14,183,775

Table 15.—Value Added by Manufacturing

	$	$
Value of products	12,069,928	16,738,308
Cost of materials	3,501,472	4,448,870
Value added by manufacturing	8,568,456	12,289,438

SECTION TWO.—COMPRESSED GASES

Considerable progress has been made during the past three years in the manufacture of compressed gases in Canada, and the value of the products of this industry has risen from one million dollars in 1918 to $1,470,000 in 1919, and $1,993,000 in 1920.

Included in this industrial group are all firms manufacturing oxygen, hydrogen, acetylene, carbon dioxide and ammonia. Some firms who did not manufacture their own acetylene purchased the gas and compressed it in cylinders in which form it was marketed. The activities of these firms are included in this report. The manufacture of pure ammonia gas is also included but the production of ammonia liquor from

gas plants, is excluded. The wide-spread demand for the products of this industry was reflected by the gradual increase in the number of plants and by their Dominion-wide distribution.

Table 1.—Number of Plants in the Compressed Gas Industry by Provinces, 1918, 1919 and 1920

Year	Quebec	Ontario	Manitoba	Nova Scotia	British Columbia	Alberta	Total Dominion
1918	3	3	4	2	1	1	14
1919	3	7	4	2	1	...	17
1920	4	11	4	2	3	1	25

Practically all the oxygen made was produced by the liquid air process. By this means air is compressed, cooled and expanded by a continuous process until it liquifies. The nitrogen, for which there is no market, is then boiled off and discarded, leaving the oxygen to be bottled and sold. A small quantity of oxygen was also made by the electrolytic process. Oxygen is used principally in conjunction with acetylene in the oxy-acetylene blow pipe for cutting and welding metals, but it also finds considerable use in hospitals, chemical laboratories and metallurgical plants. Acetylene is produced entirely by the decomposition of calcium carbide in contact with water. Since acetylene is liable to violent decomposition when under pressures exceeding two atmospheres this gas is compressed into cylinders containing acetone, in which it dissolves. In this condition it is safe under 10 atmospheres pressure for use in such portable lighting systems as those on motor cycles and automobiles.

Carbon dioxide is the familiar soda water gas which is used for aerated water, carbonating liquors and very extensively in the manufacture of the refreshing drinks dispensed at soda fountains. It is produced in this country by passing air through incandescent coke. The carbon of the coke unites with the oxygen contained in the air to form carbon dioxide gas. This gas is then scrubbed and compressed into cylinders in which form it is placed on the market.

One or two firms whose production is not included in this report manufactured considerable quantities of chlorine and hydrogen, but consumed the whole production in their own plants, the former in the manufacture of bleach liquor and the latter for the hydrogenation of oils.

Capital Employed.—There has been a continued increase in the amount of capital employed in this industry, the details of which are shown in Table 2.

Table 2.—Capital Employed in the Compressed Gas Industry by Provinces in 1919 and 1920

—	Year	Quebec	Ontario	Manitoba	*Other Provinces	Total Dominion
Land, buildings, fixtures, machinery and tools	1919	266,635	617,583	157,710	169,186	1,211,114
	1920	532,450	1,233,223	229,679	408,793	2,404,145
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	1919	20,533	393,463	28,901	47,713	489,610
	1920	206,877	464,588	101,711	213,400	986,576
Cash, trading and operating accounts and bills receivable	1919	61,448	446,151	31,613	43,411	582,623
	1920	96,056	431,065	44,551	71,284	642,956
Total	1919	348,616	1,456,197	218,224	260,310	2,283,347
	1920	835,383	2,128,876	375,941	693,477	4,033,677

*1919, Nova Scotia and British Columbia. 1920, Nova Scotia, Alberta and British Columbia.

Products.—In point of value, the production of oxygen was the principal commodity made in this industry, with the production of acetylene next, and carbon dioxide a close third. Further analysis of the products of the industry has not been shown but a note following the table on production makes the necessary explanation.

Table 3.—Products Made in the Compressed Gas Industry in 1918, 1919 and 1920

Product	Unit of Measure	1918		1919		1920	
		Quantity	Value	Quantity	Value	Quantity	Value
			$		$		$
Oxygen	Cu. ft	33,880,000	674,693	34,768,587	562,603	54,618,400	888,072
Acetylene	"	5,484,755	138,881	11,684,646	277,516	16,121,701	389,032
Carbon dioxide	lbs.	2,742,632	221,001	3,571,681	332,659	3,582,149	378,335
Other products			13,696		297,670		*337,702
Total			1,048,271		1,470,448		1,993,141

*Includes ammonia, aqua and anhydrous, made by the Canadian Ammonia Co., and hydrogen made by the National Electro Products, Limited.

The total value of the products of this industry made in each province, is given in Table 4.

Table 4.—Products of the Compressed Gas Industry by Provinces, 1919 and 1920

Year	Quebec	Ontario	Manitoba	*Other Provinces	Total Dominion
	$	$	$	$	$
1919	399,074	705,611	199,901	165,862	1,470,448
1920	576,590	896,499	246,799	273,253	1,993,114

*1919, Nova Scotia and British Columbia. 1920, Nova Scotia, Alberta and British Columbia.

The production of acetylene shown in Table 3 includes the acetylene made from carbide, and also the acetylene purchased by compressing firms and marketed in the form of acetylene dissolved in acetone, compressed in cylinders.

In the table following, which shows the quantities and values of the materials used, the purchased acetylene is shown as a separate item.

Table 5.—Materials Used in the Compressed Gas Industry in 1918, 1919 and 1920

Kind	Unit of Measure	1918		1919		1920	
		Quantity	Cost	Quantity	Cost	Quantity	Cost
			$		$		$
Calcium carbide	tons	82	4,922	799	49,095	1,111	94,421
Coke	"	1,851	29,662	2,325	37,042	2,655	50,600
Acetylene	Cu. ft.	1,787,000	10,073	5,122,194	27,963	6,531,304	36,751
Acetone	lbs.	25,843	9,967	75,362	18,522	217,468	55,587
Sodium hydroxide	"		67	4,972	316	147,900	11,667
Sodium bichromate	"					10,000	3,500
Zinc oxide	tons					16	5,760
All other materials			34,351		118,985		*105,378
Total			89,042		251,923		363,664

*Includes ammonia liquor, calcium chloride, sulphuric acid, calcium carbonate, sodium carbonate and zinc chloride.

Table 6.—Cost of Materials Used in the Compressed Gas Industry by Provinces, 1919 and 1920

Year	Quebec	Ontario	Manitoba	*Other Provinces	Total Dominion
	$	$	$	$	$
1919	40,128	180,678	16,918	14,199	251,923
1920	57,925	238,265	28,254	39,220	363,664

*1919, Nova Scotia and British Columbia. 1920, Nova Scotia, Alberta and British Columbia.

Employees, Salaries and Wages.—The number of employees in this industry practically doubled between 1918 and 1920. Table 7 shows the number of employees by classes for the past two years, and Table 8 shows the difference in the number employed, as shown by the payrolls of the companies reporting for the 15th day of each month in the past two years. In this latter table the number of wage-earners is shown by provinces. In 1918 one female employee was engaged from January to August, inclusive. For the balance of that year and the two following years, there were no female employees beyond those in the office. The average number employed in the whole industry in 1918 was ninety-four salaried employees and one hundred and seventy-one wage-earners.

Table 7.—Number of Employees in the Compressed Gas Industry by Classes in 1919 and 1920

	1919			1920		
	Male	Female	Salaries	Male	Female	Salaries
			$			$
Salaried Employees—						
Officers, superintendents and managers	33	.....	82,345	53	.....	137,153
Clerks, stenographers, salesmen and other salaried employees	49	35	89,228	88	42	144,557
Office Sub-total	82	35	171,573	141	42	281,710
	Male	Female	Total	Male	Female	Total
Wage-earners receiving per week—						
Under $10	.....	.....	.....	1	.....	1
$10 but under $15	.....	.....	.....	6	.....	6
$15 but under $20	12	.....	12	14	.....	14
$20 but under $26	84	.....	84	62	.....	62
$26 but under $30	99	.....	99	82	.....	82
$30 and over	40	.....	40	105	.....	105
Works sub-total	235	.....	235	270	.....	270
Grand total	317	35	352	411	42	453

Table 8.—Number of Wage-Earners in the Compressed Gas Industry by Provinces in 1919 and 1920

Month	Quebec		Ontario		Manitoba		*Other Provinces		Total Dominion	
	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920
January	46	46	113	131	22	22	30	32	211	231
February	46	48	112	129	21	22	31	33	210	232
March	46	53	112	135	19	22	28	34	205	244
April	46	51	115	140	21	22	27	35	209	248
May	46	52	115	145	23	22	28	35	212	254
June	45	55	116	148	20	24	27	36	208	263
July	45	53	115	154	22	26	24	39	206	272
August	47	53	114	170	22	25	26	39	209	287
September	50	55	125	170	25	24	26	40	226	289
October	50	57	127	177	24	24	27	40	228	298
November	50	46	135	162	23	23	27	40	229	271
December	52	47	137	163	23	22	29	38	241	270
Average	47	51	120	152	22	23	27	37	216	263

*1919, Nova Scotia and British Columbia. 1920, Nova Scotia, Alberta and British Columbia.

Table 9.—Salaries and Wages Paid in the Compressed Gas Industry by Provinces in 1919 and 1920

Province	Salaries		Wages		Total	
	1919	1920	1919	1920	1919	1920
	$	$	$	$	$	$
Quebec	39,345	66,187	48,500	74,510	87,845	140,697
Ontario	82,305	136,726	141,683	224,637	223,988	361,363
Manitoba	29,969	29,257	27,519	33,816	57,488	63,073
*Other Provinces	19,954	49,540	29,916	54,447	49,870	103,987
Total Dominion	171,573	281,710	247,618	387,410	419,191	669,120

*1919, Nova Scotia and British Columbia. 1920, Nova Scotia, Alberta and British Columbia.

Fuel and Power.—The consumption of fuel for power and heating was a small item the details of which for 1919 and 1920 have been arranged in Tables 10, and 11. The power equipment of this industry in 1919 and 1920 consisted principally of electric motors presumably used to operate compressors. Details of the equipment as reported by the manufacturers are given in Table 12.

Table 10.—Fuel Used in the Compressed Gas Industry by Kind and Source, 1919 and 1920

Kind	Year	Unit of Measure	Canadian		Foreign	
			Quantity	Cost	Quantity	Cost
				$		$
Bituminous coal—		Short tons				
Slack	1919	"	32	387	1,462	10,234
	1920	"	.....	.....	1,850	25,238
Lump	1919	"	7	82	.....	.....
	1920	"	.....	.....	15	180
Run of mine	1919	"	170	1,985	205	2,161
	1920	"	22	306	367	4,244
Anthracite coal, lump	1919	"	.....	.....	166	1,650
	1920	"	.....	.....	614	7,689
Coke screenings	1919	"	.....	.....	2,758	9,653
	1920	"	.....	.....	2,726	9,637
Oil, fuel	1919	Imp. gals.	.....	.....	.....	.....
	1920	"	14,600	2,628	.....	.....
Wood	1919	Cords	1	11	.....	.....
	1920	"	60	525	.....	.....
Gas	1919	M cu. ft.	158	158	.....	.....
	1920	"	3,045	3,607	.....	.....
Sub-total	1919	.....	.....	2,623	.....	23,698
	1920	.....	.....	7,066	.....	46,988
Total cost of fuel used	1919	.....	.....	.....	$26,321	
	1920	.....	.....	.....	54,054	

Table 11.—Value of Fuel Used in the Compressed Gas Industry by Kinds and Provinces, 1919 and 1920

Kind	Year	Quebec	Ontario	Manitoba	*Other Provinces	Total Dominion
		$	$	$	$	$
Bituminous coal—						
Slack	1919	.....	10,234	387	.....	10,621
	1920	630	24,608	.....	.....	25,238
Lump	1919	.....	.....	.....	82	82
	1920	.....	.....	.....	180	180
Run of mine	1919	1,265	1,426	735	720	4,146
	1920	2,364	1,798	388	.....	4,550
Anthracite coal, lump	1919	400	707	543	.....	1,650
	1920	803	3,596	1,208	2,082	7,689
Coke screenings	1919	.....	9,653	.....	.....	9,653
	1920	.....	9,637	.....	.....	9,637
Oil, fuel	1919	.....	.....	.....	.....	.....
	1920	.....	2,628	.....	.....	2,628
Wood	1919	.....	.....	11	.....	11
	1920	.....	525	.....	.....	525
Gas	1919	.....	158	.....	.....	158
	1920	.....	3,607	.....	.....	3,607
Total cost of fuel used	1919	1,665	22,178	1,676	802	26,321
	1920	3,797	46,399	1,596	2,262	54,054

*1919, Nova Scotia and British Columbia. 1920, Nova Scotia, Alberta and British Columbia.

Table 12.—Power Employed in the Compressed Gas Industry in 1919 and 1920

—	No. of Units		Total H.P. according to Manufacturers' Rating		Total H.P. Used	
	1919	1920	1919	1920	1919	1920
Boilers—						
Fired by hand	2	3	500	750	400	400
Fired mechanically	...	...	...	...	...	...
Engines—						
Steam	3	4	120	135	90	75
Electric motors—						
Alternating current	60	104	1,688	3,446	1,601	2,947
Direct current	4	...	68	...	68	...
Other power	9	9	150	150	100	100
Generators—						
Direct current	1	...	400 k.w.	...	400 k.w.	...

Miscellaneous Expenses.—The expenses applicable to manufacturing operations which are not shown elsewhere have been collected in Table 13.

Table 13.—Miscellaneous Expenses in the Compressed Gas Industry in 1919 and 1920

—	1919	1920
	$	$
Rent of offices, works and machinery	5,900	8,509
Cost of purchased power	37,203	71,312
Insurance (premium for year only)	14,347	17,690
Taxes—		
Excise	...	8,669
Excess profits tax	5,739	37,004
Provincial and municipal	10,282	14,841
Royalties	507	...
Advertising expenses	9,303	15,066
Travelling expenses	12,011	21,332
Repairs to buildings and machinery	65,664	54,792
All other sundry expenses	227,503	285,254
Total	388,459	534,469

Table 14.—Summary of Expenditures in the Compressed Gas Industry, 1919 and 1920

—	1919	1920
	$	$
Salaries	171,573	281,710
Wages	247,618	387,410
Fuel	26,321	54,054
Miscellaneous expenses	388,459	534,469
Materials used	251,923	363,664
Total expenditures	1,085,894	1,621,307

Table 15.—Value Added by Manufacturing

	$	$
Value of products	1,470,448	1,993,141
Cost of materials	251,923	363,664
Value added by manufacturing	1,218,525	1,629,477

Imports and Exports.—Tables showing the imports and exports of such commodities as are included in the foregoing production report, have been prepared and are given below.

Table 16.—Imports into Canada of Acids, Alkalies and Salts for Calendar Years 1919 and 1920

Kind	Unit of Measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Acid, sulphuric	lbs	2,874,614	38,759	640,424	22,664
Alum in bulk, ground or unground, but not calcined and sulphate of alumina or alum cake	"	8,053,333	150,317		
Ammonia, sulphate of	"	203,408	12,129	624,659	31,495
Barium, peroxide of, non-alcoholic for use in the manufacture of peroxide of hydrogen when imported by manufacturers of peroxide of hydrogen	"	103,127	23,788	165,728	40,986
Acetic acid	gals	6,483	16,162	6,636	4,827
Acid, nitric	lbs	73,010	9,964	111,859	16,233
Borax	"	2,960,379	227,638	3,229,215	263,869
Chloride of lime and hypochlorite of lime	"	17,817,053	304,691	39,058,935	1,179,663
Collodion (for use in films for photo engraving, and for engraving copper rollers, when imported by photo-engravers and manufacturers of copper rollers)	gals	1,092	1,901	977	2,238
Glycerine, n.o.p.	lbs	25,961	4,868	91,859	18,100
Potash, muriate and sulphate of, crude	"	630,890	34,691	14,639,137	686,436
Nitrite of Soda	"	1,025,186	32,875	3,565,402	127,806
Sodium bicarbonate	"	6,991,706	150,697	9,653,225	233,255
Sodium bisulphite	"	805,432	27,711	668,425	36,986
Sulphate of iron (copperas)	"	926,262	16,761	1,382,940	29,288
Sulphuric ether, chloroform and solutions of peroxide of hydrogen	lbs				19,530
Tartaric acid, crystals	"	455,623	315,740	550,743	400,774
Lime	cwt	79,540	53,190	54,774	48,790
Gypsum, crude (sulphate of lime)	tons	1,238	22,556	2,294	25,477
Gypsum or plaster of paris ground, not calcined	cwt	1,700	2,695	2,354	3,966
Gypsum or plaster of paris, calcined, and prepared wall plaster	cwt	30,503	22,204	56,438	48,859
Nitrate of soda or cubic nitre	lb	9,084,536	411,423	49,596,148	1,651,934
Soda ash	"	62,636,999	1,305,348	14,915,413	372,936

Table 17.—Exports of Acids, Alkalies and Salts from Canada for Calendar Years 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Acids—					
Sulphuric	cwt.	105,393	83,559	100,339	89,992
Other	"	69,304	388,819	167,601	1,393,549
Ammonium sulphate	"	373,312	1,846,713	366,585	1,895,660
Baking powder	"	3,533	62,497	4,750	83,939
Calcium acetate	"	104,265	257,857	117,981	337,342
Calcium carbide	"	956,556	3,960,410	939,771	3,848,091
Calcium cyanamide	"	1,171,584	4,104,052	1,196,574	4,031,162
Cobalt oxide and salts	lbs.	468,225	731,506	595,739	1,137,586
Lime	cwt.	193,073	128,810	460,310	381,899
Lye	.....	.....	35,865	.....	45,494
Magnesium sulphate	cwt.	.....	.....	14,851	3,737
Potash, crude	"	633	8,559	720	19,009

List of Plants Whose Operations are Listed in the Foregoing Chapter on Acids, Alkalies and Salts and Compressed Gases in Canada in 1920

NOVA SCOTIA—

Canadian Carbonate Co., Ltd., Dartmouth, N.S.
L'Air Liquide Society, Halifax, N.S.

QUEBEC—

Canada Carbide Co., Ltd., Shawinigan Falls, Que.
Canadian Carbonate Co., Ltd., 1 Hadley street, Côte St. Paul, Montreal, Que.
Canadian Electro-Products Co., Ltd., Shawinigan Falls, Que.
Cowan, John, Chemical Co., Ltd., 9 Dalhousie street, Montreal, Que.
Electric Reduction Co., Ltd., Buckingham, Que.
L'Air Liquide Society, 1 Ernest street, Montreal, Que.
Laporte-Irwin, Ltd., 20 St. Paul street west, Montreal, Que.
National Drug & Chemical Co., 23 St. Jean Baptiste street, Montreal, Que.
National Electro Products, Ltd., 149 Moreau street, Montreal, Que.
The Nichols Chemical Co., Ltd., Capelton, Que.
Prest-O-Lite Co. of Canada, Ltd., Transmission avenue, Shawinigan Falls, Que.
Les Usines Chimiques du Canada, Ltée., 24 Grothé street, Montreal, Que.

ONTARIO—

American Cyanamid Co., Niagara Falls, Ont.
Canada Carbide Co., Ltd., Merritton, Ont.
Brunner, Mond Canada, Ltd., Amherstburg, Ont.
Canadian Ammonia Co., Ltd., 65-87 Heward avenue, Toronto, Ont.
Canadian Carbonate Co., Ltd., 263 Sorauren avenue, Toronto, Ont., and foot of Simcoe street, Hamilton, Ont.
The Canadian Hanson & Van Winkle Co., Ltd., 15-25 Morrow avenue, Toronto, Ont.
The Canadian Salt Co., Ltd., Sandwich, Ont.
Chemical Products of Canada, Ltd., Trenton, Ont.
Commercial Acetylene Supply Co., Ltd., 9 Noble street, Toronto, Ont.
Commonwealth Chemical Corp. of Canada, Ltd., Kildare road, Walkerville, Ont.
Dominion Oxygen Co., Ltd., Hillcrest Park, Toronto, Ont.
Foster, W. L., 333½ Adelaide street west, Toronto, Ont.
The Grasselli Chemical Co., Ltd., Burlington street, Hamilton, Ont.

ONTARIO—*Concluded*

L'Air Liquide Society, York street, London, Ont.; Shaughnessy street, Sudbury, Ont., and 16 Boler street, West Toronto, Ont.
Moss Chemical Mfg. Co., foot of Carlaw avenue, Toronto, Ont.
National Electro Products, Ltd., 293-295 Dufferin street, Toronto, Ont.
The Nichols Chemical Co., Ltd., Sulphide, Ont.
The People's Gas Supply Co., 2 Mill street, Ottawa, Ont.
The Prest-O-Lite Co. of Canada, Ltd., Merritton, Ont.
The Riordon Pulp & Paper Co., Ltd., Merritton, Ont.
Union Carbide Co. of Canada, Ltd., Welland, Ont.
Yocum Faust, Ltd., 123 St. George street, London, Ont.

MANITOBA—

The Auto Lite Gas Co., Ltd., 456 Lipton street, Winnipeg, Man.
L'Air Liquide Society, 1207 Pine street, Winnipeg, Man.
Canadian Carbonate Co., Ltd., Archibald street, St. Boniface, Man.
Prest-O-Lite Co. of Canada, Ltd., Tache avenue, St. Boniface, Man.

ALBERTA—

L'Air Liquide Society, 202 First street east, Calgary, Alta.

BRITISH COLUMBIA—

American Nitrogen Products Co., Lake Buntzen, B.C.
Canadian Carbonate Limited, corner Yew and 11th avenue, Vancouver, B.C.
Compressed Gas Co., Ltd., 1530 Hastings street east, Vancouver, B.C.
Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B.C.
L'Air Liquide Society, corner 5th avenue and Yukon street, Vancouver, B.C.
The Nichols Chemical Co., Ltd., Barnet, B.C.

CHAPTER THREE

EXPLOSIVES, AMMUNITION, FIREWORKS AND MATCHES

General Review

The last year of the war saw Canada producing explosives on a scale far in excess of anything which had previously been attempted in this line in the country before. Returns made by firms manufacturing explosives, fireworks and matches, during 1918, reflected the progress of the industry in so far as the primary records taken in that year permitted and showed that the manufacture of explosives in Canada in 1918 involved an investment in plant and equipment of over nineteen million dollars: the manufacture of fireworks and matches accounted for an additional capital investment of two and one-third millions, making a total investment in these industries of nearly twenty-two millions of dollars. Expenditures of nearly seven million dollars for wages and salaries account gave employment to almost six thousand workers throughout the year in producing from the twenty-four million dollars' worth of materials used, finished products having a total selling value of forty-two million dollars. The magnitude of the industry was reflected also by the fact that over five million dollars was spent in the last year of the war by the explosives industry in Canada in the construction of new buildings and repairs to those already built. An expenditure of nearly a million dollars was made in general expenses chargeable to manufacturing operations.

With the return to peace-time conditions, the volume of production in explosives was much curtailed and many of the war-time plants were closed. The years 1919 and 1920 showed first the abnormal depression following the war period of unusual production, and then the gradual recovery of the industry as it readapted itself to the new needs. The capital employed in 1920 was less than in 1919 but the value of the products made rose slightly above the record for the preceding year.

By the regulations provided for under the Explosives Act which was assented to in June, 1914, and finally brought into force March 1, 1920, explosives in Canada were divided into seven classes as follows:—

(1) Gunpowder,
(2) Nitrate mixture,
(3) Nitro-compound,
(4) Chlorate mixture,
(5) Fulminate,
(6) Ammunition,
(7) Fireworks.

An "authorized explosive" was defined to mean "any explosive the manufacture or importation of which has been authorized under the Act," and the term "explosive" as used in the Act means "gunpowder, blasting powder, nitro-glycerine, gun cotton, dynamite, blasting gelatine, gelignite, fulminates of mercury or other metals, coloured fires, and every other substance whether chemical compound or mechanical mixture, used or manufactured with a view to produce a violent effect by explosion, or a pyrotechnic effect, and includes fireworks, fuses, rockets, percussion caps, detonators, cartridges, ammunition of all descriptions, fog and other signals and every other adaption or preparation of an explosive as above defined."

The Annual Report of the Explosives Division of the Department of Mines for the calendar year 1919, by Lt.-Col. G. Ogilvie, Chief Inspector, included a historical

sketch of the drafting of the Act; its terms; classification of explosives and rules for their manufacture; transportation and storage; forms, terms and conditions upon which licenses for magazines or factories are issued; and regulations prescribing the manner of testing explosives before declaring them authorized, and to what tests authorized explosives shall be subject.

With the passage of the Explosives Act, a scheme of co-operation was evolved whereby the Bureau and the Explosives Division of the Department of Mines could make use of a joint form for the collection of the statistical data required by the two departments. This plan permitted a considerable expansion in the matter of detailed records, while at the same time it cut down the labour required of the manufacturer making statistical returns to the Government. Based on this new arrangement the present report on the production of explosives in Canada in 1919 and 1920 covers the manufacture of fireworks, blasting and sporting powders, dynamites and other explosives for commercial uses, in addition to the operations of the Government arsenals at Quebec and Lindsay.

This report is in two parts, the first, in three sections with summary tables deals with the commodities mentioned in the Explosives Act, under the following heads: (1) powders, dynamite and other explosives, (2) ammunition, (3) fireworks; the second part refers to the related industry, the manufacture of matches. A summary of the principal statistics of the industry as a whole follows:—

Summary Statistics, 1918, 1919 and 1920

—		Years	Explosives	Ammunition	Fireworks	Matches	Total
Number of plants		1918	11	91	2	3	107
		1919	7	4	3	4	18
		1920	8	4	5	4	21
Capital employed	$	1918	19,172,539	54,112,884	*	*2,364,289	75,649,712
	$	1919	12,837,988	4,725,283	140,701	2,493,997	20,197,969
	$	1920	7,210,422	4,476,619	217,111	2,785,356	14,689,508
Value of products	$	1918	41,477,828	186,034,920	*	*1,604,792	229,117,540
	$	1919	4,494,394	3,677,410	251,999	2,207,221	10,631,024
	$	1920	6,810,907	2,873,688	320,123	2,698,125	12,702,843
Cost of raw materials	$	1918	23,125,839	100,947,392	*	*788,182	124,861,413
	$	1919	2,016,573	1,506,802	119,599	1,076,788	4,719,762
	$	1920	2,941,383	1,359,119	155,658	1,315,532	5,771,692
Cost of fuel used	$	1918	1,047,175	2,954,153	*	*16,867	4,018,195
	$	1919	141,829	124,734	1,626	37,074	305,263
	$	1920	188,065	127,029	3,914	53,841	372,849
Miscellaneous expenses	$	1918	2,091,639	15,075,922	*	*161,795	17,329,356
	$	1919	1,677,046	521,910	18,720	295,044	2,512,720
	$	1920	1,247,502	292,510	48,037	294,218	1,812,267
Salaries and wages paid	$	1918	6,420,847	45,927,522	20,954	347,514	52,716,837
	$	1919	821,184	1,090,800	40,212	435,294	2,387,490
	$	1920	1,196,216	1,001,426	68,855	591,915	2,858,412
Average number of employees		1918	4,959	36,782	26	675	42,442
		1919	724	1,383	51	657	2,815
		1920	791	1,013	70	757	2,631

*As only two firms were engaged in the manufacture of fireworks in 1918 the data regarding their operations were included with those of the "match industry."

For convenience of reference the products made in the explosives, ammunition, fireworks and match industries have been itemized in detail in the summary table shown below.

Table 1.—Products of the Explosives, Ammunition, Fireworks and Match Industries, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Class I. Gunpowder	lbs.	285,000	56,900	213,000	86,625
Class II. Nitrate mixtures	"	2,229,000	210,073	2,365,000	253,640
Class III. Nitro-compounds—					
Division 1—					
Dynamites	"	9,446,000	2,005,840	9,709,000	2,053,462
Gelatine dynamites	"	7,613,000	1,812,855	13,502,000	3,352,166
Monobels	"	1,642,000	358,522	1,972,000	435,633
Propellant powder	"	.....	195	16,000	23,671
Division 2	.....	.....	.....	450,000	76,669
Class IV. Chlorate Mixtures—					
Division 2	.....	.....	.....	74,000	
Total powder and blasting explosives in bulk	.....	21,215,000	4,444,385	28,301,000	6,281,866
Class V. Fulminates	.....	Included with all other products.			
Class VI. Ammunition—					
Division 1—					
Safety cartridges	No.	121,574,000	2,360,012	130,715,000	2,314,084
Railway fog signals	"	891,000	13,807	1,202,000	21,234
Divisions 2 and 3—					
Detonators, electric detonators and primers	"	12,030,000	289,518	13,538,000	291,571
Class VII. Fireworks—					
Division 2—					
Manufactured fireworks for retail stores and exhibition displays together with railway signal fuses	.....	.....	190,409	.....	287,351
Other products and by-products*	.....	.....	1,125,672	.....	808,612
Sub-total—					
Explosives, ammunition, and fireworks	.....	.....	8,423,803	.....	10,004,718
Matches	.....	.....	2,207,221	.....	2,698,125
Total	.....	.....	10,631,024	.....	12,702,843

*Includes mercury fulminate, percussion caps, sodium sulphate, nitre cake and miscellaneous products and by-products.

Table 2.—Value Added by Manufacturing 1918, 1919 and 1920

——	1918	1919	1920
	$	$	$
Selling value of products made	229,117,540	10,631,024	12,702,843
Cost of materials used	124,861,413	4,719,762	5,771,692
Value added by manufacturing	104,256,127	5,911,262	6,931,151

PART I

EXPLOSIVES, AMMUNITION AND FIREWORKS

SECTION 1.—EXPLOSIVES

The explosives industry in Canada in 1919 reflected in a marked degree the decline in the manufacture for war purposes. Whereas, in 1918 the total value of products and by-products of the industry including products of the British Chemical Co., Trenton, Ont., was $41,477,828, and exported ammunition and explosives were worth over 270 million dollars, production in 1919 was valued at only $4,494,394 and the exports of ammunition and explosives declined in value to $36,283,673. Two-thirds of this amount was the value of goods exported in January and February, 1919, while the remainder, $13,659,447, was spread over the other ten months of the year. Eleven firms manufactured explosives in Canada in 1918: five plants were in Ontario; three in British Columbia; and three in Quebec. In the following year there were only seven plants in operation: three in Quebec, one in Ontario and three in British Columbia. In 1920 one additional plant commenced operations in Ontario making a total of eight plants: three in the province of Quebec, two in Ontario and three in British Columbia. The total value of products and by-products in 1920 was $6,810,907, while exports of explosives and ammunition dropped in value to $1,392,297.

Capital Employed.—Working capital as expressed by the value of such fixed assets as lands, buildings and machinery and current assets including materials and stocks on hand, cash, trading accounts and bills receivable, amounting at the end of 1919 to $12,837,988, declined in 1920 to $7,210,422, distributed as shown in Table 1.

Table 1.—Distribution of Capital Employed in the Manufacture of Explosives, 1919 and 1920

—	1919	1920
	$	$
Lands, buildings, fixtures, machinery and tools	9,288,028	4,204,279
Materials on hand, stocks in process, finished products on hand, fuel and miscellaneous supplies on hand	1,290,179	1,540,827
Cash, trading accounts and bills receivable	2,259,781	1,465,316
Total	12,837,988	7,210,422

At the end of 1918 the working capital similarly defined of the eleven plants in operation during that year amounted to $19,172,539. It is to be noted that the data given above refer only to operating plants.

Products.—Although the decline in the amount of capital employed continued throughout 1920, the value of the production was higher in 1920 than in the preceding year, which may be taken as an indication of a resumption of more normal trading conditions after the depression in the industry following the close of hostilities. The output data have been arranged in accordance with the classification used in the Explosives Act. Under this Act the term "gunpowder" in Class 1 means exclusively "gunpowder ordinarily so called," and has been interpreted to mean only those "gunpowders" containing 75% potassium nitrate, since this is the percentage contained in the army standard black powder of Great Britain, United States, France, Italy, Austria, Russia, and Switzerland. (Manual of Ind. Chem., 1915, Rogers, Page 920.)

Table 2 gives the quantities and selling values at the factories of all finished products and by-products. The values include actual income from goods manufactured and sold, and the market value of products made but still unsold at the end of the respective years.

Table 2.—Production of Explosives in Canada in 1919 and 1920

Kind	1919		1920	
	Quantity 1,000 lbs.	Selling value	Quantity 1,000 lbs.	Selling value
		$		$
Class I—				
Gunpowder	285	56,800	213	86,583
Class II—				
Nitrate mixtures	2,229	210,073	2,365	253,640
Class III. Nitro compounds—				
Division 1—				
Dynamites	9,446	2,005,840	9,709	2,053,462
Gelatine dynamites	7,613	1,812,855	13,502	3,352,167
Monobels	1,642	358,522	1,972	435,633
Propellants			16	23,671
Division 2			340	76,669
Class IV. Chlorate mixture—				
Division 2			74	
Total powder and blasting explosives in bulk	21,215	4,444,090	28,301	6,281,825
*Other products and by-products		50,304		529,082
Total value of production		4,494,394		6,810,907

*Includes mercury fulminate, sodium sulphate, nitre cake and various other by-products. In 1920 a considerable quantity of fertilizer and super-phosphate of lime was also included.

During 1919 and 1920 the following intermediate products were made by the firms for their own use. As these products represented only a step in the process from raw materials to finished products, they were not included in the production for the year. The values given are those which might have been obtained if the products had been sold at rates prevailing throughout the year instead of being used. Charcoal, dynamite shells, cases, etc., kegs and various other intermediate products were included in the item "All other Intermediate Products."

Table 3.—Intermediate Products Made in the Explosives Industry, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Nitric acid	lbs.	2,629,973	212,697	3,861,827	301,871
Recovered acids	"	10,798,398	215,842	18,805,944	306,995
Ammonium nitrate	"	1,186,202	231,140	62,668	11,166
Nitroglycerine	"	5,103,360	1,203,839	7,835,924	1,791,267
All other intermediate products			226,803		344,701
Total			2,090,321		2,755,910

Materials Used.—Table 4 gives the quantity and cost of all materials used, whether for the manufacture directly of finished products, or for the preparation of intermediate products used in further processes of manufacture. The cost of materials used was $2,016,573 in 1919 and $2,941,383 in 1920. The item " All other Miscellaneous Materials" includes potassium nitrate, magnesium salts, naphthalene, alcohol, charcoal, sodium hydroxide, copper sulphate, ammonium sulphate, mercury, wood, and several others which were used to some extent in the industry.

Table 4.—Materials Used in the Manufacture of Explosives

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Ammonium hydroxide	lbs. NH_3	222,325	49,893	.....	.....
Ammonium nitrate	lbs.	1,402,782	161,892	2,756,131	204,941
Calcium carbonate (chalk)	"	175,945	2,601	231,520	3,816
Glycerine	"	1,862,940	377,153	3,313,088	774,712
Graphite	"	9,250	588	6,317	508
Mixed acids and oleum	"	9,719,890	326,276	12,378,627	218,311
Nitric acid	"	629,553	62,225	599,000	53,665
Petrolatum	"	15,925	568	14,096	381
Other petroleum products chiefly paraffin wax	"	406,703	32,537	562,478	55,412
Nitro or pyro cotton	"	69,321	26,671	178,388	106,244
Sodium carbonate	"	372,903	12,125	168,947	3,658
Sodium chloride	"	521,361	6,412	588,334	7,233
Sodium nitrate	"	14,810,239	529,520	19,868,329	728,445
Trinitrotoluene	"	182,718	27,964	482,350	56,639
Sugar and its derivatives	"	205,479	20,245	153,786	24,576
Flour	"	728,149	28,331	804,773	32,456
Wood pulp	"	990,699	23,034	1,345,224	45,900
All other miscellaneous materials	"	.....	328,538	.....	624,486
Total	.....	.....	2,016,573	.....	2,941,383

Employees, Salaries and Wages.—Fewer hands were employed in the explosives industry at the close of 1920 than in the preceding year in spite of the fact that the value of the year's output was about 50% higher than in 1919. Tables have been compiled which show the relative numbers employed in each year, differentiation being made between the several classes of salaried employees and the wage-earners; the latter are grouped according to their weekly rates of pay. See Table 5. The number on the rolls on the fifteenth day of each month is shown in Table 6. This table indicates very well the activity in the industry throughout the period and shows how the increased output was obtained during the first nine or ten months of the year. Table 5 shows the distribution of employees as on December 15th or on the nearest representative working day. In 1919 two employees were under 16 years of age; in 1920 there was only one under this age. The Tables follow.

Table 5.—Number of Employees in the Explosives Industry by Classes on December 15, 1919-1920

——	1919			1920		
	Number of employees			Number of employees		
	Male	Female	Total	Male	Female	Total
Salaried Employees—						
Officers, superintendents and managers	12	.....	12	14	.....	14
Clerks, stenographers, salesmen and other salaried employees	72	11	83	80	8	88
Office sub-total	84	11	95	94	8	102
Wage-earners receiving per week—						
Less than $10	14	1	15	83	3	86
$10 but less than $15	23	1	24	86	11	97
$15 but less than $20	79	2	81	73	.....	73
$20 but less than $26	144	2	146	66	1	67
$26 but less than $30	128	.....	128	56	.....	56
$30 and over	217	.....	217	82	.....	82
Works sub-total	605	6	611	446	15	461
Total	689	17	706	540	23	563

The fact that a plant closing down in the middle of the year would report distribution of employees as for the last month of active operation, makes it impossible to check the data given in this table with the figures in the table showing the average number employed, and accounts for any differences noted between the total number of employees as shown for the month of December, in the two tables.

Table 6.—Number of Wage-Earners in the Explosives Industry by Months, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	851	27	878	605	3	608
February	770	20	790	692	27	719
March	677	39	716	610	37	647
April	710	16	726	761	54	815
May	557	12	569	804	68	872
June	461	9	470	792	64	856
July	480	6	486	778	56	834
August	476	5	481	744	17	761
September	507	6	513	670	16	686
October	669	6	675	593	17	610
November	650	6	656	452	19	471
December	590	6	596	369	17	386
Average	616	13	629	656	33	689

Table 7.—Salaries and Wages Paid in the Explosives Industry

—	1919	1920
	$	$
Salaries	194,868	234,860
Wages	626,316	961,356
Total	821,184	1,196,216

Fuel.—The plants located in British Columbia used Canadian coal and wood exclusively, but purchased fuel oil and gasoline of foreign origin to the value of $42,824, in 1919 and $64,904 in 1920.

In Ontario, bituminous slack from the United States was the chief fuel, while in Quebec over 7,000 tons of anthracite dust was used in each of the two years, in addition to bituminous coal, fuel oil and a small quantity of wood. All the fuel used in the industry in Quebec and Ontario was imported except a few cords of wood valued at less than $100 in 1919 and a little more than $200 in 1920. The value of fuel used in the industry in the whole of Canada, exclusive of any supplied to employees, was $141,829 in 1919 and $188,065 in the following year, as shown in Table 8. The value shown includes freight, duty, and handling charges and was the actual cost of fuel as laid down at the plant.

Table 8.—Fuel Used in the Explosives Industry, 1919 and 1920

Kind.	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost	Quantity	Cost
				$		$
Bituminous Coal—						
Slack	1919	Short tons			8,100	30,402
	1920	"			9,113	62,903
Lump	1919	"	204	1,945		
	1920	"	170	2,054		
Run of mine	1919	"			189	1,669
	1920	"			133	1,246
Anthracite Coal—						
Lump	1919	"	1,624	11,342	383	3,707
	1920	"	464	4,394	231	3,752
Dust	1919	"	430	3,291	7,915	43,865
	1920	"			7,176	43,551
Lignite coal	1919	"				
	1920	"	35	368		
Gasoline	1919	Imp. gals.			3,801	1,452
	1920	"			5,230	2,171
Fuel oil	1919	"			722,382	41,839
	1920	"			849,029	63,626
Wood	1919	Cords	662	2,317		
	1920	"	1,031	4,000		
Sub-totals	1919			18,895		122,934
	1920			10,816		177,249

Total cost of fuel used	1919	$141,829
	1920	188,065

Power.—Table 9 shows the power equipment of the plants manufacturing explosives in 1919 and 1920:—

Table 9.—Power Employed in the Explosives Industry, 1919 and 1920

Class	Year	Number of units	Total H.P. according to manufacturers' rating	Total H.P. used
Boilers	1919	33	6,077	2,539
	1919	17	2,921	1,493
Engines—				
(a) Steam engines and turbines	1919	47	4,851	880
	1920	10	1,207	999
(b) Gas	1919	3	18	6
	1920	1	12	
(c) Oil	1919	1	300	
	1920			
Hydraulic turbines or water wheels	1919	11	285	190
	1920	11	285	190
Electric motors	1919	281	4,546	1,407
	1920	176	2,416	1,155
Generators	1919	1	500 k.w.	125 k.w.
	1920	6	764 k.w.	253 k.w.

Miscellaneous Expenses.—The following are the items of expenditure in the explosives industry in 1919 and 1920:—

Table 10.—Miscellaneous Expenditures in the Explosives Industry, 1919 and 1920

—	1919	1920
	$	$
Rent of offices, works and machinery	882	2,194
Cost of purchased power	20,995	21,448
Taxes—		
Excise	300	58,782
Excess profits	872,643	229,654
Provincial and municipal	37,764	23,735
Advertising	9,376	22,665
Travelling	26,605	36,825
Repairs to buildings and machinery	134,690	196,312
All other sundry expenses	573,791	655,887
Total miscellaneous expenditures	1,677,046	1,247,502

Table 11.—Summary of Expenditures

—	1919	1920
	$	$
Salaries	194,868	234,860
Wages	626,316	961,356
Fuel	141,829	188,065
Materials	2,016,573	2,941,383
Miscellaneous expenses	1,677,046	1,247,502
Total expenditures	4,656,632	5,573,166

Table 12.—Value Added by Manufacturing

—	1919	1920
	$	$
Selling value of products	4,494,394	6,810,907
Cost of materials used	2,016,573	2,941,383
Value added	2,477,821	3,869,524

A table at the end of the chapter shows the imports for consumption in Canada of explosives, ammunition and fireworks. Exports of similar goods of Canadian manufacture are also shown.

SECTION TWO.—AMMUNITION

Ammunition, as defined in the regulations under the Explosives Act means an explosive of any class when enclosed in any case or contrivance, or otherwise adapted or prepared so as to form a cartridge or charge for small arms, cannon, or any other weapon, or for blasting, or to form any safety or other fuse for blasting or for shells, or to form any tube for firing explosives, or to form a percussion cap, a detonator, a fog signal, a shell, a torpedo, a war rocket, or other contrivance other than a firework."

According to this definition, the output of four plants was classed as ammunition in 1919 and 1920. Two of these plants were in Quebec and two in Ontario.

Capital Employed.—The total assets of the four plants at the end of 1919 had a value of $4,725,283 of which $2,443,546 represented land, buildings and machinery, while the remainder, $2,281,737 included cash, trading and operating accounts amounting to $696,487, together with the value of materials and stocks on hand, etc., amounting to $1,585,250.

By the end of 1920, cash, trading and operating accounts and bills receivable had declined to $91,466; materials on hand, stocks in process, fuel, miscellaneous supplies and finished products on hand had an estimated value of $2,019,334; while land, buildings and equipment were valued at $2,365,819. The total capital employed at the end of the year was $4,476,619.

The distribution was as shown in Table 1.

Table 1.—Capital Employed in the Ammunition Industry, 1919 and 1920

—	1919	1920
	$	$
Land, buildings, fixtures, machinery and tools	2,443,546	2,365,819
Materials on hand, fuel and miscellaneous supplies on hand, stocks in process and finished products on hand	1,585,250	2,019,334
Cash, trading and operating accounts and bills receivable	696,487	91,466
	4,725,283	4,476,619

Products.—The total selling value of the products made in 1919 was $3,677,410. Safety cartridges numbered 121,574,000 rounds and were valued at $2,360,012, or 64.2% of the total. Products made in 1920 had a selling value of $2,873,688. The number of safety cartridges was 130,715,000 valued at $2,314,084, or 80.5% of the total value of the production for the year.

The products are listed in the table following:

Table 2.—Products Made in the Ammunition Industry, 1919 and 1920

Kind	1919		1920	
	Quantity	Value	Quantity	Value
		$		$
Class VI. Ammunition—				
Division 1—				
Safety cartridges	121,574,000	2,360,012	130,715,000	2,314,084
Railway fog signals	*	.....	*	.....
Percussion caps	*	.....	*	.....
Divisions 2 and 3—				
Detonators, electric detonators and primers	12,030,000	289,518	13,538,000	291,571
All other products†	.....	1,027,880	.....	268,033
	.....	3,677,410	.....	2,873,688

*Included with "all other products".

†Railway fog signals, percussion caps, artillery ammunition, various by-products and boxes, etc., for packing.

Materials Used.—Table 3 gives the quantities and values of materials used during each of the two years, whether for the manufacture directly of finished products or for the preparation of intermediate products used in further processes of manufacture. All other materials grouped together at the end of the table included aluminum, antimony, nickel shot, fulminates and a number of other commodities not separately itemized.

Table 3.—Materials Used in the Ammunition Industry, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Copper and copper alloys	lbs.	758,577	241,095	1,030,513	343,549
Iron and steel (sheet, wire, etc.)	"	.....	.....	206,352	34,701
Lead (including pig lead)	"	762,717	52,874	847,333	61,253
Cordite and powder	"	261,077	225,456	334,390	267,172
Tin	"	.....	.....	18,576	12,197
Potassium chlorate	"	.....	.....	11,063	2,631
All other materials	.....	.....	987,377	.....	637,616
Total	.....	.....	1,506,802	.....	1,359,119

Employees, Salaries and Wages.—The number of hands employed in the manufacture of ammunition declined very considerably in the last four months of 1920, after having been maintained between 1,000 and 1,500 throughout 1919 and the earlier months of 1920. This decline in the number of employees was in conformity with the lowered output recorded for the year.

The accompanying table shows the number of employees both male and female, according to the pay-rolls on the 15th of each month during the two years.

Table 4.—Number of Wage-Earners on the Payrolls on the Fifteenth of Each Month in the Ammunition Industry, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	975	615	1,590	739	320	1,059
February	1,024	643	1,667	759	337	1,096
March	989	582	1,571	818	345	1,163
April	861	365	1,226	760	324	1,084
May	817	351	1,168	792	314	1,106
June	819	336	1,155	804	301	1,105
July	810	325	1,135	815	315	1,130
August	802	326	1,128	822	323	1,145
September	836	327	1,163	453	201	654
October	783	364	1,147	419	216	635
November	932	456	1,388	398	219	617
December	1,007	490	1,497	445	237	682
Average	888	432	1,320	668	288	956

Table 5.—Salaries and Wages Paid in the Ammunition Industry, 1919 and 1920

——	1919	1920
	$	$
Salaries paid	104,022	101,563
Wages paid	986,778	899,863
Total salaries and wages	1,090,800	1,001,426

Table 6 shows the distribution of employees on December 15th or the nearest representative working day, the wage-earners being classified according to rates of pay.

Table 6.—Distribution of Employees in the Ammunition Industry, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees—						
Officers, superintendents and managers	10	.....	10	13	.....	13
Clerks, stenographers, salesmen and other salaried employees	50	3	53	42	2	44
Office sub-total	60	3	63	55	2	57
Wage-earners receiving less than—						
$10 per week	177	351	528	19	69	88
$10 but under $15	152	81	233	53	170	223
$15 but under $20	303	16	319	140	20	160
$20 but under $26	217	.....	217	167	1	168
$26 but under $30	67	.....	67	55	.....	55
$30 and over	108	.....	108	90	.....	90
Works sub-total	1,024	448	1,472	524	260	784
Total	1,084	451	1,535	579	262	841

Of these wage-earners in 1919 those under sixteen years of age numbered twenty-two males and twenty-two females of whom all but eight males were receiving less than $10 per week. In 1920 similar employees numbered 8 males and 26 females; all of these were receiving less than $15 a week.

Fuel.—Table 7 shows the source, kind, quantity and cost at the plants of all the fuel used during each of the two years. The quantity is exclusive of any supplied to employees.

Table 7.—Fuel Used in the Ammunition Industry, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Value	Quantity	Value
				$		$
Bituminous coal—						
Slack	1919	Short tons	.....	.....	3,712	26,579
	1920	"	.....	.....	5,047	48,280
Lump	1919	"	.....	.....	.....	.....
	1920	"	1,180	15,527	.....	.....
Run of mine	1919	"	.....	.....	4,958	39,563
	1920	"	.....	.....	3,551	28,296
Anthracite coal—						
Lump	1919	"	.....	.....	1,310	11,457
	1920	"	.....	.....	1,087	11,239
Dust	1919	"	.....	.....	161	1,139
	1920	"	.....	.....	.....	.....
Coke	1919	"	.....	.....	1,167	19,421
	1920	"	.....	.....	392	6,844
Gasoline	1919	Gallons	.....	.....	2,802	844
	1920	"	.....	.....	2,264	881
Fuel oil	1919	"	.....	.....	14,030	1,764
	1920	"	.....	.....	16,982	2,127
Gas	1919	1,000 cu. ft.	19,419	23,927	.....	.....
	1920	"	17,225	13,817	.....	.....
Other fuel	1919	.....	.....	.....	.....	40
	1920	.....	.....	18	.....	.....
Sub-totals	1919	.....	.....	23,927	.....	100,807
	1920	.....	.....	29,362	.....	97,667

Total cost of fuel used, 1919	$124,734
1920	127,029

Power.—The power equipment used in each of the two years is shown in Table 8.

Table 8.—Power Employed in the Ammunition Industry, 1919 and 1920

Class	Year	Number of Units	Total H.P. according to manufacturers rating	Total H.P. used
Boilers	1919	14	1,816	1,008
	1920	10	1,546	730
Steam engines and turbines	1919	6	850	700
	1920	4	695	54
Hydraulic turbines or water wheels	1919	1	168	115
	1920	1	110	110
Electric motors	1919	119	1,900	1,317
	1920	118	1,740	1,226
Generators or dynamos	1919	2	500 K.V.A.	150 K.V.A.
	1920	2	500 K.V.A.	150 K.V.A.

Miscellaneous Expenditures.—Miscellaneous expenses are itimized in the following table and a summary of expenditures for all accounts follows:—

Table 9.—Miscellaneous Expenses in the Ammunition Industry, 1919 and 1920

—	1919	1920
	$	$
Rent of office, works and machinery	140	140
Cost of purchased power	17,447	16,850
Insurance (premium for year only)	11,198	10,922
Provincial and municipal tax	1,758	2,728
Advertising expenses		60,223
Travelling expenses	5,047	1,335
Repairs to buildings and machinery	36,045	30,390
All other sundry expenses (not including fuel costs, materials used, salaries nor wages)	450,275	99,922
Total miscellaneous expenses	521,910	222,510

Table 10.—Summary of Expenditures

—	1919	1920
	$	$
Salaries	104,022	101,563
Wages	986,778	899,863
Fuel	121,734	127,029
Materials used	1,506,802	1,359,119
Miscellaneous expenses	521,910	222,510
Total expenditures	3,244,246	2,710,084

Table 11.—Value Added by Manufacturing

—	1919	1920
	$	$
Selling value of products made	3,677,410	2,873,688
Cost of raw materials used	1,506,802	1,359,119
Value added	2,170,608	1,514,569

SECTION THREE.—FIREWORKS

"The term 'firework' comprises firework composition and manufactured fireworks. This class consists of two divisions:

Division 1 comprises firework composition, which term means any chemical compound or mechanically mixed preparation of an explosive of inflammable nature which is used for the purpose of making manufactured fireworks, and is not included in the former classes of explosives and also any star and any coloured fire composition which is not included in Division 2."

Division 2 comprises manufactured fireworks, which term means any explosive of the foregoing classes, and any firework composition when such explosive or composition is enclosed in any case or contrivance, or is otherwise manufactured or adapted for the production of pyrotechnic effects or pyrotechnic signals." (Regulations under Explosives Act.)

The Canadian output did not include any products under Division 1 as only manufactured fireworks were made. Three firms operated in 1919 and five in 1920; the names are listed in the appendix to this report. The Central Railway Signal Co. manufactured railway signal fusees, which come under the definition "fireworks".

Capital Employed.—The capital employed in the manufacture of fireworks in Canada was 59% greater in 1920 than in the preceding year. The several items are shown in the following table.

Table 1.—Capital Employed in the Fireworks Industry at the End of 1919 and 1920

	1919	1920
	$	$
Land, buildings, fixtures, machinery and tools	28,384	39,156
Materials on hand, stocks in process, finished products on hand, fuel and miscellaneous supplies on hand	37,751	45,204
Cash, trading and operating accounts and bills receivable	74,566	132,751
Total	140,701	217,111

Products.—Products comprising fireworks for retail sale and exhibition purposes railway signal fusees, railway torpedoes, flags, lanterns, confetti, and a small quantity of powder made in each year were valued at $320,123 in 1920 as compared with $251,999 in 1919. Production values are itemized in the following table.

Table 2.—Products Made in the Fireworks Industry, 1919 and 1920

Kind	1919		1920	
	Quantity	Selling value at works	Quantity	Selling value at works
	lbs.	$	lbs.	$
Class I. Gunpowder	200	100	90	42
Class III. Nitro compounds				
Propellant powders	300	195		
Class VI. Ammunition				
Railway fog signals[1]				
Class VII. Fireworks—				
Division 2—				
Manufactured fireworks for retail stores and exhibition displays together with railway signal fusees		190,409		287,351
All other products[2]		61,295		32,730
Total		251,999		320,123

[1]Product of one firm included in "all other products".
[2]All other products—railway fog signals, confetti, flags and lantern and various other products not itemized separately.

Materials Used.—The largest single item used in the manufacture of fireworks was strontium salts, nitrate and carbonate, the consumption of which nearly doubled in the two years. Barium salts were also used in considerable quantities. Quantities and values are shown below:—

Table 3.—Materials Used in the Manufacture of Fireworks, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Barium salts[1]	lbs.	28,325	3,678	72,911	9,788
Petrolatum	"	4,275	295	9,109	685
Potassium nitrate	"	7,195	1,173	7,050	1,239
Strontium salts[2]	"	156,365	35,605	269,610	61,463
Other chemicals[3]	.....	.....	14,449	.....	15,772
All other materials[4]	.....	.....	64,399	.....	66,711
Total	.....	.....	119,599	.....	155,658

[1]Not specified completely.
[2]Includes nitrate and carbonate.
[3]Includes potassium perchlorate; sodium carbonate, chloride, nitrate, and oxalate; alcohol, copper arsenite; lead nitrate; calomel and a number of others in small quantities.
[4]Includes woodwork for scenery rocket and flag sticks; cotton for flags, paper; powder; confetti; paste canvas; paint; lead and purchased flags; balloons; firecrackers and sundry materials including containers

Employees, Salaries and Wages.—Table 4 shows the distribution of salaried employees and plant workers on December 15th, or on the nearest representative working day.

Table 4.—Classification of Employees in the Fireworks Industry, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees—						
Officers, superintendents and managers	4	.....	4	5	.....	5
Clerks, stenographers, salesmen and other salaried employees	2	1	3	4	2	6
Office sub-total	6	1	7	9	2	11
Wage-earners receiving per week—						
Less than $10	3	13	16	7	19	26
$10 but less than $15	10	4	14	3	14	17
$15 but less than $20	2	3	5	15	4	19
$20 but less than $26	7	.....	7	10	1	11
$26 but less than $30	1	.....	1	7	.....	7
$30 and over	.....	.....	.....	2	.....	2
Works sub-total	23	20	43	44	38	82
Grand total	29	21	50	53	40	93

In 1919 one male and two females were reported as being under 16 years of age; all three were in the class receiving less than $10 per week. In 1920 three males and six females under 16 years of age were receiving less than $12 per week.

Table 5 shows the number of employees throughout the two years as taken from the pay-rolls of the various firms on the 15th of each month.

Table 5.—Number of Wage-Earners in the Fireworks Industry by Months, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	21	17	38	24	20	44
February	21	20	41	27	26	53
March	23	21	44	27	24	51
April	25	29	54	28	32	60
May	24	23	47	32	26	58
June	24	24	48	30	28	58
July	23	26	49	33	24	57
August	24	25	49	32	28	60
September	22	19	41	32	28	60
October	20	17	37	37	26	63
November	21	17	38	37	30	67
December	21	20	41	40	38	78
Average	22	22	44	32	27	59

Table 6.—Salaries and Wages Paid in the Fireworks Industry, 1919 and 1920

—	1919	1920
	$	$
Salaries	16,628	35,316
Wages	23,584	33,539
Total	40,212	68,855

Fuel and Power.—The fuel consumed in the industry in 1919 was small in amount being only 82,000 cubic feet of gas valued at $106; 125 tons of bituminous coal (run of mine) at $1,000; and 48 tons anthracite coal, dust or slack, which cost $520. In 1920 one ton of anthracite costing $17 and 283 tons of bituminous coal costing $3,882 was reported as consumed, in addition to 60,000 cubic feet of gas which cost $15. All the coal was of foreign origin while the gas was of Canadian origin. The total cost of fuel used in 1919 was $1,626 as compared with $3,914 in the following year. The power equipment in this industry was not of much importance, consisting only of 6 motors with a total rating of 19 horse-power in 1919 while in the next year only 4 motors rated at 12 horse-power were reported.

Miscellaneous Expenses.—The miscellaneous expenses amounted to $18,720 in 1919 and increased to $48,037 in the following year. The details are shown in the following table.

Table 7.—Miscellaneous Expenditures in the Fireworks Industry, 1919 and 1920

—	1919	1920
	$	$
Rent of offices, works and machinery	1,800	4,200
Cost of purchased power	342	376
Insurance (premium for year only)	1,564	2,275
Taxes—		
Excise	2,138	700
Excess profits	1,425	20,717
Provincial and municipal	1,449	1,529
Advertising expenses	79	664
Travelling expenses	539	1,553
Repairs to buildings and machinery	4,309	3,845
All other sundry expenses (not including fuel materials, salaries and wages)	5,075	12,178
Total miscellaneous expenditures	18,720	48,037

Table 8.—Summary of Expenditures, 1919 and 1920

—	1919	1920
	$	$
Salaries	16,628	35,316
Wages	23,584	33,539
Fuel	1,626	3,914
Materials	119,599	155,658
Miscellaneous expenses	18,720	48,037
Total expenditures	180,157	276,464

Table 9.—Value Added by Manufacturing

—	1919	1920
	$	$
Selling value of products made	251,999	320,123
Cost of materials used	119,599	155,658
Value added	132,400	164,465

PART II

MATCHES

The production of matches in Canada during 1919 was valued at $2,207,221, an increase of $661,541 over the preceding year. In 1920 a further increase of $490,904 took place, bringing the value of production for that year up to $2,698,125. The entire output was consumed in Canada with the exception of $92,293 worth exported in 1919 and $107,762 worth exported in the following year. Imports during the two years were valued at $8,801 and $37,770. It may be pointed out that the amount spent for matches is much more than the selling value at the factory owing to the excise tax imposed for revenue purposes. In 1919 the total sum paid to the Government from this tax was $2,665,198 while in the following year it amounted to $2,757,754. The value of the output at the works, therefore, from the consumer's viewpoint was $4,872,419 in 1919 and $5,455,879 in 1920. In each of the two years four plants were in operation, two in Quebec and two in Ontario.

Capital Employed.—The capital employed at the end of 1919 was $2,493,997; by the end of the following year it had been increased to $2,785,356.

The total assets at the end of the two years are shown in the following table.

Table 1.—Capital Employed in the Match Industry at the End of 1919 and 1920

	1919	1920
	$	$
Lands, buildings, fixtures, machinery and tools	1,495,614	1,517,709
Materials on hand, stocks in process, finished products on hand, fuel and miscellaneous supplies on hand	754,163	1,113,424
Cash, trading and operating accounts and bills receivable	244,220	154,223
Total	2,493,997	2,785,356

Materials Used.—The materials used have been divided into three groups: lumber, chemicals and all other materials including containers.

These data are tabulated below:

Table 2.—Materials Used in the Manufacture of Matches, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Lumber	bd. ft.	7,396,470	316,226	7,329,068	447,655
Miscellaneous chemicals*	lbs.	1,164,026	309,071	2,024,568	336,130
All other materials†	.....	.....	451,491	.....	531,747
Total	.....	.....	1,076,788	.....	1,315,532

*Includes chlorate of potash, phosphorus (sesquisulphide and amorphous) and all other chemicals.
†Includes paper, containers, ground glass and other miscellaneous material.

The manufacture of matches involves many light tasks that call for quickness of action rather than strength and as a consequence the number of girls and women employed is often greater than the number of men. Most of the work is mechanical and a large part is now done by intricate labour-saving machinery, some of which has been designed by employees of Canadian plants. The manufacture of matches has been profitably carried on in Canada for many years and as a result the industry is firmly established both as to procedure in manufacture and in meeting the demands of the market.

Employees, Salaries and Wages.—The distribution of employees on December 15th, or the nearest representative working day, is shown in Table 3.

Table 3.—Distribution of Employees in the Match Industry, December 15, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees—						
Officers, superintendents and managers	15	1	16	13	.....	13
Clerks, stenographers, salesmen and other salaried employees	14	6	20	9	5	14
Office sub-total	29	7	36	22	5	27
Wage-earners receiving per week—						
Less than $10	94	305	399	69	214	283
$10 but under $15	46	71	117	61	108	169
$15 but under $20	124	7	131	61	6	67
$20 but under $26	63	.....	63	96	.....	96
$26 but under $30	12	.....	12	29	.....	29
$30 and over	13	.....	13	17	.....	17
Works sub-total	352	383	735	333	328	661
Grand total	381	390	771	355	333	688

The total for 1919 includes fifty-one males and seventy-one females under sixteen years of age, all of whom were receiving less than twelve dollars per week. In 1920 such employees numbered 43 males and 72 females, all of whom were receiving less than $13 per week.

The accompanying table shows the fluctuations in the number of wage-earners both male and female, according to the pay-rolls on the 15th of each month. In 1919, with the exception of the three months, March, April and May, the number of female wage-earners exceeded the males by numbers ranging from 7 to 107. In the average for the year the males numbered 291 and the females 330, the latter being in excess by 39. In 1920 the same condition prevailed, female employees exceeded the males in every month with the exception of July. The average number of females engaged for the year was 387, or 44 more than the average number of males.

Table 4.—Number of Wage-Earners by Months in the Match Industry, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	230	280	511	300	399	699
February	283	290	573	353	473	826
March	275	271	546	419	448	867
April	282	257	539	382	442	824
May	260	248	508	387	424	811
June	263	296	559	355	389	744
July	262	346	608	320	311	631
August	266	350	616	315	352	667
September	337	444	781	321	372	693
October	339	384	723	338	367	705
November	345	411	756	311	331	642
December	352	383	735	318	331	649
Average	291	330	621	343	387	730

Table 5.—Salaries and Wages Paid in the Match Industry, 1919 and 1920

—	1919	1920
	$	$
Salaries	68,067	57,568
Wages	367,227	534,347
Total	435,294	591,915

The total cost of all fuel used in each of the two years was $37,074 in 1919 and $53,841 in 1920, as shown in Table 6. The value includes freight, duty and other charges.

Table 6.—Fuel Used in the Match Industry, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1919	short tons	.....	.....	6,030	33,529
	1920	"	.....	.....	5,040	45,958
Lump	1919	"	.....	.....	54	470
	1920	"	.....	.....	625	4,980
Wood	1919	cords	1,275	3,075	.....	.....
	1920	.....	.....	.....	.....	.....
Other fuel	1919	.....	.....	.....	.....	.....
	1920	.....	.....	2,903	.....	.....
Sub-totals	1919	.....	.....	3,075	.....	33,999
	1920	.....	.....	2,903	.....	50,938

Total cost of fuel used, 1919	$37,074
1920	53,841

Table 7 shows the power equipment of the match factories in Canada.

The one steam engine listed was reported as being only an auxiliary used in case of the failure of electric power. Of the 34 motors reported in 1920 twelve rated at 376 H.P. were run by power generated by the establishments reporting. The remainder were operated by rented power.

Table 7.—Power Equipment

Class	Year	Number of Units	Total H.P. according to manufacturer's rating	Total H.P. used
Boilers	1919	3	255	205
	1920	3	240	140
Engines: steam	1919	1	60	.....
	1920	1	60	.....
Hydraulic turbines of water wheels	1919	1	200	200
	1920	1	200	200
Electric motors alternating current	1919	35	541	490
	1920	34	566	425

Miscellaneous Expenses.—Excepting the excise payments made by the companies to the Dominion Government, but recovered by them from the consuming public through the use of excise stamps, miscellaneous expenses incurred amounted to $295,044 in 1919 and $294,218 in the following year.

These expenditures are listed in Table 8.

Table 8.—Miscellaneous Expenses in the Match Industry, 1919 and 1920

—	1919	1920
	$	$
Rent of offices, works and machinery	1,810	2,018
Cost of purchased power	2,237	2,492
Insurance (premium for year only)	17,850	21,747
Taxes—		
Excess profits	29,849	28,334
Provincial	21,850	17,293
Advertising	10,349	12,709
Travelling expenses	3,478	3,624
Repairs to buildings and machinery	44,936	17,072
All other sundry expenses	162,685	188,839
Total miscellaneous expenses	295,044	294,218

Table 9.—Summary of Expenditures

—	1919	1920
	$	$
Salaries	68,067	57,568
Wages	367,227	534,347
Fuel	37,074	53,841
Materials used	1,076,788	1,315,532
Miscellaneous expenses	295,044	294,218
Total	1,844,200	2,255,506

Table 10.—Value Added by Manufacturing

—	1919	1920
	$	$
Selling value of products	2,207,221	2,698,125
Cost of raw materials	1,076,788	1,315,532
Value added	1,130,433	1,382,593
The selling value of these products including excise was	4,872,419	5,455,879

Imports and Exports.—In 1920 imports of matches into Canada were valued at $37,770 as against $8,801 in the previous year and $10,275 in 1918.

Exports of Canadian matches in 1920 amounted in value to $107,762 an increase of more than $15,000 over the previous year when $92,293 worth were exported. In neither year was the value as high as in 1918 when it was reported as $117,604.

The following materials were imported in 1919 and 1920 for consumption in Canada. It is to be noted that, while these materials are used in the manufacture of explosives, the data given cover the imports for all purposes.

Table 11.—Imports into Canada of Materials Used in Explosives Manufacture

Kind	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Nitro-compounds (including binitrotoluol and trinitrotoluol, and ammonium perchlorate, when used for explosive manufacture	lbs.	237,142	27,738	187,857	38,083
Nitrate compounds, adapted for use in explosive manufacture	"	1,263,740	39,688	123,741	4,906
Ammonium nitrate	"	2,802,796	205,346	2,736,706	185,472
Potassium nitrate	"	316,444	35,889	1,000,558	83,109
Sodium nitrate	"	9,084,536	411,423	49,596,148	1,651,934
Nitric acid	"	73,010	9,964	111,859	16,233
Glycerine, imported exclusively for manufacture of explosives	"	145,106	25,584	1,040,209	247,964
Total			755,632		2,227,701

Table 12 gives the quantity and value of finished products of the explosives, ammunition and fireworks industries, imported for consumption in Canada in 1919 and 1920. The Monthly Summary of Foreign Commerce of U.S. for 1919 gives exports of Cartridges, Dynamite, Gunpowder and all other explosives to Canada as having a value of $712,851. (See Production of Explosives in U.S. for Calendar Year 1919, Page 16.) According to the Monthly Trade Reports of Canada the value of imports of explosives and ammunition from U.S. was $652,008.

Table 12.—Imports of Explosives into Canada, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Blasting and mining powder	lbs.	111,845	7,335	353,725	21,173
Fireworks, firecrackers and torpedoes of all kinds			54,623		57,515
Fuses, non-metallic			105,832		293,967
Giant powder, nitro, and other explosives, n.o.p.	lbs.	97,013	68,879	316,573	248,340
Dynamite and nitro-glycerine	"	69,171	18,159	44,285	11,699
Gun, rifle, sporting, cannon, musket and cannister powder	"	102,755	102,103	192,927	188,430
Gun, rifle and pistol cartridges, or other ammunition, n.o.p.			404,392		560,574
Cartridge cases, gun wads, percussion caps and primers			12,316		45,612
Total			773,639		1,427,310

In the following table the exports of similar goods of Canadian manufacture for 1918, 1919 and 1920 are given. In 1918 the exports were valued at over two hundred and seventy million dollars, but in 1919 this figure declined to thirty-six millions. During January and February, 1919 the exports were chiefly to the United Kingdom; for the remainder of the year to the United States. In 1920 the exports dropped to such an extent that the total value amounted to only $1,392,297.

Table 13.—Exports of Explosives and Ammunition from Canada in 1918, 1919 and 1920

Month	Year	Gun, rifle and pistol cartridges	Dynamite	Other explosives and fulminates n.o.p.	Total
		$	$	$	$
January	1918	16,316,079		2,362,954	18,679,033
	1919	12,018,493		4,509,385	16,527,878
	1920	27,046		6,075	33,121
February	1918	16,266,326		2,678,526	18,944,852
	1919	5,271,971		824,377	6,096,348
	1920	91			91
March	1918	8,567,233		3,718,234	12,285,467
	1919	959,732		823,863	1,783,595
	1920	24,289		108,427	132,716
9 months ending December	1918	191,485,335		31,348,669	222,834,004
	1919	7,315,307	31,460	4,529,085	11,875,852
	1920	49,514	141,011	1,035,844	1,226,369
Total for the year	1918	232,634,973		40,108,383	272,743,356
	1919	25,565,503	31,460	10,686,710	36,283,673
	1920	100,940	141,011	1,150,346	1,392,297

The value of exports for the year 1919 was greatly in excess of the total production of explosives and ammunition, and as 62.4% of the total export business for the year was during January and February it may be assumed that this business resulted from war contracts entered into prior to the signing of the Armistice in November, 1918.

Plants Engaged in the Manufacture of Explosives, Ammunition, Fireworks and Matches in Canada in 1920

QUEBEC—

Les Allumettes de Drummondville, Ltée., Drummondville, Que.
Canadian Explosives, Ltd., McMasterville, Que.
Canadian Explosives, Ltd., Windsor Mills, Que.
Central Railway Signal Company, Iberville, Que.
Dominion Arsenal (Quebec), Arsenal St., Quebec, Que.
Dominion Cartridge Co., Ltd., Brownsburg, Que.
E. B. Eddy Co., Ltd., Bridge St., Hull, Que.
Howard, George M., Capelton, Que.

ONTARIO—

Aetna Explosives Company, Inc., Prescott, Ont.
Beacon Match Co., Ltd., Deseronto, Ont.
Henry Bottieri, First St., London, Ont.
Canadian Explosives, Ltd., Nobel, Ont.
Dominion Arsenal, 100 Albert St. South, Lindsay, Ont.
Dominion Match Co., Ltd., Deseronto, Ont.
T. W. Hand Firework Co., Ltd., 612-616 King St. W., Hamilton, Ont.
Jackson Signal Co., Ltd., 110 Morris St., Guelph, Ont.
Dominick Ruffo, York St., Cornwall, Ont.
Toronto Fireworks Co., Ltd., Dundas Road, Toronto, Ont.

BRITISH COLUMBIA—

Canadian Explosives, Ltd., James Island, B.C.
Giant Powder Co. of Canada, Ltd., Nanoose Bay, B.C.
Sabulite Explosives, Limited, Port Coquitlam, B.C.

CHAPTER FOUR

FERTILIZERS

The increased demand for vegetables, fruits and farm produce in large cities has stimulated the use of fertilizers, particularly in the older districts in which the soil has become impoverished through long use. A study of soils has become more common and plant foods which are lacking are supplied by the scientific use of fertilizers. The chief plant foods supplied in this way are nitrogen, phosphorus and potash. Materials containing these in available form are classed as true fertilizers A second class such as lime and gypsum, tend to make the first class more available as plant food.

Nitrogen is usually obtained from Chile saltpetre or sodium nitrate, tankage, slaughter-house and meat-packing wastes, and ammonium sulphate, a by-product in the manufacture of coal-gas and coke.

Phosphorus comes from bones, mineral phosphates, and basic slag from smelters in all of which it occurs in combination with lime or potash. The chief sources of potash are: kainite or crude potassium chloride, potassium sulphate and wood ashes. During recent years when the supply of crude potash salts from Germany has not been available, production of potash salts from kelp and other sources and the recovery from flue dust in large cement plants has been attempted on a large scale. Efforts have from time to time been made to find a method of extracting the potash from the almost limitless supply of orthoclase feldspar but so far none of these attempts has met with any commercial success.

A very comprehensive treatment of the nature and use of fertilizers is given in Bulletin 223 (Revised February 1919), issued by the Ontario Department of Agriculture. The exposition covers the different materials used and the part each ingredient plays in plant life; the evaluation of fertilizers and methods of experimenting to find the needs of various soils.

The present report for 1919 and 1920 covers the Canadian fertilizer group comprising those plants producing fertilizers a major product. This classification conforms to that used throughout this series of reports. There is also included in the section on products some account of the fertilizers made in those plants, whose major product necessitates their inclusion in one of the other industrial groups.

In 1919 fifteen plants were in operation, seven in Ontario, three in each of the provinces of Nova Scotia and New Brunswick, one in British Columbia and one in Quebec. In 1920 the same plants operated, with one additional firm in the province of Quebec. A complete list of the plants will be found at the end of this chapter.

Summary of Statistics, 1919 and 1920

		1919	1920
Number of plants		15	16
Capital employed	$	3,545,554	3,839,923
Value of products	$	2,541,097	3,788,027
Cost of raw materials	$	1,461,291	2,388,818
Cost of fuel used	$	42,334	51,436
Miscellaneous expenses	$	440,655	597,200
Salaries and wages	$	353,578	437,438
Average number of employees		367	402

Capital Employed.—Employing nearly four million dollars of capital in fixed and current assets at the end of 1920, the industry showed an advance over the capital

investment in the two preceding years amounting in all to nearly a million dollars. Conforming to this increase in money placed in the business the value of the output, which was lower in 1919 than in 1918, advanced in 1920 till the close of the year showed a total output valued at an amount almost equal to the capital investment.

Comparable data on capital employed in 1918, 1919 and 1920 are given below in tabular form.

Table 1.—Distribution of Capital Employed in the Fertilizer Industry in 1918, 1919 and 1920

	1918	1919	1920
	$	$	$
Lands, buildings, fixtures, machinery and tools	658,101	753,390	748,893
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	1,009,066	1,173,246	498,358
Cash, trading and operating accounts and bills receivable	1,396,944	1,618,918	2,592,672
Total	3,064,111	3,545,554	3,839,923

Products.—Products made in 1918 had a sales value of $2,558,007 at point of production. The output in the following year was only slightly less at $2,541,097 and 1920 marked a considerable advance, the output for the year being valued at $3,788,027, an increase of a million and a quarter dollars in one year.

A complete fertilizer is made by mixing the required amounts of materials bearing nitrogen, phosphorus and potash in order that a sufficient quantity of each of these plant foods may be present to meet the particular needs of the soil for the crops to be grown. Thus a fertilizer designated as 4-8-10 contains 4% nitrogen, 8% available phosphoric acid and 10% potash. In order to protect the public the Dominion Government requires all manufacturers and agents to give a guarantee of the amount of plant food constituents contained in the product offered for sale.

Several manufacturers sold portions of purchased superphosphate after treatment or dilution with a filler to meet the requirements of the trade. There is often a demand, on the part of those who do not require a complete fertilizer, for products which supply only one element of plant food.

Three-quarters of the output from the plants reporting in this industrial group was in the form of complete fertilizers.

Table 2 shows the production in the industry during 1919 and 1920.

Table 2.—Production of the Fertilizer Industry in Canada, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Selling value at factory	Quantity	Selling value at factory
			$		$
Complete fertilizers	Lbs.	66,450,934	1,773,536	93,486,875	2,885,868
Superphosphate*	"	10,175,526	150,315	10,728,177	174,396
Bone our and meal	"	766,364	14,072	2,032,848	45,548
Meat and fish scraps and fish guano	"	528,280	21,240	751,300	39,385
Grease and tallow	"	330,550	58,624	583,103	83,437
Bone and blood					14,907
Tankage and animal refuse					15,635
All other products			523,310		528,851
Total			2,541,097		3,788,027

*Includes fertilizers containing only superphosphate as the active ingredient and also superphosphates produced from phosphate rock, etc.

The foregoing statement includes the production of those industries which were engaged primarily in the manufacture of fertilizers, but a number of other industries made products which could be used alone or in admixture to provide one or more elements of plant food. Thus the slaughtering and meat-packing industry produced as by-products large quantities of animal tankage, bone and complete fertilizers. Ammonium sulphate was obtained in immense quantities from the by-product coke plants.

The following table shows the quality and selling value of these various materials, as well as the industries from which they were obtained.

Table 3.—Production of Fertilizers and Fertilizer Materials in Other Industries, 1919 and 1920

Industry	Commodity	Year	Unit of measure	Quantity	Selling value
					$
Cyanamide	Calcium cyanamide	1919	Short tons	59,245	4,065,749
		1920	"	62,962	5,087,000
Wood ashes	Potash	1919	Lbs.	39,500	4,740
		1920			3,227
Slaughtering and meat packing	Animal tankage	1919	Tons	19,769	893,225
		1920	"	12,171	607,358
	Bone, raw, ground	1919	"	9,836	590,058
		1920	"	5,699	480,864
	Complete fertilizers	1919	"	3,506	405,505
		1920	"	7,370	573,565
Fisheries	Fish and whale fertilizer	1919			165,743
		1920			207,047
Chemical	Mixed fertilizer	1919	Tons	887	44,325
		1920	"	1,639	147,510
Coke and gas	Ammonium sulphate	1919	"	19,322	1,423,545
		1920	"	18,880	1,435,418

Materials Used.—Materials used in the fertilizer industry as defined in the introduction to this review cost $1,461,291 in 1919 as compared with $1,573,582 in 1918, and $2,388,818 in 1920. The decrease shown in 1919 was $112,291 or 7.1% from 1918. In 1920 the increase in cost of materials over 1919 was $927,527 or 63.5%.

The great variety of materials may be seen from Table 4. The list is roughly divided into materials carrying nitrogen, phosphorus, and potash respectively, the three chief plant foods other than oxygen, carbon dioxide and water. Some of the materials, such as sodium nitrate, ammonium sulphate and the potash salts are soluble and readily available as plant food; acid phosphate is also comparatively soluble. The consumption of calcium cyanamide in 1919 would seem to indicate that this compound is meeting with more favour than formerly, as a source of nitrogen. When first used it was claimed the presence of carbides, phosphides and sulphides in this material gave rise after decomposition to acetylene, phosphine and sulphuretted hydrogen, all of which are poisonous to plant life. These disadvantages have been removed by a better knowledge of the use and by special treatment of the product for fertilizer material. As the prejudice against it is gradually overcome, cyanamide will no doubt become one of the most important sources of nitrogen for plant food.

In 1920 the consumption of cyanamide as a fertilizer material decreased in quantity nearly 50 per cent, and ammonium sulphate declined more than 20 per cent. The use of other nitro-bearing materials increased considerably during 1920. The consumption of sodium nitrate increased to over four times the quantity used in 1919 and 50 per cent more tankage was used in 1920 than in the previous year. Meat and garbage consumption increased approximately 85 per cent while more than five times as much dried blood was used as in the preceding year.

The consumption of acid phosphate showed an increase of 37 per cent, and the total quantity of potash salts used in 1920 was more than three times the amount of similar compounds used in 1919.

Table 4.—Materials Used in the Manufacture of Fertilizers in Canada, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Sodium nitrate	Lbs.	1,565,757	64,988	6,756,191	236,839
Ammonium sulphate	"	2,413,715	166,854	1,872,021	113,734
Calcium cyanamide	"	456,893	20,961	256,872	13,181
Tankage	"	7,580,980	248,272	11,394,663	358,699
Meat and garbage	"	653,350	6,723	1,208,684	11,713
Dried blood	"	51,429	1,169	276,847	14,562
Fish, offal and dried fish scrap	"	3,245,612	75,133	5,706,684	121,907
Basic slag	"	70,124,620	30,952	72,811,479	34,619
Bone meal (crude)	"	746,000	9,664	2,067,985	31,533
Bone flour (steamed)	"	1,414,057	23,082	926,057	16,012
Bone (kind not specified)[1]	"	272,566	3,629	1,008,459	16,901
Phosphate rock (crude)	"	143,600	1,691	Included with miscellaneous materials.	
Acid phosphate (superphosphate)	"	38,610,070	365,605	52,935,117	607,832
Potassium carbonate and wood ashes	"	40,220	300	378,600	21,952
Kainit and other crude potash salts	"	794,803	17,190	838,164	16,045
Potassium chloride	"	1,240,605	72,854	8,006,127	308,128
Potassium sulphate	"	663,110	44,986	24,800	1,855
Lime or land plaster	"	7,889,110	20,880	5,853,731	13,357
Sand and fillers	"	1,620,000	1,920	3,536,340	3,245
Humus, peat and sugar beet refuse	"	3,390,000	37,600	1,441,420	17,466
Miscellaneous materials[2]	.....	.....	246,838	.....	290,303
Bags, barrels and containers	.....	.....	.....	.....	138,935
Totals	.....	.....	1,461,291	.....	2,388,818

[1]In 1920 specified as "green and junk" bone.
[2]In 1919 miscellaneous materials included containers.

Table 5.—Salaries and Wages Paid in the Fertilizer Industry in 1918, 1919 and 1920

	1918	1919	1920
	$	$	$
Salaries paid	132,216	124,593	137,940
Wages paid	237,875	228,985	299,498
Total	370,091	353,578	437,438

Table 6 shows the distribution by classes of all persons engaged in the industry on December 15th (or nearest representative working day) of the three years, 1918, 1919 and 1920.

Table 6.—Number of Employees in the Fertilizer Industry by Classes on December 15th (*) 1918, 1919, 1920

	1918		1919		1920	
	Male	Female	Male	Female	Male	Female
Salaried Employees:—						
Officers, superintendents and managers	23	.....	20	1	23	1
Clerks, stenographers, salesmen and other salaried employees	60	20	51	20	53	16
Office sub-total	83	20	71	21	76	17
Wage-earners, receiving per week—						
Less than $10	11	.....	2	1	3	1
$10 but less than $15	66	.....	17	2	18	2
$15 but less than $20	127	3	122	.....	96	.....
$20 but less than $25	72	.....	.....	.....	.....	.....
$25 and over	30	.....	.....	.....	.....	.....
$20 but less than $24	.....	.....	31	.....	72	.....
$24 but less than $30	.....	.....	70	.....	80	.....
$30 and over	.....	.....	23	.....	37	.....
Works sub-total	306	3	265	3	306	3
Grand Total	389	23	336	24	382	20

(*) Plants not operating on December 15th, reported as for last day of normal operations.

Table 7 gives the number engaged in the industry as shown by the pay-rolls of the various establishments on the 15th of each month.

Table 7.—Number of Wage-Earners in the Fertilizer Industry by Months According to Payrolls on the 15th of Each Month

Month	1918			1919			1920		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
January	269	4	273	312	3	315	282	3	285
February	311	7	318	305	3	308	315	3	318
March	322	9	331	345	3	348	368	3	371
April	315	9	324	335	3	338	432	3	435
May	267	4	271	300	3	303	382	3	385
June	235	6	241	255	3	258	258	3	261
July	253	3	256	234	3	237	252	3	255
August	272	3	275	231	3	234	267	3	270
September	258	3	261	220	3	223	272	3	275
October	269	3	272	205	3	208	251	3	254
November	264	3	267	260	3	263	290	3	293
December	278	3	281	257	3	260	300	3	303
Average	276	5	281	272	3	275	306	3	309

Fuel and Power.—The total cost of fuel used in 1918 was $39,236 as compared with $42,334 in 1919 and $51,436 in 1920. The fuel used in each year is shown in Table 8, itemized as to kind, quantity, source, and cost at works.

Table 8.—Fuel Used in the Fertilizer Industry, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1919	Short tons	385	2,503	153	1,138
	1920	"	305	2,134	347	1,154
Lump	1919	"	10	120	.....	.....
	1920	"	.....	.....	999	8,214
Run of mine	1919	"	4,310	28,748	975	6,092
	1920	"	4,730	32,330	.....	.....
Anthracite coal—						
Lump	1919	"	.....	.....	50	750
	1920	"	.....	.....	25	462
Dust or slack	1919	"	.....	.....	.....	.....
	1920	"	.....	.....	109	1,083
Coke	1919	"	.....	.....	.....	.....
	1920	"	26	267	.....	.....
Gasoline	1919	Imp. gals.	3,456	1,440	.....	.....
	1920	"	9,400	3,239	.....	.....
Wood	1919	Cords	330	1,543	.....	.....
	1920	"	285	2,033	.....	.....
Other fuel	1919	.....	.....	.....	.....	.....
	1920	.....	.....	.....	.....	520
Totals	1919	.....	.....	34,354	.....	7,980
	1920	.....	.....	40,003	.....	11,433

Total Value of Fuel Consumed	1919	$ 42,334
	1920	51,436

Table 9 shows the power employed in the fertilizer industry in 1919 and 1920.

Table 9.—Power Employed in the Fertilizer Industry, 1919 and 1920

Class	Number of units		Total H.P. according to manufacturers rating		Total H.P. used	
	1919	1920	1919	1920	1919	1920
Boilers	17	14	1,995	1,720	995	765
Engines—						
Steam	6	8	970	925	670	690
Gasoline	.....	3	.....	84	.....	12
Water wheels	.....	1	.....	75	.....	75
Electric motors—						
Alternating current	10	37	255	737	255	443
Direct current	19		408		276	
Generators: Direct current	4	2	k.w. 40	k.w. 30	k.w. 40	k.w. 30

Miscellaneous Expenditures.—Miscellaneous expenditures in the fertilizer industry are tabulated below:—

Table 10.—Miscellaneous Expenditures in the Fertilizer Industry, 1919 and 1920

—	1919	1920
	$	$
Rent of offices, works and machinery	6,325	6,677
Cost of purchased power	5,467	5,098
Insurance (premium for year only)	34,546	39,355
Taxes—		
Excise	1,876	2,268
Excess profits tax	52,900	55,518
Provincial and municipal	4,046	4,995
Royalties, use of patents, etc	1,092	1,350
Advertising expenses	23,552	26,494
Travelling expenses	40,822	59,039
Repairs to buildings and machinery	50,270	58,992
All other sundry expenses (not including fuel costs, materials used, salaries and wages	219,759	337,414
Total	440,655	597,200

Table 11.—Summary of Expenditures

—	1919	1920
	$	$
Salaries	124,593	137,940
Wages	228,985	299,498
Fuel	42,334	51,436
Materials	1,461,291	2,388,818
Miscellaneous expenses	440,655	597,200
Total expenditures	2,297,858	3,474,892

Table 12.—Value Added by Manufacturing

—	1919	1920
	$	$
Selling value of products	2,541,097	3,788,027
Cost of materials	1,461,291	2,388,818
Value added by manufacturing	1,079,806	1,399,209

Imports and Exports.—Table 13 gives the importations, during the calendar years 1919 and 1920, of fertilizers and materials of interest in connection with the fertilizer industry in Canada. The conclusion must not be drawn that all the materials here shown were used as fertilizer material. No doubt a large portion of the acid phosphate was used in the manufacture of baking powder, while some of the phosphate rock undoubtedly was consumed in the chemical industries. Bone dust, charred bone, and bone ash may also have been only partly used in the manufacture of fertilizers.

Table 13.—Imports of Fertilizers and Materials of Interest in Connection with the Fertilizer Industry

Kind	Year	Unit of Measure	Quantity	Value
				$
Bone dust, charred bone and bone ash	1919	cwt.	10,140	22,346
	1920	"	56,098	461,636
Fertilizers, compounded or manufactured	1919	.....	.....	830,124
	1920	.....	.....	1,241,360
Fertilizers, unmanufactured	1919	.....	.....	75,610
	1920	.....	.....	253,566
Guano and other animal manures	1919	cwt.	18,634	31,069
	1920	"	36,374	95,124
Kainite and other crude German potash salts for fertilizers	1919	lbs.	649,841	22,627
	1920	"	3,994,607	169,416
Manures, vegetable	1919	cwt.	3,257	13,140
	1920	"	17,667	9,078
Phosphate rock	1919	"	.....	30,267
	1920	"	269,529	114,480
Acid phosphate not medicinal	1919	lbs.	2,846,000	295,387
	1920	"	3,455,735	369,105
Blast furnace slag	1919	.....	.....	416
	1920	.....	.....	18,343
Ammonium Sulphate	1919	lbs.	203,408	12,129
	1920	"	624,659	31,495
Sodium Nitrate	1919	"	9,084,536	411,423
	1920	"	49,596,148	1,651,934
Pot and Pearl Ash, in packages of not less than 25 pounds	1919	"	19,340	6,755
	1920	"	65,128	18,712
Fertilizers, superphosphate or acid phosphate of lime	1919	Included with compounded or manufactured fertilizers.		
	1920	.....	.....	469,970
Potash, muriate and sulphate of, crude	1919	lbs.	630,890	34,691
	1920	"	14,639,137	686,436

Exports of fertilizers and related materials during the calendar year 1919 amounted to $7,057,418, and during 1920, $7,012,946. The kind, quantity and value of the various materials are shown in Table 14.

Table 14.—Exports of Fertilizers and Materials of Interest in the Fertilizer Industry, 1919 and 1920

Kind	Year	Unit of Measure	Quantity	Value
				$
Ammonium sulphate	1919	cwt.	373,312	1,846,713
	1920	"	366,585	1,896,660
Cyanamide	1919	"	1,174,584	4,104,052
	1920	"	1,196,574	4,031,162
Manufactured fertilizers	1919	.....	.....	283,304
	1920	.....	.....	317,676
Unmanufactured fertilizers	1919	.....	.....	187,299
	1920	.....	.....	.....
Phosphate rock*	1919	tons	48	741
	1920	"	76	645
Pot and pearl ashes and other ashes	1919	.....	.....	42,604
	1920	.....	.....	37,527
Tankage	1919	cwt.	267,022	617,538
	1920	"	261,110	729,276

*Nine months 1919, April to December, inclusive. Similar materials may have been included under "unmanufactured fertilizers" during January, February and March.

Names of the Operating Firms and the Location of the Plants Covered in this Report

NOVA SCOTIA—

Colonial Fertilizer Co. (branch of Consolidated Rendering Co.), Windsor, N.S.
Cross Fertilizer Co., Ltd., Prince St., Sydney, N.S.
Nova Scotia Fertilizer Co., 25 George St., Halifax, N.S.

NEW BRUNSWICK—

Dominion Fertilizer Co., Ltd., St. Stephen, N.B.
Kinsella, A., Chesley St., St. John, N.B.
Provincial Chemical Fertilizer Co., Ltd., 89 Water St., St. John, N.B.

QUEBEC—

The Capelton Chemical and Fertilizer Co., Buckingham Jct., Que.
Georges Tanguay, Ltée., 118-120 rue St. André, Quebec, Que.

ONTARIO—

Canadian Fertilizer Co., Ltd., end of King St. E., Chatham, Ont.
Farmer's Fertilizer Co., Ltd., Wingham, Ont.
Freeman Co., Ltd., W. A., Terra Cotta Ave., Hamilton, Ont.
Ontario Fertilizers, Limited, Harris Road, West Toronto, Ont.
Port Stanley Supply Co., Port Stanley, Ont.
William Stone Sons, Ltd., Ingersoll, Ont.
Cyrus Witts, Norwich Junction, Ont.

BRITISH COLUMBIA—

Globe Fertilizer Co., Campbell Road, South Vancouver, B.C.

CHAPTER FIVE

MEDICINAL AND PHARMACEUTICAL PREPARATIONS

The manufacture of patent and proprietary medicinal preparations and of pharmaceuticals, toilet preparations, and the myriad products made by plants in this group was carried on in Canada by ninety-seven plants in 1919, and by one hundred plants in the following year. Sixty-one of these were located in Ontario, twenty-nine in Quebec, seven in Manitoba and one in each of the provinces of Nova Scotia, New Brunswick and British Columbia.

Summary of Statistics, 1919 and 1920

		1919	1920
Number of plants		97	100
Capital invested	$	11,827,595	12,191,155
Value of products	$	13,739,776	15,728,224
Cost of materials	$	5,854,106	7,029,594
Cost of fuel used	$	58,888	79,588
Miscellaneous expenses	$	3,288,116	3,212,739
Salaries and wages	$	2,594,159	2,964,822
Average number of employees		2,776	2,838

Capital Employed.—The total capital employed comprising the value of lands, buildings, fixtures, machinery and tools, cost of stocks in process, materials on hand, finished products, fuel and miscellaneous supplies on hand and the balance of cash, trading and operating accounts and bills receivable rose from $11,827,595 in 1919 to $12,191,155 in 1920.

Table 1.—Capital Employed in the Medicinal and Pharmaceutical Preparations Industry in 1919 and 1920

	1919	1920
	$	$
Land, buildings, fixtures machinery and tools	2,567,545	2,949,695
Materials on hand, stocks in process, finished products and miscellaneous supplies on hand	4,518,247	4,623,958
Cash, trading and operating accounts and bills receivable	4,741,803	4,617,502
Total	11,827,595	12,191,155

Products.—In each of the two years pharmaceutical preparations accounted for the largest item of value among the products while patent medicines were next in importance and toilet preparations, medicated wines and disinfectants followed.

It will be understood that the foregoing references to production relate only to the industry under review. Products similar to those last mentioned were also made as major products of the "Perfumery, Cosmetics and Toilet Preparations Industry."

Table 2.—Products of the Medicinal and Pharmaceutical Preparations Group, 1919 and 1920

Kind	1919	1920
	Selling value	Selling value
	$	$
Patent medicines	4,607,723	5,434,270
Toilet preparations, including perfumes, hair tonics, etc.	793,864	1,215,643
Medicated wines	140,425	171,844
Disinfectants	93,216	45,112
Pharmaceutical preparations	*6,734,607	6,539,081
All other products	‡1,369,941	2,322,274
Total	13,739,776	15,728,224

*Includes diarsenol, neo-diarsenol, phenarsenyl, neo-phenarsenyl, and all kinds of pharmacopoeial preparations.

‡Surgical dressings, plasters, etc., flavouring extracts, temperance beverages and small quantities of various other products.

Materials Used.—The most striking items on the list of materials used were those showing the cost of containers. Since most of the products of this industry are sold in small packages or bottles the cost of containers represents a large proportion of the expenditures for materials used. In 1919 purchased containers cost $1,255,520, or 21·4 per cent of the total cost of materials, while in the following year the sum so spent was $1,669,026, or 23·7 per cent of the total.

Under the heading "All other materials," there has been included a small number of materials which were grouped by the manufacturers when reporting and also some which were used by one firm only. The bulk of the item, however, was made up from materials which were not named on the schedules supplied to manufacturers for use in reporting to the Bureau, and to some extent by those materials which were used in such small quantities that the total cost was less than $500. It is hoped that the amount representing unspecified materials may be reduced considerably in future reports.

A partially itemized list of materials is given in Table 3.

Table 3.—Materials Used in the Medicinal and Pharmaceutical Preparations Group in 1919 and 1920

Kind	Unit of Measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Acetone	lbs.	47,367	9,472	15,776	3,733
Acids—					
Acetic—56%	"	2,988	613	2,432	359
Acetic, glacial	"	15,943	5,331	1,565	491
Arsenious (white arsenic)	"	14,197	4,180	.....	.....
Boric	"	38,534	6,353	36,002	6,527
Citric	"	52,691	57,753	54,245	58,874
Hydrochloric—20° Bé	"	8,374	2,671	13,417	997
Oxalic	"	1,614	807	10,363	5,678
Phosphoric	"	8,187	4,356	9,002	3,988
Nitric (1·4 S.G.)	"	4,956	1,542	3,716	867
Sulphuric	.....	.....	2,506	.....	1,455
Tannic	lbs.	595	913	420	707
Tartaric (crystals)	"	42,340	34,133	59,045	41,648
Alcohol, ethyl	.....	.....	572,390	.....	742,484
" methyl (pure)	gals.	1,026	3,333	140	691
" methylated spirits	"	606	1,472	919	1,640
" wood	"	4,087	7,703	2,946	9,697

Table 3.—Materials Used in the Medicinal and Pharmaceutical Preparations Group in 1919 and 1920—*Concluded*

Kind	Unit of Measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Alum, ammonia	lbs.	6,875	653	.....	.....
Ammonia, liquor	"	17,216	1,832	10,966	1,533
" carbonate	"	9,977	1,647	6,889	1,327
" chloride	"	5,567	1,313	3,666	764
Barium peroxide	"	36,606	8,543	52,727	13,009
Bismuth salts	"	1,049	3,973	1,310	4,370
Caffeine	"	1,581	14,531	1,575	14,096
Caffeine citrate	"	76	588	111	816
Calcium carbonate (chalk)	"	102,838	5,783	74,348	5,228
Carbon tetrachloride	"	5,200	706	3,725	566
Collodion	"	5,892	2,258	.....	1,749
Ether	"	10,219	3,895	8,901	3,678
Formaldehyde (40%)	"	3,188	1,065	3,406	1,350
Glycerine, refined	"	397,177	110,015	405,931	117,598
Iodine, crude	"	319	1,293	3,163	11,286
" resublimed	"	584	3,134	767	3,985
Iron sulphate (copper)	"	19,708	682	20,363	504
Magnesium carbonate	"	10,133	1,736	10,030	1,798
" oxide	"	6,089	4,227	5,281	3,922
" sulphate	"	151,083	9,700	182,893	8,643
Mercuric chloride	"	3,987	6,254	2,396	4,550
Mercurous chloride	"	7,444	14,989	1,019	2,005
Petroleum, gasoline, etc	.....	.....	6,083	.....	5,733
Potassium antimonyl tartrate	lbs.	719	509	.....	.....
Potassium bicarbonate	"	4,149	1,488	4,182	1,845
" bitartrate	"	1,446	936	7,235	4,027
" carbonate	"	1,199	722	2,292	1,084
" chlorate	"	8,590	3,139	4,209	1,001
" hydroxide	"	5,827	3,566	4,848	1,804
" iodide	"	2,906	12,387	2,032	8,459
" nitrate	"	10,708	2,572	17,308	3,383
" permanganate	"	822	1,144	629	614
" sodium tartrate	"	34,892	15,121	51,103	18,964
Sodium biborate	"	8,529	858	19,716	1,968
" bicarbonate	"	160,067	5,547	134,776	5,353
" carbonate (crystals)	"	10,048	788	12,208	1,002
" chloride	"	110,195	1,229	.....	.....
" citrate	"	1,488	2,149	1,965	1,858
" hydroxide	"	28,848	2,698	18,607	1,886
" phosphate (dibasic)	"	27,641	3,318	24,183	2,381
" silicate	"	22,794	789	28,598	627
" sulphate	"	149,523	3,739	135,448	4,486
Sulphur	"	56,723	2,290	32,068	1,171
Zinc oxide	"	10,267	1,687	9,251	1,543
Coal tar and its derivatives—					
Acetphenetidine	"	1,311	4,330	2,086	6,075
Acid, acetylsalicylic	"	28,978	39,360	28,520	30,829
" benzoic	"	925	1,321	643	801
" carbolic (phenol)	"	17,338	7,683	6,606	1,461
" cresylic (cresol)	"	23,783	3,434	.....	880
" salicylic	"	6,292	3,280	3,188	2,177
Coumarin	"	103	1,465	.....	.....
Creosote oils	.....	.....	3,825	.....	562
Naphthalene	lbs.	7,399	624	16,593	1,754
Sodium benzoate	"	624	1,342	1,201	1,243
" salicylate	"	2,740	2,336	6,030	4,735
Herbs, roots and other drugs	.....	.....	442,795	.....	462,809
Extracts	.....	.....	82,754	.....	68,558
Gums, including camphor	.....	.....	112,378	.....	103,546
Sugar	.....	.....	163,589	.....	682,266
Essential oils	.....	.....	63,030	.....	69,286
Containers	.....	.....	1,255,520	.....	1,669,026
All other materials, drugs and chemicals	.....	.....	2,677,936	.....	2,771,784
Total	.....	.....	5,854,106	.....	7,029,594

Employees, Salaries and Wages.—Tables have been prepared to show the distribution of employees by classes and the number of employees on wages by months and by sex. Much of the work done in this industry is of such a character as to permit the employment of a large number of girls and women. Throughout the two years, female employees far outnumbered the male workers. The data on Table 4 were reported as for December 15, of each year while the number of employees for each month shown in Table 5 was taken from the pay-rolls as of the fifteenth of each month.

In the case of firms reporting whose plants were not in normal operation on December 15, the data for Table 4 were taken as for the last day of active operations.

Table 4.—Number of Employees in the Medicinal and Pharmaceutical Preparations Group by Classes as of December 15, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees—						
Officers, superintendents and managers	141	5	146	158	4	162
Clerks, stenographers, salesmen and other salaried employees	397	245	642	417	264	681
Office sub-total	538	250	788	575	268	843
Wage-earners receiving per week—						
Under $10	71	529	600	26	261	287
$10 but under $15	101	483	584	93	444	537
$15 but under $20	238	179	417	195	183	378
$20 but under $26	299	21	320	274	15	289
$26 but under $30	75	3	78	87	1	88
$30 and over	65	.....	65	125	1	126
Works sub-total	849	1,215	2,064	800	905	1,705
Grand total	1,387	1,465	2,852	1,375	1,173	2,548

In Table 5 is listed the number of wage-earners in the industry as shown by the pay-rolls of the various firms on the fifteenth of each month.

Table 5.—Number of Wage-Earners in the Medicinal and Pharmaceutical Preparations Group by Months and by Sex, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	770	1,169	1,939	974	1,053	2,027
February	789	1,234	2,023	968	1,052	2,020
March	810	1,201	2,011	979	1,055	2,034
April	810	1,155	1,965	950	1,015	1,965
May	794	1,133	1,927	942	1,003	1,945
June	805	1,072	1,877	905	1,014	1,919
July	811	1,100	1,911	898	1,092	1,990
August	817	1,118	1,935	914	1,083	1,997
September	821	1,218	2,039	1,095	1,111	2,206
October	839	1,237	2,076	1,006	1,131	2,137
November	855	1,255	2,110	945	1,040	1,985
December	847	1,201	2,048	809	907	1,716
Average	814	1,174	1,988	949	1,046	1,995

Table 6.—Salaries and Wages Paid in the Medicinal and Pharmaceutical Preparations Group in 1919 and 1920

—	1919	1920
	$	$
Salaries	1,307,274	1,493,296
Wages	1,286,885	1,471,526
Total salaries and wages	2,594,159	2,964,822

Fuel and Power.—In Table 7 the various kinds of fuel are itemized as to source, quantity and cost at the works. Any fuel supplied to employees is not included.

Table 7.—Fuel Used in the Medicinal and Pharmaceutical Preparations Group in 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1919	short tons	.....	.....	1,756	12,338
	1920	"	.....	.....	2,012	17,567
Lump	1919	"	209	2,093	1,296	10,137
	1920	"	131	2,354	1,222	11,369
Run of mine	1919	"	849	6,931	2,010	16,096
	1920	"	811	9,555	2,312	24,494
Anthracite coal—						
Lump	1919	"	.....	.....	456	5,106
	1920	"	.....	.....	541	7,783
Dust or slack	1919	"	.....	.....	79	830
	1920	"	.....	.....	194	1,394
Lignite coal	1919	"	.....	.....	.....	.....
	1920	"	19	256	.....	.....
Coke	1919	"	2	18	.....	.....
	1920	.....	.....	.....	.....	.....
Gasoline	1919	Imp. gals.	960	314	.....	.....
	1920	"	2,835	1,212	.....	.....
Oil fuel	1919	"	45	9	.....	.....
	1920	.....	.....	.....	.....	.....
Wood	1919	cords	85	569	.....	.....
	1920	"	25	205	.....	.....
Gas	1919	1,000 cu.ft	4,264	2,972	.....	.....
	1920	"	2,234	2,373	.....	.....
Other fuel	1919	.....	.....	1,475	.....	.....
	1920	.....	.....	1,026	.....	.....
Sub-totals	1919	.....	.....	14,381	.....	44,507
	1920	.....	.....	16,981	.....	62,607

Total cost of fuel consumed,	1919	$58,888
	1920	79,588

Details of the power equipment of the operating plants have been arranged in Table 8. Boilers were used as a source of power to operate steam engines and also as a source of heat for use in the several processes employed. Most of the light mixing machinery was operated by light electric motors.

Table 8.—Power Employed in the Medicinal and Pharmaceutical Preparations Group, 1919 and 1920

Class	Number of units		Total H.P. according to manufacturers rating		Total H.P. used	
	1919	1920	1919	1920	1919	1920
Boilers—						
Fired by hand	18	29	1,025	1,717	726	875
Fired mechanically	3		300		225	
Engines—						
Steam	6	3	447	190	225	150
Gas	1	1	3	5	3	5
Gasoline	.....	1	.....	3	.....	3
Electric motors—						
Alternating current	185	301	918	1,153	771	728
Direct current	37		536		474	
Generators—						
Alternating current	2	.....	100 K.V.A.	.....	10 K.V.A	.....
Direct current	2	.....	13 K.V.A.	.....	13 K.V.A	.....

Miscellaneous Expenses.—Miscellaneous expenses appilcable to manufacturing operations have been collected in Table 9. A summary of expenditures is shown in Table 10 followed by an item showing the value added by manufacturing operations. See Table 11.

Table 9.—Miscellaneous Expenses in the Medicinal and Pharmaceutical Preparations Group in 1919 and 1920

—	1919	1920
	$	$
Rent of offices, works and machinery	124,841	97,138
Cost of purchased power	25,488	85,900
Insurance (premium for year only)	40,425	43,739
Taxes—		
Excise	105,305	181,948
Excess profits	163,340	104,247
Provincial and municipal	53,718	54,004
Royalties, use of patents, etc	39,218	36,179
Advertising expenses	736,699	923,657
Travelling expenses	444,809	387,563
Repairs to buildings and machinery	84,163	101,467
All other sundry expenses	1,470,110	1,196,897
Total miscellaneous expenses	3,288,116	3,212,739

Table 10.—Summary of Expenditures, 1919 and 1920

—	1919	1920
	$	$
Salaries	1,307,274	1,493,296
Wages	1,286,885	1,471,526
Fuel	58,888	79,588
Materials used	5,854,106	7,029,594
Miscellaneous expenses	3,288,116	3,212,739
Total	11,795,269	13,286,743

Table 11.—Value Added by Manufacturing, 1919 and 1920

—	1919	1920
	$	$
Selling value of products	13,739,776	15,728,224
Cost of materials	5,854,106	7,029,594
Added value by manufacturing	7,885,670	8,698,630

Table 12.—Imports into Canada of Specified Items of Interest in Connection with the Medicinal and Pharmaceutical Preparations Group of Industries, 1919 and 1920

	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Drugs, crude, such as barks, flowers, roots, beans, berries, balsams, bulbs, fruits, insects, grains, gums and gum resins, herbs, leaves, nuts, fruit, and stem seeds which are not edible and which are in a crude state and not advanced in value by refining or grinding or any other process of manufacture, n.o.p.			274,536		338,471
Papaine			119		175
Quassia juice					11
Roots, medicinal, viz.: Alkanet, crude, crushed or ground, aconite, calumba, foliae digitalis, gentian, ginseng, jalap, ipecacuanha, iris, orris root, liquorice, sarsaparilla, squills, taraxacum, rhubarb and valerian, unground			17,095		26,503
Liquid preparations, non-alcoholic, for disinfecting, dipping or spraying, n.o.p.			184,870		143,464
Liquorice, in paste, rolls and sticks, not sweetened, n.o.p.	lbs.	116,675	42,415	227,576	76,119
Medicinal, chemical and pharmaceutical preparations, including proprietary preparations (dry)			1,724,416		2,374,103
Medicinal, chemical and pharmaceutical preparations, including proprietary preparations, all other non-alcoholic			119,592		96,042
Medicinal, chemical and pharmaceutical preparations including proprietary preparations, all other			253,648		399,467
Medicinal, or medicated wines, containing not more than 40% of proof spirits	gals.	9,413	15,160	4,027	13,836
Spirits and strong waters of any kind, mixed with any ingredient or ingredients, and being known or designated as anodynes, elixirs, essences, extracts, lotions, tinctures, or medicines, or ethereal and spirituous fruit essences, n.o.p.	gals.	4,489	89,944	8,297	123,638
Dressings, antiseptic, surgical such as absorbent cotton, cotton wool, lint, lamb's wool, tow, jute, gauzes, and oakum prepared for use as surgical dressings plain or medicated			380,535		475,896

Table 13.—Exports of Certain Medicinal Preparations from Canada

Drugs	1919		1920	
	Quantity	Value	Quantity	Value
		$		$
Medicinal and proprietary preparations	.....	418,804	.....	1,049,059
Roots, herbs, bark flowers, etc. for medicinal use, n.o.p.	.....	102,857	.....	81,024
Senega root	487,893	630,930	281,430	318,577

List of Plants Engaged in the Medicinal and Pharmaceutical Preparations Group During the Year 1920

NOVA SCOTIA—

Minard's Liniment Co., Ltd., 7 Jenkins St., Yarmouth, N.S.

NEW BRUNSWICK—

The Brayley Drug Co., Ltd., 13 Hill St., St. John, N.B.

QUEBEC—

The American Druggists Syndicate Ltd., 24 Craig St. W., Montreal, Que.
G. Andrien, 511 Viger Avenue, Montreal, Que.
Henrie E. Archambault, C-O Cie Produits Chimiques Vairain, 76 Notre Dame St. East, Montreal, Que.
J. C. Ayer Company, 30 Pinnet St., Montreal, Que.
The Centaur Co., 442 St. James St., Montreal, Que.
Alphonse Chretien, St. Eulalie, Que.
Davis & Lawrence Co., 356 St. Antoine St., Montreal, Que.
The Denver Chemical Mfg. Co., 107 Lagauchetiere St. W., Montreal, Que.
R. J. Devins, Ltd., 1845 Notre Dame St. W., Montreal, Que.
W. Duclos, Esq., Bienville, Que.
Frasier, Thornton & Co., Cookshire, Que.
Charles E. Frosst & Co., 101 Lagauchetiere St. W., Montreal, Que.
J. A. E. Gauvin, Esq., 850 St. Catherine St. East, Montreal, Que.
G. C. Hanford Mfg. Co., Ltd., 133 Youville Square, Montreal, Que.
Frank W. Horner, Ltd., 40 St. Urbain St., Montreal, Que.
Ideal Medicine Co., Victoriaville, Que.
Dr. J. O. Lambert, Ltd., 396 St. Antoine St., Montreal, Que.
J. L. Mathieu Co., 10-12-14 rue Albert, Sherbrooke, Que.
Menley & James, Ltd., of Canada, 45 St. Alexander St., Montreal, Que.
The National Licorice Co., Ernest Street and Desjardins Ave., Montreal, Que.
The Phenarsenyl Co., Ltd., 75 Jurors St., Montreal, Que.
N. C. Polson & Co., Ltd., 311 Notre Dame St. W., Montreal, Que.
Antoine Racicot, Esq., 950 Papineau St., Montreal, Que.
Philadelphia Routhier, 517 Mont Royal East, Montreal, Que.
La Société des Eaux Purgatives "Riga", 40 Plessis St., Montreal, Que.
D. Watson & Co., Ltd., 11 Place Youville, Montreal, Que.
A. J. White & Co., Ltd., 45 St. Alexander St., Montreal, Que.
Wingate Chemical Co., Ltd., 545 Notre Dame St. West, Montreal, Que.
John Wyeth & Brother, Incorporated, 46 Prince St., Montreal, Que.

ONTARIO—

The Allen & Hanburys Co., Ltd., 65 King St. E., Lindsay, Ont.
Fred C. Arner, Esq. (The Arner Co., Ltd.), Fort Erie, Ont.
Bauer & Black, Limited, 96 Spadina Avenue, Toronto, Ont.
G. C. Briggs & Sons, 122 King St. West, Hamilton, Ont.

List of Plants Engaged in the Medicinal and Pharmaceutical Preparations Group During the Year 1920—*Continued*

ONTARIO—*Continued*—

The Bennett & Messecar Co., Ltd., Mille Roches, Ont.
The Canada Pharmacal Co., Ltd., 447 Talbot St., London, Ont.
Canadian Gunagathon Co., Ltd., 750 B. Yonge St., Toronto, Ont.
Carter Cumming & Co., 107 Duke St., Toronto, Ont.
Carter Drug Co., 1560 Dundas St. West, Toronto, Ont.
Chamberlain Medicine Co., Ltd., 41 Dovercourt Road, Toronto, Ont.
Coleman & Co., Canada Ltd., 67 Portland St., Toronto, Ont.
L. Crossman, Esq., 439 Booth St., Ottawa, Ont.
D. D. D. Co'y., 27 Lyall Ave., Toronto, Ont.
C. W. Diffin, Esq., Bridgeburg, Ont.
Douglas & Co., John St., Napanee, Ont.
The T. Eaton Drug Co., Ltd., 190 Yonge St., Toronto, Ont.
Edmanson, Bates & Co., Ltd., 244 Adelaide St. West, Toronto, Ont.
Emerson Drug Co., 64 Spadina Ave., Toronto, Ont.
Dr. Peter Fahrney & Sons Co., 22 Pitt St., Windsor, Ont.
Fleming Bros., 25 Toronto St., Toronto, Ont.
Foster Dack Co., Ltd., 337 King St. West, Toronto, Ont.
C. E. Fulford, Limited, 310 Dupont St., Toronto, Ont.
The Gallagher Remedy Co., 332 Water St., Peterboro, Ont.
S. F. Gibson & Son, 1229 Wyandotte St. E., Windsor, Ont.
The J. F. Hartz Co., Ltd., 24-26 Hayter St., Toronto, Ont.
C. T. Hood Company, 6 Millstone Lane, Toronto, Ont.
Howard Brothers, Chemical Co., Bridgeburg, Ont.
International Druggists' & Chemists' Laboratories, 147 Carling St., London, Ont.
E. G. Jefferis, Esq., 442 Quebec Ave., Toronto, Ont.
The F. E. Karn Drug Co., Ltd., Queen & Victoria Sts., Toronto, Ont.
Lambert Pharmacal Company, 66 Gerrard St. E., Toronto, Ont.
Lee Chemical Mfg. Co., 17 High Park Blvd., Toronto, Ont.
A. H. Lewis Medicine Co., Smith's Falls, Ont.
The Lyman Bros. & Co., Ltd., 179 Front St. E., Toronto, Ont.
Dr. Mahon's Compass Oil Co., 18 Garfield Ave., London, Ont.
The Mentholatum Company, Lewis St., Bridgeburg, Ont.
The Merrill Co., Ltd., 93½ Church St., Toronto, Ont.
The T. Milburn Co., Ltd., 643 King St. W., Toronto, Ont.
The National Drug & Chemical Co., 1 Phoebe St., Toronto, Ont.
Geo. M. Noll, Esq., 539 King St. West., Toronto, Ont.
Northrop & Lyman Co., Ltd., 462-466 Wellington St. W., Toronto, Ont.
Orillia Chemical Co. (J. I. Deadman), Box 440, Orillia, Ont.
Parke Davis & Company, Cor. Walker Rd. & Sandwich St., Wakerville, Ont.
The Penslar Co., Ltd., Walkerville, Ont.
Lydia E. Pinkham Medicine Co., University Ave., Cobourg, Ont.
The Geo. H. Rundle & Son Co., Ltd., Cor. Pitt St. & Dougal Ave., Windsor, Ont.
John E. Sanderson, Esq., Richmond Hill, Ont.
W. E. Saunders & Co., Ltd., 352 Clarence St., London, Ont.
Scott & Bowne, 126 Wellington St. W., Toronto, Ont.
E. B. Shuttleworth Chemical Co., Ltd., 29 Dundas St. E., Toronto, Ont.
Frederick Stearns & Co. of Canada, Ltd., 99½ Sandwich St. West, Windsor, Ont.
Synthetic Drug Co., Ltd., 243 College St., Toronto, Ont.
The Tanlac Co., Ltd., 12 Kildare Rd., Walkerville, Ont.
The Toronto Pharmacal Co., Ltd., 20 Brockton Ave., Toronto, Ont.
The United Drug Co., Ltd., 78 Broadview Ave., Toronto, Ont.
Vanderhoof & Co., Ltd., 104 East Wyandotte St., Windsor, Ont.

List of Plants Engaged in the Medicinal and Pharmaceutical Preparations Group During the Year 1920—*Concluded*

ONTARIO—*Concluded*—

Henry K. Wampole & Co., Ltd., Perth, Ont.
The Waterbury Chemical Co. of Canada, Ltd., 58 Spadina Ave., Toronto, Ont.
Ernest P. West, 41 Duchess St., Toronto, Ont.
Williams Chemical Co., Ltd., Russell, Ont.
Worlds Dispensary Medical Assn., Courtwright St., Bridgeburg, Ont.

MANITOBA—

Canadian Sundries Ltd., 392 Notre Dame St., Winnipeg, Man.
The T. Eaton Co., Ltd., Winnipeg, Man.
The Martin, Bole & Wynne Co., Ltd., Winnipeg, Man.
Anton, Mickelson Co., Ltd., 143 Smith St., Winnipeg, Man.
The W. T. Rawleigh Co., Ltd., Cor. Gunnell St. & Henry Ave., Winnipeg, Man.
Sanal Mfg. Co., 614 Portage Ave., Winnipeg, Man.
The J. R. Watkins Co., Winnipeg, Man.

BRITISH COLUMBIA—

B. C. Pharmacal Co., Ltd., 329 Railway St., Vancouver, B.C.

CHAPTER SIX

PAINTS, PIGMENTS AND VARNISH

The paint and varnish industry in Canada showed a marked increase in 1919 over the previous year, and a still greater increase in 1920. For the three years 1918, 1919 and 1920 the cost of materials used was $9,203,530, $10,937,181 and $15,918,557, respectively. Products made from such materials in the respective years were valued at $17,678,049, $19,523,086 and $26,939,476.

In 1919 approximately five and one half million pounds more pig lead was corroded for the production of basic carbonate of lead than in 1918, while in 1920 the quantity corroded exceeded that of 1919 by more than ten and three-quarter million pounds. The greater portion of the basic carbonate obtained was apparently consumed in Canada by the paint manufacturers, the thousands of painters and plumbers throughout the country, by Governmental Departments, large manufacturing concerns and railroad companies. Only a small quantity of white lead was exported, other than as a constituent of mixed paints.

Summary of Statistics, 1919 and 1920

	1919	1920
Number of plants	46	48
Capital invested	$ 17,852,176	20,320,851
Value of products	$ 19,523,086	26,939,476
Cost of materials used	$ 10,937,181	15,918,557
Cost of fuel used	$ 165,370	320,947
Miscellaneous expenses	$ 2,774,561	3,857,502
Salaries and wages	$ 2,525,144	3,431,064
Average number of employees	2,234	2,568

Forty-eight plants were operated in 1920, as compared with 46 in 1919 and 45 in 1918. The number of plants by provinces is shown for the years 1918, 1919 and 1920 in Table 1; while for the last named year a list of operators with the location of plants is given at the end of this chapter.

Table 1.—Number of Plants in the Paint, Pigments and Varnish Industry in Canada

Province	1918	1919	1920
Nova Scotia	2	1	1
Quebec	12	12	12
Ontario	21	23	22
Manitoba	3	3	3
British Columbia	7	7	10
Total Dominion	45	46	48

Capital Employed.—The total capital employed in this industry showed a steady increase during the three years under review rising from $15,784,000 in 1918 to $17,852,000 in 1919 and advancing still further to $20,321,000 in 1920. The increase

in capital employed reflected the growth of the industry in recent years and was indicative of the established and yet progressive nature of the concerns engaged in this very important group. The increased use of paint and varnish in the country has been due in part to the volume of new construction undertaken but more perhaps to the growing appreciation of the value of conservation. Educational campaigns vigorously prosecuted by the makers of paint and varnish furnished an excellent example to other industries and the success attending the attempt to interest the general public in the value of "saving the surface" was evidence of the usefulness of the campaign.

Table 2 shows the distribution of capital employed at the end of the years 1918, 1919 and 1920.

Table 2.—Capital Employed in the Paint and Varnish Industry in Canada in 1918, 1919 and 1920

	1918	1919	1920
	$	$	$
Land, buildings, fixtures, machinery and tools	5,778,669	6,283,303	7,019,082
Materials, finished products, fuel and miscellaneous supplies on hand and stocks in process	5,486,347	6,502,052	7,632,518
Cash, trading and operating accounts and bills receivable	4,519,594	5,066,821	5,669,251
Total	15,784,610	17,852,176	20,320,851

Products.—In 1918 three firms corroded pig lead for the production of 4,030,367 pounds of dry white lead and 8,456,236 pounds of white lead ground in oil, in addition to 1,421,686 pounds of litharge. During 1919 four firms were engaged in this phase of the industry and the increase in the amount of pig lead used was over five million pounds. Production increased accordingly and the basic carbonate obtained amounted to 7,742,200 pounds of the dry product and 10,066,048 pounds ground in oil. The quantity of litharge made was 2,358,000 pounds or an increase of 936,214 pounds over 1918.

The same four firms corroded lead in 1920 and used 10,787,527 pounds more pig lead than in the preceding year. The increase in dry basic carbonate obtained amounted to approximately three million pounds while the product ground in oil showed an increase of nearly eight million pounds over 1919. The respective quantities of the two commodities produced in 1920 were 10,747,636 pounds dry valued at $1,072,249 and 17,816,329 pounds ground in oil valued at $2,520,377. The litharge obtained amounted to 3,441,226 pounds or an increase of more than a million pounds over 1919.

In Table 3 are shown the lead products obtained by the four firms corroding pig lead during 1919 and 1920.

Table 3.—Lead Products Made in Lead Corroding Plants in Canada in 1919 and 1920

	Unit of measure	1919		1920	
		Quantity	Selling value at factories	Quantity	Selling value at factories
			$		$
Basic carbonate lead, dry	lbs.	7,742,200	773,015	10,747,636	1,072,249
Basic carbonate lead, in oil	"	10,066,048	1,621,862	17,816,329	2,520,377
Red lead	"	1,030,135	111,602	1,450,596	162,721
Litharge	"	2,358,000	234,841	3,441,226	373,765

All the dry basic carbonate reported was the product of the four firms corroding pig lead. Several other firms bought a quantity of the dry product, ground it in oil, used a portion of the resulting product for the further manufacture of mixed paints and reported the balance under "Basic Carbonate ground in oil." In 1919 the quantity so reported was 1,252,188 pounds, having a selling value of $185,858, while in 1920 the quantity was 871,246 pounds and the selling value, $161,931.

These quantities and values have been added to those reported by the corroders and the totals are shown in Table 4.

Three of the four firms corroding lead also made mixed paints, but the quantity of basic carbonate used by them for this purpose has not been considered in the present report owing to the fact that sufficiently complete data were not received. These three firms in 1919 made 311,906 gallons of ready mixed paint having a selling value of $1,294,502 and in 1920 their production amounted to 340,438 gallons valued at $1,065,281. The basic carbonate which formed a part of this paint was included in the record of the production of white lead as reported in Table 3.

The total quantity of ready mixed paints produced in the industry in 1919 was 2,580,433 gallons having a selling value of $8,726,167 or 44·7 per cent of the total output of the plants reporting; in 1920 the production amounted to 3,244,345 gallons valued at $11,312,004, or 42 per cent of the value of the output for the year.

As regards value varnishes were next in importance. In 1919 the quantity of all kinds of varnishes made was 1,499,074 gallons having a selling value at the factories of $3,278,055, while in 1920 the quantity was 2,549,038 gallons valued at $5,076,947. The values formed 16.8% and 18.8% of the total values of products and by-products made in the respective years.

Iron oxide pigments as reported in the following table included a considerable quantity produced from mines under the control of paint companies. According to a report published by the Mines Branch, 19,128 tons of iron oxide was mined and shipped in 1920 for use as paint material and in the purification of illuminating gas.

In Table 4, the principal products of the paint, pigments and varnish industry are itemized as the quantity and selling value at the factories.

Table 4.—Products Made in the Paint and Varnish Industry in Canada in 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at the works	Quantity	Cost at the works
			$		$
Basic carbonate white lead, dry *	lbs.	7,742,200	773,015	10,747,636	1,072,249
Basic carbonate white lead, in oil	"	11,318,236	1,807,720	18,687,575	2,682,308
Red lead	"	1,060,908	115,856	1,538,925	174,367
Litharge	"	2,358,000	234,841	3,441,226	373,765
Dry colours	"	3,221,487	547,734	3,881,821	857,814
Iron oxide pigments	"	3,566,525	85,938	4,250,397	134,568
Putty and other fillers	"	6,900,463	377,561	6,976,623	485,404
Mixed paints ready for use	Gals.	2,580,433	8,726,167	3,244,345	11,312,004
Varnishes, all kinds	"	1,499,074	3,278,055	2,549,038	5,076,947
Japans and lacquers	"	624,165	601,898	275,928	421,203
Linoleate driers made	"	2,948	10,070	3,337	10,005
Resinate driers made	"	30,019	52,542	66,586	122,094
Stains	"	307,636	552,296	448,153	792,241
Shellac	"	106,596	560,398	118,068	664,587
Asphaltic and tar paints	"	52,848	47,130	88,149	83,836
Linseed oil, boiled	"	89,263	199,880	176,033	324,357
Stand, blown or enamel oils	"	43,933	84,416	14,456	52,436
Floor waxes and polishes	lbs.	137,976	51,442	159,773	66,150
All other products	.....	.....	1,416,157	.....	2,335,671
Total	.....	.....	19,523,086	.....	27,042,096

* See Table 3.

Materials Used.—As stated at the beginning of this chapter materials used in the manufacture of paint and varnish in Canada during the three years 1918, 1919 and 1920 cost at the factories $9,203,530, $10,947,181, and $15,931,923 respectively.

The quantity of pig lead corroded increased from 10,593,351 pounds valued at $874,638 in 1918 to 16,022,908 pounds in 1919 and 26,810,435 pounds in 1920. The cost at the factories in the two latter years rose from $1,081,479 to $2,169,868.

Basic carbonate retained its place as one of the most important pigments, an increase in the annual consumption of approximately one million pounds having taken place in 1920 over the previous year. It is to be noted, however, that the quantites of basic carbonate shown in Table 5 do not represent the total amounts of basic carbonate used for mixed paints, but only the amounts so used by manufacturers who had to purchase their supply, and are exclusive of the quantity used in the factories where lead was corroded.

In 1918 zinc oxide and lithopone used were reported together; the total quantity used was 7,198,248 pounds. In 1919 and 1920 the combined quantities of zinc oxide, leaded zinc oxide and lithopone were 7,979,348 pounds and 11,648,454 pounds respectively. These three materials have been listed separately in Table 5 and lithopone is seen to be the most important. In 1919 the quantity used was 4,235,986 pounds or more than 53% of the three combined while in 1920 the lithopone consumed amounted to 6,530,882 pounds, or 56% of the total of the three.

Barytes and whiting or chalk were also used extensively; over three and one-half million pounds of the former and nearly nine million pounds of the latter were used in 1919; in 1920, the respective quantities were 5,193,309 pounds and 10,763,829 pounds. Kaolin or china clay was used to the extent of 1,167,724 pounds in 1919 and 1,530,221 pounds in 1920, while 2,777,279 pounds of asbestine was used in 1919 and 3,962,070 pounds in 1920.

The extensive use of lithopone and related commodities in Canada was made the subject of a special survey by the Dominion Bureau of Statistics in 1921 to determine the quantity of barium compounds consumed in various Canadian industries during the preceding year. In addition to the quantities used by paint manufacturers it was found that 2,665,600 pounds of lithopone was used in the rubber, linoleum and oilcloth industries; 1,328,000 pounds of ground barytes in the rubber industry, and 310,000 pounds of blanc fixe in the rubber and paper industries.

In Table 5, the materials used in the paint, pigment and varnish industry during the two years 1919 and 1920 are itemized as to kind, quantity and cost at the works.

Table 5—Materials Used in the Manufacture of Paints, Pigments and Varnish in Canada in 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Pig lead	lbs.	16,022,908	1,081,479	26,810,435	2,169,868
Basic carbonate white lead, dry	"	2,531,135	308,028	3,275,563	408,362
Basic carbonate white lead, in oil	"	1,193,338	157,520	1,354,957	174,388
Basic sulphate white lead (sublimed lead)	"	283,829	31,305	593,791	70,450
Red lead	"	639,626	75,815	681,792	86,600
Litharge	"	617,876	74,020	803,740	101,201
Zinc or zinc ore	"	105,720	6,285	494,185	25,449
Zinc oxide, pure	"	925,064	113,629	1,413,275	169,663
Leaded zinc oxide and zinc leads	"	2,818,298	297,350	3,704,297	392,534
Lithopone	"	4,235,986	363,587	6,530,882	617,148
Blanc fixe	"	37,502	2,630	35,076	1,544
Barytes	"	3,647,084	83,546	5,193,309	120,053
Satin white or gypsum	"	307,051	4,295	150,307	1,176
Whiting or chalk	"	8,833,230	139,083	10,763,829	185,960
Asbestine	"	2,777,279	40,249	3,962,070	58,336
Kaolin or china clay	"	1,167,724	16,646	1,530,221	31,061
Silica, silex or infusorial earth	"	693,954	12,755	998,927	23,752
Iron oxide ore	"	.....	15,661	.....	21,897
Iron oxide pigments	"	1,985,984	71,773	890,279	35,255
Ochres, siennas and umbers	"	1,366,461	106,207	2,028,315	144,895
Coal tar lakes (all colours)	"	54,158	25,813	33,737	41,453
Ultramarine	"	130,197	43,109	148,662	43,757
Prussian blue	"	9,556	7,157	8,680	8,060
Graphite	"	331,164	10,706	466,900	15,428
Lamp black and other carbon black	"	319,305	44,068	396,802	66,747
All other pigments and dry colours	"	2,941,067	296,168	2,238,531	363,067
Manganese salts	"	100,059	63,550	74,813	8,997
Cobalt salts	"	886	436	23,383	4,340
Resins	"	4,643,138	460,106	6,980,129	546,771
Gums	"	1,176,589	386,048	1,617,431	610,957
Waxes	"	60,012	22,612	69,595	26,015
Linoleate driers purchased	"	16,027	2,909	10,471	8,976
Resinate driers purchased	"	41,661	24,817	76,759	29,760
Linseed oil, raw	gals.	1,035,556	1,990,861	1,308,012	2,476,365
Linseed oil, boiled (purchased as such)	"	188,675	396,930	229,691	472,908
China wood oil (tung oil)	"	272,360	542,119	399,197	903,648
Soya bean oil	"	34,564	64,096	46,736	80,380
Fish oils	"	30,126	45,484	58,827	89,849
Turpentine (gum spirits)	"	395,744	718,986	346,673	706,958
Wood turpentine	"	32,621	58,415	54,693	109,578
Petroleum distillate	"	1,056,999	329,389	1,875,925	686,779
Alcohol	"	95,227	130,492	111,954	145,786
Acetone	lbs.	73,951	14,674	71,874	21,752
Creosote	gals.	124,006	44,763	61,711	30,513
Coal tar naphtha and benzol	"	490,514	137,209	525,493	205,076
Coal tar pitch	lbs.	106,213	1,863	152,516	3,163
Asphaltum	"	567,755	14,825	787,053	25,741
Cans, cases, barrels, labels	"	.....	1,333,563	.....	1,565,413
All other materials	.....	.....	728,150	.....	1,794,094
Total	.....	.....	10,947,181	.....	15,931,923

Employees, Salaries and Wages.—Salaries in 1918 amounted to $921,708 of which $351,647 was paid to 128 officers, superintendents and managers. In 1919 and 1920 further increases took place, the total salaries paid in each of the two years having been $1,272,067 and $1,737,154 respectively. In the former year $424,944 went to 135 officers, superintendents and managers, while in the latter year 130 such employees received $506,999.

Wage-earners employed, including both male and female, in the three years averaged 1,388, 1,536 and 1,816 respectively, and the wages paid increased from $948,637 in 1918 to $1,253,077 in 1919 and $1,693,910 in 1920.

Included among the wage earners in 1919 were 16 males and 4 females under 16 years of age while in 1920 this class included only 7 males and 1 female.

Table 6 gives the distribution of both salaried employees and wage-earners in December for the three years. In some instances the distribution was given for a period other than December, thus resulting in a slight difference between the work sub-total in this table and the number of wage-earners shown for December in Table 7.

In 1919 and 1920 a different wage grouping from that in 1918 was used, but the evidence of increased wages was not lost by the new arrangement. Assuming that the distribution in the various wage groups was in the same proportion throughout the year the total number of employees receiving less than $15 per week in 1919 was less than 70% of the number in 1918, while in 1920 the number was about 65% of that in 1919. Wage-earners receiving from $15 to $20 per week remained approximately the same in number in 1918 and 1919, but in 1920 the number in this class was only about 60% of those in the same class in the previous years. Those employees receiving over $20 per week more than doubled in 1919 while in 1920 approximately 62% of all the wage-earners were receiving more than $20 per week.

Table 6.—Number of Employees in the Paint and Varnish Industry by Classes on December 15, 1918, 1919 and 1920

	1918		1919		1920	
	Male	Female	Male	Female	Male	Female
Salaried employees—						
Officers, superintendents and managers	126	2	134	1	128	2
Clerks, stenographers, salesmen and other salaried employees	325	161	396	167	428	194
Office sub-total	451	163	530	168	556	196
Wage-earners receiving per week—						
Under $10	242	134	61	111	19	51
$10 but under $15	134	45	117	82	71	103
$15 but under $20	522	7	499	20	292	27
$20 but under $26	.....	.....	603	4	576	8
$26 but under $30	.....	.....	85	1	159	2
$30 and over	.....	.....	79	.....	169	.....
$20 but under $25	229	.....	.....	.....	.....	.....
$25 and over	96	.....	.....	.....	.....	.....
Works sub-total	1,223	186	1,444	218	1,286	191
Grand total	1,674	349	1,974	386	1,842	387

In Table 7 is shown the number of wage-earners by months for the three years 1918, 1919 and 1920. The data were supplied by the manufacturers from their payrolls as on the 15th of each month.

Throughout the year 1919 both male and female employees exceeded the number employed in the corresponding months of 1918. In January, 1919 the lowest number of males for the year was reported, namely, 1,276. This number was practically the same as the highest number for 1918, in which year 1,275 were reported for April. The table shows a general, though not uniform tendency, towards an increase throughout 1919, with the highest point reached in December. Except during December the male employees in 1920 exceeded those for the corresponding months of either of the two previous years. The number increased from January to April and then gradually declined. During the last two months the decrease was sufficient to bring the number for December, 1920, to a level as low as any for 1919.

Table 7.—Number of Wage-Earners by Months and by Sex Employed in the Paint and Varnish Industry in Canada, 1918, 1919 and 1920

Month	1918			1919			1920		
	Male	Female	Total	Female	Male	Total	Male	Female	Total
January	1,168	158	1,326	1,276	206	1,482	1,556	225	1,781
February	1,182	167	1,349	1,280	209	1,489	1,653	238	1,891
March	1,247	174	1,421	1,283	211	1,494	1,682	249	1,931
April	1,275	183	1,458	1,300	207	1,507	1,696	251	1,947
May	1,219	190	1,409	1,286	200	1,486	1,688	251	1,939
June	1,214	181	1,395	1,324	206	1,530	1,680	237	1,917
July	1,240	182	1,422	1,358	218	1,576	1,673	229	1,902
August	1,214	165	1,379	1,352	207	1,559	1,622	207	1,829
September	1,177	156	1,333	1,326	193	1,519	1,563	224	1,787
October	1,201	161	1,362	1,349	186	1,535	1,552	210	1,762
November	1,215	174	1,389	1,379	206	1,585	1,433	200	1,633
December	1,222	186	1,408	1,446	218	1,664	1,277	191	1,468
Average	1,215	173	1,388	1,330	206	1,536	1,590	226	1,816

Fuel and Power.—Itemized as to source, kind, quantity and cost at works the fuel consumed during each of the three years is shown in Table 8.

Table 8.—Fuel Used in the Paint and Varnish Industry, 1918, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1918	Short tons	12	96	4,167	25,949
	1919	"	4,739	45,351	2,349	17,196
	1920	"	366	2,712	1,831	17,354
Lump	1918	"	155	1,556	1,932	16,440
	1919	"	187	2,051	1,189	9,857
	1920	"	209	2,958	1,468	15,991
Run of mine	1918	"	9,157	84,414	5,126	45,757
	1919	"	1,169	9,196	3,488	26,632
Anthracite—	1920	"	11,802	122,813	7,325	66,576
Lump	1918	"	72	712	112	1,516
	1919	"	.....	.....	219	2,362
	1920	"	.....	.....	1,047	11,305
Dust or slack	1918	"	.....	.....	448	3,540
	1919	"	.....	.....	301	2,723
	1920	"	.....	.....	39	175
Lignite coal	1918	"	.....	.....	12	86
	1919	"	.....	.....	.....	
	1920	"	258	3,478	.....	
Coke	1918	"	1,299	13,268	1,541	20,368
	1919	"	725	7,575	852	10,166
	1920	"	1,815	21,404	1,588	22,289
Gasoline	1918	Imp. gals.	3,223	1,076	2,302	826
	1919	"	12,606	3,298	2,039	734
	1920	"	7,650	2,985	.....	
Oil, fuel	1918	"	154,603	16,474	15,000	2,250
	1919	"	316,086	20,344	24,922	2,830
	1920	"	365,832	24,188	30,837	4,085
Wood	1918	Cords	684	2,170	.....	
	1919	"	581	2,328	.....	
	1920	"	475	1,951	.....	
Gas	1918	M cu. ft.	2,804	965	.....	
	1919	"	1,745	528	.....	
	1920	"	476	593	.....	
All other fuel	1918	.....	.....	.....	.....	
	1919	.....	.....	399	.....	1,800
	1920	.....	.....	.....	.....	
Sub-totals	1918	.....	.....	120,731	.....	116,732
	1919	.....	.....	91,070	.....	74,300
	1920	.....	.....	183,172	.....	137,775

Total cost of all fuel used, 1918 ..... $237,463
1919 165,370
1920 320,947

Table 9.—Power Employed in the Paint and Varnish Industry, 1919 and 1920

Class	Number of Units		Total H.P. according to manufacturers rating		Total H.P. used	
	1919	1920	1919	1920	1919	1920
Boilers	32	28	2,114	1,965	1,838	1,538
Steam engines	10	11	1,437	1,242	1,052	1,037
Water wheels	1	1	100	100	100	100
Electric Motors:						
Alternating current	177	231	1,993	3,126	1,692	2,610
Direct current	25		672		558	
Generators	5		K.W. 387		K.W. 250	

Miscellaneous Expenditures.—The miscellaneous expenditures for the two years are itemized in Table 10.

Table 10.—Miscellaneous Expenditures, Paint and Varnish Industry, 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	86,502	135,923
Cost of purchased power	44,862	64,160
Insurance (premium for year only)	91,515	112,469
Taxes:		
Excise	25,691	42,271
Excess Profits	89,103	151,357
Provincial and Municipal	82,280	89,547
Royalties, use of patents, etc	6,433	22,064
Advertising Expenses	422,748	647,335
Travelling expenses	466,549	606,462
Repairs to buildings and machinery	162,064	306,498
All other sundry expenses (not including fuel costs, materials used, salaries or wages)	1,296,814	1,679,416
Total	2,774,561	3,857,502

Table 11.—Summary of Expenditures

	1919	1920
	$	$
Salaries	1,272,067	1,737,154
Wages	1,253,077	1,693,910
Fuel	165,370	320,947
Materials used	10,937,181	15,918,557
Miscellaneous expenses	2,774,561	3,857,502
Total	16,402,256	23,528,070

Table 12.—Value Added by Manufacturing

	1919	1920
	$	$
Selling value of products	19,523,086	26,939,476
Cost of materials	10,937,181	15,918,557
Value added by manufacturing	8,585,905	11,020,919

Imports and Exports.—Imports and exports of commodities which are of interest in connection with the paint, pigment and varnish industry are shown in the two following Tables.

Table 13.—Imports into Canada of Paints and Paint Materials for Calendar Years 1919 and 1920

Paints and Varnishes	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Amyl acetate and acetone	.....	.....	6,763	.....	10,927
Arabic, amber, barberry, elimi gedda senegal and tragacanth	lbs.	.....	.....	540,879	171,006
Australian, copal, damar, kaurie, pontianac and sandarac	"	.....	1,132,287	2,656,465	570,313
Lac, crude, seed, button, stick and shell	"	.....	.....	1,448,539	1,431,992
Burgundy pitch	"	30,835	2,203	95,713	8,055
Chicle or Sarpato gum, crude	"	.....	1,688,771	578,547	377,506
Dragon's blood	"	868	1,175	1,377	1,917
Resin or rosin in packages of not less than 100 lbs	cwt.	231,422	1,339,321	287,628	1,723,669
Gums, other, n.o.p.	lbs.	34,176	8,689	102,841	19,564
Blanc fixe and satin white	"	7,436,263	114,732	4,858,687	102,198
Brocade and Bronze powders	.....	.....	56,087	.....	79,337
Gold liquid paint	.....	.....	9,114	.....	9,737
Blacks, lamp, bone, ivory and carbon	lbs.	3,416,240	329,005	4,096,457	502,250
Red lead, dry and orange mineral	"	1,120,713	102,119	967,533	110,989
Lead, white, dry	"	158,482	13,188	34,520	3,703
White lead ground in oil	"	75,806	8,415	39,032	5,444
Liquid fillers, anticorrosive and antifouling paints and ground and liquid paints, n.o.p.	"	4,482,024	507,228	3,882,051	627,183
Litharge	cwt.	15,463	126,243	24,579	277,951
Ochres, ochrey earths, siennas and umbers	lbs.	2,403,695	65,744	6,461,965	182,997
Colours, metallic, viz, oxide of cobalt, tin and copper n.o.p.	"	112,104	44,414	255,854	125,359
Paints and colours ground in spirits, and all spirits varnishes and lacquers	gals.	25,919	70,319	17,776	72,000
Putty	lbs.	483,585	21,528	571,169	25,197
Ultramarine blue, dry or in pulp	"	*361,615	79,714	404,169	93,838
Whiting, gilders' whiting and paris white	cwt.	223,761	214,535	376,557	424,169
Zinc white	lbs.	6,657,168	1,254,958	21,254,272	1,829,620
Varnish, lacquers, japans, japan dyers, liquid, dryers and oil finish, n.o.p.	gals.	58,046	126,720	74,587	170,332
Coal-tar base or salt (paranitraniline)	lbs.	60,463	43,205	82,466	51,395
Turpentine, raw or crude	"	339,357	41,786	578,706	112,002
Spirits of turpentine	gals.	949,035	1,097,886	801,507	1,367,617

Table 14.—Exports from Canada of Paints and Paint Materials in 1919 and 1920

Paints and Varnishes	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Mineral pigments, iron oxides, ochres, etc.	cwt.	15,349	25,229	30,561	78,913
Cobalt, oxide and cobalt salts	lbs.	468,225	731,506	595,739	1,137,586
Paints and varnishes of all kinds	.....	.....	1,796,905	.....	.....
Paints	.....	.....	.....	.....	1,981,391
Varnish	gals.	.....	.....	12,643	31,805
Putty	cwt.	2,499	14,683,	1,707	10,772

List of Plants Operating in the Paint, Pigment and Varnish Industry in Canada in 1920

NOVA SCOTIA—

Brandram-Henderson, Ltd., 230-240 Kempt Road, Halifax, N.S.

QUEBEC—

Brandram-Henderson, Ltd., 2984 St. Urbain St., Montreal, Que.
The Carter White Lead Co., of Canada, Ltd., 91 Delorimier Ave., Montreal, Que.
The Dougall Varnish Co., Ltd., 305 Manufacturers St., Montreal, Que.
The Holland Varnish Co., Ltd., 3000 Park Ave., Montreal, Que.
Jas. W. Jamieson Co., Ltd., Boyce Ave., Montreal, Que.
R. C. Jamieson & Co., Ltd., 264 St. Patrick St., Montreal, Que.
The Martin-Senour Co., Ltd., 2951 Greenshields Ave., Montreal, Que.
McArthur-Irwin, Ltd., 20 St. Paul St. West, Montreal, Que.
Mount Royal Color & Varnish Co., Ltd., 195 Dorchester St. East, Montreal, Que.
National Varnish Co. of Canada, Ltd., 1019 New Birk's Bldg., Montreal, Que.
A. Ramsay & Son Company, 12 Inspector St., Montreal, Que.
The Sherwin-Williams Co. of Canada, Ltd., 897 Centre St., Montreal, Que.

ONTARIO—

Berry Brothers, Incorporated, Walker Road, Walkerville, Ont.
Brandram-Henderson, Ltd., 377-387 Carlaw Ave., Toronto, Ont.
Cooke & Boulton, 174 King St. East, Toronto, Ont.
Cosmos Chemical Co., Port Hope, Ont.
H. S. & T. Crystal Co., Ltd., 65 Adelaide St. East, Toronto, Ont.
Dominion Paint Works, Ltd., Walkerville, Ont.
The Flint Varnish & Color Works of Canada, Ltd., Perth Ave. East, Toronto, Ont.
The Glidden Co., Ltd., 372-380 Wallace Ave., Toronto, Ont.
Imperial Varnish & Color Co., Ltd., 6-20 Morse St., Toronto, Ont.
International Varnish Co., Ltd., Carlaw & Gerrard Sts., Toronto, Ont.
James Langmuir & Co., Ltd., Oakville, Ont.
Lowe Brothers, Ltd., 263 Sorauren Ave., Toronto, Ont.
Benjamin Moore & Co., Ltd., 2-4-6 Lloyd St., West Toronto, Ont.
A. Muirhead Co., Ltd., 217 King St. East, Toronto, Ont.
The Northern Varnish Co., Ltd., Owen Sound, Ont.
Ottawa Paint Works, Ltd., 687 Wellington St., Ottawa, Ont.
Penfound Varnish Co., Cariboo Ave., Toronto, Ont.
Pratt and Lambert, Inc., Courtwright St., Welland, Ont.
Reynolds & Co., 261 Macdonell Ave., Toronto, Ont.
Scarfe & Co., Ltd., P.O. Box 173, Brantford, Ont.
Standard Paint & Varnish Co., Ltd., Windsor, Ont.
Watts Chemical Co., 80 Don Esplanade Ave., Toronto, Ont.

MANITOBA—

The Martin-Senour Co., Ltd., P.O. Box 2991, Winnipeg, Man.
The Sherwin-Williams Co., of Canada, Ltd., 110 Sutherland Ave., Winnipeg, Man.
G. F. Stephens & Co., Ltd., 172 Market St. E., Winnipeg, Man.

BRITISH COLUMBIA—

Ayres Varnish & Paint Co., Vancouver, B.C.
British America Paint Co., Ltd., Victoria, B.C.
British Marine Paint Co., Ltd., 801 Powell St., Vancouver, B.C.
Henry Darling & Son, 28 Powell St., Vancouver, B.C.
Crown Paint Co. (R. C. Gibson), 24 Cordova St. E., Vancouver, B.C.
Impermealite Products Co., Ltd., 328 Rogers Bldg., Vancouver, B.C.
Martin-Senour Co., Ltd., 1505 Powell St., Vancouver, B.C.
Nag Paint Co., Ltd., 1302 Wharf St., Victoria, B.C.
Pacific White Lead Co., Ltd., Industrial Island, Vancouver, B.C.
The Staneland Co., Ltd., 830 Fort St., Victoria, B.C.

CHAPTER SEVEN

SOAPS, PERFUMES, COSMETICS AND TOILET PREPARATIONS

The soap industry is one of the very old industries of the world. Early records show that soap was manufactured in Italy and Spain during the eighth century, and the first soap works in France was established at Marseilles in the twelfth century when olive oil was first employed for the purpose of soap-making. In the early days the methods employed were very crude but when Leblanc introduced his process for the manufacture of soda from common salt, the industry made considerable advances The work of Chevreul made possible the scientific manufacture of soap.

The present report covers several distinct industries which have sufficient in common to permit of their being reviewed in one chapter. The manufacture of soaps; the related industry, the manufacture of washing compounds, and the manufacture of perfumes, cosmetics and toilet preparations are included. The report is in three sections, each dealing with a particular part of the industry. Summary statistics for the whole industry are shown below.

Summary Statistics, 1919 and 1920

	Years	Soaps	Washing compounds	Perfumes, cosmetics and toilet preparations	Total
Number of plants	1919	26	13	16	55
	1920	26	12	20	58
Capital invested	1919	12,017,281	167,172	764,168	12,948,621
	1920	14,858,770	157,543	1,222,603	16,238,916
Value of products	1919	17,384,260	345,397	1,128,000	18,857,657
	1920	17,410,826	316,176	2,077,813	19,804,815
Cost of materials used	1919	12,070,081	119,417	451,189	12,640,787
	1920	11,831,566	129,800	963,497	12,924,863
Cost of fuel used	1919	320,640	2,415	3,620	326,675
	1920	428,524	2,222	7,754	438,500
Miscellaneous expenses	1919	1,403,172	44,840	268,712	1,716,724
	1920	2,130,271	65,201	496,767	2,692,239
Salaries and wages	1919	1,459,654	98,665	231,056	1,789,375
	1920	1,765,317	88,567	413,168	2,267,052
Average number of employees	1919	1,487	87	256	1,830
	1920	1,482	84	430	1,996

SECTION ONE.—THE SOAP INDUSTRY

During the years of the war the soap industry in Canada made rapid strides and reached a peak in production in 1918 when the value of the output was $20,889,000. Exports in the same year reached a total value of $1,255,000, a record which had not previously been equalled. A large part of the export trade was with the United Kingdom, on war account. In the following year surplus stocks and current production permitted further large exports to be made to the United Kingdom, Belgium and France while considerable quantities were also sold to the Netherlands. The output in 1919, during which year readjustment to peace-time conditions was largely effected, declined in value to $17,387,000 which was maintained and slightly increased in 1920.

The manufacture of soap which in the early days was a household operation, has gradually developed until now practically the whole output is produced in large

factories. The number of establishments manufacturing soap and washing compounds in Canada in 1880 was 78, while in 1920 the number was only 26, but the value of the output has increased tenfold. The output of the Canadian plants reviewed in this section included laundry and household soaps, toilet soaps, polishing and scouring soaps, soft soap, soap powders, lye, washing compounds (other than those covered in the Washing Compound Industry) and such other products as glycerine, toilet preparations, perfumes, and hydrogenated oils.

In 1919 twenty-six plants were in operation, twelve of which were located in Ontario, six in Quebec, two in each of the provinces of Manitoba, Alberta and British Columbia, and one in each of the provinces of New Brunswick and Saskatchewan. In 1920 no report was received from Saskatchewan, while three plants reported from British Columbia so that the total number in Canada remained the same as in the previous year.

Capital Employed.—The total capital employed comprising the cost of land, buildings, fixtures, machinery and tools, materials, fuel, stocks and finished products on hand, together with stocks in process and the balance of cash, trading and operating accounts and bills receivable has been tabulated for each year and the items are shown in Table 1.

Table 1.—Capital Employed in the Soap Industry, 1918, 1919, 1920

	1918	1919	1920
	$	$	$
Land, buildings, fixtures, machinery and tools	4,540,930	4,701,935	5,639,493
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	7,244,026	5,640,819	5,658,218
Cash, trading and operating accounts and bills receivable	1,301,977	1,674,527	3,561,059
Total	13,086,933	12,017,281	14,858,770

Products.—Seventeen million dollars' worth of products represented the contribution to Canadian commerce in the two years under review. Household laundry and toilet soaps were the principal products. Glycerine, which in previous years had been required for war purposes and had been produced in large quantities, declined in volume and in value. Comparative statistics of production for 1918 have been included with those of 1919 and 1920 in Table 2.

Table 2.—Products of the Soap Industry, 1918, 1919 and 1920

Kind	Unit of Measure	1918		1919		1920	
		Quantity	Selling value	Quantity	Selling value	Quantity	Selling value
			$		$		$
Hard soaps—							
Household soaps	lbs.	83,302,070	9,170,894	31,192,654	3,952,158	53,435,214	6,840,021
Laundry soaps and soap chips	"			34,073,766	3,591,813	20,156,338	3,012,690
Toilet soaps	"	8,805,766	2,136,838	10,819,505	3,408,248	7,512,417	2,206,734
Polishing or scouring powders or soaps	"	6,809,563	690,155	6,490,442	593,372	8,597,176	765,641
Soap powder	"	7,711,635	423,589	6,451,025	403,549	7,484,270	593,811
All other hard soap	"	5,931,363	928,464	4,223,076	500,833	1,405,679	157,193
Soft soaps	"	928,924	102,768	1,133,776	138,558	1,152,493	155,708
Washing compounds	"	2,047,646	126,913	3,263,284	141,777	3,325,835	108,643
Lye	"	875,603	106,762	1,040,374	138,841	468,872	44,594
Glycerine, crude, sold as such	"	3,526,416	1,322,367	2,700,213	666,256	2,627,194	399,188
Glycerine, refined	"	3,935,710	2,257,888	3,557,055	1,039,184	3,399,756	918,423
Toilet preparations	.....	.....	110,453	.....	168,081	.....	141,186
All other products*	.....	.....	3,512,387	.....	2,641,590	.....	2,066,994
Total	.....	.....	20,889,478	.....	17,384,260	.....	17,410,826

*Lard oil, soda, wire drawing powder, hand cleaner, perfumes, hydrogenated oils, refined tallow, and various products not specified.

Materials Used.—The wide range of substances used in soap manufacture is indicated in the accompanying table. Tallow, grease and other fats, as might be expected were used in greater quantities than other materials since they naturally yield a hard soap on saponification with caustic soda. Formerly potash was used for saponification of fats, resulting in a soft soap which could be converted into hard soap by the addition of common salt.

Cotton seed oil, corn oil and similar products which tend to become rancid on long standing and also those oils that produce only a soap of soft consistency may be rendered suitable as a base for a good hard soap by the process of hydrogenation, whereby hydrogen, in the presence of a catalyst is made to combine with the olein or other liquid fat, with the resulting production of a hard fat such as stearin. Fish oil after hydrogenation becomes hard like tallow, losing also its offensive odour and taste, so that it may then be used in the soap making industry. Linseed oil, also by hydrogenation, is rendered more suitable for soap making.

More complete statistics were obtained for 1919 and 1920 than in 1918 in respect of materials used; for this reason details of the quantities and values shown below relate only to the two latter years. The total value of materials used in 1918 by the soap industry was $14,595,624.

Table 3.—Materials Used in the Soap Industry, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Tallow, grease and other fats	lbs.	28,045,322	4,419,476	32,067,341	4,959,363
Palm oil	"	900,283	138,191	1,165,382	188,368
Cocoanut oil	"	7,016,233	1,368,668	6,252,578	1,191,170
Cottonseed oil	"	11,261,520	2,413,564	8,326,387	1,407,541
Olive oil	"	64,030	18,192	179,826	33,850
Soya bean oil	"	7,860,089	1,360,623	3,717,074	659,154
Corn oil	"	1,364,451	222,357	1,193,017	232,145
Linseed oil	gals.	22,035	32,053	24,168	25,948
Rosin oil	lbs.	1,899,422	123,886	4,503,107	430,530
Foots: cottonseed, olive, cocoanut and others	"	850,821	53,729	823,432	86,614
Castor oil	"	10,176	2,983	5,233	1,258
Peanut oil	"	83,609	15,577	24,362	5,160
Alcohol	.....	.....	11,835	.....	6,802
Sugar	lbs.	42,853	5,068	40,091	6,645
Perfumes	.....	.....	127,130	.....	202,577
Glycerine, crude, purchased	"	1,575,903	171,445	1,691,921	255,290
Caustic soda	"	8,359,581	383,101	10,174,973	495,475
Soda ash	"	9,013,793	205,776	7,030,880	188,480
Soap	"	123,402	21,600	.....	.....
Rosin	"	4,751,259	264,041	3,554,946	318,158
Silicate of soda	"	305,898	10,286	774,435	21,998
Stearic acid	"	19,084	5,652	23,328	7,001
Caustic potash	"	.....	2,688	74,319	5,132
Talc	"	135,410	1,690	100,839	1,111
Fillers, sand, pumice, spar, silicate of soda, starch, salt, calcium, chloride, acids, dyes, oils, alum and other chemicals	.....	.....	176,095	.....	126,013
Chemicals not specified together with boxes, paper packing, etc.	.....	.....	514,475	.....	975,783
Total	.....	.....	12,070,181	.....	11,831,566

Employees, Salaries and Wages.—Table 4 shows the distribution of salaried employees and those on wages on December 15th or nearest representative working day for each of the three years 1918, 1919 and 1920. It will be noted that the grand total for December in each of the two years 1918 and 1919 was the same although two more plants were operating in the former than in the latter year.

This table does not classify the employees according to age, but it might be mentioned that in 1919 fifty-eight males and twenty-three females were under 16 years

of age and all of these received less than $13 per week. In 1920 the number of employees under 16 years of age included in the distribution table was 25, of which 14 were males and 11 were females. All were receiving less than $15 per week.

Table 4.—Number of Employees in the Soap Industry by Classes, 1918, 1919 and 1920

	1918		1919		1920	
	Male	Female	Male	Female	Male	Female
Salaried Employees—						
Officers, superintendents and managers	81	1	81	.....	87	.....
Clerks, stenographers, salesmen and other salaried employees	167	114	170	105	180	70
Office sub-total	248	115	251	105	267	70
Wage-earners receiving per week—						
Under $10	47	153	40	49	20	26
$10 but under $15	113	135	148	203	100	107
$15 but under $20	317	21	280	31	134	33
$20 but under $25	281	1	.....	.....	.....	.....
$25 and over	140	.....	.....	.....	.....	.....
$20 but under $26	.....	.....	378	1	257	2
$26 but under $30	.....	.....	55	.....	76	.....
$30 and over	.....	.....	30	.....	57	.....
Works sub-total	898	310	931	284	644	168
Grand total	1,146	425	1,182	389	911	238

The number of employees on wages, according to the pay-rolls on the 15th of each month are tabulated below. The classification is according to sex, and comparative data are given for the three years, 1918, 1919 and 1920.

During the first half of 1919, with the exception of January, the number of employees was considerably less than during the corresponding period of 1918, but in the second half year the conditions were reversed, a larger number having been employed in 1919 than in 1918. The increase, however, was not sufficient to make a greater average for the year; in fact the average decreased from 1,182 in 1918 to 1,131 in 1919.

During the first three months of 1920 the number of employees increased from 1,182 to 1,371; then from April until the end of the year a general though not uniform decrease was noted, the number employed in December having been only 795. The average for the year was 14 greater than the average for 1919.

Table 5.—Number of Wage-Earners in the Soap Industry by Months and by Sex, 1918, 1919 and 1920

	1918			1919			1920		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
January	814	275	1,089	858	276	1,134	905	277	1,182
February	834	272	1,106	760	274	1,034	1,018	287	1,305
March	882	277	1,159	685	232	917	1,070	301	1,371
April	885	269	1,154	692	232	924	992	311	1,303
May	903	321	1,224	730	235	965	990	291	1,281
June	897	345	1,242	789	292	1,081	1,024	274	1,298
July	888	345	1,233	933	296	1,229	992	244	1,236
August	875	339	1,214	969	307	1,276	797	202	999
September	864	338	1,202	963	295	1,258	836	187	1,023
October	854	320	1,174	973	297	1,270	815	192	1,007
November	871	309	1,180	961	307	1,268	742	194	936
December	898	310	1,208	931	284	1,215	628	167	795
Average	872	310	1,182	854	277	1,131	901	244	1,145

Table 6.—Salaries and Wages Paid in the Soap Industry, 1919 and 1920

	1919	1920
	$	$
Salaries	574,937	629,528
Wages	884,717	1,135,789
Total salaries and wages	1,459,654	1,765,317

Fuel and Power.—Of the fuel used in this industry, bituminous coal, run of mine and slack, formed the major portion.

Table 7 shows the fuel consumed during 1919 and 1920. The various classes are itemized as to source, quantity and cost at the works. Fuel supplied to employees was not included.

Table 7.—Fuel Used in the Soap Industry in 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
		Short		$		$
Bituminous coal—						
Slack	1919	tons	3,972	29,612	2,345	20,014
	1920	"	3,060	26,185	14,337	151,015
Lump	1919	"	.....	.....	12,842	95,835
	1920	"	377	2,925	445	5,290
Run of mine	1919	"	3,070	23,880	20,896	123,558
	1920	"	3,850	31,278	21,149	167,086
Anthracite coal—						
Lump	1919	"	.....	.....	6	75
	1920	"	.....	.....	689	7,618
Slack	1919	"	.....	.....	1,197	12,834
	1920	"	.....	.....	1,958	20,091
Lignite coal—Lump	1919	"	377	2,434	.....	.....
	1920	"	.....	.....	.....	.....
Coke	1919	"	875	9,616	.....	.....
	1920	"	58	705	942	12,614
Gasoline	1919	Imp. gals	15	7	.....	.....
	1920	"	600	264	400	202
Wood	1919	Cords	401	1,276	.....	.....
	1920	"	224	928	.....	.....
Other fuel	1919	.....	.....	1,499	.....	.....
	1920	.....	.....	2,323	.....	.....
Sub-totals	1919	.....	.....	68,324	.....	252,316
	1920	.....	.....	64,608	.....	363,916
Total cost of fuel	1919	.....	.....	$320,640		
	1920	.....	.....	428,524		

Table 8 shows the power employed in 1919 and 1920. Nearly 6,000 H.P. was supplied from boilers, but only a small portion was used for driving engines; the remainder was used for heating, boiling or evaporating purposes as required in the processes of manufacture.

More than half of the power required for driving machinery was obtained from electric motors.

Table 8.—Power Employed in the Soap Industry, 1919 and 1920

Class	Number of units		Total H.P. according to manufacturers rating		Total H.P. used	
	1919	1920	1919	1920	1919	1920
Boilers—						
(a) Fired by hand	29	43	3,424	6,496	2,420	5,444
(b) Fired mechanically	17		4,370		3,370	
Engines—						
Steam	20	13	729	594	523	559
Gas	2	1	15	33	15	.....
Gasoline	1	1	7	12	7	12
Electric motors—						
Alternating current	186	212	1,446	1,418	691	1,046
Direct current	44		319		129	

Miscellaneous Expenditures.—Miscellaneous expenditures applicable to manufacturing in 1918 amounted to $1,219,680, which increased by 15% to $1,403,172 in 1919. As might be expected in this industry advertising formed the greatest single item in the miscellaneous expenditures, and amounted to $444,299 or 31.7% of the total for 1919. In 1920 corresponding items amounted to $2,130,271, an increase of $727,099, or 51.8% over 1919. Advertising expenses amounting to $519,958 showed an increase of $75,659, or 17% over similar expenses in 1919. Travelling expenses and repairs also showed marked increases. The detail of the items is given in the following table.

Table 9.—Miscellaneous Expenditures, Soap Industry, 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	24,462	23,444
Cost of purchased power	31,670	30,344
Insurance (premium for year only)	64,547	76,925
Taxes—		
Excess profits	6,355	23,842
Excise	.....	31,901
Provincial and municipal	48,162	56,169
Advertising expenses	444,299	519,958
Travelling expenses	134,306	183,372
Repairs to buildings and machinery	152,140	220,588
All other sundry expenses (not including fuel costs, materials used, salaries and wages)	497,231	963,728
Total	1,403,172	2,130,271

Table 10.—Summary of Expenditures

	1919	1920
	$	$
Salaries	574,937	629,528
Wages	884,717	1,135,789
Fuel	320,640	428,524
Materials	12,070,181	11,831,566
Miscellaneous expenses	1,403,172	2,130,271
Total expenditures	15,253,647	16,155,678

Table 11.—Value Added by Manufacturing in the Soap Industry

	1919	1920
	$	$
Selling value of products	17,384,260	17,410,826
Cost of materials	12,070,181	11,831,566
Value added by manufacturing	5,314,079	5,579,260

SECTION TWO.—WASHING COMPOUNDS

Closely related to the manufacture of soaps is the comparatively new industry making washing compounds or powders of which there are two general classes: those containing 10 to 20 per cent water being known as "old-style" and those having 35 to 40 per cent of water, or "new-style", usually known as "Fluffy" powders.

These powders are mixtures of soda ash, soap and water, the many products on the market containing differing quantities of the same materials, varying amounts of water, or being made from different kinds of soap.

The more water that is added to a powder, the more crystallized sodium carbonate will be formed and the smoother and softer the powder will be.

Scouring powders consist largely of soap powders supplemented by the addition of silica (silex) talc, or similar products having abrasive qualities. In 1919, thirteen plants in Canada produced such commodities as are described above; in 1920 the number was one less. Of the thirteen plants in 1919, six were located in Ontario, five in Quebec, one in Manitoba and one in British Columbia. Of the 12 plants from which reports were received in 1920, seven were in Ontario, four in Quebec and one in Alberta.

Capital Employed.—At the end of 1919 the capital employed amounted to $167,172 while at the end of 1920 it had decreased to $157,543. The decrease in value of land, buildings and equipment was $8,343 and in cash and accounts, $7,211. The estimated value of materials on hand, stocks in process, finished products and miscellaneous supplies on hand increased by $5,925. The net decrease in the total amount of capital employed at the end of 1920 was $9,629.

The distribution of capital employed at the end of each of the two years is shown in Table 1.

Table 1.—Capital Employed in the Washing Compounds Industry, 1919 and 1920

	1919	1920
	$	$
Lands, buildings, fixtures, machinery and tools	76,098	67,755
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	55,984	61,909
Cash, trading and operating accounts and bills receivable	35,090	27,879
Total	167,172	157,543

Products.—The value of the output for 1920 was only slightly less than in the preceding year, and amounted in all to $316,176, including not only washing compounds but also javelle water, used largely as a disinfectant, and an almost infinite variety of polishes and similar preparations. The principal groups of products are shown in Table 2, and the quantities and values of materials used are given in Table 3.

Table 2.—Products Made in the Washing Compounds Industry, 1919 and 1920

	1919	1920
	$	$
Washing compounds	82,016	123,072
Javelle water	142,512	139,542
All other products	*120,869	53,562
Total products	345,397	316,176

*Principally polishes of various kinds.

Table 3.—Materials Used in the Washing Compounds Industry, 1919 and 1920

Kind	1919		1920	
	lbs.	$	lbs.	$
Soda ash	1,275,200	31,187	1,129,947	29,223
Chloride of lime	615,081	17,261	485,897	31,788
Dyes and colours	.....	2,451	.....	6,725
Other materials	.....	68,518	.....	62,064
Total materials	.....	119,417	.....	129,800

Employees, Salaries and Wages.—Throughout 1919 there was a gradual increase in the number of hands employed, and this development continued in the early months of 1920, reaching a peak in April of that year. From then on there was a gradual return to the average number employed in the preceding year.

Tables 4 and 5 show respectively an analysis of employees on the rolls at the end of the year, and the number employed on the fifteenth day of each month in the two years.

Table 4.—Number of Employees in the Washing Compounds Industry by Classes on December 15, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees—						
Officers, superintendents and managers	18	.....	18	9	.....	9
Clerks, stenographers, salesmen and other salaried employees	10	6	16	9	4	13
Office sub-total	28	6	34	18	4	22
Wage-earners, receiving per week—						
Under $10	.....	5	5	4	4	8
$10 but under $15	10	10	20	5	5	10
$15 but under $20	28	1	29	8	.....	8
$20 but under $26	8	.....	8	20	.....	20
$26 but under $30	2	.....	2	6	2	8
$30 and over	1	.....	1	6	.....	6
Works sub-total	49	16	65	49	11	60
Grand Total	77	22	99	67	15	82

Table 5.—Number of Employees by Months and by Sex According to the Payrolls of the Different Plants in the Washing Compounds Industry on the 15th of Each Month, 1919 and 1920

Months	1919			1920		
	Male	Female	Total	Male	Female	Total
January	39	7	46	44	14	58
February	36	9	45	44	17	61
March	39	8	47	49	17	66
April	40	10	50	59	18	77
May	38	12	50	55	19	74
June	41	13	54	46	18	64
July	44	15	59	46	18	64
August	42	17	59	47	17	64
September	43	11	54	43	12	55
October	45	10	55	44	12	56
November	45	17	62	44	12	56
December	43	17	60	41	8	49
Average	41	12	53	47	15	62

Table 6.—Salaries and Wages Paid in the Washing Compounds Industry, 1919 and 1920

—	1919	1920
	$	$
Salaries	52,298	42,500
Wages	46,367	46,067
Total salaries and wages	98,665	88,567

Fuel and Power.—Table 7 shows all the fuel consumed in the industry during the two years, itemized as to source, kind, quantity and cost at the works.

The power employed during the two years is given in Table 8.

Table 7.—Fuel Used in the Washing Compounds Industry in 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1919	Short tons	.....	.....	.....	.....
	1920	"	.....	.....	30	150
Run of mine	1919	"	.....	.....	.....	.....
	1920	"	8	144	28	222
Lump	1919	"	21	263	72	890
	1920	"	.....	.....	22	280
Anthracite coal—						
Lump	1919	"	.....	.....	52	635
	1920	"	.....	.....	58	1,014
Dust or slack	1919	"	.....	.....	35	378
	1920	"	.....	.....	.....	.....
Lignite	1919	"	3	39	.....	.....
	1920	"	.....	.....	.....	.....
Coke	1919	"	.....	.....	4	42
	1920	"	.....	.....	.....	.....
Oil (fuel)	1919	Imp. gals.	40	12	.....	.....
	1920	"	.....	.....	.....	.....
Wood	1919	Cord	10	90	.....	.....
	1920	"	55	327	.....	.....
Gas	1919	M cu. ft.	69	66	.....	.....
	1920	"	68	85	.....	.....
Sub-Totals	1919	.....	.....	470	.....	1,945
	1920	.....	.....	556	.....	1,666

Total cost of fuel used, 1919..... $ 2,415
1920..... 2,222

Table 8.—Power Employed in the Washing Compounds Industry in 1919 and 1920

Class	Number of units		Total H.P. according to manufacturers' rating		Total H.P. actually employed	
	1919	1920	1919	1920	1919	1920
Boilers	2	1	34	12	34	12
Gasoline engines	.....	1	.....	6	.....	6
Electric motors—						
Alternating current	5	12	17	61	15	56
Direct current	5		36		36	

Table 9.—Miscellaneous Expenses in Washing Compounds Industry, 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	2,580	5,237
Cost of purchased power	430	375
Insurance (premium for year only)	1,841	1,642
Taxes—		
Excise	400	2,451
Excess profits	367	98
Provincial and municipal	1,720	1,335
Advertising expenses	3,362	7,518
Travelling expenses	6,806	9,417
Repairs to buildings and machinery	2,012	1,166
All other sundry expenses	25,322	35,962
Total miscellaneous expenses	44,840	65,201

Table 10.—Summary of Expenditures

	1919	1920
	$	$
Salaries	52,298	42,500
Wages	46,367	46,067
Fuel	2,415	2,222
Materials used	119,417	129,800
Miscellaneous expenses	44,840	65,201
Total expenditures	265,337	285,790

Table 11.—Value Added by Manufacturing

	1919	1920
	$	$
Selling value of products	345,397	316,176
Cost of materials	119,417	129,800
Value added by manufacturing	225,980	186,376

SECTION THREE.—PERFUMERY, COSMETICS, AND TOILET PREPARATIONS

While considerable quantities of perfumes, cosmetics and toilet preparations are made as minor products of several other industries, the manufacture of these commodities as principal products has been carried on in Canada for a number of years and the present section has been prepared as a review of the activities in this growing industry.

Toilet preparations, perfumes and cosmetics and other products of this industry in 1919 amounted in value to more than one million dollars and the growth of the industry is indicated by the fact that the 1920 production was nearly double that of 1919, reaching a total of $2,077,813. The growth of the industry was further indicated in the number of firms active. Sixteen firms reported for 1919; of these nine were located in Ontario, six in Quebec and one in Manitoba. In the following year three additional firms reported from Quebec and one more from Ontario, making a total of twenty in all for the Dominion.

Capital Employed.—The capital employed at the end of each of the two years is shown in Table 1.

Table 1.—Capital Employed in the Perfumery, Cosmetics and Toilet Preparations Industry in 1919 and 1920

—	1919	1920
	$	$
Lands, buildings, fixtures, machinery and tools	140,351	191,869
Materials, finished products, fuel and miscellaneous supplies on hand, stocks in process	277,714	674,031
Cash, trading and operating accounts and bills receivable	346,103	356,703
Total	764,168	1,222,603

Products.—The infinite variety of products made by this industry would fill a catalogue with names but, to the producer, and the student of industry, separation into a few main groups is sufficient. These have been arranged for each of the two years in Table 2.

Table 2.—Products Made in the Perfumery, Cosmetics and Toilet Preparations Group, 1919 and 1920

Kind	1919	1920
	$	$
Toilet preparations, cosmetics and perfumes	1,108,345	2,050,518
Pharmaceutical preparations	10,443	950
Patent medicines	4,400	2,259
Disinfectants	1,800	2,852
All other drugs and chemicals	3,012	21,234
Total	1,128,000	2,077,813

Materials Used.—Hundreds of different kinds of materials were used in this industry, the total reported quantities of some having cost as low as $2. Only the most important materials reported in 1919 and 1920 have been listed in Table 3; the balance together with commodities used by only one firm are grouped under "all other materials".

Table 3.—Materials Used in the Perfumery, Cosmetics and Toilet Preparations Industry, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
Acids—			$		$
Boric	lbs.	.....	.....	11,296	1,904
Citric	"	1,800	1,360	.....	.....
Tartaric	"	1,500	1,500	.....	.....
Calcium carbonate (chalk)	"	.....	.....	47,036	3,108
Coumarin	"	.....	.....	113	1,204
Ethyl alcohol	proof gals.	35,744	58,167	41,632	125,926
Essential oils	.....	.....	112,560	.....	43,424
Glycerine (refined)	lbs.	12,349	3,556	129,395	37,853
Gums (including camphor)	.....	.....	3,814	.....	2,690
Herbs, roots and other crude drugs	.....	.....	2,679	.....	3,243
Potassium hydroxide	.....	.....	.....	.....	2,833
Zinc oxide	lbs.	.....	3,540	7,816	2,154
All other materials and chemicals (including hydrogen peroxide, limestone, iodine, petrolatum, paraffin wax, orris root, soap, saccharine, talcum powder and many others)	.....	.....	47,392	.....	372,963
Containers	.....	.....	216,621	.....	366,195
Total	.....	.....	451,189	.....	963,497

Employees, Salaries and Wages.—The development of the industry was reflected in the number of employees, 80% of whom were girls and women. The two tables which follow provide an analysis of the staffs employed and of the wages paid as well as the average number working in each month of the two years under review.

Table 4.—Number of Employees by Classes on December 15th or Nearest Representative Working Day in the Perfumery, Cosmetics and Toilet Preparations Industry, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried employees—						
Officers, superintendents and managers	21	2	23	28	2	30
Clerks, stenographers, salesmen and other salaried employees	18	15	33	57	29	86
Office sub-total	39	17	56	85	31	116
Wage-earners receiving per week—						
Less than $10	9	95	104	9	84	93
$10 but less than $15	8	85	93	5	96	101
$15 but less than $20	6	7	13	15	25	40
$20 but less than $26	18	4	22	24	2	26
$26 but less than $30	1	.....	1	2	1	3
$30 and over	3	.....	3	9	.....	9
Works sub-total	45	191	236	64	208	272
Grand total	84	208	292	149	239	388

Table 5 gives the number of wage earners engaged in the industry as shown by the payrolls on the 15th of each month.

Table 5.—Number of Wage-Earners by Months and by Sex in the Perfumery, Cosmetics and Toilet Preparations Industry, 1919 and 1920

Month	1919			1920		
	Male	Female	Total	Male	Female	Total
January	39	108	147	64	233	297
February	40	108	148	69	234	303
March	42	118	160	71	246	317
April	40	138	178	75	255	330
May	43	151	194	66	250	316
June	43	155	198	66	243	309
July	41	154	195	67	258	325
August	45	172	217	63	270	333
September	48	189	237	63	257	320
October	49	199	248	65	266	331
November	47	199	246	67	254	321
December	44	188	232	63	206	269
Average	43	157	200	66	248	314

Table 6.—Salaries and Wages Paid in the Perfumery, Cosmetics and Toilet Preparations Industry in 1919 and 1920

—	1919	1920
	$	$
Salaries	129,834	236,812
Wages	101,222	176,356
Total	231,056	413,168

Fuel and Power.—The total cost of fuel used in this industry was small but the source, kind, quantity and cost at the works of all the fuel used during each of the two years has been compiled and is shown in Table 7.

Table 7.—Fuel Used in the Perfumery, Cosmetics and Toilet Preparations Group, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—		Short				
Slack	1919	tons	.....	.....	.....	.....
	1920	"	.....	.....	15	90
Lump	1919	"	.....	.....	56	452
	1920	"	.....	.....	43	473
Run of mine	1919	"	.....	.....	182	1,447
	1920	"	.....	.....	239	3,479
Anthracite coal—						
Lump	1919	"	.....	.....	48	589
	1920	"	.....	.....	111	1,926
Dust or slack	1919	"	.....	.....	100	916
	1920	"	.....	.....	49	854
Coke	1919	"	4	38	.....	.....
	1920	"	.....	.....	4	57
Gas	1919	M cu. ft.	207	87	.....	.....
	1920	"	838	736	.....	.....
Other fuel	1919	.....	.....	.....	.....	91
	1920	.....	.....	139	.....	.....
Sub-totals	1919	.....	.....	125	.....	3,495
	1920	.....	.....	875	.....	6,879
Total cost of fuel used,	1919			$3,620		
	1920			7,754		

The power as shown in Table 8 was not a large factor in this industry, having been used chiefly for driving light machinery such as mixers.

Table 8.—Power Employed in the Perfumery, Cosmetics and Toilet Preparations Group, 1919 and 1920

—	Number of units		Total H.P. according to manufacturers' rating		Total H.P. used	
	1919	1920	1919	1920	1919	1920
Boilers	1	1	40	40	40	40
Engines—						
Steam	1	1	25	25	25	25
Gas	.....	1	.....	5	.....	5
Electric motors—						
Alternating current	18	29	44	76	42	74
Direct current	1		10		10	
Other power	1	1	16	16	8	8

Miscellaneous Expenditures.—The miscellaneous expenditures applicable to manufacturing are itemized in Table 9.

Table 9.—Miscellaneous Expenditures in the Perfumery, Cosmetics and Toilet Preparations Group, 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	9,218	22,231
Cost of purchased power	1,136	2,407
Insurance (premium for year only)	3,794	7,970
Taxes—		
Excise	23,413	16,442
Excess profits	12,458	44,595
Provincial, municipal, etc.	3,521	6,381
Advertising expenses	64,779	184,473
Travelling expenses	19,539	51,501
Repairs to buildings and machinery	2,650	10,393
All other sundry expenses	128,204	150,374
Total miscellaneous expenses	268,712	496,767

Table 10.—Summary of Expenditures

	1919	1920
	$	$
Salaries	129,834	236,812
Wages	191,222	176,356
Fuel	3,620	7,754
Materials used	451,189	963,497
Miscellaneous expenditures	268,712	496,767
Total	954,577	1,881,189

Table 11.—Value Added by Manufacturing

	1919	1920
	$	$
Selling value of products	1,128,000	2,077,813
Cost of materials	451,189	963,497
Value added by manufacturing	676,811	1,114,316

Imports and Exports.—Imports of soaps, cosmetics, toilet preparations, perfumes, and materials of interest in connection with the manufacture of such commodities are shown in the following table:—

Table 12.—Imports of Soaps, Perfumery, Cosmetics and Toilet Preparations in the Calendar Years 1919 and 1920

	Unit of quantity	1919		1920	
		Total quantity	Total value	Total quantity	Total value
			$		$
Foots	cwts.	2,315	33,937	2,302	31,406
Castor oil	gals.	117,220	221,175	136,137	291,759
Chinawood oil	lbs.	1,528,555	326,009	4,359,171	848,232
Cocoanut, palm and palm kernel oil not edible, peanut and soyabean oil for manufacture of soap	gals.	1,220,559	1,553,972	1,313,270	1,895,558
Cocoanut oil, n.o.p.	"	72,438	163,127	168,021	359,539
Cotton seed, refined, edible and peanut oil for canning fish	"	29,252	65,496	62,373	96,484
Cotton seed oil, crude for the manufacture of refined cotton seed oil	"	4,416,096	7,162,218	4,798,326	7,000,795
Cotton seed oil, n.o.p.	"	148,939	277,255	213,737	343,918
Flax seed or linseed oil, raw or boiled	lbs.	2,465,522	544,986	8,323,183	1,987,252
Olive oil for manufacturing soap or tobacco or for canning fish	gals.	6,741	16,401	12,362	23,333
Olive oil, n.o.p.	"	160,946	477,156	149,668	591,438
Palm oil, bleached and shea butter	lbs.	60,886	11,347	112,322	21,249
Peanut and soya bean oil, n.o.p.	gals.	182,885	283,570	114,943	174,627
Rosin oil	"	80,394	62,751	129,707	125,903
Rosin oil and chinawood oil	"	.....	142,727	.....	.....
Sesame seed oil	"	1,363	2,776	1,310	2,618
Vegetable oil, n.o.p.	"	194,414	319,164	228,068	261,416
Essential oils, n.o.p.	lbs.	366,469	848,264	347,496	1,070,160
Peppermint oil	"	20,216	130,327	14,421	91,625
Total oils	.....	.....	12,642,658	.....	15,217,312
Camphor	lbs.	83,162	191,525	64,051	128,703
Rosin or resin in packages of not less than 100 lbs.	cwt.	231,422	1,339,321	287,628	1,723,669
Soda, caustic, when in packages of less than 25 lbs.	lbs.	232,363	17,876	281,584	23,119
Tallow	"	196,289	33,500	529,512	87,990
Soda, caustic when in packages of 25 lbs. and over	"	6,756,248	274,492	8,130,720	361,141
Sodium, silicate of, in crystals or in solution	"	21,469,018	250,707	31,408,652	369,721
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground	"	.....	29,910	.....	57,068
Sodium carbonate, soda ash or barilla	"	62,636,999	1,305,348	14,915,413	372,936
Grease, rough, the refuse of animal fat, for the manufacture of soap and oils only	"	11,189,224	1,357,303	16,218,265	2,054,288
Soaps:—					
Castile soap	"	45,159	7,966	284,534	71,919
Common laundry soap	"	4,413,357	453,062	6,071,535	666,850
Common soft soap	"	132,789	9,442	164,094	15,027
Harness soap	"	4,663	870	4,724	957
Pearline and other soap powder	"	544,084	33,600	799,789	64,105
Toilet soap	"	.....	666,864	.....	726,205
Whale oil soap	"	77,317	7,277	50,087	5,004
Soap n.o.p., including pumice silver and mineral soaps, sapolio and like articles		.....	78,976	.....	148,478
Total soaps	.....	.....	1,258,057	.....	1,698,545
Alcohol perfumes and perfumed spirits, bay rum, cologne and lavender waters, hair, tooth, and skin washes and other toilet preparations in bottles, flasks or other packages containing more than 4 ounces each	gals.	4,402	114,359	7,206	246,878

Table 12.—Imports of Soaps, Perfumery, Cosmetics and Toilet Preparations in the Calendar Years 1919 and 1920—*Concluded*

	Unit of quantity	1919		1920	
		Total quantity	Total value	Total quantity	Total value
			$		$
Alcoholic perfumes and perfumed spirits, bay rum, cologne and lavender waters, hair, tooth and skin washes, and other toilet preparations in bottles or flasks containing not more than 4 ounces each	gals.	4,992	83,092	3,980	139,277
Hair, oil, tooth and other powders and washes, pomatums, pastes and all other perfumed preparations, n.o.p., used for the hair, mouth and skin	.....	.....	767,037	.....	874,991
Musk in pods or in grain	ozs.	269	6,105	119	3,841
Pomades, French or flower odours, etc., imported in tins of not less than ten pounds each	lbs.	925	1,822	510	1,814
Total perfumery, cosmetics and toilet preparations	.....	.....	972,445	.....	1,266,801

Table 13.—Exports of Soaps and Soap Materials from Canada During the Calendar Years 1919 and 1920

	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Soap	lbs.	8,373,311	1,255,175	2,286,657	332,427
Grease and grease scraps	cwt.	86,444	746,876	20,513	145,115
Cod liver oil	gals.	337,564	345,296	178,746	181,513
Seal oil	"	60,818	88,198	28,130	42,590
Whale oil	"	427,589	666,232	137,327	157,863
Oils, vegetable, n.o.p.	"	1,160,321	1,289,937	474,678	361,640
Neat's foot and other animal oils, n.o.p.	"	130,200	332,690	24,004	68,621
Other fish oil	"	156,021	128,030	107,803	80,872
Tallow	cwt.	71,707	1,046,294	17,542	205,009

Plants Engaged in the Manufacture of Soaps, Washing Compounds, Perfumes, Cosmetics and Toilet Preparations in 1920

NEW BRUNSWICK—

St. Croix Soap Manufacturing Co., St. Stephen, N.B.

QUEBEC—

Albert Soaps Limited, 168 McCord St., Montreal, Que.
J. Barsalon & Co., Ltd., 172 Delormier Ave., Montreal, Que.
Albert Bellefontaine, 322 St. Denis St., Montreal, Que.
California Perfume Co. of Canada, Ltd., 35 St. Alexander St., Montreal, Que.
Chesebrough Manufacturing Co., Cons., 1880 Chabot Ave., Montreal, Que.
Colgate & Co., Ltd., 8 St. Helen St., Montreal, Que.
Darling & Brady, Limited, 159 Richardson St., Montreal, Que.
Forhan's Limited, 307 St. James St., Montreal, Que.
Fyon and Fyon, 292 Garnier St., Montreal, Que.
S. A. Giroux, Esq., 16 Jenckes Lane, Sherbrooke, Que.

Plants Engaged in the Manufacture of Soaps, Washing Compounds, Perfumes, Cosmetics and Toilet Preparations in 1920.—*Concluded*

QUEBEC.—*Concluded*—

G. A. Lewis Co., Ltd., 92 Prince St., Montreal, Que.
J. A. Marceau, Ltd., 2 Rodney St., Montreal, Que.
Marx & Rawolle of Canada, Ltd., 516 St. Ambroise St., Montreal, Que.
The Mennen Company, 565 St. Paul St. West, Montreal, Que.
Palmers, Limited, 100 Latour St., Montreal, Que.
Joseph Paquin, Esq., 915 Berri St., Montreal, Que.
J. T. Robertson Co. of Canada, Ltd., 501 Bennett Ave., Maisonneuve, Que.
J. J. Robillard & Cie, 204 rue Fabre, Montreal, Que.
Albert Sansfacen & Wm. V. Boileau, 611 Belanger Ave., Montreal, Que.

ONTARIO—

The Alpha Chemical Co., Ltd., Station Place, Kitchener, Ont.
Canadian Booster Co., Ltd., 515 Wyandotte St. E., Windsor, Ont.
The Cudahy Packing Co., 64 Macauley Ave., Toronto, Ont.
Diamond Cleanser, Ltd., 363 Royce Ave., Toronto, Ont.
J. & R. Elliott, South Water St., Galt, Ont.
Eze Manufacturing Co., Ltd., 182 Adelaide St. W., Guelph, Ont.
Guelph Soap Co., 12-20 Waterloo St. W., Guelph, Ont.
The Herpicide Co., 4 Goyeau St., Windsor, Ont.
Frederick F. Ingram Co., 1 Ouelette Ave., Windsor, Ont.
G. R. H. and W. F. Judd, 101 Bay St. North, Hamilton, Ont.
Lever Brothers, Limited, Eastern Avenue, Toronto, Ont.
London Soap Co., Ltd., 197 Ottaway Ave., London, Ont.
Mack's Laundry Specialty Co., Almonte, Ont.
R. W. McLarty, Ltd., 432 Wellington St. W., Toronto, Ont.
Misner Manufacturing Co., Ltd., Waterloo St., Goderich, Ont.
David Morton & Son, Ltd., 77 Emerald St. S., Hamilton, Ont.
Ontario Soap & Oil Co., 45 Dickens Ave., Toronto, Ont.
The Palmolive Co. of Canada, Ltd., 64 Natalie St., Toronto, Ont.
L. Partin, Limited, 190 Bleecker St., Toronto, Ont.
Peninsula Products Co., St. Catharines, Ont.
Pompeian Company, 15 Wyandotte St. East, Walkerville, Ont.
The Procter & Gamble Manufacturing Co., Burlington St. E., Hamilton, Ont.
Pugsley, Dingman & Co., Ltd., Corner Eastern Ave. & Davies Ave., Toronto, Ont.
Francis P. Savage, Esq., R.R. No. 2, Manotic Station, Ont.
Seely Mfg. Co., Ltd., 15 Church St., Windsor, Ont.
Sovereign Perfumes, Limited, 146-148 Brock Ave., Toronto, Ont.
Standard Cleaning Products, Ltd., 81 Bond St., Toronto, Ont.
E. G. West & Company, 80 George St., Toronto, Ont.
The F. A. Williamson Manufacturing Co., Ltd., Ann St., Renfrew, Ont.

MANITOBA—

Beaver Soap Co., Ltd., 1377 Winnipeg Ave., Winnipeg, Man.
Pulford Drug Co., Ltd., 316 Donald St., Winnipeg, Man.
Royal Crown Soaps, Ltd., King & Henry Sts., Winnipeg, Man.

ALBERTA—

Acme Soap Works, North Edmonton, Alberta
Royal Crown Soaps, Ltd., Calgary, Alberta.
Alex. G. Wildren, 10249-95th St., Edmonton, Alta.

BRITISH COLUMBIA—

W. J. Pendray & Sons, Ltd., Belleville & Montreal Sts., Victoria, B.C.
Royal Crown Soaps, Limited, 308 Georgia St. East, Vancouver, B.C.
Silver Foam Soap Mfg. Co., Ltd., Viewfield Road, Esquimalt, B.C.

CHAPTER EIGHT

THE MANUFACTURE OF INKS, DYES, AND COLOURS

Since the 1918 report on the Canadian Ink Industry was written, a new classification has been adopted whereby inks, dyes and colours form one group of related industries. The present report for 1919 and 1920 covers this group.

Twenty-four plants were in operation during 1919 and twenty-five in 1920. In the former year eleven of the operating plants were situated in Ontario, seven in Quebec, three in British Columbia, two in Manitoba and one in New Brunswick. Five plants produced such commodities as dyes and food colours, while nineteen made either writing ink or printing ink and printers' rollers. In 1920 one additional plant located in Alberta reported to the Bureau. In the other provinces the number of plants remained the same as in 1919. Six plants made dyes or colours, seven writing inks and twelve printing inks and printers rollers.

The co-operation of the manufacturers has enabled the Bureau to prepare this report in more detail than the previous one but a number of manufacturers still failed to itemize the materials used and products made to the extent necessary for the compilation of a complete report. The number of such delinquents is constantly becoming smaller and subsequent reports will no doubt contain more detailed statements of materials and products.

In 1920 the total production had a selling value of $3,288,664, of which printing inks, writing inks, ink pellets and powders represented 51.9% of the total value of production. Printers' rollers and composition were reported as being 6.6% of the total.

A large quantity of household dyes and dye soaps was also produced, while various colours such as hat colours, food and butter colours, and washing blue were also made. These two latter classes together made up 22.6% of the total. The balance, covered adhesives, mortar and shingle stains, paints and varnishes, carbon paper, typewriter ribbons and various other products and by-products.

Imports of printing ink in 1919 amounted to $185,713, and in 1920 to $221,667, while the value of writing inks imported during the two years was $38,667 and $57,181 respectively.

Summary of Statistics, 1919 and 1920

	1919	1920
Number of plants	24	25
Capital employed	$ 1,549,937	1,931,705
Value of products	$ 2,361,587	3,288,664
Cost of raw materials	$ 1,151,315	1,643,991
Cost of fuel used	$ 13,671	16,066
Miscellaneous expenses	$ 422,369	605,233
Salaries and wages	$ 419,273	613,084
Average number of employees	331	412

Capital Employed.—The total capital employed at the end of 1919 comprising investments in land, buildings, fixtures, machinery and tools, the value of materials, finished products, fuel and miscellaneous supplies on hand and stocks in process and cash, trading and operating accounts and bills receivable amounted to $1,549,937. By the end of 1920 the total capital employed had increased to $1,931,705.

Table 1 shows the distribution of capital employed as outlined above.

Table 1.—Capital Employed in the Manufacture of Inks, Dyes and Colours in Canada in 1919 and 1920

	1919	1920
	$	$
Land, buildings, fixtures, machinery and tools	520,610	546,058
Materials on hand, stocks in process finished products, fuel and miscellaneous supplied on hand	546,782	865,427
Cash trading and operating accounts and bills receivable	482,545	520,220
Total	1,549,937	1,931,705

Products Made.—The total selling value of all products and by-products of this industry in 1919 was $2,361,587, of which $1,371,755 was the combined value of printing inks, dry colours and printers' rolls.

In 1920 the selling value at the factories of all the products and by-products was $3,288,664 including printing inks, printers' rollers and composition writing inks, ink tablets and powders, adhesives such as mucilage and paste, household dyes and dye soaps, various colours such as hat colours, food and butter colours and washing blue, mortar colours, shingle stains, paints and varnishes and such other products as carbon paper and typewriter ribbons.

In Table 2 the various groups of products obtained in 1919 are listed with their selling values only. The grouping is partly due to the failure on the part of some manufacturers to itemize their products when reporting to the Bureau. The products obtained in 1920 are listed in Table 3. The grouping was much more satisfactory than that for 1919.

Table 2.—Products Made by Firms in the Ink, Dyes and Colours Group in 1919

Kind	Selling value at works
	$
Printing inks, dry colours and printers' rolls	1,371,755
Writing inks, ink powders and adhesives	232,249
Paste, mucilage and glue	20,054
Dyes, including household dyes, hat colour, butter and sugar colour and washing blue	294,710
Drugs and pharmaceuticals	6,306
All other products including stove polish, typewriter ribbons and carbon paper, varnish, water glass and various other products n.e.s.	436,513
Total	2,361,587

Table 3.—Products Made by Firms in the Ink, Dyes and Colours Group in 1920

Kind	Selling value at works
	$
Dyes and dye soaps	594,644
Hat colour, washing blue, butter and sugar colour	148,278
Printing inks	1,459,054
Printers rollers and composition	216,923
Writing inks	245,335
Ink pellets, powders and miscellaneous inks	3,499
Mucilage and paste	58,943
Mortar colours, shingle stains, paints, varnishes colours, and stove polish	433,647
All other products, malt flour, water, water glass, carbon paper, typewriter ribbons and various others	128,341
Total	3,288,664

Materials Used.—The difficulty experienced in obtaining from the manufacturers of inks, dyes and colours, specific information regarding the quantities and values of materials used by them was due largely to the lack of a uniform system of accounting throughout the group, and indeed it may be said that in very many industries the same lack of information concerning costs has been found. It has been urged that a carefully kept record of materials will often prevent losses which otherwise may be considerable and that such a record, far from being costly and burdensome can be very cheaply and easily kept. For 1920, much better reports reached the Bureau and it is to be assumed that in the near future the benefits of using improved method will become apparent to all.

For the reasons set out above, the materials used in 1919 were not itemized in detail but for 1920 a rough grouping of the materials was made as shown in Table 4. In all probability the item "all other materials" included values which should be shown under other headings; similarly any group may include a small percentage which should rightfully fall in another group. At present a new schedule is being devised for use of manufacturers in reporting and it is hoped to obtain a more satisfactory grouping of materials for subsequent reports.

Table 4.—Materials Used in the Inks, Dyes and Colours Group in 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works $	Quantity	Cost at works $
Dry colours, aniline dyes, and dye mixtures	lbs.	.....	.....	.....	632,970
Plumbago, carbon and other blacks	"	.....	.....	117,313	15,549
Oils, varnishes and dryers	"	.....	.....	.....	376,372
Methylated spirits, alcohol, benzine, naphtha and turpentine	"	.....	871,354	.....	47,415
Dextrin, gums, resins and shellac	"	.....	.....	.....	48,816
Glycerine	"	.....	.....	66,889	18,983
Glue	"	.....	.....	42,882	16,639
Tannic acid, gallic acid, nut galls, logwood extract	.....	.....	.....	.....	4,126
All other materials	.....	.....	132,952	.....	194,646
Containers	.....	.....	147,009	.....	288,475
Total	.....	.....	1,151,315	.....	1,643,991

Employees, Salaries and Wages.—The average number of wage-earners employed in this industrial group was higher by 70 than in the preceding year and for the year was 279 comprising 69 female workers and 210 males.

Table 5.—Salaries and Wages Paid in the Inks, Dyes and Colours Group in 1919 and 1920

	1919	1920
Salaries	$244,697	$340,864
Wages	174,576	272,220
Total	$419,273	$613,084

For the final operating period in each year (December 15, or nearest representative day) a record of the number of employees by classes was obtained and the results are shown in Table 6.

Table 6.—Number of Employees by Classes in the Inks, Dyes and Colours Group as on December 15th, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
Salaried Employees—						
Officers, superintendents and managers	32	1	33	42	.....	42
Clerks, stenographers, salesmen and other salaried employees	60	29	89	62	29	91
Office sub-total	92	30	122	104	29	133
Wage-earners receiving per week—						
Under $10	19	37	56	10	21	31
$10 but under $15	19	10	29	17	22	39
$15 but under $20	27	2	29	23	10	33
$20 but under $26	74	1	75	81	5	86
$26 but under $30	19	.....	19	25	.....	25
$30 and over	33	.....	33	47	.....	47
Works sub-total	191	50	241	203	58	261
Grand total	283	80	363	307	87	394

In Table 7 the number of wage-earners, male and female, is shown, the data being taken from the pay-rolls of the various plants on the 15th of each month or nearest representative working day. It will be noted that for both 1919 and 1920 the works sub-totals as shown in Table 6 are slightly greater than the number of wage-earners shown for December in Table 7. This is due to the distribution in one or two instances having been given as normal on some date other than December 15th.

Table 7.—Number of Wage-Earners by Months and by Sex Employed in the Inks, Dyes and Colours Group, 1919 and 1920

	1919			1920		
	Male	Female	Total	Male	Female	Total
January	144	56	200	186	69	255
February	157	51	208	189	79	268
March	150	46	196	188	75	263
April	148	47	195	202	71	273
May	153	62	215	198	67	265
June	160	47	207	235	91	326
July	158	39	197	232	68	300
August	164	48	212	224	71	295
September	166	46	212	220	58	278
October	172	39	211	232	67	299
November	178	47	225	212	59	271
December	185	52	237	199	55	254
Average	161	48	209	210	69	279

Fuel and Power.—The total cost of fuel used in the Inks, Dyes and Colours industry in 1919 was $13,671 and in 1920 it was $16,066, an increase of $2,395.

Table 8 shows the fuel used during each of the two years itemized as to source, kind, quantity and cost at works.

In Table 9 is shown the power employed in the industry in 1919 and 1920. The boilers used supplied heat for the melting up of the various ingredients used in manufacturing the different products. Motors supplied the power for running mixers and other light machinery.

Table 8.—Fuel Used in the Inks, Dyes and Colours Group, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—		Short				
Slack	1919	tons	12	96	21	242
	1920	"	.....	.....	704	8,167
Lump	1919	"	247	2,053	763	6,067
	1920	"	176	2,843	90	669
Run of mine	1919	"	.....	.....	.....	.....
	1920	"	10	85	129	1,773
Anthracite coal—						
Lump	1919	"	.....	.....	316	3,638
	1920	"	.....	.....	73	1,014
Dust or slack	1919	"	.....	.....	20	244
	1920	"	.....	.....	41	615
Coke	1919	"	108	912	.....	.....
	1920	.....	.....	.....	.....	.....
Wood	1919	cords	13	59	.....	.....
	1920	"	5	22	.....	.....
Gas	1919	M cu. ft.	265	360	.....	.....
	1920	"	239	327	.....	.....
Other fuel	1919	.....	.....	.....	.....	.....
	1920	.....	.....	.....	.....	551
Sub-totals	1919	.....	.....	3,480	.....	10,191
	1920	.....	.....	3,277	.....	12,789
Total cost of fuel used	1919	.....	.....	.....	$13,671	
"	1920	.....	.....	.....	16,066	

Table 9.—Power Employed in the Inks, Dyes and Colours Group, 1919 and 1920

Class	Number of units		Total horse power according to manufacturers' rating		Total horse power used	
	1919	1920	1919	1920	1919	1920
Boilers	9	6	601	500	396	340
Electric motors—						
(a) Alternating current	33	65	483	884	468	822
(a) Direct current	13		120		80	

Miscellaneous Expenditures.—Miscellaneous expenditures during 1919 amounted to $422,369 and in 1920 to $605,233, as shown in Table 10.

Table 10.—Miscellaneous Expenditures in the Inks, Dyes and Colours Group, 1919 and 1920

	1919	1920
	$	$
Rent of offices, works and machinery	28,073	36,198
Cost of purchased power	9,707	19,641
Insurance (premium for the year only)	10,972	15,199
Taxes—		
Excise	255	3,157
Excess Profits	4,222	26,117
Provincial and municipal	10,073	12,970
Advertising expenses	21,883	91,258
Travelling expenses	78,267	77,900
Repairs to buildings and machinery	7,613	26,230
All other sundry expenses	251,304	296,563
Total miscellaneous expenditures	422,369	605,233

Table 11.—Summary of Expenditures, 1919 and 1920

	1919	1920
	$	$
Salaries	244,697	340,864
Wages	174,576	272,220
Fuel	13,671	16,066
Materials used	1,151,315	1,643,991
Miscellaneous expenditures	422,369	605,233
Total	2,006,628	2,878,374

Table 12.—Value Added by Manufacturing

	1919	1920
	$	$
Selling value of products made	2,361,587	3,288,664
Cost of materials used	1,151,315	1,643,991
Value added by manufacturing	1,210,272	1,644,673

Imports.—In the two following tables are shown imports and exports for the calendar years 1919 and 1920 of commodities which are of interest in connection with the inks, dyes and colours industry.

Table 13.—Imports of Inks, Dyes and Colours into Canada During the Calendar Years 1919 and 1920

	1919		1920	
	Quantity	Value	Quantity	Value
		$		$
Aniline and coal tar dyes, soluble in water, in bulk or packages of not less than 1 lb. weight, including alizarine and artificial alizarine lbs.	2,469,906	2,362,759	3,632,955	3,520,315
Aniline dyes, in packages of less than 1 lb. weight "	1,890	2,907	6,517	2,430
Aniline oil, crude "	276,857	71,656	560,500	170,214
Aniline salts "	7,927	3,758	31,728	13,658
Coal tar base or salt (Paranitraniline) "	60,463	43,205	82,466	51,395
Annatto, liquid or solid "	95,684	24,350	86,654	21,361
Annato seeds "	28,493	1,945	44,679	3,130
Camwood and sumac and extract thereof "	360,609	17,886	350,735	22,202
Cochineal "	666	490	1,096	695
Dyeing or tanning articles in crude state used in dyeing or tanning, n.o.p "	8,575,412	541,929	12,863,264	721,482
Indigo "	305	414	332	331
Indigo paste and extract of "	248,785	146,362	303,085	212,551
Litmus and all lichens prepared or not "	349	255	1,119	398
Logwood and fustic, ground, and ground oak bark "	44,330	3,853	179,310	23,159
Logwood, fustic, oak and oak bark, and quebracho extract of "	29,804,912	1,781,523	29,329,595	2,014,877
Nut galls and extracts thereof "	3,469	1,821	86,851	49,012
Persis, or extract of archill and cudbear "	2,108	319	727	186
Saffron, saffron cake, safflower and extracts of "	699	1,740	785	1,647
Terra japonica, gambier or cutch "	304,477	35,759	431,895	40,464
Turmeric "	61,628	7,788	65,315	6,469
Antimony salts for dyeing "	100	74	388	191
Iron liquor, being solution of acetate or nitrate of iron adapted for dyeing and calico printing "	.....	2,924	.....	4,200
Red liquor, being a crude acetate of aluminum prepared from pyroligneous acid and adapted for dyeing and calico printing "	.....	1	.....	229
Blacks, lamp, bone ivory and carbon "	3,416,240	329,005	4,096,457	502,250
Ink, printing	.....	185,713	.....	221,667
Ink, writing	.....	38,667	.....	57,181
Mucilage and adhesive paste	.....	72,832	.....	82,652
Ribbons, undyed for the manufacture of type-writer ribbons	.....	38,666	.....	109,289

Table 14.—Exports of Dyestuffs, etc., from Canada During the Calendar Years 1919 and 1920

	1919		1920	
	Quantity	Value	Quantity	Value
		$		$
Dye stuffs		2,380		
Extracts of hemlock bark		63,262		35,826

List of Plants Operating in the Inks, Dyes and Colours Industry in Canada in 1920

New Brunswick—

Ensley B. Johnson, 62 Bridge St., St. John, N.B.

Quebec—

The Carters Ink Co., 655 Drolet St., Montreal, Que.
Dominion Caramel Co., 21 Walnut Ave., St. Henri, Montreal, Que.
Frontenac Ink Works, 243 William St., Montreal, Que.
Johnson-Richardson, Ltd., 74 St. Antoine St., Montreal, Que.
John S. Robertson, 119 Lagauchetière St. W., Montreal, Que.
Tellier, Bydwell & Co., 24-26 St. Dizier St., Montreal, Que.
Wells and Richardson Co., Ltd., 200 Mountain St., Montreal, Que.

Ontario—

The Ault & Wiborg Co. of Canada, Ltd., 19 Charlotte St., Toronto, Ont.
Charles Bush, Ltd., 105 Davenport Road, Toronto, Ont.
Canada Printing Ink Co., Ltd., 15 Duncan St., Toronto, Ont.
Cutler Ink Company, 61 Richmond St. W., Toronto, Ont.
Dominion Printing Ink & Color Co., Ltd., 128 Pears Ave., Toronto, Ont.
Charles Gardner, Esq., 83 West Burlington St., Hamilton, Ont.
Manton Bros., 105 Elizabeth St., Toronto, Ont.
J. E. Poole & Co., 21 Prescott Ave., Toronto, Ont.
Shackell Edwards & Co., Ltd., 127 Peter St., Toronto, Ont.
Sinclair & Valentine Co. of Canada, 233 Richmond St. W., Toronto, Ont.
S. S. Stafford, Ltd., 9 Davenport Road, Toronto, Ont.
Sunbeam Chemical Co. of Canada, Ltd., 90 Jarvis St., Toronto, Ont.

Manitoba—

Reliance Ink Co., Ltd., 520 McGee St., Winnipeg, Man.
W. Schofield, 657 10th St., Brandon, Man.

British Columbia—

Peerless Products, Ltd., 1150 Hamilton St., Vancouver, B.C.
Frank Walmsley, 1021 Harwood St., Vancouver, B.C.
J. G. Whiteacre and G. M. Winn, 1063 Hamilton St., Vancouver, B.C.

CHAPTER NINE

WOOD DISTILLATES AND EXTRACTS

SECTION ONE.—THE WOOD DISTILLATION INDUSTRY

The output of Canadian plants engaged in wood distillation in 1919 had a selling value of $2,807,037, which was a considerable decrease from that of 1918. The condition of the industry improved again in 1920 and the selling value of the products amounted to $4,899,704. In 1918, 128,097 cords of hardwood and 140,420 bushels of lime were used, while in 1919 these had decreased to 69,958 cords and 67,100 bushels respectively. In 1920 the respective quantities of hardwood and lime were 100,347 cords and 98,647 bushels. In 1918 no distinction was made between intermediate products and the final products placed on the market, whereas in this report the methyl hydrate and gray acetate used for the further production of formaldehyde and acetone are listed as intermediate products made for use. This procedure was necessary, the intermediates having been made in several plants, and portions sold as such while the remainder was sent to a central refinery for further processes of manufacture. In order that each district might be credited with its due share in the industrial life of the country all the intermediates made as well as the final products were listed as "output" in the general tables.

Capital Employed.—The capital invested at the end of each of the two successive years was $5,760,395 and $4,005,022 respectively and comprised the value assigned to land, buildings and plant equipment; materials, fuel, finished products and miscellaneous supplies on hand, stocks in process; and the amount of cash, trading and operating accounts and bills receivable. The increase in capital invested in 1919 over 1918 was $2,147,822, the total capital employed at the end of 1918 having been $3,612,573. The increase in plant and equipment was $335,994, while that of stocks and materials on hand and stocks in process amounted to $1,809,672.

This large increase of stocks on hand was probably due to the decreased demand for acetone, and other products of the industry which were used in such large quantities in the manufacture of cordite and for various other purposes during the war. The increase in cash and accounts amounted to only $2,156. With the exception of cash accounts which increased $13,532, the various assets showed a considerable decrease at the end of 1920. Land, buildings and equipment decreased by $16,383, while stocks in process, materials and supplies on hand decreased by $1,752,522. The total decrease from 1919 amounted to $1,755,373.

Table 1.—Capital Employed in the Wood Distillation Industry in Canada in 1919 and 1920

—	Year	Ontario	Quebec	Total
		$	$	$
Land, buildings, fixtures, machinery and tools	1919	1,851,941	1,328,264	3,180,205
	1920	1,835,557	1,328,265	3,163,822
Materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand	1919	327,447	2,239,326	2,566,773
	1920	400,508	413,743	814,251
Cash, trading and operating accounts and bills receivable	1919	13,417	.....	13,417
	1920	26,949	....	26,949
Total	1919	2,192,805	3,567,590	5,760,395
	1920	2,263,014	1,742,008	4,005,022

Plant and Equipment.—The plant equipment in the wood distillation industry is very extensive and represents a large investment. The ovens in Canadian plants are chiefly the rectangular horizontal type, ranging in capacity from six to eight cords of 128 cubic feet each.

The tar stills are steam heated and are used to separate tar from the pyroligneous acid liquor. No tar was reported as having been sold by the manufacturers, but some was probably used as fuel under the retorts.

The lime lee stills are used to distil off crude methyl hydrate, acetone and oils from the pyroligneous acid liquor after it is neutralized by the addition of lime. The solution containing calcium acetate is evaporated until crystallization takes place. The crystal product is then dried on top of the ovens.

In 1919, crude and dilute methyl hydrate was distilled from the twenty-one alcohol stills which had a total capacity of 5,186 gallons of 95% methyl hydrate daily, when in full operation. Seven column stills were used for distilling acetone. Their total capacity was 900 gallons of 100% acetone daily. In addition to the equipment shown in Table 2 four column stills and one periodic still having a total daily capacity of 4,200 gallons were used in refining various products, chiefly methyl hydrate. In 1920 six column stills and one periodic still having a total daily capacity of 6,200 gallons were in use. With the exception of the difference just noted and six additional ovens, having a total capacity of sixty cords of wood, reported in 1920, the plant equipment was practically the same as in the previous year.

Table 2.—Equipment of Wood Distillation Plants in Canada, 1920

—	Number of units	Total capacity
Retorts, ovens and kilns	93	620 cords of 128 cubic feet each.
Tar stills	28	81,340 gallons per day.
Alcohol stills	21	5,186 gallons, 95 per cent alcohol, daily.
Lime Lee stills	21	80,692 gallons per day.
Column stills (acetone)	7	900 gallons, 100 per cent acetone, daily.

During 1919 new construction and additions to plant cost $18,873 of which $7,769 paid for wages is included in the total wages mentioned elsewhere in this report. The balance or $11,104 was the cost of the materials used in construction. In 1920 the reported new construction was negligible.

Products.—Intermediate products which were made for use in further processes of manufacture are listed in Table 3, in addition to the finished products made for sale. The quantity of intermediates made for use was not necessarily the same as the quantity used during the year.

In 1919 the 3,589,275 bushels of charcoal produced had a selling value of $714,660, while in 1920 the quantity produced was 5,116,171 bushels and the value $1,287,580. The selling values per bushel in each of the two successive years were 20 cents and 25 cents.

The total quantities of gray acetate of lime made in the two years were 13,886,165 pounds and 18,230,899 pounds respectively, the selling value at the factories having been $294,315 and $525,604 respectively. The average selling value per pound in 1919 was $0.021 and $0.029 in 1920.

Table 3.—Products Made in the Wood Distillation Industry in 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Selling value	Quantity	Selling value
			$		$
Products made for sale—					
Charcoal	Bus.	3,589,275	714,660	5,116,171	1,287,580
Gray acetate of lime	Lbs.	10,300,203	217,875	15,071,589	424,498
Methyl hydrate, 95 per cent	Gal.	323,448	561,993	302,820	317,678
Methyl hydrate, pure	"			252,678	727,712
Columnian spirits	"	17,221	51,531	10,767	49,413
Methylated spirits	"	2,484	3,424		
Acetone	Lbs.	384,769	65,829	385,289	104,028
Acetone oils	"	113,533	19,300	80,104	17,622
[1]Wood creosote	Gal.	7,947	1,986	213,859[1]	10,946
Acetic acid, 28 per cent	Lbs.	220,027	9,781	772,445	33,215
Acetic acid, 80 per cent	"	156,643	30,445	313,302	43,369
Methyl acetate	"	4,760	1,074		
Formaldehyde	"	1,011,019	308,132	1,866,343	858,517
Acetic anhydride	"	322	435		
Sodium acetate	"	266,886	17,510		
Total finished products			2,003,975		3,874,578
Intermediates made for use—					
Gray acetate of lime	Lbs.	3,585,962	76,440	3,159,310	101,106
Acetic acid, 28 per cent	"	237,947	6,540		
Crude methyl hydrate	Gal.	512,585	512,585	640,623	640,623
Refined methyl hydrate	"	155,579	205,197	220,131	283,397
Wood tars	Lbs.	100,000	2,000		
Charcoal	Bus.	2,500	300		
Total intermediates made for use			803,062		1,025,126
Total production of the industry			2,807,037		4,899,704

[1]Wood creosote was reported in pounds in 1920.

In order to give an idea of the total production of charcoal, gray acetate and methyl hydrate from the wood and lime used, the quantities of these products have been determined from the individual reports of the manufacturers, and are listed in Table 4. The quantities of wood and lime from which the products were obtained are shown in Table 5. It is unfortunate that the cord should have to be considered the unit of measure for wood owing to the impossibility of it always representing the true quantity. A much better unit would be that of weight, with due allowance for the moisture contained in the wood.

Table 4.—Primary Products, Wood Distillation Industry, 1919 and 1920

Product	Unit of quantity	Quantity produced		Recovery per cord of wood	
		1919	1920	1919	1920
Charcoal	Bus.	3,589,275	5,116,171	51·3	51·0
Gray acetate of lime	Lbs.	13,886,165	18,230,899	198·5	181·7
Methyl hydrate, 95 per cent	Gal.	571,703	835,626	8·2	8·3

Table 5.—Hardwood and Lime Used in 1919 and 1920

Material	Unit of quantity	Quantity used	
		1919	1920
Hardwood	Cord	69,958	100,347
Lime	Bush.	67,100	98,647

Materials Used.—In Table 6, both primary materials and intermediates such as gray acetate and methyl hydrate which were used for the production of acetone, acetic acid, and formaldehyde, have been listed. In 1919 hard wood cost 94.7% of the total cost of primary materials, and lime 3.6%; the quantities were 54.6% and 47.8% of the respective quantities used in 1918. In 1920 the cost of 100,347 cords of wood was $1,092,840 and of 98,647 bushels of lime $39,838. Wood and lime cost 95.6% and 3.4% respectively, of the total cost of primary materials used, while the quantities of each showed an increase of 43.4% and 47.0% over the respective quantities used in 1919.

The kind of wood used in the industry is determined by the nature of the products desired. In the Canadian industry hardwoods are used almost exclusively as they yield higher percentages of acetic acid and methyl hydrate than do soft woods.

There is considerable disagreement among technical men as to the effect of moisture in the wood on the yield of methyl hydrate and acetic acid, but it is generally conceded by all that any increased yield due to high moisture content is not sufficient to offset the extra cost of distillation and refinement.

Dry wood is composed chiefly of carbon, hydrogen and oxygen combined to form the chemical constituents cellulose, lignin and carbohydrates. Cellulose when distilled alone yields no methyl hydrate, but gives a fairly high yield of acetic acid. From analyses of wood by hydrolysis the percentage of acetic acid shown to be present is less than that actually recovered by practical distillation, but the yield may be greatly increased by treatment of the wood with a large excess of caustic soda. (Mahood and Cable. J. Ind. Eng. Chem. 1919.)

Lignin is apparently the source of methyl hydrate, which is shown by analysis to be present in wood in a much larger quantity than that recovered in actual practice by distillation. It would seem, therefore, that by some modified method the yield of both acetic acid and methyl hydrate might be considerably increased.

Table 6.—Materials Used in the Wood Distillation Industry, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Cost at works	Quantity	Cost at works
			$		$
Primary materials—					
Hardwood	Cords	69,958	717,214	100,347	1,092,840
Resinous woods	"	300	1,200	.....	.....
Lime	Bus.	67,100	27,571	98,647	39,838
Salt	Lbs.	30,800	308	18,300	183
Calcium chloride	"	17,600	270	10,800	155
Sulphuric acid, 60°Bé	"	493,280	6,067	506,861	6,234
Soda ash	"	87,539	3,064	.....	.....
Caustic soda	"	30,000	1,350	35,631	2,492
Other materials	.....	.....	27	.....	530
Total primary materials used	.....	.....	757,071	.....	1,142,272
Intermediates used—					
Gray acetate of lime	Lbs.	2,959,078	66,889	3,034,911	93,507
Acetic acid, 28 per cent	"	237,947	6,540	.....	.....
Crude methyl hydrate	Gal.	570,520	570,520	578,749	578,749
Refined methyl hydrate	"	155,579	205,197	220,131	283,397
Total intermediates used	.....	.....	849,146	.....	955,653
Total materials used	.....	.....	1,606,217	.....	2,097,925

Employees, Salaries and Wages.—In 1918 salaried employees numbered 28 males and one female, the total sum received in salaries having been $36,890. In 1919 the number had increased to 30 males and one female and the total salaries to $39,006. A still greater increase was noted in 1920, when the salaried employees numbered 38 males and 4 females, and salaries amounted to $69,814, of which $42,375 went to 20 officers, superintendents and managers as compared with $26,928 paid to 16 such employees in 1919.

The number of wage-earners decreased considerably in 1919. In the previous year they numbered 646 (including 20 outside piece-workers) and received wages amounting to $693,735, but in 1919 there were only 410 males and 2 females employed, and wages decreased to $355,742. No piece-workers were reported for the year.

More employees were taken on in 1920, the average number of wage-earners having been 542 males and 1 female, while the total wages amounted to $608,971.

Table 4 shows the distribution of salaried employees and those on wages on December 15th or on the nearest representative working day. The number of women engaged in this industry is very small, and no employees were reported as being under 16 years of age.

Table 7.—Number of Employees in the Wood Distillation Industry by Classes, 1919 and 1920

	1919		1920	
	Male	Female	Male	Female
Salaried employees—				
Officers, superintendents and managers	16	.....	20	.....
Clerks, stenographers, salesmen and other salaried employees	14	1	18	4
Office sub-total	30	1	38	4
Wage-earners, receiving per week—				
$12 but less than $15	9	.....	1	1
$15 but less than $20	141	.....	103	.....
$20 but less than $26	273	1	163	.....
$26 but less than $30	59	.....	23	.....
$30 and over	18	.....	44	.....
Works sub-total	500	1	334	1
Grand total	530	2	372	5

In Table 8 is given the number of employees on wages from month to month as shown by the pay-rolls on the 15th of each month or on the nearest normal working day.

In 1919 six plants were practically idle from March to August, inclusive; the general tendency throughout the whole industry was the same. The number of wage-earners in December corresponds with the number in the distribution table above, although the average for the year was only 412. The number in December gives more clearly the importance of the industry as an employer of labour when business is running normally. In 1920 the condition of the industry was somewhat different, the period of most active operation having been from March to September.

Table 8.—Number of Wage-Earners Employed in the Wood Distillation Industry by Months and by Sex, 1919 and 1920

Month	1919		1920	
	Male	Female	Male	Female
January	612	4	445	.....
February	500	4	505	.....
March	360	4	580	.....
April	316	3	615	.....
May	321	3	647	.....
June	323	3	601	.....
July	333	2	623	1
August	308	2	622	1
September	404	1	578	1
October	440	1	533	1
November	506	1	438	1
December	500	1	322	1
Average	410	2	542	1

Fuel and Power.—The total cost of fuel used during 1919, as laid down at the various plants, was $371,289 as compared with $839,966 in 1918. In 1920 the cost of fuel increased to $618,161, of which $570,126 or 92.2% was paid for 60,937 tons of bituminous coal of foreign origin. Canadian fuel cost $48,035, or 7.8% of the total.

The kind, source, quantity and cost at the works of all the fuel used during the two years, exclusive of any supplied to employees, is shown in Table 9.

Table 9.—Fuel Used in the Wood Distillation Industry, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1919	Short tons	.....	.....	22,589	166,153
	1920	"	.....	.....	4,203	29,165
Lump	1919	"	.....	.....	.....	.....
	1920	"	.....	.....	725	8,153
Run of mine	1919	"	.....	.....	22,922	172,334
	1920	"	.....	.....	56,009	532,808
Oil (fuel)	1919	Imp. gals.	.....	.....	.....	
	1920	"	65,215	4,391	.....	
Wood	1919	Cord	4,260	19,998	.....	
	1920	"	7,884	38,369	.....	
Other fuel[1]	1919	.....	.....	12,804	.....	
	1920	.....	.....	5,275	.....	
Sub-totals	1919	.....	.....	$32,802	.....	$338,487
	1920	.....	.....	$48,035	.....	$570,126

Total cost of fuel used, 1919 ..... $371,289
1920 618,161

[1]Includes hogged fuel, sawdust, charcoal, and waste gas from the retorts.

The power equipment used in this industry is shown for the two years, 1919 and 1920 in Table 10. The major portion of the power was supplied from boilers and was used in the operation of the steam-heated stills.

Table 10.—Power Employed in the Wood Distillation Industry, 1919 and 1920

Class	Number of units		Total H.P. according to manufacturers' rating		Total H.P. actually employed	
	1919	1920	1919	1920	1919	1920
Boilers	49	50	6,340	6,040	5,515	5,040
Engines—						
Steam	9	10	315	323	255	261
Oil	1	6	6	6	6	6
Electric motors—						
Alternating	27	27	810	810	730	730
Direct	1	20	20	20	20	20
Generators—						
Alternating	3	3	145 K.V.A.	145 K.V.A.	145 K.V.A.	145 K.V.A.
Direct	1	1	15 K.V.A.	15 K.V.A.	15 K.V.A.	15 K.V.A.

Miscellaneous Expenditures.—During 1919 miscellaneous expenditures amounted to $261,530 of which $127,028, or 48.5% was spent for repairs to buildings and machinery, showing the great depreciation of plants in this industry. This was still more evident in 1920 when $437,087, or 82·6% of the total miscellaneous expenditures for that year, was spent for the same purpose. Insurance was the next largest single item, having cost $43,676, or 16.7% of the total for 1919 and $46,336, or 8.8% of the total for 1920. This was, no doubt, due in a great measure to the necessity of air-drying the wood for a number of months before using and the consequent insurance against loss by fire. The total miscellaneous expenditures in 1920 amounted to $528,597.

Table 11.—Miscellaneous Expenditures in the Wood Distillation Industry, 1919 and 1920

—	1919	1920
	$	$
Cost of power	14,418	10,304
Insurance (premium for the year only)	43,676	46,336
Taxes (provincial, municipal, etc.)	13,907	14,756
Travelling expenses	250	1,533
Repairs to buildings and machinery	127,028	437,087
All other sundry expenses (not including fuel costs, materials used, salaries and wages)	62,251	18,581
Total	261,530	528,597

Table 12.—Summary of Expenditures

—	1919	1920
	$	$
Salaries	39,006	69,814
Wages	355,742	608,971
Fuel	371,289	618,161
Materials used (primary)	757,071	1,142,272
Miscellaneous expenses	261,530	528,597
Total expenditures	1,784,638	2,967,815

Table 13.—Value Added by Manufacturing in the Wood Distillation Industry, 1919 and 1920

	1919	1920
	$	$
Selling value of products	2,807,037	4,899,704
Cost of materials (primary and intermediate)	1,606,217	2,097,925
Value added by manufacturing	1,200,820	2,801,779

SECTION TWO.—WOOD EXTRACTS

The extraction of hemlock bark, the manufacture of crude potash by wood-burning and the distillation of turpentine from wood are all industries somewhat allied to the distillation of wood for the production of acetate of lime and acetone, and for this reason this section of the report, dealing with the first mentioned processes has been included in the same chapter with the review of the wood distillation industry. A separate statistical review seemed, however, to be necessary.

In 1919 and 1920 there were four establishments operating in Canada, two making potash in Ontario, one producing turpentine in Quebec, and one making hemlock bark extract in New Brunswick.

The combined capital invested in these establishments at the end of 1919 was $244,182, of which $114,866 represented land, buildings, fixtures, machinery and tools; $89,235, materials and stock on hand, stocks in process, fuel and miscellaneous supplies on hand. The cash, trading and operating accounts and bills receivable amounted to $40,081.

At the end of 1920 the total capital employed amounted to $242,075. Land, buildings, fixtures, machinery and tools were valued at $114,911, while stocks in process, materials, finished products, fuel and miscellaneous supplies on hand had an estimated value of $104,689. Cash, trading and operating accounts and bills receivable amounted to $22,475.

In 1919 the average number of employees, including both those on salary and those on wages, was 41, while in 1920 the number had decreased to 19. Total salaries and wages also decreased from $37,094 in 1919 to $22,325 in the following year.

Fuel was a small item of expense, 613 tons of bituminous coal used in 1920 having cost $4,456 and 123 cords of wood $476. The total cost of fuel in 1920 was $4,932 as compared with $19,467 paid for 2,766 tons of bituminous coal in 1919.

The materials used by these four establishments consisted of wood ashes, hemlock bark, sulphuric acid, barrels, boxes and other containers. The total cost in each of the two successive years was $112,004 and $55,080 respectively.

Products, which were potash, hemlock tanning extract and turpentine, had a selling value in 1919 of $90,991, while in 1920 the value of the output was only $82,579.

Miscellaneous expenditures amounted to $16,147 in 1919 and $18,541 in 1920, details of which are shown in the following table:

Table 14.—Miscellaneous Expenditures in the Wood Extracts Industry, 1919 and 1920

	1919	1920
	$	$
Insurance	2,480	2,656
Provincial and municipal tax, etc.	1,499	2,383
Advertising expenses	743	396
Travelling expenses	208	611
Repairs to buildings and machinery	5,392	4,131
Sundry expenses (not including fuel costs, materials used, salaries and wages)	5,825	8,364
Total	16,147	18,541

Table 15.—Value Added by Manufacturing in the Wood Extracts Industry

—	1919	1920
	$	$
Selling value of products	190,991	82,579
Cost of materials	112,004	55,080
Value added	78,987	27,499

Following is a list of imports in 1919 and 1920 for consumption in Canada, of commodities that are of interest in connection with the Wood Distillates and Extracts Industries. Exports of similar commodities are shown in Table 17.

Table 16.—Imports into Canada of Certain Commodities, 1919 and 1920

—	Unit of Quantity	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Lime	Cwt.	79,540	53,190	54,774	48,790
Methyl alcohol, wood alcohol, wood naphtha, pyroxylic spirits or any substance known as wood spirits or methylated spirits	Gals.	68	176	10,245	28,383
Charcoal	.....	.....	86,641	.....	85,833
Acid, acetic and pyroligneous, crude, of any strength not exceeding 30 per cent	Gals.	3,680	2,741	5,337	2,698
Acid, acetic and pyroligneous in excess of strength of proof	"	2,672	13,384	502	1,734
Acetic acid and pyroligneous, n.o.p., not exceeding proof strength	"	131	37	797	395
Total	.....	.....	156,169	.....	167,833

Table 17.—Exports from Canada of Wood Distillation Products, 1919 and 1920

—	Unit of of Quantity	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Charcoal	.....	.....	6,726	.....	76,581
Hemlock bark extract	.....	.....	63,262	.....	35,826
Calcium acetate	Cwt.	104,265	257,857	117,981	337,342
Wood alcohol	Gals.	161,922	292,083	404,988	777,379
Lime	Cwt.	193,073	128,810	460,310	381,899
Total	.....	.....	748,738	.....	1,609,027

List of Plants Operating in 1919 and 1920, Who Furnished the Data Used in the Preparation of This Chapter

Wood Distillation Plants

Quebec—

Standard Chemical Co., Ltd., Cookshire, Que.
Standard Chemical Co., Ltd., Fassett, Que.
Standard Chemical Co., Ltd., 524 St. Ambroise St., Montreal, Que.
Standard Chemical Co., Ltd., Weedon, Que.
Laurentian Chemical Co., Ltd. (Owned by Standard Chemical Co.), Lac Mercier, Que.

List of Plants Operating in 1919 and 1920, Who Furnished the Data Used in the Preparation of This Chapter.—*Concluded*

WOOD DISTILLATION PLANTS—*Concluded*

ONTARIO—

Standard Chemical Co., Ltd., Longford Mills, Ont.
Standard Chemical Co., Ltd., Parry Sound, Ont.
Standard Chemical Co., Ltd., South River, Ont.
Standard Chemical Co., Ltd., Sault Ste. Marie, Ont.
Standard Chemical Co., Ltd., Thornbury, Ont.
Wood Products Co., Ltd. (Owned by Standard Chemical Co., Ltd.), Donald, Ont.
Dominion Wood & Lumber Co., Ltd., Trout Creek, Ont.
Hodgson Bros. Chemical Co., Ltd., St. Paul St., Lindsay, Ont.

WOOD EXTRACTS

NEW BRUNSWICK—

Miller Extracts, Ltd., Millerton, N.B.

QUEBEC—

Brown Corporation, La Tuque, Que.

ONTARIO—

John E. Cass, Esq., Maxville, Ont.
James McDonagh, Esq., Beckwith St., Perth, Ont.

CHAPTER TEN

MISCELLANEOUS CHEMICAL INDUSTRIES

A number of firms operating in Canada produce chemicals or allied products which do not naturally fall in any of the groups previously considered, so a miscellaneous group has been made, and the industries therein have been divided into nine classes, namely: adhesives, artificial abrasives, boiler compounds, flavoring extracts and jelly powders; polishes and dressings, sweeping compounds, baking powders, insecticides and chemical products not elsewhere specified. The total cost of materials used by all the firms in this group in 1919 amounted to $5,704,858 and the selling value of the various products and by-products was $11,424,266. Thus the value added by the process of manufacturing was $5,719,408. In 1920 materials used cost $6,810,244, products had a selling value of $13,688,141 and the value added by manufacturing was $6,877,897.

In 1919 one hundred and three firms were listed in the miscellaneous group; fifty-seven of these were located in Ontario; thirty-four in Quebec, while the remaining twelve plants were distributed as follows: three in each of the provinces of Nova Scotia and New Brunswick, two in Manitoba, two in Alberta, one in British Columbia and one in Saskatchewan.

In 1920 one hundred and ten plants were included in the miscellaneous group; sixty-two were in Ontario; thirty-five in Quebec; while of the remaining thirteen, three plants were located in each of the provinces of Nova Scotia, Manitoba and British Columbia; two were in New Brunswick; and one in each of the provinces of Alberta and Saskatchewan.

Table 1 shows the distribution of the plants in the miscellaneous group, according to the class and the province in which they were located.

Capital Employed.—The total amount of capital invested in these miscellaneous industries at the end of 1919 amounted to $10,179,188, of which $5,423,821, or 53.3%, represented land, buildings, fixtures, machinery and tools. Materials, finished products, fuel and miscellaneous supplies on hand and stocks in process had an estimated value of $2,597, 144, or 25.5% of the total; while cash, trading and operating accounts and bills receivable amounted to $2,158,223, or 21.2%.

By classes, the artificial abrasive industry represented $3,990,232 or 39.2% of the total capital investment of the whole group. Investment in the adhesive industry came next at $1,831,543, or 18%, while that of the firms making jelly powders and flavouring extracts amounted to $1,475,042, or 14.5%. The firms making baking powders had an investment of $1,420,108 or 14% of the total, while $1,036,227, or 10.2% represented the capital employed by manufacturers of polishes and dressings.

The capital employed in the five classes mentioned above represented approximately 96% of the total investment in the whole group; the balance was distributed amongst the other four classes.

At the end of 1920 the total capital employed amounted to $11,523,714, of which $5,627,403, or 48.8% represented land, buildings, fixtures, machinery and tools. The estimated value of materials, finished products, fuel and miscellaneous supplies on hand and stocks in process was $3,657,444, or 31.7% of the total; while cash trading and operating accounts and bills receivable amounted to $2,238,867, or 19.4%.

With regard to the capital invested in the different classes of industries the order remained approximately the same as in 1919, artificial abrasives held first place with capital employed amounting to $4,471,881, or 38.8% of the total; adhesives came second with $2,233,364 or 19.4% of the total; flavouring extracts and jelly powders were third with $1,756,080, or 15.2% of the total. The baking powder industry which was in the fourth place in 1919 dropped to fifth in 1920, the capital invested at the end of the latter year having been $1,083,800. Firms making polishes and dressings increased their investments to $1,444,963 or 12.5% of the total in 1920, putting this class in fourth place.

The capital employed in the five classes of industries mentioned above represented 95.3% of the total at the end of 1920; the balance, or 4.7% was divided amongst the other four classes.

Products Made.—The total value of all the products and by-products from the miscellaneous chemical industries in 1919 was $11,424,266, of which $3,012,669, or over 26%, represented the production from the artificial abrasives industry. The baking powder industry came next with a production valued at $2,323,475, or over 20% of the total. Flavouring extracts and jelly powders, together with by-products had a selling value of $1,932,915, and adhesives with by-products of the industry were valued at $1,917,046. The production of polishes and dressings and such products amounted in value to $1,769,552, or over 15% of the total.

In 1920 the five chief classes of industries in the miscellaneous group were in the same order of importance in value of production as in the previous year. The values of products and by-products from these five classes were as follows: Artificial abrasives $3,958,699 or 28.9% of the total production value of the miscellaneous group; Baking powders $2,602,382, or 19.0%; flavouring extracts and jelly powders $2,213,495, or 16.2%; adhesives $2,202,059, or 16.1%; and polishes and dressings $2,005,970, or 14.7%. The total production of the whole miscellaneous group in 1920 had a selling value of $13,688,141, or an increase of more than two and one quarter million dollars over the previous year.

Table 3 gives a list of the various classes in the miscellaneous group showing the values of the production in each class.

Table 1.—Number of Plants in the Miscellaneous Chemical Industries Group by Provinces and Classes of Industry, 1919 and 1920

Province	Year	Industry									TOTAL
		Adhesives	Artificial abrasives	Boiler compounds	Flavouring extracts and jelly powders	Polishes and dressings	Sweeping compounds	Baking powder	Insecticides	Chemical products N.E.S.	
Nova Scotia	1919	1				1		1			3
	1920	1				1		1			3
New Brunswick	1919	1			1				1		3
	1920	1			1						2
Quebec	1919	6	1		7	11	1	5	2	1	34
	1920	8	1		8	9		4	3	2	35
Ontario	1919	8	5	6	6	17	4	5	3	3	57
	1920	7	5	6	12	19	3	4	4	2	62
Manitoba	1919					1	1				2
	1920						2			1	3
Saskatchewan	1919					1					1
	1920					1					1
Alberta	1919					1	1				2
	1920					1					1
British Columbia	1919					1					1
	1920				1	1	1				3
Total	1919	16	6	6	14	33	7	11	6	4	103
	1920	17	6	6	22	32	6	9	7	5	110

Table 2.—Capital Employed in the Miscellaneous Chemical Industries Group, by Classes of Industry, for 1919 and 1920

Item	Year	Industry									TOTAL
		Adhesives	Artificial abrasives	Boiler compounds	Flavouring extracts and jelly powders	Polishes and dressings	Sweeping compounds	Baking powders	Insecticides	Chemical products N.E.S.	
		$	$	$	$	$	$	$	$	$	$
Land, buildings, fixtures, machinery and tools	1919	1,073,062	2,904,866	89,538	329,741	215,982	18,350	696,972	41,410	53,900	5,423,821
	1920	1,275,511	2,953,056	99,427	375,223	329,537	16,981	483,561	38,264	55,843	5,627,403
Materials, finished products, fuel and miscellaneous supplies on hand, and stocks in process	1919	300,256	687,867	22,481	695,251	415,687	13,084	396,725	21,143	44,650	2,597,144
	1920	374,449	1,036,144	45,199	877,125	701,152	19,954	520,510	25,778	57,133	3,657,444
Cash trading, and operating accounts and bills receivable	1919	458,225	397,499	32,975	450,050	404,558	25,345	326,411	28,785	34,375	2,158,223
	1920	583,404	482,681	82,651	503,732	414,274	21,907	79,729	23,401	47,088	2,238,867
Totals	1919	1,831,543	3,990,232	144,994	1,475,042	1,036,227	56,779	1,420,108	91,338	132,925	10,179,188
	1920	2,233,364	4,471,881	227,277	1,756,080	1,444,963	58,842	1,083,800	87,443	160,064	11,523,714

Table 3.—Products, Miscellaneous Chemical Industries Group, 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Selling Value	Quantity	Selling Value
			$		$
Artificial abrasives—					
Artificial abrasives	tons	13,190	2,540,822	37,042	3,905,097
Ferro-silicon	"	3,525	409,278	2,543	50,357
Other products			40,703		3,245
All other products			21,866		
Total			3,012,669		3,958,699
Baking powders—					
Baking powders of various grades and trade names, together with by-products			2,323,475		2,602,382
Flavouring extracts—					
Flavouring extracts			621,641		806,176
Jelly powders			335,324		499,616
Ice cream powders			38,424		41,961
Baking powder			8,504		26,253
All other products			929,022		839,489
Total			1,932,915		2,213,495
Adhesives—					
Glue	lbs.	3,650,094	872,470	3,794,098	1,048,436
Liquid fish glue	gals.	19,857	23,517	20,041	25,320
Gum, dextrine, mucilage, liquid glue and flour paste			196,981		183,930
Size, including rosin paper sizing			187,306		175,480
Rubber and other cements and sealing wax			99,109		91,700
All other products and by-products			537,663		677,193
Total			1,917,046		2,202,059
Polishes and Dressings—					
Including stove polish, shoe, metal, furniture and floor polishes, and various leather dressings together with other products and by-products			1,769,552		2,005,970
Boiler Compounds—					
Boiler compounds			183,278		246,825
All other products			4,866		6,858
Total			188,144		253,683
Miscellaneous Products—					
Welding compounds, refined beeswax and various other products			164,370		186,239
Sweeping Compounds—					
Dustbane, so-clean, and other sweeping compounds together with by-products			83,171		124,913
Insecticides—					
Roach killer, lime sulphur solution, other insecticides and by-products			32,924		140,701
Total			11,424,266		13,688,141

Materials Used.—The total cost of materials used by all the miscellaneous industries in 1919 was $5,704,858, while in the following year the cost was $6,810,244. No attempt has been made to itemize the materials since they were so numerous and in many cases grouped in such a way by the manufacturers when reporting that a satisfactory list could not be made. This defect will be overcome as far as possible in subsequent reports.

In Table 4 is shown the cost of materials used in each class of the miscellaneous group, together with the value of products obtained. The difference in each case gives the value added by the process of manufacture.

Table 4.—Cost of Materials Used and Value of Products Made

Industry	1919			1920		
	Materials used	Products made	Value added by process of manufacturing	Materials used	Products made	Value added by process of manufacturing
	$	$	$	$	$	$
Adhesives	1,004,325	1,917,046	912,721	1,070,493	2,202,059	1,131,566
Artificial abrasives	1,206,384	3,012,669	1,806,285	1,531,741	3,958,699	2,426,958
Boiler compounds	70,305	188,144	117,839	90,868	253,683	162,815
Flavouring extracts and jelly powders	1,245,130	1,932,915	687,785	1,420,445	2,213,495	793,050
Polishes and dressings	908,584	1,769,552	860,968	1,130,377	2,005,970	875,593
Sweeping compounds	27,266	83,171	55,905	54,729	124,913	70,184
Baking powders	1,121,241	2,323,475	1,202,234	1,303,805	2,602,382	1,298,577
Insecticides	11,541	32,924	21,383	80,420	140,701	60,281
Chemical products, n.e.s.	110,082	164,370	54,288	127,366	186,239	58,873
Totals	5,704,858	11,424,266	5,719,408	6,810,244	13,688,141	6,877,897

Employees, Salaries and Wages.—In 1919, the salaried employees in the miscellaneous industries numbered 373 males and 131 females, making a total of 504. The total amount paid in salaries by the operating firms was $760,945, of which $341,342 was paid to officers, superintendents and managers.

Wage-earners, of whom the average number was 1,433, received wages amounting to $1,426,573.

In the following year, salaried employees numbered 555, of whom 401 were males and 154 females. The total salaries paid to these employees amounted to $962,693, of which $437,996 went to officers, superintendents and managers. Wages paid amounted to $1,839,568, and the average number of wage-earners for the year was 1,637, of whom 1,293 were males and 344 females.

Included in the number of wage-earners in 1919 were 38 males and 33 females under 16 years of age, while in 1920 such employees numbered 34 males and 22 females.

In Table 5 the number of employees is shown by classes as for December 15th, or the nearest representative working day. The works sub-total is slightly greater than the number of wage-earners reported for December in Table 7, due to the fact that some firms reported their distribution as being more normal on a date other than December 15th.

Table 6 shows the total salaries and wages paid in the various classes during 1919 and 1920.

Table 7 shows the number of wage-earners, male and female, by months in the various classes of the miscellaneous group. The data were compiled from reports of firms from their payrolls on the 15th of each month.

The average number of wage-earners in all these miscellaneous industries in 1919 was 1,088 males and 345 females, a total of 1,433. Of the females 139 were employed in the baking powder industry, 116 by manufacturers of flavouring extracts and jelly powders, and 72 in manufacturing polishes and dressings. The greater number of the remainder were employed by manufacturers of adhesives. The artificial abrasives, boiler compounds, sweeping compounds, and insecticides industries employed no female wage-earners but the numbers of men employed in these industries were respectively 466; 8; 8; and 6.

In 1920 the average number of employees on wages was 1,637, of whom 1,293 were males and 344 females. As in 1919 the greatest number of females was employed in the baking powder industry, in which the average number for the year was 126. Manufacturers of flavouring extracts and jelly powders engaged an average of 111 females while 84 were employed in making polishes and dressings. The male wage-earners in these three classes numbered 164, 86 and 111 respectively. In 1920, as in the previous year, the artificial abrasives, boiler compounds and sweeping compounds industries employed no females but the males numbered 563, 11 and 9 respectively. The insecticides industry which employed no female labour in 1919 had in 1920 an average of 8 males and 6 females. In the latter year, next to the artificial abrasives industry the manufacturers of adhesives employed the largest number of male wage-earners, 328 having been the average for the year.

Fuel and Power.—The total cost of fuel used in 1919 was $116,132, of which $105, 536, or 90.9% was paid for foreign fuel and $10,596, or 9.1% for that of Canadian origin.

Bituminous coal accounted for the greater portion of the expenditure—14,928 tons having cost $104,648, while 563 tons of anthracite coal cost $6,164.

In 1920 the total cost of all the fuel consumed was $246,039, of which $215,005 or 87.4%, was paid for fuel of foreign origin, and $31,034, or 12.6% was paid for that of Canadian origin.

As in the previous year bituminous coal accounted for the major portion of the expenditure for fuel, 21,679 tons having cost $205,241, or 83·4% of the total. The anthracite coal used amounted to 1,133 tons and cost $13,491.

The total amount of fuel used by all these miscellaneous industries, itemized as to source, kind, quantity and cost at the works is shown in Table 8, while Table 9 gives the cost of fuel used by each class in the miscellaneous group.

Table 10 shows the power employed in the miscellaneous group of industries. The electric furnaces were used entirely in the artificial abrasives industry.

Table 5.—Number of Employees by Classes and Sex as on December 15th or Nearest Representative Day

Employees	Year	Industry																		TOTALS	
		Adhesives		Artificial abrasives		Boiler compounds		Flavouring extracts and jelly powders		Polishes and dressings		Sweeping compounds		Baking powders		Insecticides		Chemical products n.e.s.			
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Salaried employees—																					
Officers, superintendents and managers	1919	28	2	33	1	6	2	26	.....	21	1	3	.....	13	.....	1	.....	3	.....	134	6
	1920	27	1	33	.....	6	2	35	.....	32	2	3	.....	11	.....	3	.....	5	.....	155	5
Clerks, stenographers, salesmen, and other salaried employees	1919	27	11	29	13	9	2	43	19	44	25	3	2	73	52	1	.....	10	1	239	125
	1920	31	13	21	15	6	3	52	34	51	29	7	2	67	50	3	2	8	1	246	149
Office sub-total	1919	55	13	62	14	15	4	69	19	65	26	6	2	86	52	2	.....	13	1	373	131
	1920	58	14	54	15	12	5	87	34	83	31	10	2	78	50	6	2	13	1	401	154
Wage-earners receiving per week—																					
Under $10	1919	8	5	1	.....	1	.....	8	80	8	42	.....	.....	4	26	.....	.....	.....	3	30	156
	1920	17	3	1	.....	.....	.....	6	21	4	9	.....	.....	2	30	.....	.....	.....	.....	30	63
$10 but under $15	1919	15	11	2	.....	.....	.....	3	14	28	20	3	.....	7	115	4	.....	2	.....	64	160
	1920	15	7	1	.....	1	.....	14	37	21	40	.....	.....	4	75	3	4	1	1	60	164
$15 but under $20	1919	92	.....	2	.....	3	.....	9	4	27	8	2	.....	77	21	1	.....	5	.....	218	33
	1920	70	7	6	.....	2	.....	4	5	26	15	4	.....	46	33	6	.....	2	.....	166	60
$20 but under $26	1919	108	.....	179	.....	4	.....	30	1	32	2	2	.....	70	2	1	.....	12	.....	438	5
	1920	70	.....	66	.....	12	.....	26	3	40	1	3	.....	74	4	2	1	8	.....	301	9
$26 but under $30	1919	113	.....	118	.....	.....	.....	4	.....	6	.....	1	.....	10	.....	.....	.....	1	.....	253	
	1920	76	.....	180	.....	.....	.....	4	.....	8	1	1	.....	15	2	.....	.....	.....	.....	284	3
$30 and over	1919	7	.....	224	.....	.....	.....	10	.....	5	.....	.....	.....	13	.....	.....	.....	3	.....	262	
	1920	52	.....	235	.....	.....	.....	18	.....	15	.....	1	.....	19	.....	1	.....	3	.....	344	
Works sub-total	1919	343	16	526	.....	8	.....	64	99	106	72	8	.....	181	164	6	.....	23	3	1,265	354
	1920	300	17	489	.....	15	.....	72	66	114	66	9	.....	160	144	12	5	14	1	1,185	299
Grand total	1919	398	29	588	14	23	4	133	118	171	98	14	2	267	216	8	.....	36	4	1,638	485
	1920	358	31	543	15	27	5	159	100	197	97	19	2	238	194	18	7	27	2	1,586	453
Wage-earners under 16 years of age included in the above table	1919	25	.....	2	.....	1	.....	3	17	5	7	.....	.....	2	9	.....	.....	.....	.....	38	33
	1920	29	.....	1	.....	.....	.....	2	9	.....	2	.....	.....	2	11	.....	.....	.....	.....	34	22

Table 6.—Salaries and Wages Paid in the Miscellaneous Chemical Industries Group, 1919 and 1920

Salaries and Wages	Year	Industry									TOTAL
		Adhesives	Artificial abrasives	Boiler compounds	Flavouring extracts and jelly powders	Polishes and dressings	Sweeping compounds	Baking powders	Insecticides	Chemical products N.E.S.	
		$	$	$	$	$	$	$	$	$	$
Salaries—											
Officers, superintendents and managers	1919	63,099	69,730	21,948	66,613	64,904	9,460	41,594	44	3,950	341,342
	1920	66,082	92,042	21,404	99,097	86,559	12,917	46,811	5,404	7,680	437,996
Clerks, stenographers, salesmen and other salaried employees	1919	37,569	47,903	10,427	75,498	96,062	6,884	140,160	300	4,800	419,603
	1920	61,536	53,004	12,633	112,954	115,903	13,516	142,035	10,117	2,999	524,697
Total salaries	1919	100,668	117,633	32,375	142,111	160,966	16,344	181,754	344	8,750	760,945
	1920	127,618	145,046	34,037	212,051	202,462	26,433	188,846	15,521	10,679	962,693
Total wages paid to wage-earners	1919	290,564	651,661	7,535	101,512	131,487	7,403	212,625	4,206	19,580	1,426,573
	1920	352,855	895,746	11,075	148,278	147,835	10,240	248,161	10,656	14,722	1,839,568
Total salaries and wages	1919	391,232	769,294	39,910	243,623	292,453	23,747	394,379	4,550	28,330	2,187,518
	1920	480,473	1,040,792	45,112	360,329	350,297	36,673	437,007	26,177	25,401	2,802,261

Table 7.—Number of Employees, by Months and by Sex in Miscellaneous Chemicals Industries, 1919 and 1920

Month	Year	Industry																		TOTALS	
		Adhesives		Artificial Abrasives		Boiler compounds		Flavouring extracts and jelly powders		Polishes and dressings		Sweeping compounds		Baking powders		Insecticides		Chemical products n.e.s.			
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
January	1919	263	17	867	.....	8	.....	54	119	105	75	8	.....	107	135	4	.....	21	1	1,437	347
	1920	352	14	518	.....	7	.....	79	89	103	75	8	.....	158	129	7	2	15	3	1,247	312
February	1919	289	17	550	.....	8	.....	60	106	103	91	8	.....	97	131	13	.....	14	1	1,142	346
	1920	339	14	518	.....	7	.....	88	101	107	76	8	.....	173	104	7	2	11	4	1,258	301
March	1919	303	16	473	.....	8	.....	51	111	97	75	8	.....	98	129	13	.....	15	1	1,066	332
	1920	333	14	507	.....	7	.....	102	139	115	89	9	.....	174	108	11	4	13	3	1,271	357
April	1919	302	16	453	.....	9	.....	59	148	95	72	8	.....	93	123	7	.....	16	1	1,042	360
	1920	332	14	520	.....	9	.....	101	155	114	92	11	.....	178	123	11	5	13	3	1,289	392
May	1919	309	16	415	.....	10	.....	53	113	95	69	8	.....	101	118	6	.....	15	2	1,012	318
	1920	343	14	517	.....	11	.....	95	127	127	108	10	.....	176	122	8	6	13	5	1,300	382
June	1919	286	14	376	.....	8	.....	58	122	87	64	7	.....	130	146	5	.....	16	2	973	348
	1920	344	14	515	.....	13	.....	89	127	117	110	10	.....	173	134	10	6	14	3	1,285	394
July	1919	292	14	366	.....	8	.....	60	122	89	74	9	.....	126	140	5	.....	16	2	971	352
	1920	350	14	592	.....	12	.....	93	128	119	108	10	.....	164	113	9	8	14	2	1,363	373
August	1919	290	13	379	.....	8	.....	60	119	92	71	8	.....	125	156	5	.....	17	3	984	362
	1920	324	14	604	.....	13	.....	88	124	112	79	10	.....	151	108	9	8	12	2	1,323	335
September	1919	277	16	383	.....	8	.....	60	104	98	64	8	.....	153	145	4	.....	18	3	1,009	332
	1920	319	15	634	.....	13	.....	81	121	103	66	8	.....	150	128	8	9	13	1	1,329	340
October	1919	285	14	398	.....	8	.....	65	109	108	73	8	.....	165	134	4	.....	19	3	1,060	333
	1920	310	14	687	.....	12	.....	77	99	108	75	9	.....	147	160	7	7	12	2	1,369	357
November	1919	296	16	419	.....	8	.....	65	124	107	73	9	.....	187	143	4	.....	26	3	1,121	359
	1920	295	14	652	.....	13	.....	69	61	104	67	9	.....	167	155	8	7	13	1	1,330	305
December	1919	343	16	514	.....	8	.....	64	100	100	68	9	.....	181	163	4	.....	23	3	1,246	350
	1920	293	16	493	.....	14	.....	69	62	100	62	9	.....	159	132	7	3	14	1	1,158	276
Average	1919	295	15	466	.....	8	.....	59	116	98	72	8	.....	130	139	6	...	18	2	1,088	345
	1920	328	14	563	.....	11	.....	86	111	111	84	9	.....	164	126	8	6	13	3	1,293	344

Table 8.—Fuel Used in the Miscellaneous Chemical Industries Group, 1919 and 1920

Kind	Year	Unit of measure	Canadian		Foreign	
			Quantity	Cost at works	Quantity	Cost at works
				$		$
Bituminous coal—						
Slack	1919	Short tons	523	3,343	8,957	55,746
	1920	"	388	4,591	15,984	148,835
Lump	1919	"	115	1,069	1,119	9,072
	1920	"	26	332	1,853	19,335
Run of mine	1919	"	337	3,067	3,877	32,351
	1920	"	2,024	19,829	1,404	12,319
Anthracite coal—						
Lump	1919	"	.....	.....	495	5,554
	1920	"	.....	.....	661	8,379
Dust or slack	1919	"	.....	.....	68	610
	1920	"	.....	.....	472	5,112
Lignite coal—						
Lump	1919	"	6	29	.....	.....
	1920	"	5	75	.....	.....
Coke	1919	"	89	945	10	123
	1920	"	120	1,330	30	354
Gasoline	1919	Imp. gals.	1,500	589	.....	.....
	1920	"	1,725	708	.....	.....
Oil (fuel)	1919	"	135	41	18,070	1,570
	1920	"	2,962	576	128,295	20,609
Wood	1919	Cord	33	324	.....	.....
	1920	"	57	700	.....	.....
Gas	1919	1,000 cu. ft.	2,645	1,189	.....	.....
	1920	"	3,526	2,837	.....	.....
Other fuel	1919	.....	.....	.....	.....	510
	1920	.....	.....	56	.....	62
Sub-totals	1919	.....	.....	10,596	.....	105,536
	1920	.....	.....	31,034	.....	215,005

Total cost of fuel consumed ..... 1919 ..... $116,132
1920 246,039

Table 9.—Cost of Fuel Used by Different Classes of Miscellaneous Chemical Industries, 1919 and 1920

Industry	1919			1920		
	Canadian	Foreign	Total	Canadian	Foreign	Total
	$	$	$	$	$	$
Adhesives	5,428	68,499	73,927	21,577	147,024	168,601
Artificial abrasives	306	23,237	23,543	1,219	37,519	38,738
Boiler compounds	75	996	1,071	643	780	1,423
Flavouring extracts and jelly powders	788	5,059	5,847	2,383	5,671	8,054
Polishes and dressings	1,724	3,880	5,604	1,523	8,673	10,196
Sweeping compounds	131	420	551	78	420	498
Baking powders	101	1,096	1,197	239	13,887	14,126
Insecticides	27	372	399	41	645	686
Chemical products, n.e.s.	2,016	1,977	3,993	3,351	366	3,717
Total	10,596	105,536	116,132	31,054	214,985	246,039

Table 10.—Power Employed, Miscellaneous Chemical Industries, 1919 and 1920

Class	Number of units		Total horse power according to manufacturers' rating		Total horse power used	
	1919	1920	1919	1920	1919	1920
Boilers—						
(a) Fired by hand	31	35	1,427	2,332	1,076	1,743
(b) Fired mechanically	8		900		720	
Engines—						
(a) Steam	13	8	385	300	330	290
(b) Gas	1	1	5	1	5	1
(c) Gasoline		1		12		12
Electric motors—						
(a) Alternating current	267	356	2,807	4,159	1,376	2,076
(b) Direct current	29		313		259	

Miscellaneous Expenditures.—The miscellaneous expenditures of all the firms included in this chapter amounted to $2,279,908 in 1919. Of this sum $941,517, or 41.3% was incurred by the manufacturers of artificial abrasives. The next largest expenditure, $559,249, or 24.5%, was made by firms manufacturing baking powders. Polishes and dressings, flavouring extracts and jelly powders, and adhesives accounted for $282,919, or 12.4%, $220,815 or 9.7%, and $220,550, or 9.6% respectively. The expenditures of the five classes of industries mentioned amounted to 97.5% of the total. The balance, 2.5% was divided among the other four classes.

In the artificial abrasive industry the cost of power was $460,952, or 48.9% of the miscellaneous expenditures of that industry, and 95.9% of the total cost of power in all the miscellaneous industries. This industry also paid $420,272, or 44.6% of the total miscellaneous expenditures of the industry for repairs to buildings and machinery. This sum was also 84.4% of the total expenses for the same purpose in all the miscellaneous industries.

These large expenditures for power and repairs were due to the electric furnaces used by abrasives manufacturers.

Baking powders, polishes and dressings, and flavouring extracts and jelly powders were responsible for the main expenditures for advertising and travelling. As compared with the total expenditures for such purposes, baking powders accounted for approximately 74% of the advertising and approximately 48% of the travelling expenses.

Only in three classes of industries artificial abrasives, polishes and dressings, and baking powders, were sums paid for royalties and use of patents. In polishes and dressings $30,860 was spent, or 87% of the total spent for this purpose by all the miscellaneous industries.

Miscellaneous expenditures in 1920 amounted to $3,018,592, of which $1,027,830, or 34.0%, was spent in the artificial abrasives industry. The four next largest expenditures were as follows: baking powder industry $705,030, or 23.4%; flavouring extracts and jelly powders $422,093, or 14.0%; polishes and dressings $395,769, or 13.1%, and adhesives $348,477, or 11.5%. The total miscellaneous expenses in the other four classes of the group amounted to $119,393, or 4.0%.

As in the previous year the cost of power used by manufacturers of artificial abrasives represented the largest item of expenditure, the amount having been $546,715, or 53.2% of the miscellaneous expenditures of that industry and 96.0% of the total cost of power in the miscellaneous group of industries.

In the baking powder industry $274,653 was spent for advertising and $158,477 for travelling expenses. These sums were respectively 39.0% and 22.5% of the miscellaneous expenditures of the industry and 66.6% and 42.0% of the sums spent for the same purposes by the whole miscellaneous group of industries.

Table 11 shows the miscellaneous expenditures of all the miscellaneous group of industries.

Table 11.—Miscellaneous Expenses Incurred by the Miscellaneous Chemical Industries Group, 1919 and 1920

Kind	Year	Industry									TOTAL
		Adhesives	Artificial abrasives	Boiler compounds	Flavouring extracts and jelly powders	Polishes and dressings	Sweeping compounds	Baking powders	Insecticides	Chemical products N.E.S.	
		$	$	$	$	$	$	$	$	$	$
Rent of offices, works and machinery	1919	1,030	2,291	2,402	11,210	15,385	3,080	10,179	565	1,770	47,912
	1920	1,215	7,853	1,889	19,776	19,592	3,000	8,902	802	1,400	64,429
Cost of purchased power	1919	8,529	460,952	509	3,176	2,887	225	3,279	.....	796	480,353
	1920	9,832	546,715	766	4,943	2,715	492	3,616	227	848	570,154
Insurance (premium for year only)	1919	14,933	13,792	398	6,845	8,028	282	3,403	249	678	48,608
	1920	15,482	22,410	344	14,991	11,083	344	3,200	854	833	69,541
Taxes—											
Excise	1919	.....	.....	1,039	3,153	10	.....	10	.....	.....	4,212
	1920	1,042	1,768	.....	39,422	4,626	13	8,302	35	.....	55,208
Excess profits	1919	10,387	9,990	.....	115	116	.....	10,000	.....	.....	30,608
	1920	20,522	9,366	.....	22,406	3,773	.....	76,244	23	.....	132,334
Provincial and municipal	1919	22,419	10,905	1,262	5,357	6,053	256	12,051	353	256	58,912
	1920	23,835	9,972	1,592	9,199	5,861	147	12,615	612	366	64,199
Royalties, use of patents, etc	1919	.....	3,207	.....	.....	30,860	.....	1,360	.....	.....	35,427
	1920	.....	.....	1,072	.....	36,682	.....	914	75	.....	38,743
Advertising expenses	1919	8,610	.....	1,401	18,728	53,408	1,550	241,597	395	951	326,640
	1920	7,921	.....	1,792	37,418	83,746	4,187	274,653	2,024	596	412,337
Travelling expenses	1919	23,092	4,733	7,027	80,692	41,697	5,477	152,123	1,025	2,600	318,466
	1920	22,241	5,031	8,195	99,061	69,274	12,806	158,477	384	2,647	378,116
Repairs to buildings, machinery, etc	1919	43,341	420,272	.....	11,339	4,755	240	16,040	161	1,955	498,103
	1920	58,962	150,814	.....	19,945	2,854	323	8,073	673	1,596	243,240
All other sundry expenses	1919	88,209	15,375	7,606	80,200	119,720	3,492	109,207	5,814	1,044	430,667
	1920	187,425	273,901	44,206	154,932	155,563	8,780	150,034	15,046	424	990,291
Total miscellaneous expenses	1919	220,550	941,517	21,644	220,815	282,919	14,602	559,249	8,562	10,050	2,279,908
	1920	348,477	1,027,830	59,856	422,093	395,769	30,072	705,030	20,755	8,710	3,018,592

Table 12.—Imports of Miscellaneous Chemical Products into Canada in 1919 and 1920

Kind	1919		1920	
	Quantity	Value	Quantity	Value
		$		$
Mucilage and adhesive paste		72,832		82,652
Rubber cement		65,495		60,494
Polish or composition, knife or other, n.o.p.		341,755		452,372
Sealing wax		22,222		43,753
Artificial abrasives in bulk, crushed or ground for the manufacture of abrasive wheels and polishing composition		82,866		251,260
Diamond dust or bort and black diamonds for borers		126,863		290,200
Emery in bulk crushed or ground		38,106		69,462
Emery and carborundum wheels and manufactures of emery or carborundum		316,322		471,853
Grindstones not mounted and not less than 36 inches in diameter		250,827		286,749
Grindstones, n.o.p.		30,239		25,923
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground		29,910		47,068
Sand paper, glass, flint and emery paper or emery cloth		362,069		560,180
Flavouring powders, custard powders, jelly powders, sweetened breads, cakes, pies, puddings and all other confections containing sugar lbs.	147,436	37,618*	269,734	92,705
Sugar candy and confectionery of all kinds, n.o.p., including sweetened gums, candied peel, candied pop corn, fruit and nuts; sweetened breads, cakes, pies puddings and all other confections containing sugar lbs.	223,590	45,095†		
Blacking, shoe and shoemakers' ink, shoe harness and leather dressing, n.o.p.		282,251		253,197
Baking powder lbs.	10,426	2,733	88,485	27,295
Paris green, dry "	45,678	16,255	2,811	1,192

*Nine months only, 1919. †Three months only, 1919.

Table 13.—Exports of Miscellaneous Chemical Products from Canada in 1919 and 1920

Kind	Unit of measure	1919		1920	
		Quantity	Value	Quantity	Value
			$		$
Baking powder	Cwt.	3,533	62,497	4,750	83,930
Abrasives, artificial crude, including carborundum	"	401,263	1,040,132	598,664	1,579,508
Abrasives, artificial made up into wheels, stones, etc.			14,858		41,058
Grindstones, manufactured			38,682		41,705
Abrasives, artificial			465,228		

List of Manufacturers in the Miscellaneous Chemical Industries Group Included in This Report for the Year 1920

Manufacturers of Adhesives

Nova Scotia—
Robinson Glue Co., Ltd., Canso, N.S.

New Brunswick—
Russia Cement Co., Gilbert Lane, St. John, N.B.

Quebec—
Dominion Flour Paste Co., 613 Maisonneuve St., Montreal, Que.
Fox, Thomas M., 60 North Bank Canal, Montreal, Que.
Kumfort Specialties, Ltd., 200 Mountain St., Montreal, Que.
Marquis, F. Canac, Guyart St., Quebec, Que.
Russia Cement Co., 559 Pius IX Ave., Montreal, Que.
Severs, G., (Auld Mucilage Co., Reg.), 46 Alexander St., Montreal, Que.
Woodward & Sons, F. E., 17th Ave., Lachine, Que.
Vol-Peek Mfg. Co., 50 Main St., Montreal, Que.

Ontario—
James Battle & Joseph Battle (The Dextrine Company), Thorold, Ont.
Canada Glue Co., Ltd., Brantford, Ont.
Cannon Canadian Co., Ltd., 361 Sorauren Ave., Toronto, Ont.
W. Harris & Co., Ltd., 994 Danforth Ave., Toronto, Ont.
Machon, Albert E., 47 St. James Ave., Toronto, Ont.
Vera Chemical Co. of Canada, Ltd., Burlington, Ont.
Wintermeyer, A. C., Kitchener, Ont.

Manufacturers of Artificial Abrasives

Quebec—
Canadian Carborundum Co., Ltd., Shawinigan Falls, Que.

Ontario—
Abrasive Co. of Canada, Ltd., Burlington St. and Harvey Lane, Hamilton, Ont.
Canadian Carborundum Co., Ltd., Niagara Falls, Ont.
Exolon Company, Thorold, Ont.
National Abrasive Co., Stanley St., Niagara Falls, Ont.
Norton Company, Chippawa, Ont.

Manufacturers of Baking Powders

Nova Scotia—
Pearman, W. S., 62 Almon St., Halifax, N.S.

Quebec—
Bistodeau, G. A., 43 Champflour St., Three Rivers, Que.
Pacaud & Co., H. F., Reg., 641 St. Paul St. W., Montreal, Que.
Puritas, Limitée, 77 rue St. Dominique, Quebec, Que.
Royal Baking Powder Co., 4 St. Lawrence Blvd., Montreal, Que.

Ontario—
Coleman Baking Powder Co., Ltd., 133 Perth St., Brockville, Ont.
Egg-O Baking Powder Co., Ltd., 198-204 Gage Ave South, Hamilton, Ont.
Gillett Co., Ltd., E. W., Fraser Ave. and Liberty St., Toronto, Ont.
Pratt, F. & W., 57 Ossington Ave., Toronto, Ont.

Manufacturers of Boiler Compounds

Ontario—
Bird-Archer Company, Division St., Cobourg, Ont.
Dearborn Chemical Co. of Canada, Ltd., 2454-64 Dundas St. West, Toronto, Ont.
Gravege Manufacturing Co., 60 Havelock St., Toronto, Ont.
Ferolin Company of Canada, Ltd., 858 Dupont St., Toronto, Ont.
Shell-Bar Boiler Supply, Ltd., 1-15 Saunders Ave., Toronto, Ont.
Woodward, Geo. A., 2 Magill St., Hamilton, Ont.

List of Manufacturers in the Miscellaneous Chemical Industries Group Included in This Report for the Year 1920.—*Continued*

MANUFACTURERS OF FLAVOURING EXTRACTS

NEW BRUNSWICK—
Wilson Chemical Co., Ltd., 27½ Prince William St., St. John, N.B.

QUEBEC—
Bush & Co., W. J., (Canada), Ltd., 394-6 St. Paul St. West, Montreal, Que.
Forbes & Son, 291 St. Paul St., Montreal, Que.
Jonas & Company, Henri, 173-177 St. Paul St. West, Montreal, Que.
King-Marceau, Ltd., 48 St. Vincent St., Montreal, Que.
Reodman, Mde. Vene O., 841 Notre Dame St. East., Montreal, Que.
Rose & Laflamme, Ltd., 500 St. Paul St. West, Montreal, Que.
Stuart Brothers, 41-43 Youville Square, Montreal, Que.
Tremblay, Thomas, 1868 Bordeaux St., Montreal, Que.

ONTARIO—
Cressy, John R., & Geo. L., 523 King St. W., Toronto, Ont.
Genesee Pure Food Co. of Canada, Ltd., Bridgeburg, Ont.
Horne Co., Ltd., Harry, 1297-1301 Queen St. West, Toronto, Ont.
Jeffress, Ltd., E. W., Walker Power Bldg., Walkerville, Ont.
Lowe Co., Ltd., Joe, 122-124 Wellington St. West, Toronto, Ont.
Mackenzie Mfg. Co., Lucknow, Ont.
Patrick & Co., Ltd., W. F., 51 Wellington St. W., Toronto, Ont.
Robinson, Edwin, 83 St. Patrick St., Toronto, Ont.
Sutcliffe & Bingham of Canada, Ltd., 81 Peter St., Toronto, Ont.
Weir Specialty Co., Ltd. of Toronto, 561 Yonge St., Toronto, Ont.

BRITISH COLUMBIA—
Grantham & Co., Ltd., F. C., 700-16th Ave. West, Vancouver, B.C.

MANUFACTURERS OF INSECTICIDES

QUEBEC—
Anto Roach Killer Co., 1359 St. Hubert St., Montreal, Que.
Kennedy, W. Alan, 588 Henry Julien Ave., Montreal, Que.

ONTARIO—
Canada Rex Spray Co., Ltd., Brighton, Ont.
Common Sense Manufacturing Co., 393 Queen St. West, Toronto, Ont.
Ellis, William, 97 Carling St., London, Ont.
Niagara Brand Spray Co., Burlington, Ont.

MANUFACTURERS OF MISCELLANEOUS PRODUCTS

QUEBEC—
Davies Irwin, Ltd., 84 Wellington St., Montreal, Que.
Montreal Water & Power Co., 20 Charlevoix St., Montreal, Que.

ONTARIO—
Anti-Borax Compound Co., 918 McDougall St., Windsor, Ont.
Commercial Oil Co., Ltd., 420 Jackson St. W., Hamilton, Ont.

MANITOBA—
North Star Anti-Freeze Co., Ltd., 331 Austin St., Winnipeg, Man.

MANUFACTURERS OF POLISHES AND DRESSINGS

NOVA SCOTIA—
Blacking & Mercantile Company, Amherst, N.S.

QUEBEC—
American Metal Polish Co., Ville St. Pierre, Que.
Boston Blacking Co., Cote St. Paul and 152 McGill St., Montreal, Que.

List of Manufacturers in the Miscellaneous Chemical Industries Group Included in This Report for the Year 1920.—*Concluded*

MANUFACTURERS OF POLISHES AND DRESSINGS—*Concluded*

Canadian Furniture Gloss Co., 3361 St. Hubert St., Montreal, Que.
Clark Bros. & Stewart, 30 Youville Square, Montreal, Que.
La-Lo Manufacturing Co., Ltd., 365 Aqueduct St., Montreal, Que.
Kirk B. Mathes, 46 St. Alexander St., Montreal, Que.
Sultana, Limited, 102 Amherst St., Montreal, Que.
Vlit Manufacturing Co., Ltd., 635 St. Paul St. W., Montreal, Que.
Uncle Sam Dressing Co., Lanoraie, Que.

ONTARIO—
Buffalo Specialty Co., Bridgeburg, Ont.
Canadian Polishes, Ltd., 58 Catharine St. W., Hamilton, Ont.
Channell Chemical Co., Ltd., Parry Sound, Ont.
Dailey, John, 184 Logan Ave., Toronto, Ont.
Dalley Co., F. F. of Canada, Ltd., Corner Sandford and Cumberland Ave., Hamilton, Ont.
Hawes & Co., Edward, 71 Duke St., Toronto, Ont.
Hersee, E. B., Burlington, Ont.
Johnson & Son, Ltd., S. C., Frank St., Brantford, Ont.
Lion Polish Co., Ltd., 525 King St. W., Toronto, Ont.
MacNeil Liquid Wax Co., Ltd., 78-80 Ontario St., Toronto, Ont.
Morrow, John D., (The Hays Mfg. Co.,) Cor. Broadview and Eastern Aves., Toronto, Ont.
Nonsuch Mfg. Co., Ltd., 9 Busy St., Toronto, Ont.
Permanent Ink Co., Ltd., 302 Cumberland Ave., Hamilton, Ont.
Ralston & Co., Ltd., Robert, 33 Sanford Ave. S., Hamilton, Ont.
Reflex Manufacturing Co., Ltd., Parry Sound, Ont.
Solient Mfg. Co., (H. A. Felt), 160 Simcoe St. S., Oshawa, Ont.
Windsor Polish Co., St. Thomas, Ont.

SASKATCHEWAN—
Lawrence, T. M., 1811 Albert St., Regina, Sask.

ALBERTA—
Rudder Mfg. Co., 11402—79th St., Edmonton, Alta.

BRITISH COLUMBIA—
Tilikum Mfg. Co., 52 Dufferin St. W., Vancouver, B.C.

MANUFACTURERS OF SWEEPING COMPOUNDS

ONTARIO—
Dustbane Mfg. Co., Ltd., Ottawa, Ont.
Richards, Arthur E., 78-80 Albert St., Toronto, Ont.
Soclean, Limited, 444 King St. West, Toronto, Ont.

MANITOBA—
Dustbane Western, Limited, 333 Elgin Ave., Winnipeg, Man.
Saidie Newman, 207 McDermot Ave., Winnipeg, Man.

BRITISH COLUMBIA—
Milnes Mfg. Co., 571 Howe St., Vancouver, B.C.