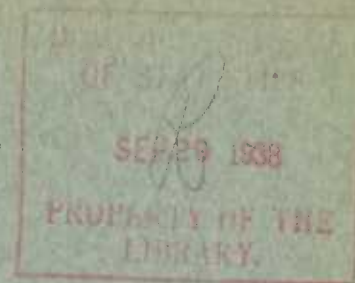


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CANADA
DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
CENSUS OF INDUSTRY
MINING, METALLURGICAL & CHEMICAL BRANCH

THE COMPRESSED GASES INDUSTRY
IN
CANADA
1937



OTTAWA
1938

Price 10 cents

DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
CENSUS OF INDUSTRY
MINING, METALLURGICAL AND CHEMICAL BRANCH
OTTAWA - CANADA

Dominion Statistician: R. H. Coats, LL.D., F.R.S.C., F.S.S. (Hon.)
Chief - Mining, Metallurgical and Chemical Branch: W. H. Losee, B.Sc.

ANNUAL INDUSTRY REPORT

CHEMICALS AND ALLIED PRODUCTS GROUP

THE COMPRESSED GASES INDUSTRY, 1937

Production from the manufacturing plants in Canada which were occupied chiefly in making industrial gases was valued at \$3,929,242 in 1937 compared with \$3,360,220 in 1936, an increase of 17.1 per cent.

Twenty-seven factories were in operation in 1937, distributed as follows - 12 in Ontario, 5 in Quebec, 3 in Manitoba, 2 in Nova Scotia, 2 in Alberta, 2 in British Columbia, and 1 in Saskatchewan. These establishments employed capital amounting to \$4,605,170, of which \$2,629,496 was the value of land, buildings and equipment, \$324,934 was the value placed on inventories, and \$1,650,740 was the amount of working capital at the end of the year.

The average number of employees in this industry in 1937 was 606, including 341 salaried workers and 265 wage-earners. Salaries for the year amounted to \$577,307 and wages totalled \$342,466.

The chief products were oxygen, acetylene and carbon dioxide (in cylinders), each of which was made in greater quantity than in 1936. The output of oxygen increased 28 per cent to 194,446,755 cubic feet; acetylene, 17 per cent to 48,310,646 cubic feet; and carbon dioxide (in cylinders), 18 per cent to 6,294,271 pounds. The output of hydrogen declined slightly to 40,189,319 cubic feet. Aqua ammonia, anhydrous ammonia, solid carbon dioxide, nitrogen and nitrous oxide were other products of this industry.

The Compressed Gases Industry, as reviewed in this bulletin, includes only those factories which made industrial gases as their main products. In addition, liquid chlorine and synthetic ammonia were manufactured in the Sandwich plant of Canadian Industries Limited but data pertaining to these departments were not shown separately from the general plant operations and so have been included in the Acids, Alkalies and Salts Industry. Synthetic ammonia (and the hydrogen and nitrogen for its manufacture) was made also at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, but as all of the output was used in making ammonia fertilizers, the statistics relating thereto have been included in the Fertilizers Industry. Similarly, acetylene was made by Shawinigan Chemicals Limited at Shawinigan Falls for use in their own works in making acetic acid, etc., and nitrogen was 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 was 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 - 1937.

Year	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling 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	117,582	371,204	2,490,215
1934	28	3,754,447	446	646,981	116,867	378,111	2,803,840
1935	28	4,316,244	510	741,681	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
% change 1937 from 1936	- 3.6	/ 0.9	/ 6.7	/ 11.7	- 0.8	/ 7.6	/ 17.1

Table 2 - PRINCIPAL STATISTICS, BY PROVINCES, 1936 and 1937.

Province	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling value of products at works
		\$		\$	\$	\$	\$
<u>1936</u>							
Quebec	5	1,081,069	109	158,403	25,593	120,389	810,482
Ontario	13	2,297,604	294	434,305	82,247	229,960	1,480,934
Manitoba	3	351,465	51	68,917	7,802	36,209	300,377
Nova Scotia	2)						
Saskatchewan	1)	855,411	114	162,089	25,753	103,483	768,427
Alberta	2)						
British Columbia ...	2)						
CANADA	28	4,565,549	568	823,714	141,395	490,041	3,360,220
<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	1,665,850
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

Table 3 - SIZE OF ESTABLISHMENTS, 1937.

	Number of plants	Capital employed	Average number of employees	Gross selling value of products at works
		\$		\$
<u>(a) PRODUCTION</u>				
Under \$50,000	6	401,667	58	212,831
\$50,000 to \$100,000	6	752,532	86	391,466
Over \$100,000	15	3,450,971	482	3,324,945
TOTAL	27	4,605,170	606	3,929,242
<u>(b) EMPLOYEES</u>				
1 to 10	9	617,458	55	545,158
11 to 20	8	714,243	79	930,227
Over 20	12	3,273,469	472	2,453,857
TOTAL	27	4,605,170	606	3,929,242

Table 3 - SIZE OF ESTABLISHMENTS, 1937. (concluded)

	Number of plants	Capital employed \$	Average number of employees	Gross selling value of products at works \$
(c) CAPITAL EMPLOYED				
Under \$50,000	6	160,202	41	592,896
\$50,000 to \$100,000	6	441,376	97	821,826
\$100,001 to \$200,000	10	1,450,280	210	1,556,348
Over \$200,000	5	2,553,312	258	958,172
TOTAL	27	4,605,170	606	3,929,242

Table 4 - CAPITAL EMPLOYED, 1936 and 1937.

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, prepaid expenses, etc.) \$	TOTAL CAPITAL EMPLOYED \$
<u>1936</u>				
Quebec	788,266	120,681	152,122	1,061,069
Ontario	1,186,636	249,988	860,980	2,297,604
Manitoba	217,695	51,166	82,604	351,465
Other provinces	574,583	92,997	180,831	855,411
CANADA	2,767,180	521,832	1,276,537	4,565,549
<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

Table 5 - EMPLOYEES, SALARIES AND WAGES, 1936 and 1937.

Province	Average number of employees					Salaries	Wages	TOTAL SALARIES AND WAGES
	On salaries		On wages		TOTAL			
	Male	Female	Male	Female				
						\$	\$	\$
1936								
Quebec	34	17	58	...	109	96,918	61,485	158,403
Ontario	135	41	118	...	294	294,616	139,689	434,305
Manitoba	18	7	26	...	51	41,663	27,254	68,917
Other provinces	39	19	56	...	114	103,124	58,965	162,089
CANADA.....	226	84	258	...	568	536,321	287,393	823,714
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

Table 6 - WAGE-EARNERS, BY MONTHS, 1936 and 1937.

Month	1936	1937	Month	1936	1937
	Male	Male		Male	Male
January	235	239	July	278	294
February	239	234	August	269	292
March	252	242	September	265	281
April	265	253	October	258	281
May	258	259	November	251	275
June	265	270	December	249	274
AVERAGE				258	265

Table 7 - REGULAR HOURS WORKED PER WEEK BY WAGE-EARNERS (OVERTIME NOT INCLUDED), 1936 and 1937.
(Based on figures for month of highest employment)

Regular hours worked per week	Per cent of wage-earners		Regular hours worked per week	Per cent of wage-earners	
	1 9 3 6	1 9 3 7		1 9 3 6	1 9 3 7
40 hours or less	14.9	11.2	51 - 53 hours	1.3	0.6
41 - 43 hours	1.9	2.2	54 hours	3.3	...
44 hours	0.7	16.7	55 hours	0.7	...
45 - 47 hours .....	...	1.6	56 - 59 hours	5.8	2.6
48 hours	60.4	52.9	60 hours and over	5.5	3.5
49 - 50 hours	5.5	8.7			

Table 8 - FUEL AND ELECTRICITY USED, 1936 and 1937.

Kind	Unit of measure	1 9 3 6		1 9 3 7	
		Quantity	Cost at works \$	Quantity	Cost at works \$
Bituminous coal - Canadian	short ton	389	2,816	1,060	6,010
Imported	short ton	266	1,658	1,118	5,900
Anthracite coal	short ton	478	3,360	475	3,349
Coke	short ton	3,845	11,502	1,065	3,842
Gasoline	Imp. gal.	318	83	...	...
Kerosene	Imp. gal.	44	12	...	...
Fuel oil	Imp. gal.	11,175	570	9,045	461
Wood	cord	13	170	...	...
Gas - Manufactured	M cu.ft.	571	440	664	483
Natural	M cu.ft.	2,185	734	2,231	783
Other fuel .....	\$	...	4,515	...	...
Electricity purchased	K. W. H.	13,922,286	115,535	15,327,818	119,395
TOTAL .....	\$	...	141,395	...	140,221

Table 9 - POWER EQUIPMENT, 1936 and 1937.

Kind	Ordinarily in use		In reserve or idle	
	Number of units	Total rated horse power	Number of units	Total rated horse power
1 9 3 6				
Steam engines and steam turbines	6	728	...	...
Total Primary	6	728	...	...
Electric motors run by purchased power	167	4,813	13	185
TOTAL	173	5,541	13	185
Boilers	8	732	...	...
1 9 3 7				
Steam engines and steam turbines	5	628	...	...
Total Primary	5	628	...	...
Electric motors run by purchased power	168	5,077	16	182
TOTAL	173	5,705	16	182
Boilers	6	615	...	...

Table 10 - MATERIALS USED, 1936 and 1937.

Material	Unit of measure	1 9 3 6		1 9 3 7	
		Quantity	Cost at works \$	Quantity	Cost at works \$
Acetone	pound	170,823	25,603	184,025	22,719
Calcium carbide	ton	4,402	275,375	5,160	321,611
Coke	ton	2,992	34,356	3,604	42,940
Other materials (x) .....	\$	...	85,915	...	73,123
Cylinders purchased during the year	Number	4,835	68,792	3,868	67,017
TOTAL .....	\$	...	490,041	...	527,410

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

Table 11 - PRODUCTS MANUFACTURED, 1936 and 1937.

Product	Unit of measure	1 9 3 6		1 9 3 7	
		Quantity	Selling value at works \$	Quantity	Selling value at works \$
Acetylene	cubic feet	41,315,850	1,016,256	48,310,646	1,186,361
Carbon dioxide in cylinders	pound	5,318,656	445,195	6,294,271	472,259
Hydrogen	cubic feet	40,313,740	74,345	40,189,319	90,864
Oxygen	cubic feet	151,500,660	1,438,799	194,446,735	1,855,691
Other products (x) .....	\$	...	385,625	...	344,087
TOTAL .....	\$	...	3,360,220	...	3,929,242

(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 - 1937.

Year	Acetylene	Carbon Dioxide (in cylinders)(x)	Oxygen
	Cubic feet	Pounds	Cubic feet
1918	5,484,755	2,742,652	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	3,555,628	72,637,943
1924	19,229,042	3,428,953	68,331,575
1925	24,394,431	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	44,131,816	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	32,337,312	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	41,315,850	5,318,656	151,500,660
1937	48,310,646	6,294,271	194,446,735

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

Table 13 - PRODUCTION OF ACETYLENE, CARBON DIOXIDE (IN CYLINDERS), and OXYGEN, BY PROVINCES, 1928-1937.

		Ontario	Quebec	Other Provinces	CANADA
<u>ACETYLENE -</u>					
1928	cubic feet	14,032,110	11,203,260	12,106,731	37,342,101
1929	cubic feet	18,463,129	12,854,099	14,692,538	46,009,766
1930	cubic feet	18,569,197	11,463,532	14,149,087	44,181,816
1931	cubic feet	14,680,022	9,483,373	12,885,126	37,048,521
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	41,315,850
1937	cubic feet	20,644,517	12,607,255	15,058,874	48,310,646

Table 13 - PRODUCTION OF ACETYLENE, CARBON DIOXIDE (IN CYLINDERS), and OXYGEN, BY PROVINCES, 1928 - 1937.
(concluded)

		Ontario	Quebec	Other Provinces	CANADA
<u>CARBON DIOXIDE (IN CYLINDERS) (x)</u>					
1928	pound	1,277,440	2,677,526	1,578,309	5,533,275
1929	pound	1,453,180	3,687,948	1,677,672	6,818,800
1930	pound	1,395,398	3,588,703	1,658,443	6,632,544
1931	pound	1,538,928	2,668,100	1,230,436	5,437,464
1932	pound	1,656,732	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

OXYGEN -

1928	cubic feet	54,430,578	41,971,320	42,286,721	138,688,619
1929	cubic feet	66,116,620	50,714,300	49,235,474	166,066,394
1930	cubic feet	59,045,143	45,737,255	47,636,803	152,419,201
1931	cubic feet	44,420,908	38,162,619	37,743,270	120,326,797
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	33,391,795	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

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

Table 14 - CONSUMPTION OF CARBON DIOXIDE IN THE MANUFACTURE OF CARBONATED BEVERAGES (SOFT DRINKS),
1928 - 1936.

Year	Quantity	Cost at works	Year	Quantity	Cost at works
	Pound	\$		Pound	\$
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			

Table 15 - IMPORTS INTO CANADA OF CARBON DIOXIDE AND CHLORINE, 1934 - 1937.
(From the "Trade of Canada" - Calendar Years 1934-1937).

	Quantity	Value
		\$
<u>1934</u>		
Carbon dioxide or carbonic acid gas.....	xx	...
Chlorine, liquid, or chlorine gas	lb. 10,713,725	219,985
<u>1935</u>		
Carbon dioxide or carbonic acid gas	xx	...
Chlorine, liquid, or chlorine gas	lb. 10,436,566	221,134
<u>1936</u>		
Carbon dioxide or carbonic acid gas	xx	...
Chlorine, liquid, or chlorine gas	lb. 6,296,562	153,570
<u>1937</u>		
Carbon dioxide or carbonic acid gas	xx	...
Chlorine, liquid, or chlorine gas	lb. 7,947,320	170,936

Table 16 - EXPORTS FROM THE UNITED STATES to CANADA OF COMPRESSED AND LIQUIFIED GASES, 1955 and 1956.
(From "Foreign Commerce and Navigation of the United States" Calendar Years 1955 and 1956.)

	1 9 5 5		1 9 5 6	
	Quantity	Value	Quantity	Value
		\$		\$
Ammonia, anhydrous pound	29,732	2,566	60,624	6,857
Chlorine pound	9,954,385	222,792	6,019,262	180,281
Other gases pound	1,483,882	110,903	1,509,978	101,818

DIRECTORY(x) OF FIRMS INCLUDED IN THE COMPRESSED GASES INDUSTRY IN CANADA, 1957.

<u>Names of Firms</u>	<u>Location of Plants</u>	<u>Products Made</u>
Cheney Chemicals Limited	180 Duke St., Toronto, Ont.	Nitrous oxide.
Air Liquide Society & Canadian	H.O. - 1111 Beaver Hall Hill,	Acetylene, oxygen and
Liquid Air Co. Ltd.	Montreal, P.Q.	nitrogen.
	Plants - Halifax, Montreal, Toronto,	
	London, Winnipeg, Regina,	
	Calgary and Vancouver.	
Liquid Carbonic Canadian Corporation,	H.O. - 2120 Cabot St., Cote St. Paul,	Carbon dioxide in
Limited	Montreal, P.Q.	cylinders and solid
	Plants - Dartmouth, Montreal (2),	carbon dioxide.
	Toronto, St. Boniface,	
	Edmonton and Vancouver.	
Dominion Oxygen Company, Limited	H.O. - Canada Life Bldg., 340 University Ave., Toronto, Ont.	Oxygen and nitrogen.
	Plants - Montreal and Toronto.	
Prest-O-Lite Company of Canada,	H.O. - Canada Life Bldg., 340 University Ave., Toronto, Ont.	Acetylene.
Limited	Plants - Shawinigan Falls, Merriton	
	and St. Boniface.	
Canadian Industries Limited	H.O. - P. C. Box 10, Montreal, P.Q.	Aqua ammonia and
	Plant - Toronto, Ont.	anhydrous ammonia.
Lever Brothers, Limited	299 Eastern Ave., Toronto, Ont.	Hydrogen and 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 and oxygen.
Swift Canadian Company, Limited	Keele St. and St. Clair Ave.,	
	Toronto, Ont.	Hydrogen.
Wall Chemicals Limited	1103 Millwood Rd., Toronto, Ont.	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 produced synthetic ammonia and liquid chlorine at Sandwich, Ontario, 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) was made also at Trail, B.C., by the Consolidated Mining and Smelting Company but the entire output was used by that company in the manufacture of ammonia fertilizers and a separate report was not obtained for the gas division. Similarly, acetylene was made by the Shawinigan Chemicals Limited and used in making acetic acid, etc., and nitrogen was produced by the North American Cyanamid Company at Niagara Falls as an intermediate in the manufacture of cyanamide.

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