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CENSUS OF INDUSTRY
MINING, METALLURGICAL AND CHEMICAL BRANCH
OTTAWA - CANADA

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ANNUAL INDUSTRY REPORT

CHEMICALS AND ALLIED PRODUCTS GROUP

THE COMPRESSED GASES INDUSTRY, 1938

Production from the manufacturing plants in Canada which were occupied chiefly in making industrial gases was valued at \$3,753,600 in 1938 compared with \$3,929,242 in 1937, a decrease of 4.4 per cent.

Thirty factories were in operation in 1938, distributed as follows - 13 in Ontario, 6 in Quebec, 3 in Manitoba, 3 in Nova Scotia, 2 in Alberta, 2 in British Columbia, and 1 in Saskatchewan. These establishments employed capital amounting to \$4,938,766 of which \$2,962,266 was the value of land, buildings and equipment, \$366,388 was the value placed on inventories, and \$1,610,112 was the amount of working capital at the end of the year.

The average number of employees in this industry in 1938 was 654, including 357 salaried workers and 297 wage-earners. Salaries for the year amounted to \$633,168 and wages totalled \$385,526.

The chief products were oxygen, acetylene and carbon dioxide (in cylinders). The output of oxygen decreased 10 per cent to 173,992,296 cubic feet, and acetylene declined 6 per cent to 45,394,062 cubic feet, but carbon dioxide (in cylinders) increased 13.7 per cent to 7,159,327 pounds. The output of hydrogen declined 13 per cent to 34,970,537 cubic feet. Aqua ammonia, anhydrous ammonia, solid carbon dioxide, nitrogen and nitrous oxide were other products of this industry and were produced in about the same quantities as in 1937.

The Compressed Gases Industry, as reviewed in this bulletin, includes only those factories which make industrial gases as their main products. In addition, liquid chlorine and synthetic ammonia are manufactured in the Windsor plant of Canadian Industries Limited but as data pertaining to these departments cannot be shown separately from the general operations, this establishment has been classified to the Acids, Alkalies and Salts Industry. Synthetic ammonia (and the hydrogen and nitrogen for its manufacture) is made also at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, but as all of the output is used in making ammonia fertilizers, the statistics relating thereto are included in the Fertilizers Industry. Similarly, acetylene is made by Shawinigan Chemicals Limited at Shawinigan Falls for use in ^{their} own works in making acetic acid, etc., and nitrogen is produced as an intermediate by the North American Cyanamid Company at Niagara Falls, for use in the manufacture of calcium cyanamide. Pintsch oil gas for lighting railway coaches is made at several divisional points but these plants have always been classified to other industries.

Table 1 - PRINCIPAL STATISTICS FOR THE COMPRESSED GASES INDUSTRY, 1929 - 1938.

Year	Number of plants	Capital employed \$	Average number of em- ployees	Salaries and wages \$	Cost of fuel and electricity at works \$	Cost of materials at works \$	Gross sell- ing value of products at works \$
1929	28	4,995,560	542	770,424	155,685	785,377	3,967,416
1930	30	5,020,875	472	737,240	153,796	504,975	3,557,486
1931	30	4,597,170	420	654,364	134,433	429,048	2,818,306
1932	31	4,326,599	422	617,901	121,873	380,795	2,504,550
1933	31	4,024,437	428	613,278	117,382	371,204	2,490,215
1934	28	3,734,447	446	646,981	116,887	378,111	2,803,840
1935	28	4,316,244	510	741,631	137,134	433,045	3,077,765
1936	28	4,565,549	568	823,714	141,395	490,041	3,360,220
1937	27	4,605,170	606	919,773	140,221	527,410	3,929,242
1938	30	4,938,766	654	1,018,694	147,922	506,003	3,753,600
% change 1938 from 1937 ..	+11.1	+7.2	+7.9	+10.7	+5.4	-4.0	-4.4

Table 2 - PRINCIPAL STATISTICS, BY PROVINCES, 1937 and 1938.

Province	Number of plants	Capital employed \$	Average number of em- ployees	Salaries and wages \$	Cost of fuel and electricity at works \$	Cost of materials at works \$	Gross sell- ing value of products at works \$
<u>1937</u>							
Quebec	5	1,159,502	116	177,596	25,830	131,351	1,021,634
Ontario	12	2,172,814	308	487,054	76,378	239,189	1,665,830
Manitoba	3	359,457	51	76,424	8,864	40,369	335,909
Nova Scotia	2)						
Saskatchewan ...	1)	913,397	131	178,699	29,149	116,501	905,869
Alberta	2)						
British Columbia	2)						
CANADA	27	4,605,170	606	919,773	140,221	527,410	3,929,242
<u>1938</u>							
Quebec	6	1,325,676	139	213,278	33,583	115,151	991,691
Ontario	13	2,183,415	317	527,289	73,561	230,662	1,556,067
Manitoba	3	431,376	52	80,882	9,199	41,339	334,932
Nova Scotia	3	379,200	49	72,333	13,944	40,290	282,523
Saskatchewan ...	1)						
Alberta	2)	619,099	97	124,912	17,635	78,561	588,387
British Columbia	2)						
CANADA	30	4,938,766	654	1,018,694	147,922	506,003	3,753,600

Table 3 - SIZE OF ESTABLISHMENTS, 1938.

	Number of plants	Capital employed \$	Average number of employees	Gross selling value of products at works \$
(a) <u>PRODUCTION</u>				
Under \$50,000	10	694,753	72	323,754
\$50,000 to \$100,000	6	974,874	79	409,378
Over \$100,000	14	3,269,139	503	3,020,468
TOTAL	30	4,938,766	654	3,753,600
(b) <u>EMPLOYEES</u>				
1 to 10	13	858,594	83	770,752
11 to 20	7	975,146	112	739,528
Over 20	10	3,105,026	459	2,243,320
TOTAL	30	4,938,766	654	3,753,600
(c) <u>CAPITAL EMPLOYED</u>				
Under \$50,000	7	194,326	46	530,580
\$50,000 to \$100,000	8	611,563	101	806,871
\$100,000 to \$200,000	8	1,169,546	176	1,122,965
Over \$200,000	7	2,963,331	331	1,293,184
TOTAL	30	4,938,766	654	3,753,600

Table 4 - CAPITAL EMPLOYED, 1937 and 1938.

Province	Present value of land, buildings, machinery, tools and other equip- ment \$	Inventory value of materials on hand, stocks in process, fuel, finished products and miscellaneous supplies on hand \$	Operating capital (cash, bills and accounts receivable, pre- paid expenses, etc.) \$	TOTAL CAPITAL EMPLOYED \$
<u>1937</u>				
Quebec	806,508	62,670	290,324	1,159,502
Ontario	1,011,817	175,303	985,694	2,172,814
Manitoba	219,899	29,837	109,721	359,457
Other provinces ..	591,272	57,124	265,001	913,397
CANADA	2,629,496	324,934	1,650,740	4,605,170
<u>1938</u>				
Nova Scotia	256,000	17,244	105,956	379,200
Quebec	865,268	79,084	381,324	1,325,676
Ontario	1,186,652	201,408	795,355	2,183,415
Manitoba	224,907	29,542	176,927	431,376
Other provinces ..	429,439	39,110	150,550	619,099
CANADA	2,962,266	366,388	1,610,112	4,938,766

Table 5 - EMPLOYEES, SALARIES AND WAGES, 1937 and 1938.

Table 1. EMPLOYERS, SALARIES AND WAGES, 1937 and 1938.								
Province	Average number of employees					Salaries	Wages	TOTAL SALARIES AND WAGES
	On salaries		On wages		TOTAL			
	Male	Female	Male	Female				
						\$	\$	\$
1937								
Quebec	40	16	60	...	116	94,766	82,830	177,596
Ontario	142	49	117	...	308	329,983	157,071	487,054
Manitoba	20	7	24	...	51	45,440	30,984	76,424
Other provinces .	44	23	64	...	131	107,118	71,581	178,699
CANADA	246	95	265	...	606	577,307	342,466	919,773
1938								
Nova Scotia	14	9	26	...	49	36,577	35,756	72,333
Quebec	46	21	72	...	139	115,956	97,322	213,278
Ontario	146	45	125	1	317	355,545	171,744	527,289
Manitoba	20	7	25	...	52	47,945	32,937	80,882
Other provinces .	33	16	48	...	97	77,145	47,767	124,912
CANADA	259	98	296	1	654	633,168	385,526	1,018,694

Table 6 - WAGE-EARNERS, BY MONTHS, 1937 and 1938.

Month	1937		1938		Month	1937		1938	
	Male	Female	Male	Female		Male	Female	Male	Female
January	239	282	...	...	July	294	317	1	1
February	234	290	1	...	August	292	318	1	1
March	242	289	1	...	September	281	299	1	1
April	253	296	1	...	October	281	287	1	1
May	259	299	1	...	November	275	289	1	1
June	270	315	1	...	December	274	291	1	1
AVERAGE						265	296	1	1

Table 7 - REGULAR HOURS WORKED PER WEEK BY WAGE-EARNERS (OVERTIME NOT INCLUDED), 1938.
(Based on figures for month of highest employment)

Regular hours worked per week	Per cent of wage-earners 1938	Regular hours worked per week	Per cent of wage-earners 1938
30 hours or less ...	6.1	51 - 54 hours	2.6
31 - 43 hours	1.9	55 hours .....	.7
44 hours	21.4	56 - 64 hours	2.6
45 - 47 hours .....	.3	65 hours and over ..	10.1
48 hours	47.2		
49 - 50 hours	7.1		

Table 8 - FUEL AND ELECTRICITY USED, 1937 and 1938.

Kind	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Bituminous coal - Canadian	short ton	1,060	6,010	1,574	9,441
Imported	short ton	1,118	5,900	475	2,920
Anthracite coal	short ton	475	3,349	199	1,287
Coke	short ton	1,065	3,842	1,054	4,033
Gasoline	Imp. gal.	...	...	5,500	1,375
Fuel oil	Imp. gal.	9,045	461	10,150	487
Gas - Manufactured	M cu.ft.	664	483	683	518
Natural	M cu.ft.	2,231	783	2,110	710
Other fuel .....	\$	...	...	...	1,692
Electricity purchased	K. W. H.	15,327,818	119,393	14,776,891	125,459
TOTAL .....	\$	...	140,221	...	147,922

Table 9 - POWER EQUIPMENT, 1937 and 1938.

Kind	Ordinarily in use		In reserve or idle	
	Number of units	Total rated horse power	Number of units	Total rated horse power
<u>1937</u>				
Steam engines and steam turbines	5	628	...	...
Total primary equipment	5	628	...	...
Electric motors run by purchased power	168	5,077	16	182
TOTAL	173	5,705	16	182
Boilers	6	615	...	...
<u>1938</u>				
Steam engines and steam turbines	5	628	...	...
Total primary equipment	5	628	...	...
Electric motors run by purchased power	203	6,183	11	183
TOTAL	208	6,811	11	183
Stationary boilers	7	632	...	...

Table 10 - MATERIALS USED, 1937 and 1938.

Material	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Acetone	pound	184,025	22,719	176,895	20,905
Calcium carbide	ton	5,160	321,611	4,847	310,879
Coke	ton	3,604	42,940	3,998	47,656
Other materials (x) .....	\$	...	73,123	...	121,755
Cylinders purchased during the year	Number	3,868	67,017	340	4,808
TOTAL .....	\$	...	527,410	...	506,003

(x) Includes ammonia liquor, ammonium nitrate, potassium carbonate, unpurified brewery gas, lime, soda ash, condensing water, etc.

Table 11 - PRODUCTS MANUFACTURED, 1937 and 1938.

Product	Unit of measure	1 9 3 7		1 9 3 8	
		Quantity	Selling value at works \$	Quantity	Selling value at works \$
Acetylene	cubic feet	48,310,646	1,186,361	45,394,062	1,108,576
Carbon dioxide in cylinders	pound	6,294,271	472,239	7,159,327	526,335
Hydrogen	cubic feet	40,189,310	90,864	34,970,537	63,480
Oxygen	cubic feet	194,446,735	1,835,691	173,992,296	1,636,743
Other products (x) ..	\$	...	344,087	...	418,466
TOTAL .....	\$	...	3,929,242	...	3,753,600

(x) Includes aqua and anhydrous ammonia, nitrogen, solid carbon dioxide and nitrous oxide, for which figures cannot be shown separately as each was produced by only one or two companies in this group.

Table 12 - PRODUCTION OF ACETYLENE, CARBON DIOXIDE (IN CYLINDERS), and OXYGEN, 1918 - 1938.

Year	Acetylene	Carbon Dioxide (in cylinders)(x)	Oxygen
	Cubic feet	Pounds	Cubic feet
1918	5,484,755	2,742,632	33,880,000
1919	11,684,646	3,571,681	34,768,587
1920	16,121,701	3,582,149	54,618,400
1921	15,663,702	3,567,431	53,612,271
1922	17,631,590	3,263,908	52,448,907
1923	21,729,109	3,355,628	72,637,943
1924	19,229,042	3,428,953	68,331,575
1925	24,384,431	3,650,547	68,685,153
1926	27,814,736	3,896,524	86,989,015
1927	31,195,053	4,706,519	112,757,727
1928	37,342,101	5,533,275	138,688,619
1929	46,009,766	6,818,800	166,066,394
1930	44,181,816	6,632,544	152,419,201
1931	37,048,521	5,437,464	120,326,797
1932	33,744,251	6,057,311	92,828,715
1933	32,387,312	5,410,993	93,511,573
1934	37,599,346	4,713,998	113,940,515
1935	39,922,683	4,849,687	136,059,706
1936	41,315,830	5,318,656	151,500,660
1937	48,310,646	6,294,271	194,446,735
1938	45,394,062	7,159,327	173,992,296

(x) Not including solid carbon dioxide (dry ice).

Table 13 - PRODUCTION OF ACETYLENE, CARBON DIOXIDE (IN CYLINDERS), and OXYGEN, BY PROVINCES, 1932 - 1938.

		Ontario	Quebec	Other Provinces	CANADA
ACETYLENE					
1932	cubic feet	12,962,120	8,141,640	12,640,491	33,744,251
1933	cubic feet	12,004,827	7,879,957	12,502,528	32,387,312
1934	cubic feet	14,680,380	9,209,022	13,709,944	37,599,346
1935	cubic feet	16,733,379	10,295,232	12,894,072	39,922,683
1936	cubic feet	17,581,043	10,348,716	13,386,071	41,315,830
1937	cubic feet	20,644,517	12,607,255	15,058,874	48,310,646
1938	cubic feet	18,746,895	11,788,153	14,859,014	45,394,062

Table 13 - PRODUCTION OF ACETYLENE, CARBON DIOXIDE (IN CYLINDERS), and OXYGEN, BY PROVINCES, 1932 - 1938. (concluded)

	Ontario	Quebec	Other Provinces	CANADA
<u>CARBON DIOXIDE (IN CYLINDERS) (x)</u>				
1932 pound	1,636,732	3,111,813	1,308,766	6,057,311
1933 pound	1,564,607	2,819,946	1,026,440	5,410,993
1934 pound	1,257,070	2,367,643	1,089,284	4,713,997
1935 pound	1,414,171	2,221,970	1,213,545	4,849,687
1936 pound	1,467,559	2,389,467	1,461,630	5,318,656
1937 pound	1,439,302	3,115,515	1,739,454	6,294,271
1938 pound	1,768,273	3,548,491	1,842,563	7,159,327
<u>OXYGEN -</u>				
1932 cubic feet	32,280,715	28,865,340	31,682,660	92,828,715
1933 cubic feet	34,991,667	27,093,759	31,426,147	93,511,573
1934 cubic feet	42,361,291	33,187,429	38,391,795	113,940,515
1935 cubic feet	54,375,346	37,926,890	43,757,470	136,059,706
1936 cubic feet	61,616,420	41,488,540	48,395,700	151,500,660
1937 cubic feet	81,593,815	56,493,420	56,359,500	194,446,735
1938 cubic feet	70,757,564	50,694,732	52,540,000	173,992,296

(x) Not including solid carbon dioxide (dry ice).

Table 14 - CONSUMPTION OF CARBON DIOXIDE IN THE MANUFACTURE OF CARBONATED BEVERAGES (SOFT DRINKS), 1928 - 1937.

Year	Quantity Pound	Cost at works \$	Year	Quantity Pound	Cost at works \$
1928	1,718,847	177,777	1933	1,905,884	173,782
1929	3,950,733	380,699	1934	2,138,025	199,191
1930	2,408,694	241,915	1935	2,496,969	209,672
1931	2,396,592	217,262	1936	3,491,510	261,282
1932	2,020,941	182,098	1937 - In cy- linders	4,052,728	297,262
			Solid .	811,120	31,308

Table 15 - IMPORTS INTO CANADA OF CARBON DIOXIDE AND CHLORINE, 1936 - 1938.
(From the "Trade of Canada" - Calendar Years 1936-1938).

	Quantity	Value \$
<u>1936</u>		
Carbon dioxide or carbonic acid gas	xx	...
Chlorine, liquid, or chlorine gas	lb. 6,296,562	133,570
<u>1937</u>		
Carbon dioxide or carbonic acid gas	xx	...
Chlorine, liquid, or chlorine gas	lb. 7,947,320	170,936
<u>1938</u>		
Carbon dioxide or carbonic acid gas	xx	...
Chlorine, liquid, or chlorine gas	lb. 7,721,550	165,982

Table 16 - EXPORTS FROM THE UNITED STATES to CANADA OF COMPRESSED AND LIQUIFIED GASES, 1936 and 1937.

(From "Foreign Commerce and Navigation of the United States" Calendar Years 1936 and 1937.

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
Ammonia, anhydrous	pound 60,624	6,857	75,480	7,270
Chlorine	pound 6,019,262	180,281	6,902,035	281,856
Other gases	pound 1,509,978	101,818	687,466	110,579

DIRECTORY(x) OF FIRMS INCLUDED IN THE COMPRESSED GASES INDUSTRY IN CANADA, 1938.

<u>Names of Firms</u>	<u>Location of Plants</u>	<u>Products Made</u>
Cheney Chemicals Limited Air Liquid Society & Canadian Liquid Air Co. Ltd.	180 Duke St., Toronto, Ont. H.O. - 1111 Beaver Hall Hill, Montreal, P.Q. Plants - Halifax, Sydney, Montreal, Toronto, London, Winnipeg, Regina, Calgary and Vancouver.	Nitrous oxide. Acetylene, oxygen and nitrogen.
Liquid Carbonic Canadian Corpora- tion Limited	H.O. - 2120 Cabot St., Cote St. Paul, Montreal, P.Q. Plants - Dartmouth, Montreal(2), Toronto, St. Boniface, Edmonton and Vancouver.	Carbon dioxide in cylinders and solid.
Dominion Oxygen Company, Limited	H.O. - Canada Life Bldg., 340 University Ave., Toronto, Ont. Plants - Montreal, Toronto and Sault Ste. Marie.	Oxygen and nitrogen.
Prest-O-Lite Company of Canada, Limited	H.O. - Canada Life Bldg., 340 University Ave., Toronto, Ont. Plants - Shawinigan Falls, Merritton and St. Boniface	Acetylene.
Canadian Industries Limited	H.O. - P.O. Box 10, Montreal, P.Q. Plant - Toronto, Ont.	Aqua ammonia and anhydrous ammonia.
Lever Brothers, Limited	299 Eastern Ave., Toronto, Ont.	Hydrogen & oxygen.
The People's Gas Supply Co. Ltd.	2 Mill St., Ottawa, Ont.	Acetylene.
Proctor & Gamble Co. of Canada Limited	Burlington St. E., Hamilton, Ont.	Hydrogen & oxygen.
Swift Canadian Company, Limited	Keele St. and St. Clair Ave., Toronto, Ont.	Hydrogen.
Wall Chemicals Limited	H.O. - 1103 Millwood Rd., Toronto, Ont. Plants - Montreal, Toronto.	Hydrogen, oxygen and acetylene.

(x) The plants listed above are included under the Compressed Gases Industry as they make industrial gases as their chief products. In addition, Canadian Industries Limited produces synthetic ammonia at Windsor, Ont., liquid chlorine at Windsor,

Ont., and Cornwall, Ont., and liquid sulphur dioxide at Hamilton, Ontario, but, when classified according to the main products, these plants come under the Acids, Alkalies and Salts Industry which is reviewed in a separate bulletin. Synthetic ammonia (and the hydrogen and nitrogen for its manufacture) is made also at Trail, B.C., by the Consolidated Mining and Smelting Company but the entire output is used by that company in the manufacture of ammonia fertilizers and a separate report is not submitted for the gas division. Similarly, acetylene is made by the Shawinigan Chemicals Limited and used in making acetic acid, etc., and nitrogen is produced by the North American Cyanamid Company at Niagara Falls as an intermediate in the manufacture of cyanamide.

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