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CANADA'S CHEMICAL INDUSTRIES

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Canada's Chemical Industries

BY

H. McLEOD
(Chief, Mining, Metallurgical and Chemical Statistics)
DOMINION BUREAU OF STATISTICS
OTTAWA, CANADA

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Canada's Chemical Industries

This review is intended to give a general idea of the size and diversity of the chemical industries in Canada. It is divided into five sections, as follows: *(a)* The Chemical Manufacturing Industry; *(b)* The Allied Chemical Industries; *(c)* The Chemical Process Industries; *(d)* Statistical Tables; *(e)* List of Producers. There is little reference to technical details of plant operations or methods of manufacture.

(a) The Chemical Manufacturing Industries

The story of chemical manufacturing in Canada closely parallels the story of industry as a whole. Prior to the war of 1914–18 Canada was mainly an agricultural country, but in the years which have since elapsed she has become a nation in which manufacturing has assumed the major role in its economic life, and she has come to occupy a prominent place in the world markets for manufactured goods. As is well known, there have been periods of serious decline in business operations, but over the quarter of a century there has been an upward trend that has been remarkable. In 1915 the gross value of manufactures in Canada was $1\frac{1}{2}$ billions; in 1940, when the country was again in the first year of war, the total was $4\frac{1}{2}$ billions, a threefold advance in the twenty-five years, and this latter figure was swelled by war-time activity to $9 billions in 1944. The mining industry experienced a similar expansion in which aggregate mineral production rose from $189 millions in 1917 to $564 millions in 1942 and $499 millions in 1945.

As a result of this growth in manufacturing and mining, there arose a highly diversified demand for chemicals and chemical products, offering opportunities which were quickly exploited by a well-founded chemical industry. As volume developed, the manufacture of new items, many of which were previously imported, was undertaken; new plants were built and existing facilities were expanded. From about $28 millions in 1920, when detailed records first became available, the output of heavy and fine chemicals of all kinds rose to about $110 millions in 1945.

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The chronology on page 57 gives in brief form the more important developments during this period.

Information regarding the beginning of the manufacture of chemicals in Canada is very sketchy. The Census of 1890 showed the output of chemical plants at slightly more than $2 millions but it seems certain that this total included some allied products as well as basic chemicals. At any rate, the industry at that time was very small—a sulphuric acid plant had begun operations a few years previously, the manufacture of methyl alcohol by the destructive distillation of wood had been started, some nitroglycerine was being made for use in explosives, and some ethyl alcohol was being produced. The next decade, however, saw the start of the electro-chemical industry with the building of a carbide plant at Niagara Falls, Ontario, and a phosphorus works at Buckingham, Quebec. From the turn of the century to the outbreak of the first great war, there was continued expansion featuring the opening of large works to make carbide at Shawinigan Falls, Quebec, cyanamide at Niagara Falls, Ontario, and electrolytic caustic soda at Windsor, Ontario. With the war of 1914–1918 there came heavy responsibilities to manufacture special chemicals for munitions purposes and quite a number of new plants and extensions were erected. Some of these developments were essentially for war needs, such as the manufacture of trinitrotoluene, cordite, etc., and were discontinued soon after the armistice, but others were of a fundamental nature and remained as part of the permanent industry. Outstanding among the latter was the synthetic acetic acid and acetone plant at Shawinigan Falls, Quebec.

The period between the wars was characterized by a steady advance in both volume and diversity of products, including such outstanding developments as the manufacture of soda ash at Amherstburg, Ontario, and of sulphuric acid from waste smelter gases at Copper Cliff, Ontario, and at Trail, British Columbia. In this period, too, there was consolidation within the industry through the merger of smaller units to form such concerns as Canadian Industries Limited and Shawinigan Chemicals Limited. There was remarkable progress also in technical skill, in research,

and in the training of personnel. When the last war broke upon the world in 1939, the industry was well fitted in these essentials to undertake the tremendous responsibilities that were to be placed upon it.

In the transformation of Canadian industry for war production, probably no aspect was more important or more spectacular than the explosives and chemicals program. Before the outbreak of hostilities, the explosives industry in this country was occupied almost entirely on ordinary commercial requirements, and consequently the chemical industry lacked facilities to feed a large scale munitions output. In October, 1939, under the Defence Purchasing Board, an organization, later to be the Chemicals and Explosives Branch of the Department of Munitions and Supply, was set up to expand explosives production and to place the chemical industry on a parallel course of development. Soon great plants mushroomed up in every part of the country as three score separate projects involving expenditures of more than $160 million were undertaken, some being only extensions and others entirely new works—some for explosives, some for shell filling, some for grenades, fuse powders and pyrotechnics, but about half for special chemicals requirements in the over-all program. It is estimated that the production of chemicals in Canada expanded threefold during the war to reach a total value in 1945 of about $110 millions. With the end of hostilities some of these works were closed or dismantled, but quite a number have been taken over by private concerns and have become a part of the post-war industry. Today the industry stands as one of the nation's leading activities. It supplies about 70 per cent of the country's chemical needs, and in addition makes a substantial contribution to export trade. It has buildings and capital equipment valued at $120 millions, employs 10,000 people, and annually distributes $18 millions for salaries and wages, and $40 millions for materials, fuel and power. It includes some of the largest industrial establishments in the Dominion.

Alkalies

The alkalies division of the industry is based upon the vast salt deposits which underlie the Windsor-Sarnia district in

southwestern Ontario. The salt is brought to the surface as brine of which about half is evaporated to produce ordinary salt for commercial and table use, while a half is used for chemical purposes.

At Windsor, Ontario, the Canadian Industries Limited treats brine electrolytically to produce caustic soda and liquid chlorine. Built in 1912 and operated continuously since that date, this works added in 1930 an extension to utilize the hydrogen, which formerly went to waste, in the manufacture of ammonia, this being the first synthetic unit in Canada. Other lines have been added from time to time, including hydrochloric acid, chloride of lime, ferric chloride, sulphur monochloride, sulphur dichloride and sodium hypochlorite.

To meet the demand of the expanding pulp, rayon and cellophane industries of Eastern Canada, the Canadian Industries Limited erected, in 1934, a new caustic-chlorine plant at Cornwall, Ontario, and in 1938 opened another unit at Shawinigan Falls, Quebec. For these projects most of the salt is brought from Windsor, the raw material in this instance being transported to the source of cheap power and to the principal markets for the finished products.

Another important plant which uses salt as its chief material is operated by Brunner, Mond Canada, Limited, at Amherstburg, Ontario. Built in 1919, it is the country's only producer of soda ash and also, since 1934, of calcium chloride which is recovered as a secondary product in the Solvay process.

Data on the Canadian production of caustic soda and of soda ash are not available for publication as there is only one producing company in each case. Imports under these headings in 1945 amounted to 11,234 tons at $257,945 for caustic soda and 2,229 tons at $91,655 for soda ash.

Acids

In the acids division of the industry, Canada has long been self-sufficient in regard to inorganic acids, but has been very largely dependent on foreign sources for her supply of organic

acids. The manufacture of sulphuric acid was started at London, Ontario, in 1867, and the next commercial unit was built at Capelton, Quebec, at which location there was a considerable supply of pyrites from nearby mines. Built in 1885, this latter plant operated steadily until 1925 when it was dismantled. The first unit using the contact process was built in 1908 at Sulphide, Ontario, with pyrites as the chief source of sulphur, and the first plant to utilize smelter gases was put up at Coniston, Ontario, in 1925. Three new plants were built during the war to make ten producers in all, as follows: the Canadian Industries Limited at Copper Cliff, Ontario, Hamilton, Ontario, and New Westminster, British Columbia; the Consolidated Mining and Smelting Co. of Canada Limited at Trail, British Columbia; the Nichols Chemical Company Limited at Sulphide, Ontario, Valleyfield, Quebec, and Barnet, British Columbia; the Welland Chemical Works at Welland, Ontario; the Aluminum Company of Canada, Limited, at Arvida, Quebec; and the Dominion Steel and Coal Corporation Ltd. at Sydney, Nova Scotia. Output of sulphuric acid in 1945 totalled 703,000 tons (66° Bé) compared with the highest pre-war tonnage of 282,716 in 1937.

The successful recovery of sulphuric acid from smelter gases has been one of the outstanding developments of the industry. Previously the raw materials for its manufacture were either sulphur or sulphur-bearing ores and with the exhaustion of the latter more dependence was placed on elemental sulphur imported chiefly from Texas, U.S.A. In search of a cheaper source of sulphur, attention was turned to the sulphur gases which belched from the stacks of Canada's huge metal smelters. In 1925, a trial plant was built by Canadian Industries Limited at Coniston, Ontario, in connection with the nickel smelter at that point, and it proved highly successful. In 1929 this company established a larger permanent unit at the smelter of the International Nickel Company Ltd. at Copper Cliff, Ontario.

Even more striking were the developments at Trail, British Columbia, arising out of the utilization of the gases from the lead-zinc smelter of the Consolidated Mining & Smelting Co. of Canada Ltd. For some time this company had been faced with claims for damage done by the sulphur-bearing gases to crops on

nearby lands, and this problem assumed international proportions when complaints came from across the border. This condition of affairs and the desire to eliminate waste led to an extensive program of research which culminated in the building of one of the largest chemical plants of the country. It was decided to use the waste gases to make sulphuric acid, which in turn could be used to make ammonium sulphate for fertilizer purposes. Here, there is now the largest sulphuric acid plant in the country, a huge synthetic ammonia plant, an ammonium sulphate plant, a phosphoric acid plant and an ammonium phosphate plant. The final products are the nitrogen-bearing fertilizers—ammonium sulphate, ammonium phosphate, and ammonium nitrate—which are chiefly for export. In 1934 a process was developed to produce elemental sulphur, this being Canada's only source of pure sulphur.

The principal users of nitric acid in Canada, the explosives and ammonium nitrate industries, have acid plants to make their own requirements. Works for this purpose are in use by the Welland Chemical Works Ltd. at Welland, Ontario; the Alberta Nitrogen Products Limited at Calgary, Alberta; the Consolidated Mining and Smelting Co. of Canada Ltd. at Trail, British Columbia; and the Canadian Industries Limited at McMasterville, Quebec, Nobel, Ontario, and James Island, British Columbia. Some of these concerns also make acid for sale to industrial users, as does the Nichols Chemical Company Limited at Sulphide, Ontario. A very large part of the production facilities were erected during the war and it is estimated that the total output for all purposes amounted to 245,000 tons (42° Bé) in 1945.

Muriatic or hydrochloric acid is made by Canadian Industries Limited at Hamilton, Windsor, and Cornwall, all in Ontario; cresylic acid is made by the Dominion Tar and Chemical Co. Limited at Toronto, Ontario; hydrofluosilicic acid is made by the Consolidated Mining and Smelting Co. of Canada Ltd. at Trail, British Columbia; phosphoric acid is made by the latter company as an intermediate in making phosphate fertilizers and also by the Electric Reduction Co. of Canada Ltd., at Buckingham, Quebec; stearic acid is made by the W. C. Hardesty Co. of

Canada Ltd. at Toronto, Ontario, and S. F. Lawrason & Co. Limited at London, Ontario; naphthenic acid is made by Imperial Oil Limited at Montreal, Quebec; oleic acid by S. F. Lawrason & Co. Limited, and fatty acids by the last mentioned concern and by the Woburn Chemicals Limited at Toronto, and the W. C. Hardesty Co. of Canada Ltd. at Toronto.

Glacial acetic acid is made by the Shawinigan Chemicals Limited at Shawinigan Falls, Quebec, in one of the great chemical plants of the Empire. As early as 1903 the power developments at this point had attracted a carbide plant which has continued to operate ever since. But during the War of 1914-1918 it was greatly expanded. The Allies were then in urgent need of acetone for T.N.T. and later for acetic acid for the manufacture of cellulose acetate, an essential compound for the treatment of aeroplane wings. A process was worked out by Canadian chemists by which these chemicals could be made synthetically from calcium carbide, and in 1916, at the request of the Imperial Government, the capacity of the carbide furnaces was enlarged and a large chemical plant was erected. At the close of the war the demand for acetone ceased and the company soon discontinued its manufacture, but improvements in its process for making acetic acid and an increasing demand enabled the company to expand its output and ship to markets in all parts of the world. Continuous research has led to the commercial production at this plant of many acetylene derivatives, and it is interesting to note that the company started to make acetone again in 1936 by an entirely new process. This concern is a large exporter, particularly of carbide, acetic acid, acetylene black and vinyl resins.

In 1945 Canada's export of acids amounted to $2·8 millions, chiefly acetic and sulphuric. Imports were valued at $3·3 millions with tartaric, lactic, citric, salicylic, carbolic, boracic and stearic as the principal items.

Carbide, Cyanamide and Cyanide

The first Canadian works to make calcium carbide was erected at Merritton, Ontario, in 1897, the electricity being obtained

from power stations on the nearby Welland canal. Later, a plant was erected at Ottawa, and in 1903 the Shawinigan Carbide Company completed its furnaces at Shawinigan Falls, Quebec, to utilize the newly developed power at that point. About 1912 these three companies joined to form the Canada Carbide Company, and the units at Merritton and Ottawa were later dismantled. In 1927 the Canada Carbide Company and the Canadian Electro Products Company Ltd. were consolidated into the Shawinigan Chemicals Limited. The capacity of this works was expanded considerably during the late war.

Another carbide plant is operated at Welland, Ontario, by the Electro Metallurgical Company of Canada Limited. This company and the Shawinigan Chemicals Limited are the only concerns which make carbide for sale.

At Niagara Falls, Ontario, the North American Cyanamid Limited operates a huge cyanamide works, probably the largest of its kind in the world. Started in 1909 with an initial capacity of 5,000 tons annually, the subsequent additions and improvements had brought the pre-war capacity to 355,000 tons. This tremendous tonnage was secured through the operation of what was at that time the largest lime-burning plant in the world, the largest carbide furnaces and the largest liquid air plant for the preparation of pure nitrogen. The calcium cyanamide, which is made by absorbing nitrogen in calcium carbide at white heat, is used as a fertilizer and a large part of the production is exported. Quite a large proportion of the output, however, is used by the company to make cyanide for use by the Canadian mining industry or for export, and also as a material for certain war chemicals. Sodium silicate has also been produced in this works since 1932.

Ammonia

Ammonia and its compounds were in heavy demand for military uses and facilities for increased capacity involved large expenditures in the war years. At the outbreak of war synthetic ammonia was being made at Trail, British Columbia, for use in nitrogen fertilizers, and at Windsor, Ontario, for use mainly for the manufacture of blasting explosives, and aqua ammonia and

anhydrous ammonia were recovered from gas liquor by Canadian Industries Limited in a plant at Toronto, Ontario. War requirements brought expansion to the original Trail facilities as well as a new government-owned unit at that point, also a new plant at Calgary, Alberta, operated by Alberta Nitrogen Products Limited on behalf of the government, and a new works near Welland, Ontario, also built for the government but operated by the Welland Chemicals Limited. The Calgary works is unique in that it uses natural gas as its primary material; at Welland, the coke process is used. All of these works made anhydrous ammonia and ammonium nitrate. In 1943, when war demands slackened and a shortage of fertilizer developed in United States and Canada, steps were taken to utilize the excess ammonium nitrate capacity to provide a material suitable for fertilizer use. This was made possible by a research program which resulted in the making of a prilled or pebbled form of ammonium nitrate properly conditioned to render it free-flowing when used. Practically all of the output is now marketed in this form, chiefly for export to the United States. Output of ammonium nitrate fertilizer compound amounted to 237,000 tons in 1945.

Organic Chemicals

In the manufacture of organic chemicals there has been outstanding progress in recent years. Mention has been made already of the Shawinigan Chemicals Limited, which is the leading company in this field, and is concerned mostly with products based on acetylene, including acetic acid, butyl acetate, ethyl acetate, acetone, acetylene black, acetic anhydride, acetaldehyde, croton aldehyde, pentasol acetate, vinyl acetate, vinyl resins, dibutyl phthalate and butyl alcohol. Chloral, crotonic acid and monochloracetic acid are post-war additions to the lines made by this company.

The principal producer of coal tar derivatives is the Dominion Tar & Chemical Company Ltd., Toronto, Ontario, which makes cresylic acid, phenol, cresol, orthocresol, paracresol, xylenols and naphthalene. Several coke-oven operators recover xylol, toluol and benzol; a number of explosives plants make dinitrotoluol, nitro-glycerine and trinitrotoleune; the Standard

Chemicals Limited, Montreal, Quebec, and the Canadian Industrial Alcohol Company at Lindsay, Ontario, recover methyl alcohol and acetone by the destructive distillation of hardwoods; perchlorethylene and trichlorethylene are made at Shawinigan Falls, Quebec, by the Canadian Industries Limited. In 1941 the Naugatuck Chemicals Limited, Elmira, Ontario, started to make aniline oil, diphenylamine and certain special chemicals for the rubber and plastics industries; acetanilide, nitrobenzol and D.D.T. have since been added to its products. The manufacture of styrene and butadiene for synthetic rubber began in late 1943 at the huge works of the Polymer Corporation Limited at Sarnia, Ontario, and cumene, butane and propane are recovered from refineries in Sarnia and Montreal. Industrial ethyl alcohol is made by a number of liquor distilleries and in 1943 the Ontario Paper Company at Thorold, Ontario, began to make ethyl alcohol from sulphite liquor obtained from the paper mill at that point. The Canadian Industries Limited has recently started to make chloroform at Shawinigan Falls, Quebec.

Phosphorus Compounds

Phosphorus, phosphate chemicals and chlorates are produced by the Electric Reduction Company of Canada Ltd., at Buckingham, Quebec, which is the sole producer of these items in the country. Established in 1897 to utilize the phosphate ores in the vicinity, this works has been operating mainly on imported rock in late years. Phosphorus and phosphoric acid were the main products for most of this period, but in the past decade the company has developed a very diversified line of chemicals including monosodium phosphate, disodium phosphate, trisodium phosphate, anhydrous tetrasodium phosphate, phosphorus pentoxide, calcium phosphide, acid calcium phosphate, acid sodium phosphate and phosphorus sesquisulphide, also barium chlorate, ammonium perchlorate, sodium chlorate, potassium chlorate and potassium perchlorate. Both amorphous and yellow phosphorus are made in this works.

Superphosphates for fertilizers are made by Canadian Industries Limited at McMasterville, Quebec, Hamilton, Ontario,

and New Westminster, British Columbia, and by the Consolidated Mining and Smelting Co. of Canada Ltd. at Trail, British Columbia. The latter concern also makes ammonium phosphate fertilizers.

Compressed Gases

The tremendous wartime demand for acetylene and oxygen for welding purposes in the shipbuilding, aircraft, and munitions industries was met by the building of new plants and expansion of existing facilities. The production of acetylene in 1945 at 95 million cubic feet and of oxygen at 552 million cubic feet was 95 per cent and 192 per cent, respectively, above the quantities made in 1939.

Most of the concerns in the industry operate several establishments located strategically across the country. The Canadian Liquid Air Co. Ltd. makes acetylene, oxygen and nitrogen in 11 plants; the Dominion Oxygen Company Limited makes oxygen at 5 locations; the Prest-O-Lite Company of Canada Limited makes acetylene in 4 establishments; the Wall Chemicals Canadian Corporation Limited makes acetylene and oxygen, each in two separate works, and the Liquid Carbonic Canadian Corporation Limited makes carbon dioxide at 6 different points. Other operators include the People's Gas Supply Co. Ltd., making acetylene at Ottawa, Ontario; the B.C. Welding Sales & Equipment Co. Ltd., making hydrogen and oxygen at Armstrong, British Columbia; the Oxygen Company of Canada Ltd. making nitrous oxide at Toronto and Montreal; and the Swift Canadian Co. Ltd., Lever Brothers Ltd., and the Canada Packers Limited, all of Toronto, and the Proctor and Gamble Co. of Canada Ltd. of Hamilton, making hydrogen for use in hydrogenating oils for soap-making.

Special War Chemicals

Mention has been made already of the expansion in facilities to make sulphuric acid, nitric acid, ammonia and ammonium nitrate, four of the essentials for the explosives and propellant program. The manufacture of carbamite, an important require-

ment for use as a stabilizer and plasticizer in cordite, was begun in 1941 by Defence Industries Limited at Windsor, Ontario. This project in turn necessitated a steady supply of monoethylaniline, an essential ingredient, so its manufacture was undertaken in 1941 by Shawinigan Chemicals Limited in a government-owned works at Shawinigan Falls, Quebec. Aniline for this purpose was imported at first, but at the end of 1941 the Naugatuck Chemicals Limited started its manufacture at Elmira, Ontario, and in 1942 this company began production of diphenylamine in a separate government unit at the same location.

The manufacture of dibutyl phthalate, needed for smokeless powders, was started in 1942 by the Dominion Tar and Chemical Company Ltd. at its Toronto plant and by the Shawinigan Chemicals Limited at Shawinigan Falls. The former company added a unit for phthalic anhydride in the same year and the latter concern a unit for butyl alcohol in 1943. Hexachlorethane, for smoke bombs, was produced by Defence Industries Limited in its plants at Shawinigan Falls and Windsor.

Most important of all special war projects in the chemical field was the Sarnia plant of the Polymer Corporation Limited for the manufacture of synthetic rubber, with its integrated units for making intermediate chemicals such as styrene, butadiene, etc. Erected by the government at a cost of nearly $50 millions, this huge development began operations in the fall of 1943 and is now working at capacity to meet peace-time requirements.

Probably the next largest of the government undertakings was for the production of anhydrous ammonia, ammonium nitrate, nitroguanidine and dicyandiamide at Welland, Ontario, in a works which was operated by the Welland Chemical Works Limited. It came into production early in 1941 and has been recently purchased by the American Cyanamid Company.

In addition to the above, mention might be made of the projects to produce cumene, alkylates and other such ingredients of high octane gasolines, and still other expansions to meet the increased demands for basic lines such as carbide, phosphorus, acetylene black, ethyl alcohol, toluol, glycerine and others.

According to the Department of Reconstruction and Supply, the output of military explosives and special military chemicals to the end of 1944 had reached a total of 1,500,000 tons. Some of these wartime works have now been dismantled, but others have been purchased by private interests and have become part of the country's permanent chemical industry.

Miscellaneous Chemicals

The above details refer to the main aspects of Canada's chemical manufacturing industry. To complete the story, mention should be made of certain items which do not fall under the particular features that have been treated separately, such as cobalt salts and white arsenic made by the Deloro Smelting and Refining Co. Ltd. at Deloro, Ontario; litharge and red lead by the Carter White Lead Co. of Canada Ltd., at Montreal, Quebec; zinc oxide by the Zinc Oxide Co. of Canada Ltd. at Montreal, Quebec and by the Watts Chemical Co. at Toronto, Ontario; metallic naphthenates by the Nuodex Products of Canada Ltd. at Toronto, Ontario; metallic stearates by H. L. Blachford at Montreal, Quebec; carbon bisulphide by the Cornwall Chemicals Ltd. at Cornwall, Ontario; sodium silicate by the National Silicates Ltd. at Toronto, Ontario; liquid hydrogen peroxide by Canadian Industries Limited at Shawinigan Falls, Quebec; vanillin by the Howard Smith Chemicals Ltd. at Cornwall, Ontario; aluminum sulphate by the Aluminum Company of Canada Limited at Arvida, Quebec, and the Nichols Chemical Company Limited at Valleyfield, Quebec; Copper sulphate by Canadian Copper Refiners Limited at Montreal East, Quebec; fine chemicals by the Merck & Company Ltd. and the Mallinckrodt Chemical Works Ltd. at Montreal, Quebec, and ammonium chloride, salt cake, sodium sulphite, zinc chloride, sodium metabisulphite, liquid sulphur dioxide and sodium thiosulphate by the Canadian Industries Limited at Hamilton, Ontario.

The heavy chemical industry, as it is defined for statistical purposes and for which figures are given in Table 2, includes only the plants which were occupied chiefly in this line of manufacture. Only 36 establishments were placed in this category

in 1945, but there were other works, such as coke plants, metal refineries and explosives divisions which produced chemicals as a secondary or minor part of their operations, and still other works, such as alcohol distilleries and coal tar distilleries which have been given a separate industry classification. From data assembled from all sources, it is estimated that the factory value of all chemicals made for sale was approximately $110 millions in 1945. On a similar basis, the imports were computed at $35 millions and exports at $55 millions.

(b) THE ALLIED CHEMICAL INDUSTRIES

Under this heading mention is made of the industries which use chemicals as main materials to produce paints, soaps, inks, plastics, fertilizers and similar products.

Fertilizers

Sales of fertilizers in Canada during the year ended June 30, 1945 were the highest on record with a total of 575,066 tons being distributed to domestic users compared with 535,708 tons in the previous twelve-month period and with the pre-war high of 334,003 tons in the year ended June 30, 1939. About 37 per cent of the 1945 total was used in Ontario, 26 per cent in Quebec, 28 per cent in the Maritimes, and 9 per cent in the western provinces. Eighty per cent of the total usage in 1945 was in the form of mixtures, the actual tonnage being 483,081 tons as against 91,985 tons of materials, such as ammonium sulphate, superphosphate, etc., which were applied direct.

The fertilizer manufacturing industry, as defined for this review, is made up of 24 plants which are occupied solely in making mixed fertilizers, 2 superphosphate plants which also make some mixtures, and the works of the Consolidated Mining and Smelting Co. of Canada Limited at Trail, British Columbia, which makes synthetic ammonium phosphate, synthetic ammonium sulphate and superphosphate. There are also three large works which make synthetic ammonium nitrate fertilizer compound, but in 1945 quite a large part of their output was in

the form of ammonia, ammonium nitrate and other materials for war use, so they had not yet been transferred to the fertilizer industry. The producers of ammonium nitrate are the Welland Chemicals Limited, Welland, Ontario; the Alberta Nitrogen Products Limited, Calgary, Alberta, and the Consolidated Mining and Smelting Company of Canada Limited at Trail, British Columbia. The tonnage of nitrate fertilizer compound made by these concerns in 1945 amounted to 237,000 tons. In addition, there is a large production, 221,763 tons in 1945, of ammonium sulphate from by-product coke plants and the synthetic fertilizer works at Trail. Cyanamide, chiefly for export, is made by the North American Cyanamid Company Ltd., at Niagara Falls, Ontario.

Exports in 1945 included 181,000 tons of ammonium sulphate, 161,000 tons of phosphate fertilizers, and 411,000 tons of other manufactured fertilizers.

Hardwood Distillation

The distillation of hardwoods is one of Canada's oldest industries, but the first statistical record is for 1911 when the 10 operating plants employed 2,300 men to make products valued at $2 millions. In 1945 there were 5 plants in operation, the Standard Chemical Company Limited having distillation units at Fassett, Quebec, South River, Ontario, and Donald, Ontario, and a refinery at Montreal, Quebec; and the Canadian Industrial Alcohol Co. Ltd. having a distillery and refinery at Lindsay, Ontario. Production at $1,407,000 was slightly lower than in 1944. Methyl alcohol, gray acetate of lime, acetone, and charcoal were the main products.

Medicinals and Toilet Preparations

Sales of medicinals and pharmaceuticals, including fine chemicals, were greater in 1945 than in any previous year. Output in that year was valued at $58·5 millions or 5 per cent more than in 1944. An average of 8,075 persons were employed in the 199 establishments in this line of business, and payments for salaries and wages totalled $12·2 millions. Output was made up approximately as follows: standard pharmacopœal items 18 per cent;

patent medicines 18 per cent; specialties with ingredients declared 26 per cent; biologicals 5 per cent; vitamin preparations 13 per cent; and miscellaneous items 20 per cent.

Penicillin is made in Canada by three companies, as follows: Merck & Co. Limited, and Ayerst, McKenna & Harrison Limited, with plants at Montreal, Quebec and Connaught Laboratories at Toronto, Ontario.

Imports of medicinals and pharmaceuticals were valued at $9·4 millions in 1945 compared with $7·6 millions in 1944, and exports amounted to $5·7 millions as against $4·3 millions for last year.

Production from the toilet preparations industry, which includes only the 96 concerns engaged chiefly in this line of business, totalled $17·5 millions, this being only slightly less than in the preceding year. In addition, there was a considerable output of toilet goods in other industries, the total from all sources amounting in 1945 to $20·2 millions. Imports were valued at $0·4 millions and exports at $1·7 millions.

Coal Tar Distillation

Eleven coal tar distillation plants were in operation in 1945, as follows: The Dominion Tar and Chemical Company Ltd., at Sydney, Nova Scotia; Montreal, Quebec; Toronto, Ontario; Sault Ste. Marie, Ontario, and St. Boniface, Manitoba; the Barrett Company Limited at Montreal, Quebec; Toronto, Ontario; Winnipeg, Manitoba; and Vancouver, British Columbia, and the Currie Products Limited at Hamilton, Ontario. A new plant, owned by Northern Wood Preservers Limited at Sault Ste. Marie, Ontario, began operations in June, 1945. Production at $5·7 millions in 1945 included about 6·5 million gallons of refined tars; 10·5 million gallons of creosote oils; 50,000 tons of pitch, and such chemicals as phenol, cresol and phthalic anhydride.

Imports of coal tar and its products in 1945 were as follows: crude tar, 2,370,710 gallons at $174,178; pitch 2,172 tons at $50,311, and carbolic or heavy oils 203,949 gallons at $46,469.

Exports included coal tar and pitch 3,130,120 gallons at $280,336; creosote oils 1,742,625 gallons at $266,558, and other coal tar oils 2,262,381 gallons at $374,302.

Coal tar dyes are not made in Canada but there are a few concerns engaged in blending and packaging dyes for the Canadian market. Imports of aniline dyes in 1945 totalled $4·5 millions.

Soaps

About 85 per cent of Canada's soap production comes from the factories of the three large companies—Lever Brothers Limited with works at Toronto, Ontario; St. Stephen, New Brunswick; Winnipeg, Manitoba and Vancouver, British Columbia; Colgate-Palmolive-Peet Co. Ltd., at Toronto, Ontario and Proctor & Gamble of Canada Ltd., at Hamilton, Ontario. About 38 smaller companies account for the remainder of the output which in 1945 totalled 133,000 tons valued at $29 millions. Approximately 2,700 persons are employed in these works.

Javelle water and other washing compounds are made in about 56 different plants and household cleaning preparations, such as scouring powders, ammonia powder, etc., in 38 establishments. Output under these headings totalled $3·8 millions in 1945.

Explosives and Ammunition

Before the war Canada's explosives and ammunition industry was made up of four commercial explosives plants, one privately-owned works making small arms ammunition and blasting accessories, one government arsenal making small quantities of artillery and rifle ammunition for military purposes, and three factories making pyrotechnics for civilian use. About 1,000 people were employed in the industry.

Mention has already been made of the tremendous new industry that was created with such rapidity to meet war requirements. Cordite and other military explosives were not being made prior to the outbreak of war except on an experimental scale, so all facilities and technique had to be developed from the ground up. The program involved the erection and

supervision of more than 50 projects involving expenditures of $160 millions, and including complete shell-filling plants as well as facilities for making essential chemicals, explosives and small arms ammunition. At its peak, production was at the rate of 10,000 tons of chemicals and explosives each week and employment was up to 50,000 persons. All kinds of military explosives were produced, including artillery projectiles, smoke boxes, grenades, mines, depth charges, flares, bombs and kindred items as well as detonators, fuses and other components. Output for the explosives and ammunition group, including shell-filling plants, was less than $100 millions in 1945 compared with $360 millions in 1944.

Paints

The paints industry has expanded tremendously in recent years. In 1945 production totalled $46·5 millions and 4,600 persons were employed, compared with output at $25·8 millions and employees at 3,540 in 1939.

The 90 factories which operated in 1945 were distributed across Canada as follows: Ontario 47; Quebec 24; British Columbia 10; Manitoba 5, and 1 in each of Nova Scotia, New Brunswick, Saskatchewan and Alberta.

Imports of paints, pigments and varnishes reached a value of $8.7 millions in 1945, including such important items as titanium oxide and antimony oxide 10,680 tons at $2,045,889; lithopone 10,167 tons at $1,017,275; dry colours 3,221 tons at $1,238,768; carbon black 22,634 tons at $2,145,570; varnishes and lacquers $316,917; and other paints and liquid fillers $610,304. Exports of paints and pigments were valued at $3,973,155.

Inks

In the inks industry there were 30 factories in 1945 and output at $4,950,000 was about 4 per cent over the 1944 figure. Production of printing inks amounted to 12.6 million pounds valued at $4.1 millions, and writing inks were valued at $414,000. Printers' rollers, paste and mucilage were made as minor products. Imports included 507,946 pounds of printing inks worth $266,407, and writing inks valued at $39,342.

Polishes

Polishes, floor waxes and leather dressings were the chief products of 52 establishments whose production totalled $7.3 millions in 1945. Preliminary figures on the more important items in that year are as follows: paste floor wax 7,220,000 pounds at $1,810,000; liquid floor wax 740,000 gallons at $1,742,000; shoe polishes $1,700,000; furniture polishes $268,000; auto polishes $88,000; stove polishes $107,000; silver polishes $108,000; brass polishes $87,000, and other polishes $52,000. Imports of polishes, mostly from United States, were worth $295,613 in 1945 against $286,555 in 1944.

Plastics

Phenol-formaldehyde resins have been made in Canada since about 1912 when the Plastics Limited purchased the rights to produce Bakelite in this country and erected a plant at Toronto for its manufacture. This is now the Bakelite Division, Carbide and Carbon Chemicals Limited. Phenolic resins are made also by the Laucks Monsanto Limited, at Vancouver, British Columbia for use chiefly in making adhesives.

Vinyl resins are made by the Shawinigan Chemicals Limited and Canadian Resins & Chemicals Limited, both at Shawinigan Falls, Quebec. Alkyd resins are made by Canadian General Electric Limited, Toronto, Ontario, and also by Canadian Industries Limited as an intermediate in the manufacture of paints. Moulding powders of ethyl cellulose and cellulose acetate are compounded from purchased flakes by the Synthetics Resins Limited, Galt, Ontario, and urea-formaldehyde resins are made as an intermediate for adhesives by the Hercules-Laux-Merritt Ltd., Stanbridge, Quebec. Casein plastics are made by Canadian Plastics Ltd., Montreal, Quebec, and the Universal Button Fastening & Button Co. Ltd., Windsor, Ontario.

In recent months two large works have started to make styrene resins, one being operated by Monsanto (Canada) Limited at Montreal, Quebec, and the other by the Dow Chemical Company of Canada Limited at Sarnia, Ontario.

In the secondary or moulding and fabricating section of the industry there has been much activity and many new plants have come into existence. Adequate statistics for these operations are not available at present.

Adhesives

Twenty-three factories were occupied in making glues and other adhesives in 1945 and output was valued at $5.8 millions. Here again the details for 1945 are incomplete at this time, but tentative figures place production as follows: bone and hide glue 2,400 tons at $28,000; vegetable glues 9,000 tons at $1,259,000; synthetic resin glues 4,900 tons at $1,005,000; other glues $358,000; linoleum and other cements $360,000.

Matches

Seven match factories were in operation in 1945 and output was valued at $3 millions. The Eddy Match Company had works at Pembroke, Ontario and Berthierville, Quebec; the Federal Match Limited at Hull, Quebec; the Commonwealth Match Co. Ltd. at St. Johns, Quebec; the Canada Match Co. Ltd. at Hull, Quebec; the Strike Rite Matches Ltd. at London, Ontario; and the Book Match Manufacturers Limited at Toronto, Ontario. News items indicate that two new works were under construction in British Columbia in 1946, but it is not known whether they have yet come into production.

Miscellaneous

In addition to the allied industries which have been mentioned above, there are about 200 establishments which make miscellaneous chemical products, such as insecticides, disinfectants, boiler compounds, dry colours, sulphonated oils, and specialties of various kinds. Output of these items was valued at about $15 millions in 1945.

(c) THE CHEMICAL PROCESS INDUSTRIES

In addition to the industries which have been mentioned above, there are a number of related groups which utilize chemical engineering principles or operate under chemical control and

which are generally classed as Chemical Process industries. Some of the country's largest manufacturing groups come under this heading.

Artificial Abrasives

The manufacture of artificial abrasives in Canada began about fifty years ago. The discovery of silicon carbide is generally credited to Dr. A. E. Acheson, who built the first commercial plant at Niagara Falls, New York, in 1895 and a little later erected a subsidiary works at Niagara Falls, Ontario. Fused alumina was first produced commercially as an abrasive in 1901 by the Norton Company in Niagara Falls, New York.

Most of America's output of crude artificial abrasives comes from Canadian plants, and most of this production is shipped to parent companies in the United States for crushing, cleaning and grading. Five concerns in Canada now operate 6 large works for the manufacture of these products, as follows: Abrasive Company of Canada, Arvida, Ltd., Arvida, Quebec; Canadian Carborundum Company Limited, Shawinigan Falls, Quebec and Niagara Falls, Ontario; Exolon Company, Thorold, Ontario; Lionite Abrasives Ltd., Niagara Falls, Ontario; Norton Company, Chippawa, Ontario.

Output in 1945 included 43,000 tons of silicon carbide, 126,000 tons of fused alumina, and other products, such as boron carbide, calcium boride, fused magnesia, etc.

Glass

Three companies now operate 6 glass factories across Canada. Bottles, jars, etc., are made by the Consumers Glass Company Limited, Montreal, Quebec, and by the Dominion Glass Company Limited, with works at Montreal; Hamilton, Ontario; Wallaceburg, Ontario, and Redcliff, Alberta. Window glass is made by the Industrial Glass Works Company, Limited, at Montreal. This latter works, which is the only one of its kind in the country, came into production in May, 1941, was destroyed by fire in June, 1944, and just resumed operations in the fall of 1946.

Output of pressed, blown and drawn glass of all kinds was valued at $18.3 millions in 1945. Imports of window glass in that year totalled 40 million square feet at $2.2 millions.

In 1945 about 3,500 persons were employed by the Canadian industry.

Pulp and Paper

Paper manufacturing began in Canada early in the last century. The first mill in Lower Canada was established at St. Andrews, near Lachute, in 1803, and the second in the county of Portneuf in 1810. The Maritime Provinces entered the industry in 1819 with a mill built a little distance from Bedford Basin, near Halifax. The first mill in Upper Canada was located at Crooks Hollow (now Greensville) near Hamilton, but the date is uncertain, being set by some at 1813 and by others at 1820 and 1825.

Until Confederation, the industry was confined to the manufacture of paper from rags, but in 1866 Alexander Buntin began to make wood pulp at Valleyfield, Quebec, in what is claimed to have been the first wood grinder in America. In 1887 Charles Riordon installed Canada's first sulphite mill at Merritton, Ontario, and in 1907 the Brompton Pulp and Paper Company Limited built at East Angus, Quebec, the first mill in America to produce chemical pulp by the kraft or sulphate process.

In 1881 the output of the industry was worth about $2.5 millions; forty years later, in 1921, it was $151 millions, and at the end of another 20 years, in 1941, it was $334.7 millions. In 1945, the last year for which figures are available, the total was $398.8 millions, and it included 7,478,000 tons of pulpwood, 5,600,000 tons of wood pulp and 4,360,000 tons of paper. The 109 mills which were in operation employed 40,000 persons. Exports of newsprint alone in that year totalled 3,058,000 tons at $179 millions.

Coke and Gas

The present capacity of Canada's coke plants is about 4,000,000 tons per year. By-product ovens are operated by the following concerns: Dominion Steel and Coal Corp. Limited,

Sydney, Nova Scotia; Montreal Coke & Manufacturing Co., Montreal, Quebec; Algoma Steel Corporation Limited, Sault Ste. Marie, Ontario; Hamilton By-Product Coke Ovens Limited, Hamilton, Ontario; Steel Company of Canada Ltd., Hamilton, Ontario; Public Utilities Commission, Owen Sound, Ontario; Winnipeg Electric Company, Winnipeg, Manitoba; the B.C. Electric Power & Gas Co. Ltd., Vancouver, British Columbia, and the Crow's Nest Pass Coal Co. Ltd., Michel, British Columbia. The latter company also operates beehive ovens as does the International Coal and Coke Co. Ltd., Coleman, Alberta. Retort and water gas plants are operated in 17 different cities or towns.

Production from the coke and gas industry in 1945 was valued at $65 millions, this from 30 plants which employed 4,700 workers. Coke production totalled 3,860,000 tons.

Sugar, Starch and Glucose

The refining of sugar is one of Canada's oldest industries, the Census of 1870 showing 4 establishments in this industry with 360 employees and output worth $4 millions. In 1945 there were 11 refineries with 2,700 employees and production at $62 millions. The following concerns have cane sugar refineries: Acadia Sugar Refining Company Limited, Dartmouth, Nova Scotia; Atlantic Sugar Refineries Limited, Saint John, New Brunswick; Canada and Dominion Sugar Company Ltd. at Montreal, Quebec and Chatham, Ontario; St. Lawrence Sugar Refineries Limited, Montreal, Quebec, and the British Columbia Sugar Refining Company Limited, Vancouver, British Columbia. Beet sugar plants are operated by the Quebec Sugar Refinery, St. Hilaire, Quebec; Canada & Dominion Sugar Company Ltd., Wallaceburg, Ontario; the Manitoba Sugar Company, Limited, Winnipeg, Manitoba, and the Canadian Sugar Factories Limited at Raymond and Picture Butte in Alberta. Output in 1945 included 408,000 tons of refined cane sugar and 82,000 tons of refined beet sugar.

At present there are only two concerns in Canada making corn starch, the Canada Starch Company Limited, Cardinal,

Ontario, and the St. Lawrence Starch Company Limited, Port Credit, Ontario. Glucose, corn syrup, corn oil, dextrines, and related items are also made in these works.

Potato starch is made in Prince Edward Island and New Brunswick, there being 2 operating plants in each province in 1945. Three plants in British Columbia made glucose from potatoes.

Petroleum Refining

The early '60s were years of great activity in the western Ontario oil fields. Canada's first real oil well had been drilled in 1862 by James Shaw, a photographer, and there soon followed a number of good strikes including one famous gusher of 7,000 barrels daily. Prices were high and the industry thrived, but the prosperity was shortlived. Soon discoveries in Pennsylvania, U.S.A., forced prices down and cut off markets. The Canadian industry was paralyzed and many of the refiners that had set up plants in and about the oil fields were ruined. A few struggled on, operating intermittently, and in 1880, seven of them in the London and Petrolia districts consolidated their assets and equipment to form the Imperial Oil Company Limited. This was the beginning of the present Imperial Oil Company Limited, which is now one of the principal operators, with refineries at Halifax, Montreal, Sarnia, Regina, Ioco and Norman Wells. Other major refining companies in the industry today include the British American Oil Co. Ltd., at Toronto, Clarkson, Moose Jaw and Calgary; McColl-Frontenac Oil Co. Ltd., at Montreal and Toronto; the Canadian Oil Companies Ltd., at Petrolia; the Good Rich Refining Co., Limited at Port Credit; the Shell Oil Company of Canada Ltd., at Montreal; the Standard Oil Company of British Columbia Ltd., at Burnaby, and the Shell Oil Company of British Columbia Ltd., at Vancouver. A dozen or so smaller refineries, mostly in the western provinces, complete the list.

The Census of 1901 records 14 oil refineries in operation and production at $3.5 millions. Today there are 33 refineries with 7,000 employees and production at $210 millions. Total refinery capacity in 1945 totalled 238,000 barrels of crude oil per day.

Pig Iron, Steel and Ferro-alloys

The iron and steel industry in Canada dates back more than two centuries to the establishment in 1736 of the first iron works, "Les Forges de St. Maurice", on the banks of the St. Maurice River in Quebec. This works was in continuous production until 1883 when it was abandoned. In 1787 steps were taken to develop the iron industry in Nova Scotia and there were iron furnace ventures in Ontario as early as 1800.

In 1945 Canada produced 1,780,000 net tons of pig iron and 2,660,000 net tons of steel ingots and castings. The three major corporations that constitute the core of the industry in Canada are self-contained in that they process iron and steel from the ore through to the semi-finished and finished articles. The activities of the Steel Company of Canada Limited cover a wide range of products. The main plant at Hamilton, Ontario, has 3 blast furnaces, 13 open-hearths, 1 electric furnace and rolling mills for making billets, bars, wire rods, sheets, plates, strip and light shapes. Its capacity is about 1,100,000 net tons of ingots yearly. The Algoma Steel Corporation Limited has 5 blast furnaces, 12 open-hearths and also rolling mills. Its capacity is about 736,000 tons of ingots annually. The Dominion Steel and Coal Corporation operates 4 blast furnaces and 16 steel furnaces, with yearly ingot capacity of 750,000 tons.

In addition to these larger concerns, there are 31 other steel makers which use electric or open-hearth furnaces to produce steel from pig iron and scrap. In all, there are 137 steel furnaces in the country, including 51 open-hearth units, 83 electric units and 3 converters. At the beginning of the war the rated capacity of steel furnaces was 2,300,000 net tons, but new installations raised this potential to 3,623,000 tons at the end of 1945, including 3,358,000 tons ingot capacity and 265,000 tons for castings. The capacity of iron blast furnaces at the end of 1945 was 2,770,000 net tons yearly.

In the ferro-alloys industry, there are 3 main operators, as follows: the Electro-Metallurgical Company of Canada, Welland, Ontario, makes manganese alloys, ferrosilicon and ferrochrome; the St. Lawrence Alloys and Metals Limited, Beauharnois,

Quebec, makes ferrosilicon, calciumsilicon, silicon metal and zirconium alloys; and the Chromium Mining & Smelting Corp. Limited, Sault Ste. Marie, Ontario, makes ferrosilicon, sil-x and chrom-x. In addition, ferrosilicon is recovered as a by-product by the makers of artificial abrasives; ferrophosphorus is made by the Electric Reduction Company of Canada Limited, Buckingham, Quebec; and spiegeleisen and silvery ferrosilicon are made by the Canadian Furnace Limited, Port Colborne, Ontario.

About 30,000 persons are employed in Canada's primary iron and steel industry.

Non-ferrous Metal Smelting and Refining

Amongst the countries of the world, Canada ranks first in the production of nickel and of platinum-group metals, second in gold and zinc, third in copper, and fourth in lead and silver.

The smelting and refining of non-ferrous ores is one of the Dominion's major industries, employing approximately 24,000 workers and distributing $45 millions in salaries and wages each year. At Trail, in British Columbia, there is one of the world's largest metallurgical works operated by the Consolidated Mining & Smelting Co. of Canada Limited. It produces refined lead and zinc, cadmium, bismuth, antimony, silver bullion and tin. At Flin Flon, Manitoba, the Hudson Bay Mining and Smelting Co. of Canada Limited produces refined zinc, cadmium and blister copper. Nickel smelters are operated by the Falconbridge Nickel Mines Limited, Flaconbridge, Ontario, and the International Nickel Co. of Canada Limited, at Copper Cliff, Ontario; the former company exports matte to Norway for refining, but the latter has a copper refinery at Coniston, Ontario, and a nickel refinery at Port Colborne, Ontario, and in addition to refined nickel and copper it recovers selenium, tellurium, platinum-bearing residues, nickel oxide, nickel salts, and gold and silver bullion. The Noranda Mines Limited, Noranda, Quebec, treats the copper-bearing ores from northwestern Quebec; the Deloro Smelting & Refining Co. Limited, Deloro, Ontario, produces cobalt metal and cobalt alloys; the Dominion Magnesium Limited,

Haley, Ontario, makes magnesium metal and calcium metal; and the Canadian Copper Refiners Ltd., Montreal East, Quebec, recovers refined copper, selenium, tellurium, silver, gold and copper sulphate.

At Arvida, Quebec, the Aluminum Company of Canada Ltd. has one of the world's largest aluminum reduction works, and it also has units at Shawinigan Falls, Quebec. Radium salts and uranium salts are produced by the Eldorado Mining and Refining Co. Ltd., Port Hope, Ontario.

Distilleries and Breweries

In 1945, there were 18 establishments engaged in the production of distilled liquors in Canada, 7 being in Quebec, 9 in Ontario and 2 in British Columbia. About 3,900 workers were employed in these plants and output was valued at $60 millions.

The exigencies of war had a profound effect on the distilling industry as practically all facilities were converted to the manufacture of industrial alcohol for use in the synthetic rubber and explosives programs. The output of ethyl alcohol jumped from 5 million gallons of proof spirits in 1939 to 26.7 millions in 1944.

In the brewing industry there were 60 establishments in operation in 1945 with 7,500 employees and production valued at $94 millions.

Rayon, Nylon and Synthetic Rubber

Rayon yarn is made in Canada by the Cortaulds (Canada) Limited, Cornwall, Ontario, and both yarn and fabrics of artificial silk are produced by Canadian Celanese Limited at Drummondville, Quebec. The Canadian Industries Limited, Kingston, Ontario, is the only maker of nylon yarns. Wood pulp and cotton pulp are the main raw materials of the first-mentioned concerns; imported nylon flake is used by the latter company.

The Polymer Corporation Limited, Sarnia, Ontario, turns out approximately 10 million pounds of buna-s and butyl rubber each month. This works, which employs about 1,800 people, is unique in that it not only makes both types of synthetic

rubber but it also makes the principal components—butadiene and styrene for making buna-s, and isobutylene for making butyl rubber. It is located near the Sarnia refinery of the Imperial Oil Limited, from which it draws its basic supply of petroleum gases. During the war it also supplied large quantities of ethylbenzene and cumene for use in high octane gasolines. With its tremendous facilities it is a potential source of chemicals for Canadian industries, and in fact is already providing the styrene monomer for two large plants which have recently come into production on polystyrene plastics.

TABLE 1.—OUTPUT VALUE OF CHEMICALS AND ALLIED PRODUCTS, 1918–1945

Year	Millions of Dollars	Year	Millions of Dollars
1919	98.6	1937	149.0
1921	84.9	1938	146.1
1923	99.7	1939	159.5
1925	99.4	1940	193.9
1927	111.5	1941	304.4
1929	138.5	1942	501.6
1931	105.5	1943	653.5
1933	92.8	1944	730.9
1935	118.6	1945	472.3

TABLE 2.—PRINCIPAL STATISTICS FOR THE CHEMICALS AND ALLIED PRODUCTS INDUSTRIES, 1945

(a) By Industries	Plants	Employees	Salaries and wages	Cost of fuel and electricity	Cost of materials at works	Selling value of products at works
	No.	No.	000's of dollars			
Coal tar distillation	10	381	737	338	3,357	5,372
Heavy chemicals	36	7,755	14,395	8,588	23,360	72,409
Compressed gases	41	1,114	1,941	413	1,271	8,442
Fertilizers	26	2,186	4,454	1,123	18,506	36,209
Medicinals and pharmaceuticals	199	8,075	12,271	384	22,668	58,531
Paints, pigments and varnishes	90	4,624	8,256	383	24,750	46,487
Soaps, washing compounds and cleaning preparations	139	3,068	5,540	642	18,010	36,620
Toilet preparations	96	2,367	3,181	52	6,754	17,494
Inks	30	648	1,334	52	2,090	4,950
Hardwood distillation	5	242	379	195	844	1,407
Adhesives	23	654	1,170	232	2,990	5,807
Polishes and dressings	52	651	937	34	3,900	7,327
Miscellaneous (x)	236	28,072	46,010	3,490	72,361	170,930
TOTAL	983	59,837	100,605	15,926	200,861	472,345
(b) By Provinces						
Prince Edward Island	1	28	47	2	384	598
Nova Scotia	15	386	588	171	2,466	6,001
New Brunswick	9	308	517	45	3,003	4,667
Quebec	328	30,033	48,566	5,634	74,170	183,221
Ontario	509	24,382	41,968	7,432	104,076	224,231
Manitoba	34	1,924	3,088	395	5,818	12,999
Saskatchewan	9	129	165	11	320	657
Alberta	17	479	906	546	828	5,266
British Columbia	61	2,168	4,760	1,690	9,796	34,705
CANADA	983	59,837	100,605	15,926	200,861	472,345

(x) Includes explosives, matches, insecticides, etc.

TABLE 3.—PRINCIPAL STATISTICS FOR THE CHEMICAL PROCESS INDUSTRIES—1944

Industry	No. of plants	No. of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Selling value of products at works
	No.	No.	(000's of dollars)			
Pulp and Paper	104	37,896	78,533	37,359	157,995	369,846
Distilled liquors	17	3,180	5,377	1,393	20,533	46,719
Wineries	30	682	1,058	79	3,075	6,354
Breweries	61	7,125	14,188	1,351	18,021	82,492
Vegetable oils	11	462	729	135	10,641	13,188
Malt and its products	11	459	945	518	8,472	12,900
Rubber goods	56	21,421	35,979	4,510	82,188	169,511
Dyeing of textiles	40	1,667	2,516	517	1,266	6,951
Starch and glucose	8	1,009	1,636	517	8,879	11,790
Sugar refining	11	2,590	4,576	1,476	48,033	63,875
Leather tanning	75	4,472	7,585	828	28,234	45,011
Glass	5	3,321	5,416	1,655	6,107	17,988
Artificial abrasives	6	2,251	4,419	2,496	8,210	25,536
Coke and gas	34	4,747	8,941	6,479	37,809	69,576
Petroleum refining	32	6,699	14,121	8,997	152,687	209,125
Non-ferrous smelting and refining	16	3,371	44,537	36,908	313,996	474,207
TOTAL PROCESS INDUSTRIES	517	101,352	230,556	105,218	906,146	1,625,069

TABLE 4.—PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF SULPHURIC ACID, 1925-45

Year	Production	Imports	Exports
	(Tons—66° Bé Basis)		
1925	83,396	52	19,179
1930	107,352	150	571
1935	224,410	83	1,027
1936	241,075	108	1,128
1937	282,716	108	1,608
1938	268,339	95	1,260
1939	249,558	119	1,605
1940	323,542	142	2,244
1941	482,533	3,671	3,315
1942	592,597	665	13,692
1943	641,127	221	31,414
1944	722,141	190	18,960
1945	713,000	149	11,203

TABLE 5.—CONSUMPTION* OF SULPHURIC ACID IN CANADA, 1944

Industry	Tons of 66° Baumé Acid
Fertilizers	419,000
Explosives	76,000
Non-ferrous smelters and refineries	70,000
Heavy chemicals	62,000
Coke and gas	35,000
Petroleum refining	21,000
Iron and steel	10,000
Textiles	9,000
Electrical apparatus (storage batteries)	3,600
Plastics	2,700
Miscellaneous	8,700
TOTAL	717,000

* Includes some recovered acid.

TABLE 6.—CONSUMPTION OF SULPHUR IN CANADA, 1944

Industry	Tons of 2,000 Pounds
Pulp and paper	195,203
Heavy chemicals	68,649
Explosives	1,753
Rubber goods	1,259
Insecticides	1,228
Adhesives	495
Starch	240
Fertilizers	168
Fruit and vegetable preparations	156
Sugar refining	108
Petroleum refining	51
Miscellaneous	577
TOTAL	269,887

TABLE 7.—PRODUCTION IN CANADA OF ACETYLENE, OXYGEN AND CARBON DIOXIDE, 1920-1945

Year	Acetylene	Oxygen	Carbon dioxide
	(M cu. ft.)	(M cu. ft.)	(000's lb.)
1920	16,122	54,618	5,582
1925	24,384	68,685	3,650
1930	44,182	152,419	6,632
1935	39,923	136,059	8,307
1938	45,394	173,992	11,531
1939	48,616	189,031	12,646
1940	62,076	257,519	14,156
1941	81,791	356,634	16,805
1942	105,752	541,185	18,442
1943	114,111	636,281	19,939
1944	101,981	614,111	21,856
1945	94,776	551,872	20,893

TABLE 8.—PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF TOILET PREPARATIONS, 1920-1945

Year	Production	Imports	Exports
	$	$	$
1920	3,307,347	1,266,801	
1925	4,401,411	1,029,178	
1930	6,719,986	1,267,969	Not available
1935	7,120,316	420,819	
1938	7,847,535	440,390	
1939	8,194,442	533,689	422,105
1940	9,651,786	740,545	283,094
1941	11,954,959	222,826	1,034,586
1942	13,434,424	185,424	463,505
1943	18,629,034	67,070	1,384,701
1944	20,095,208	180,876	1,683,360
1945	20,225,000	402,176	1,745,190

TABLE 9.—PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF PAINTS AND PIGMENTS, 1920–1945

Year	Production	Imports	Exports
	$	$	$
1920	27,042,096	4,642,295	2,013,196
1925	19,530,042	3,997,612	491,184
1930	23,966,502	4,663,681	480,819
1935	20,341,407	3,651,492	741,639
1938	24,317,532	3,774,148	909,875
1939	25,855,506	4,661,956	1,559,661
1940	30,109,130	5,500,622	2,325,476
1941	40,183,625	7,695,413	2,260,178
1942	45,764,802	6,420,095	1,902,695
1943	45,067,845	6,281,152	1,866,700
1944	49,107,432	7,465,070	2,534,351
1945	50,125,000	8,660,314	3,973,155

TABLE 10.—PRODUCTION IN CANADA AND IMPORTS OF PRINTING INKS, 1920-1945

Year	Production		Imports	
	Pounds	$	Pounds	$
1920	.....	1,459,054	.....	221,667
1925	4,981,364	1,442,512	.....	226,555
1930	8,691,735	1,951,245	1,453,350	375,954
1935	9,588,146	2,248,440	419,902	196,260
1938	9,353,410	2,448,710	549,508	221,119
1939	9,155,170	2,692,717	517,732	246,783
1940	9,793,866	2,984,333	665,560	320,241
1941	11,091,468	3,767,697	792,353	353,867
1942	10,390,510	3,683,455	749,111	393,520
1943	10,410,295	3,510,822	436,048	224,950
1944	10,432,495	3,582,309	423,504	232,855
1945	12,565,472	4,056,711	507,946	266,407

TABLE 11.—PRODUCTION IN CANADA AND IMPORTS OF WRITING INKS, 1920-1945

Year	Production	Imports
	$	$
1920	245,335	57,181
1925	225,149	38,208
1930	266,897	46,168
1935	251,987	26,701
1938	257,369	25,260
1939	271,374	26,214
1940	276,330	27,239
1941	380,129	36,903
1942	419,524	58,772
1943	556,627	36,948
1944	448,279	79,539
1945	413,619	39,342

TABLE 12.—PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF SOAPS, 1920-1945

Year	Production	Imports	Exports
	$	$	$
1920	13,731,798	1,698,545	332,427
1925	11,612,977	1,128,157	630,731
1930	14,404,263	.....	.....
1935	13,356,493	494,720	1,321,197
1938	14,655,172	459,503	1,419,051
1939	16,387,256	565,900	643,857
1940	16,826,910	396,286	265,115
1941	20,608,785	374,832	527,230
1942	25,632,422	294,496	1,724,443
1943	25,288,508	262,900	1,629,556
1944	26,704,357	292,570	1,467,721
1945	29,082,649	405,448	3,973,921

TABLE 13.—PRODUCTION OF SOAPS IN CANADA, 1945

Item	1945	
	Quantity	Selling value at works
	Pounds	$
Hard Soaps—		
Bar laundry and household soaps—		
(a) Yellow	69,429,079	5,528,604
(b) White	12,793,564	916,050
Soap chips and soap flakes—		
(a) In household packages	23,998,404	2,876,240
(b) In bulk (except textile and mill)	19,942,840	1,725,416
Textile and mill soaps (including soap chips and flakes)*	3,673,378	389,782
Toilet soaps	33,819,092	6,437,515
Polishing and scouring soaps	354,680	42,183
Castile soaps—		
(a) Boiled	567,906	59,470
(b) Cold process	972,393	123,975
Soap powders—		
(a) In household packages	77,709,617	7,766,752
(b) In bulk	6,568,920	507,559
Shaving soaps—		
(a) Creams	1,222,301	1,254,917
(b) All other	308,405	176,368
All other hard soap	1,500,000	95,000
Liquid soaps	7,680,864	900,308
Soft soaps	4,626,541	282,510
TOTAL SOAPS	265,167,984	29,082,649

* Includes some liquid and soft soaps.

TABLE 14.—PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF AMMONIUM SULPHATE, 1920-1945

Year	Production	Imports	Exports
	Tons	Tons	Tons
1920	19,956	312	18,329
1925	18,251	398	12,560
1930	23,893	3,423	12,010
1935	67,362	4,280	45,055
1938	119,520	5,911	77,191
1939	129,865	3,217	109,260
1940	115,679	355	72,485
1941	98,662	57	59,480
1942	116,796	5,045	79,236
1943	196,404	39	141,080
1944	209,578	104	167,496
1945	221,763	104	181,189

TABLE 15.—PRODUCTION OF MIXED FERTILIZERS IN CANADA, 1920-1945

Year	Tons	Selling value at works
		$
1920	46,743	2,885,868
1925	47,076	1,663,129
1930	78,158	2,548,226
1935	145,844	3,442,017
1938	288,634	7,426,494
1939	279,425	7,223,177
1940	302,842	8,154,305
1941	297,539	8,617,040
1942	406,141	12,480,300
1943	507,816	15,039,197
1944	542,520	15,585,502
1945	533,000	15,939,000

TABLE 16.—FERTILIZERS SOLD FOR CONSUMPTION IN CANADA
1927-1945

Year ended June 30	Materials		Mixtures		Total
	Tons	Per cent of total	Tons	Per cent of total	
1927	105,141	62.1	64,423	37.9	169,564
1929	115,672	51.7	108,078	48.3	223,750
1930	166,257	51.8	154,950	48.2	321,207
1931	137,813	48.5	146,404	51.5	284,217
1932	92,864	51.6	87,119	48.4	179,983
1933	82,374	49.5	84,033	50.5	166,407
1934	98,955	50.8	95,896	49.2	194,851
1935	104,711	49.3	107,768	50.7	212,479
1936	96,479	41.2	137,361	58.8	233,840
1937	106,993	35.9	191,283	64.1	298,276
1938	106,774	33.0	216,602	67.0	323,376
1939	101,077	30.3	232,926	69.7	334,003
1940	85,638	24.7	261,083	75.3	346,721
1941	74,534	23.0	249,667	77.0	324,201
1942	72,136	17.2	347,411	82.8	419,547
1943	72,162	14.7	417,699	85.3	489,861
1944	79,233	14.8	455,875	85.2	535,108
1945	91,985	16.0	483,081	84.0	575,066

TABLE 17.—NITROGEN, PHOSPHORIC ACID AND POTASH CONTAINED IN FERTILIZERS SOLD IN CANADA, 1936-1945

Year ended June 30	In Materials			In Mixtures		
	Nitrogen	Phosphoric acid	Potash	Nitrogen	Phosphoric acid	Potash
	(Tons of 2,000 pounds)					
1936	3,972	14,963	4,071	4,276	13,427	10,303
1937	4,544	17,934	4,623	5,714	19,095	14,819
1938	4,509	17,321	4,779	6,247	22,185	17,142
1939	4,422	15,982	4,931	6,531	24,193	18,408
1940	4,284	15,156	4,137	7,180	27,345	21,106
1941	3,488	12,965	3,994	6,939	26,278	19,908
1942	5,042	13,911	2,877	9,311	37,099	27,497
1943	3,459	13,998	3,112	11,282	45,079	32,977
1944	5,422	15,286	2,933	13,638	48,850	28,020
1945	7,633	25,387	3,087	14,327	51,309	39,578

TABLE 18.—NITROGEN, PHOSPHORIC ACID AND POTASH CONTAINED IN MIXED FERTILIZERS SOLD IN CANADA, BY PROVINCES, 1945

Province	In Materials			In Mixtures		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
	(Tons of 2,000 pounds)					
Prince Edward Island	376	1,014	787	1,659	3,791	3,759
Nova Scotia	663	257	89	1,508	3,602	2,720
New Brunswick	457	405	728	2,556	5,990	6,162
Quebec	163	1,091	86	3,808	14,204	10,627
Ontario	881	2,862	1,146	4,105	21,796	15,046
Manitoba	904	4,703	1	8	23	11
Saskatchewan	1,248	6,494	8	2	7	3
Alberta	1,392	6,159	1	7	23	19
British Columbia	1,449	2,402	241	672	1,873	1,240
CANADA	7,633	25,387	3,087	14,327	51,309	39,578

TABLE 19.—PRODUCTION IN CANADA OF REFINED COPPER, LEAD, ZINC AND ALUMINUM 1920-1945

Year	Refined copper	Refined lead	Refined zinc	Aluminum
	Tons	Tons	Tons	Tons
1920	2,590	14,360	18,517	11,192
1925	170	106,609	38,462	15,553
1930	31,377	152,236	121,496	38,109
1935	173,290	163,758	149,523	23,171
1938	227,204	200,382	171,932	71,204
1939	231,684	190,569	175,641	82,840
1940	261,878	220,088	185,722	109,144
1941	278,224	228,027	213,608	213,873
1942	268,447	243,306	215,795	340,596
1943	249,380	224,493	206,510	495,750
1944	256,244	143,556	168,518	462,065
1945	227,486	163,103	183,317	215,713

TABLE 20.—PRODUCTION IN CANADA, IMPORTS AND EXPORTS OF MATCHES, 1920-1945

Year	Production (selling value* at works)		Imports	Exports
	$		$	$
1920	2,698,125		37,770	107,762
1925	2,054,640		.....	.....
1930	1,645,545		49,661	2,529
1935	1,516,898		4,312	1,121
1938	1,688,229		9,378	508
1939	1,838,404		4,440	2,491
1940	1,842,194		4,769	7,683
	In books	Other		
	$	$		
1941	474,127	1,694,732	9,322	15,026
1942	580,915	1,897,403	8,846	93,875
1943	541,641	1,879,332	41,444	112,180
1944	690,846	1,928,388	12,533	100,342
1945	798,845	2,306,508	5,629	183,873

* Does not include sales or excise taxes.

TABLE 21.—PRODUCTION OF ARTIFICIAL ABRASIVES IN CANADA, 1925-1945

Year	Fused alumina	Silicon carbide	Total
	Tons	Tons	Tons
1925	30,337	16,945	47,282
1930	42,894	22,778	65,672
1935	51,194	18,475	69,669
1938	50,515	19,094	69,609
1939	51,118	17,225	68,343
1940	85,336	24,562	109,898
1941	130,881	32,258	163,139
1942	160,935	44,410	205,345
1943	190,727	51,281	242,008
1944	166,093	47,098	213,191
1945	126,000	43,000	169,000

TABLE 22.—PRODUCTION OF COKE IN CANADA, 1920-1945

Year	By-product and beehive coke	Gas retort coke	Petroleum coke	Pitch coke	Total Coke
	(Thousands of Tons)				
1920	1,270	438	48		1,756
1925	1,079	467	43	Not	1,589
1930	2,063	323	92	available	2,478
1935	1,963	295	72		2,330
1938	2,121	231	64	13	2,429
1939	2,147	263	66	15	2,491
1940	2,726	290	68	15	3,099
1941	2,848	298	71	19	3,236
1942	2,967	289	73	17	3,356
1943	3,243	308	82	18	3,651
1944	3,712	305	73	14	4,104
1945	3,559	304	68	15	3,946

TABLE 23.—PRODUCTION IN CANADA AND EXPORTS OF NEWSPRINT PAPER, 1920-1945

Year	Production	Exports
	Tons	Tons
1920	875,696	761,944
1925	1,536,323	1,401,659
1930	2,497,952	2,332,510
1935	2,765,444	2,574,987
1938	2,668,913	2,424,655
1939	2,926,597	2,658,723
1940	3,503,801	3,242,789
1941	3,519,733	3,262,012
1942	3,257,180	3,005,291
1943	3,046,442	2,810,288
1944	3,039,783	2,805,776
1945	2,455,116	3,058,946

TABLE 24.—SALES OF MANUFACTURED AND NATURAL GAS IN CANADA, 1945

——	Number of customers	Quantity sold	Income from sales
		M cu. ft.	$
(a) Manufactured Gas			
Domestic	493,307	12,720,922	13,928,374
House heating	6,217	1,679,796	914,981
Industrial	3,356	5,109,828	2,996,984
Commercial	29,619	3,893,848	3,429,237
Miscellaneous	114	48,423	49,040
Total	532,613	23,452,817	21,318,616
(b) Natural Gas			
Domestic	194,098	16,875,164	7,975,469
Industrial	1,162	8,375,151	1,930,013
Commercial	11,728	8,276,943	2,164,934
Miscellaneous	482	404,328	36,011
Total	207,470	33,931,586	12,106,427

TABLE 25.—CONSUMPTION IN CANADA OF CERTAIN PETROLEUM PRODUCTS, 1940-1945

	1940	1941	1942	1943	1944	1945
	000's of barrels (35 Imp. gal.)					
Gasoline—Aviation	351	1,592	3,342	4,586	4,096	1,563
Other	24,857	26,269	23,439	22,622	24,437	27,958
Tractor distillate	723	1,063	1,200	1,170	1,146	1,117
Kerosene	898	959	1,049	1,096	1,121	1,310
Light fuel oils	5,718	6,947	6,964	7,161	7,266	8,509
Heavy fuel oils	14,571	16,520	15,892	14,961	16,666	16,938
Total of above	47,118	53,350	51,886	51,596	54,732	57,395

TABLE 26.—IMPORTS INTO CANADA AND EXPORTS OF CHEMICALS AND ALLIED PRODUCTS, 1920-1945
(Values in 000's of dollars)

Year	Total Canada	From or to United Kingdom		From or to United States	
	$	$	%	$	%
(a) Imports					
1920	40,010	6,811	17.0	31,330	78.6
1925	27,653	4,300	15.6	18,327	66.3
1930	36,785	4,709	12.8	23,960	65.0
1935	29,757	6,331	21.3	17,458	58.7
1938	35,205	6,971	19.7	22,309	63.5
1939	43,706	7,375	16.9	30,668	70.2
1940	51,824	7,546	14.5	41,493	80.1
1941	65,382	9,007	13.8	53,845	82.4
1942	66,824	7,845	11.7	56,672	84.8
1943	70,548	5,619	8.0	64,703	91.7
1944	80,843	8,359	10.3	69,970	86.5
1945	79,759	4,748	5.9	71,309	89.4
(b) Exports					
1920	21,432	4,159	19.5	11,644	54.3
1925	17,450	3,451	19.8	8,937	51.2
1930	16,321	3,332	20.4	9,003	55.2
1935	16,372	3,022	18.5	7,983	48.7
1938	19,495	5,031	25.8	7,844	40.3
1939	24,263	5,731	23.6	9,684	40.0
1940	31,223	8,343	26.7	10,846	34.7
1941	58,676	26,426	45.0	15,450	26.3
1942	78,208	31,259	40.0	29,644	37.9
1943	86,391	22,937	26.5	37,149	43.0
1944	100,688	24,057	23.9	47,216	46.9
1945	111,318	16,437	14.8	51,891	46.6

TABLE 27.—IMPORTS INTO CANADA AND EXPORTS OF CHEMICALS AND ALLIED PRODUCTS, BY MAIN GROUPS, 1944 and 1945

Group	Imports		Exports	
	1944	1945	1944	1945
	$	$	$	$
Acids	3,287,948	3,302,751	2,342,333	2,830,480
Alcohols (industrial)	655,672	306,372	8,927,176	5,375,348
Cellulose products	4,925,687	5,330,489	130,718	132,851
Drugs and pharmaceuticals	7,644,786	9,440,067	4,255,536	5,739,853
Dyeing and tanning materials	7,033,319	8,296,920	.....	.....
Explosives	5,572,351	923,101	19,071,701	29,247,315
Fertilizers	4,251,050	3,706,518	23,999,623	30,428,347
Paints and pigments	7,465,070	8,660,314	2,534,351	3,973,155
Toilet preparations	180,876	402,176	1,683,360	1,745,190
Soaps	292,570	405,448	1,467,721	3,973,921
Inorganic chemicals, n.o.p.	11,951,806	11,270,438	14,913,676	12,684,783
Other chemicals	27,581,538	28,221,936	21,361,331	15,186,767
TOTAL	80,842,673	79,758,655	100,687,526	111,318,110

TABLE 28.—IMPORTS OF ACIDS INTO CANADA, 1945

——	Quantity	Value
	Pounds	$
Acetic	3,290	865
Arsenic	5,013,269	185,133
Ascorbic	2,330	19,939
Boracic	3,054,942	165,321
Carbolic, or phenol	3,540,008	353,478
Citric	1,089,007	277,131
Chromic	262,975	48,590
Cresylic	430,726	43,521
Formic	466,225	47,826
Hydrofluosilicic	63,635	10,255
Lactic	960,973	111,946
Muriatic	509,087	19,362
Nicotinic	1,459	4,985
Nitric	925,045	49,653
Oxalic	622,550	78,852
Phosphoric	908,392	62,690
Salicylic and acetylsalicylic	310,695	114,646
Stearic	114,500	167,096
Oleic	93,898	128,294
Sulphuric	298,635	17,454
Tannic	35,960	34,333
Tartaric	1,044,198	786,652
Other	534,471	112,536
TOTAL	.....	2,840,558

TABLE 29.—IMPORTS OF SODIUM COMPOUNDS INTO CANADA, 1945

Item		Quantity	Value
			$
Antimonate	lb.	254,000	43,907
Arseniate, binarseniate and stannate	lb.	47,250	16,980
Benzoate	lb.	166,881	66,441
Borax	lb.	11,425,740	329,412
Bicarbonate	lb.	15,602,364	243,543
Bichromate	lb.	4,128,205	328,527
Bisulphate (nitre cake)	lb.	1,799,469	29,851
Bisulphite	lb.	52,144	2,028
Bromide	lb.	29,000	7,424
Carbonate (sal soda)	lb.	113,420	1,633
Carbonate (soda ash)	ton	22,290	91,655
Caustic—In packages	lb.	850,038	41,294
In solution	lb.	21,618,912	216,651
Citrate	lb.	7,275	1,853
Cyanide	lb.	2,512,388	301,550
Fluoride	lb.	789,795	64,771
Hyposulphite	lb.	463,185	17,032
Nitrate	ton	13,907	518,453
Nitrite	lb.	545,867	24,375
Peroxide	lb.	184,827	32,790
Phosphate—Trisodium	lb.	2,871,762	93,486
Disodium	lb.	180,319	10,962
Other	lb.	2,297,845	191,229
Prussiate	lb.	318,830	35,509
Silicate	lb.	3,240,934	75,188
Sulphate (Glauber's salt)	lb.	2,032,640	29,452
Sulphate (salt cake)	ton	13,535	120,982
Sulphide	lb.	4,480,635	141,566
Sulphite	lb.	612,332	31,000
Other	ton	6,720	1,107,046
TOTAL			4,216,590

TABLE 30.—IMPORTS OF PLASTICS INTO CANADA, 1944 AND 1945

—	1944	1945
	$	$
Cellulose nitrate or pyroxylin plastics, not further manufactured than moulded or pressed, for use in manufactures	1,266,427	1,404,480
Moulding powders of cellulose acetate or other derivatives of cellulose	768,974	987,792
Interlined sheet stock, composed of sheets of cellulose plastics cemented to cotton fabric	18,036	24,891
Other manufactures of pyroxylin plastics	558,740	634,461
Cellulose acetate, in sheets not less than five one-thousandths of an inch in thickness, and in bars or rods, for use in manufactures	440,209	401,612
Cellulose acetate photo film	128,346	133,769
Cellulose, regenerated, and cellulose acetate, transparent, in sheets, not printed	13,489	15,010
Other manufactures of cellulose acetate and of regenerated cellulose	1,728,588	1,725,776
Phenol-formaldehyde moulding powders	384,587	331,747
Other synthetic resin moulding powders	401,171	516,819
Other synthetic resins in liquid or lump form or in tubes, rods, shapes, etc., when for use in Canadian manufactures	4,199,221	5,399,330
Laminated synthetic resins in tubes, rods or other shapes—		
(a) With base of paper or fibreboard	288,685	203,280
(b) With base of cotton or other woven fabric	179,539	152,738
Synthetic plastics with base of casein, soya bean, gelatine or starch in bars, tubes or other shapes (except button blanks)	15,468	11,724
Synthetic resin glue lb.	1,029,297	516,306
$	290,348	135,202
Synthetic casings for meats and meat products lb.	690,716	635,871
$	911,506	758,717
Other manufactures of synthetic resins	918,853	1,015,948
TOTAL	12,512,187	15,005,473

TABLE 31.—IMPORTS INTO CANADA OF VEGETABLE OILS, 1945

——	Quantity	Value
	Pounds	$
(a) For Non-edible Uses		
Castor oil	9,750,400	1,386,179
Chinawood oil	360,800	157,162
Cocoanut oil	98,000	26,967
Cottonseed oil for refining	24,481,400	2,882,508
Essential oils, not elsewhere specified	777,647	2,399,328
Eucalyptus oil	23,563	21,485
Linseed oil	176,900	40,281
Olive oil for use in manufactures	125,200	24,781
Palm oil and palm kernel oil	29,642,600	1,263,147
Peanut oil	16,200	2,958
Vegetable oils for textiles	1,016,800	202,846
Lemon oil and orange oil	76,889	221,532
Spearmint oil	12,084	53,443
Peppermint oil	38,743	279,076
Perilla oil	.....	.....
Sesame seed oil	400	114
Soya bean oil for manufacture of soap	59,500	7,890
Cashew nut oil	110,100	21,943
Oiticica oil	369,800	94,879
Sunflower seed oil	16,050,000	1,484,913
Rapeseed oil	695,200	104,936
Resin oil	560,000	35,866
Other vegetable oils for use in manufactures	544,800	84,696
(b) For Edible Uses		
Cocoanut oil	.....	.....
Cottonseed oil	74,900	9,689
Olive oil	82,000	54,897
Peanut oil	76,000	13,874
Soya bean oil	3,492,900	565,338
Total	.....	11,440,728

TABLE 32.—IMPORTS OF TWENTY-FIVE MAJOR MISCELLANEOUS CHEMICAL ITEMS, 1945

———	Tons	$
Butadiene	.....	5,072,781
Sulphur	248,846	4,063,324
Carbon black	22,634	2,145,570
Titanium oxides, titanium pigments and antimony oxide	10,680	2,045,889
Muriate of potash, crude	70,216	1,765,963
Lithopone	10,167	1,017,275
Ethylene glycol	6,731	1,446,257
Xanthates and sulpho-thio-phosphoric compounds for concentrating ores	1,755	757,583
Aluminum sulphate	34,883	877,780
Copper sulphate	3,259	417,808
Litharge	1,763	315,553
Menthol	.....	300,779
Acetone and amyl acetate	.....	273,636
Formaldehyde	3,876	265,899
Potassium sulphate, crude	3,945	159,283
Butyl alcohol; methyl ethyl ketone; isopropyl alcohol	636	157,283
Cream of tartar	170	184,074
Zinc oxide	1,168	180,281
Naphthalene flakes and balls	1,002	155,321
Riboflavin	.....	208,431
Caustic potash	1,320	140,006
Iodine, crude	37	106,149
Potassium nitrate	734	100,517
Magnesium sulphate	2,545	101,695
Carbon tetrachloride	1,028	116,202

TABLE 33.—IMPORTS INTO CANADA AND EXPORTS OF CHEMICALS AND ALLIED PRODUCTS, BY COUNTRIES, 1944 and 1945

Country from which imported	Imports		Exports	
	1944	1945	1944	1945
	$	$	$	$
United Kingdom	8,359,311	4,747,598	24,057,480	16,436,727
Ireland	.....	.....	54,898	90,053
Aden	.....	.....	57,283	24,658
British South Africa	109,340	214,607	2,031,905	2,063,652
British East Africa	.....	3,361	69,296	66,965
Southern Rhodesia	.....	.....	71,316	96,924
Bermuda	.....	.....	93,838	119,820
British India	118,983	150,566	3,043,889	4,120,304
Ceylon	4,525	2,300	1,329,484	605,048
Straits Settlements	.....	.....	.....	55,516
British Guiana	.....	1,457	312,967	383,404
British Honduras	.....	.....	47,505	66,700
Barbados	.....	.....	372,276	218,556
Gold Coast	.....	.....	16,140	87,421
Jamaica	36,097	32,536	555,526	822,616
Trinidad and Tobago	63	.....	690,246	862,930
Other British West Indies	.....	.....	428,454	377,315
Hong Kong	.....	.....	.....	6,198
Malta	.....	.....	17,303	25,744
Newfoundland	.....	.....	1,791,791	1,929,792
Australia	36,349	43	679,592	1,302,653
Fiji	.....	4,707	14	269,455
New Zealand	28,572	.....	559,739	558,164
Palestine	.....	.....	1,232,186	195,204
Other British Empire	.....	4,934	118,831	32,238
TOTAL BRITISH EMPIRE	8,693,240	5,426,947	37,598,502	30,549,309
Argentina	643,567	1,129,552	372,886	746,292
Belgian Congo	.....	.....	92,417	80,978
Belgium	.....	60	.....	245,927
Brazil	158,116	239,959	317,092	811,620
Bolivia	.....	.....	56,042	71,387
Czechoslovakia	.....	.....	.....	563,784
Chile	309,682	290,249	44,134	118,099
China	1,284	.....	3,055	22,751
Colombia	1,855	4,621	205,874	281,555
Costa Rica	.....	.....	12,655	16,397
Cuba	.....	.....	414,468	529,883
Dutch East Indies	.....	.....	.....	1,723
Ecuador	.....	.....	48,220	32,857
Egypt	.....	.....	2,194,715	562,021
France	343	5,205	414,024	5,858,522
French Africa	10,164	.....	377,471	419,080
French Oceania	.....	.....	10,674	31,088
Germany	.....	.....	.....	215,404
Greece	.....	.....	10,009	278,132

Country from which imported	Imports		Exports	
	1944	1945	1944	1945
	$	$	$	$
Greenland			298	55,740
Guatemala	695		8,584	7,532
Haiti			380,367	383,218
Honduras			32,627	31,480
Iceland			235,461	383,741
Iraq			17,073	44,424
Italy		42	1,832,929	3,900,653
Mexico	7,018	6,374	851,768	731,894
Morocco				29,779
Netherlands				1,444,503
Netherlands Guiana				23,422
Netherlands West Indies				84,004
Norway				79,018
Nicaragua			160,212	181,853
Panama			52,969	64,094
Peru	4,569	17,026	195,797	248,189
Persia			29,146	17,688
Paraguay	168,213	201,532		3,664
Poland				739,252
Portugal		35,029	97,235	135,503
Russia (U.S.S.R.)	10,065	173,960	5,020,841	3,772,538
Spain	563,033	506,632	21,589	18,628
Sweden			11,000	477,629
Switzerland	300,748	412,062		6,581
Turkey			51,084	122,220
United States	69,969,591	71,309,405	47,216,022	51,891,338
Alaska			164,796	644
Hawaii			1,505,589	3,207,733
Philippines				752
Puerto Rico			291,822	540,182
Uruguay			104,213	63,944
Venezuela	490		110,874	225,123
Yugoslavia				772,571
Other Countries			100,960	191,397
Total Other Countries	72,149,433	74,331,708	63,089,024	80,768,801
TOTAL ALL COUNTRIES	80,842,673	79,758,655	100,687,526	111,318,110

TABLE 34.—CONSUMPTION OF CHEMICALS IN CERTAIN INDUSTRIES, 1944

——	Quantity	Cost at Works
		$
PULP AND PAPER—		
Alum (aluminum sulphate)	tons	31,514	1,143,608
Caustic soda	"	19,742	833,265
Chlorine liquid	"	23,731	1,053,653
China clay	"	47,995	987,488
Copper sulphate	"	73	10,417
Lithopone	"	63	7,300
Muriatic acid	"	115	19,493
Precipitated chalk	"	300	23,444
Soda ash	"	4,393	153,535
Sodium silicate	"	1,865	72,847
Salt cake	"	70,954	1,387,417
Soapstone	"	1,024	34,276
Starch	"	3,049	339,081
Sulphur	"	195,203	5,435,481
Sulphuric acid	"	1,102	28,501
Tale	"	5,202	96,395
Titanium oxide	"	336	126,966
Zinc sulphate	"	14	1,572
RUBBER GOODS—			
Rubber—Raw or crude	"	11,481	5,736,345
Reclaimed	"	12,971	2,400,085
Scrap	"	20,717	592,885
Synthetic	"	28,918	13,290,288
Liquid latex	gal.	54,200	110,116
Powdered latex	tons	41	16,258
Other rubber	"	137	84,231
Barytes	"	289	12,894
Carbon black	"	16,117	1,896,343
Sulphur	"	1,259	68,842
Synthetic resins and plastics	"	1,381	735,771
Tale and soapstone	"	2,507	46,780
Whiting	"	2,208	46,925
Zinc oxide	"	3,504	483,142
LEATHER GOODS—			
Alum	lb.	356,333	10,401
Ammonium chloride	"	186,590	9,649
Borax	"	363,494	12,008
Dyes, aniline	"	334,791	250,329
Dyes, vegetable	"	188,574	69,810
Formaldehyde	"	120,147	9,927
Formic acid	"	147,506	26,487
Glucose	"	211,456	10,710
Lactic acid	"	830,226	44,331
Lithopone	"	164,302	10,392
Magnesium sulphate (Epsom salts)	tons	932	535,566

—		Quantity	Cost at Works
			$
LEATHER GOODS—*Con.*			
Oxalic acid	lb.	853,298	34,138
Sodium bicarbonate	lb.	930,402	34,618
Sodium bichromate	tons	969	193,532
Sodium hyposulphite	"	580	33,389
Sodium bisulphite	lb.	754,342	31,266
Sodium sulphide	"	1,076	103,874
Stearine	"	296	67,464
Wax	"	358	58,029
Other chemicals		.....	249,401
DYEING AND FINISHING OF TEXTILES—			
Acetic acid	lb.	191,836	15,580
Alcohol, ethyl	proof gal.	1,291	1,188
Alum	lb.	85,600	2,024
Ammonia, liquid	"	63,964	2,328
Carbon tetrachloride	"	1,599	155
Caustic soda	"	280,459	8,298
Chlorine, liquid	"	170,803	9,039
Dyes	"	.....	526,062
Formic acid	"	21,318	3,889
Glauber's salt	tons	597	20,916
Hydrogen peroxide	lb.	102,909	20,739
Magnesium sulphate (Epsom salts)	"	87,170	2,551
Muriatic acid	"	167,840	3,759
Soda ash	tons	208	3,007
Sulphuric acid 66° Bé	"	191	7,049
Trisodium phosphate	lb.	17,755	843
Starch	"	268,738	3,309
Other chemicals		.....	433,697
COKE AND GAS—			
Caustic soda	tons	1,015	41,293
Soda ash	"	98	3,230
Sulphuric acid, 66° Bé	"	35,249	570,177
PETROLEUM REFINING—			
Fuller's earth and clay	"	13,785	646,708
Phenol	lb.	892,069	126,539
Sulphuric acid 66° Bé	tons	21,384	461,306
Sulphur	"	51	2,628
Caustic soda	"	4,166	223,316
Soda ash	"	240	11,335
Litharge	"	185	30,346
GLASS—			
Barytes	tons	294	9,504
Borax	"	2,175	192,356
Cobalt oxide	lb.	4,024	7,647
Feldspar	tons	2,382	34,612
Fluorspar	"	376	20,776

—		Quantity	Cost at Works
			$
GLASS—*Con.*			
Nepheline syenite	tons	7,285	130,383
Salt cake	"	770	14,544
Sodium bichromate	"	15	3,018
Potassium bichromate	"	23	6,383
ELECTRICAL APPARATUS—			
Ammonium chloride	"	1,107	97,347
Manganese dioxide	"	3,314	236,404
Sulphuric acid 66° Bé	"	3,569	108,999
Zinc chloride	"	472	35,900
MEAT PACKING AND SHORTENING—			
Chemicals, not shown separately	"	.....	404,218
Oils—Animal	"	7,621	1,586,217
Coconut	"	2,803	573,421
Cottonseed	"	18,210	3,786,465
Peanut	"	1,194	349,191
Soya bean	"	5,609	1,221,154
Sunflower seed	"	9,286	4,944,283
Other vegetable oils	"	1,349	255,345
Marine	"	8,998	1,749,561
SUGAR REFINING—			
Acids	"	523	37,034
Bone black	"	742	134,738
Corn starch	"	461	53,068
Infusorial earth	"	2,188	115,053
Soda ash	"	114	5,125
Sulphur	"	108	5,078
Vegetable char	"	316	77,643
CARBONATED BEVERAGES—			
Carbon dioxide, in cylinders	"	3,534	586,483
Carbon dioxide, solid	"	225	32,656
Citric acid and tartaric acid	"	192	214,075
BREWERIES—			
Ammonia, anhydrous	lb.	58,674	11,347
Carbon dioxide gas	tons	818	83,393
Tartaric acid	lb.	58,404	25,935
VEGETABLE OILS—			
Fuller's earth	tons	206	16,991
Sulphuric acid	"	150	6,752
Caustic soda	"	55	4,219
Potash	"	64	12,122

—		Quantity	Cost at Works
			$
FRUIT AND VEGETABLE PREPARATIONS—			
Agar-agar	lb.	1,972	6,694
Alcohol, ethyl	proof gal.	588,476	630,158
Ascorbic acid	lb.	8,800	146,200
Citric acid	"	28,123	13,338
Corn starch	tons	630	68,753
Gelatine	lb.	40,967	39,137
Glucose	tons	3,931	479,554
Sulphur	"	156	11,198
Sulphur dioxide	lb.	315,167	27,742
Tartaric acid	"	2,423	2,458
Tannic acid	"	1,556	1,838
SOAPS—			
Acid—Cresylic	"	192,448	18,678
Hydrochloric	"	268,383	6,143
Stearic	"	552,407	109,801
Sulphuric	"	138,117	1,733
Alcohol, ethyl	proof gal.	15,328	19,076
Carbon tetrachloride	lb.	4,942	385
Caustic soda	tons	13,777	723,451
Caustic potash	lb.	796,775	59,592
Chalk	tons	336	11,056
Chlorine, liquid	"	1,093	101,348
Chloride of lime	"	813	46,189
Feldspar	"	15,383	35,423
Fuller's earth	"	591	35,047
Glycerine, crude	"	664	124,018
Oils—Coconut	"	13,216	2,050,462
Corn	lb.	1,842	259
Cottonseed	"	228,492	28,217
Essential	.....	.....	480,273
Fish	tons	3,172	412,574
Linseed	gal.	154,676	130,910
Olive	lb.	2,118	964
Palm and palm kernel	tons	7,377	897,868
Seal	lb.	11,150	378
Soya bean	"	231,630	24,424
Whale	tons	933	101,833
Rosin	"	3,510	396,023
Soda ash	"	7,842	240,801
Tri-Sodium phosphate	"	1,517	129,677
Sodium silicate	"	15,208	226,804
Talc	"	608	16,238
Tallow, grease and soapstock	"	.....	.....
Trichlorethylene	lb.	115,525	11,416

BRIEF CHRONOLOGICAL RECORD OF DEVELOPMENTS IN THE CHEMICAL MANUFACTURING INDUSTRY IN CANADA, 1919–1946

1919—Soda ash made by Brunner, Mond Canada, Ltd., Amherstburg, Ont.

1921–22—Liquid chlorine made by Canadian Salt Co. Ltd., Sandwich, Ont.

1923—Acetylene black made by Canadian Electro Products Co. Ltd., Shawinigan Falls, Que.

1924—Phosphoric acid made by the Electric Reduction Co. Ltd., Buckingham, Que.

1925—Sulphuric acid first made from smelter gases in new plant at smelter of the Mond Nickel Co. Ltd., Coniston, Ont.
Insulin made at Connaught Laboratories, Toronto, Ont.

1927—Butyl acetate and ethyl acetate made by Shawinigan Chemicals Ltd., Shawinigan Falls, Que.

1929—Vinyl acetate made by Shawinigan Chemicals Ltd., Shawinigan Falls, Que.

1930—Pentasol acetate made by Shawinigan Chemicals Ltd., Shawinigan Falls, Que.
Synthetic ammonia made by Canadian Industries Ltd., Windsor, Ont.
New sulphuric acid plant of Canadian Industries Ltd. at Copper Cliff, Ont. commenced operations utilizing smelter gases from smelter of the International Nickel Co. of Canada Ltd.
Nitre cake made by Canadian Industries Ltd. at Copper Cliff, Ont.
Iron oxides made by the Northern Pigment Co., New Toronto, Ont.
Synthetic nitric acid made by Canadian Industries Ltd. at Beloeil, Que.
Superphosphate and fertilizer mixing plants of Canadian Industries Ltd. at Beloeil, Que. and Hamilton, Ont., commenced operations.
The Mallinckrodt Chemical Co. started to manufacture fine chemicals in Canada.
Merck & Co. Ltd., Montreal, Que. started to manufacture fine chemicals in Canada.

1931—Synthetic ammonium sulphate, synthetic ammonium phosphate, and triple superphosphate made by the Consolidated Mining and Smelting Co. of Canada Ltd., at Trail, B.C.

1932—Sodium silicate made by the American Cyanamid Company, Niagara Falls, Ont.
Liquid sulphur dioxide made by Canadian Industries Limited, Hamilton, Ont.
Sodium chlorate plant rebuilt by the Electric Reduction Co. Ltd., Buckingham, Que.
Phenol, cresol, and other tar derivatives made by the Dominion Tar and Chemical Co. Ltd., Toronto, Ont.
Nitrous oxide made by Chency Chemicals Ltd., Toronto, Ont.

1933—Acid calcium phosphate made by the Electric Reduction Co. Ltd., Buckingham, Que.
Sulphur dichloride and sulphur monochloride made by Canadian Industries Ltd. at Windsor, Ont.
Sodium silicate plant of National Silicates Ltd., New Toronto, Ont. commenced operations.
Vinyl acetate resins made by Shawinigan Chemicals Ltd., Shawinigan Falls, Que.
Zinc oxide made by the Zinc Oxide Company of Canada Ltd., Montreal, Que.

1934—Calcium chloride made by the Brunner, Mond Canada, Ltd., Amherstburg, Ont.
Ferric chloride made by Canadian Industries Ltd., Windsor, Ont.
Caustic soda-chlorine works of Canadian Industries Ltd. at Cornwall, Ont., commenced operations.
Radium salts and uranium salts made by the Eldorado Gold Mines Ltd., Port Hope, Ont.

1935—Liquid hydrogen peroxide made by Canadian Industries Ltd. at Shawinigan Falls, Que.
Disodium and trisodium phosphate made by the Electric Reduction Company of Canada Ltd., Buckingham, Que.

1936—Acetone made by Shawinigan Chemicals Ltd.
Acid sodium pyrophosphate made by Electric Reduction Co. of Canada Ltd.
Elemental sulphur produced commercially by Consolidated Mining & Smelting Co. of Canada Ltd., Trail, B.C.
Acetic anhydride made by Shawinigan Chemicals Ltd.

1937—Perchlorethylene and trichlorethylene made by Canadian Industries Ltd., at Shawinigan Falls, Que.
Vanillin made by Howard Smith Chemicals Ltd., Cornwall, Ont.

1938—Lactic acid made by Beamish Sugar Refineries Ltd. at Toronto, Ont.
Stearic acid made by W. C. Hardesty Ltd. at Toronto.

Metallic naphthenates made by Nuodex Products of Canada Ltd. at Toronto.
Aluminum fluoride made by Aluminum Co. of Canada at Arvida.

1939—Caustic soda-chlorine works of Canadian Industries Ltd. at Shawinigan Falls came into production.
Tetrasodium pyrophosphate made by Electric Reduction Co. Ltd.

1940—Ammonium chloride, zinc chloride and sodium sulphite made by Canadian Industries Ltd. at Hamilton.
Calcium phosphide and acid sodium orthophosphate made by Electric Reduction Co. Ltd.

1941–42—Potassium chlorate, potassium perchlorate, barium chlorate, ammonium perchlorate made by Electric Reduction Co. Ltd.
Sodium thiosulphate and sodium metabisulphite made by Canadian Industries Ltd. at Hamilton.
Carbon bisulphide made by Cornwall Chemicals Ltd., Cornwall, Ont.
Nickel formate made by Catalytic Chemical Corp. Ltd. at Toronto.
Phthalic anhydride and dibutyl phthalate made by Dominion Tar & Chemical Co. Ltd. at Toronto.
Hexachlorethane made by Defence Industries Limited at Shawinigan Falls.
New sulphuric acid plant at Valleyfield, operated by Nichols Chemical Co. Ltd.
Carbamite and phosgene made by Defence Industries Ltd. at Windsor, Ont.
Sulphuric acid, anhydrous ammonia, ammonium nitrate, dicyandiamide, nitroguanidine and guanidine nitrate made by Welland Chemical Works Ltd. at Welland.
Anhydrous ammonia and ammonium nitrate made by Alberta Nitrogen Products Limited at Calgary and by Consolidated Mining and Smelting Co. of Canada Limited at Trail.
Monoethylaniline made by Shawinigan Chemicals Limited at Shawinigan Falls.

1942–43
Aniline oil, diphenylamine and rubber chemicals made by Naugatuck Chemicals Limited at Elmira.
Butyl alcohol made by Shawinigan Chemicals Limited at Shawinigan Falls.
Ethyl alcohol made from waste sulphite liquor by Ontario Paper Company Ltd. at Thorold.
Anhydrous hydrogen chloride made by Canadian Industries Limited at Shawinigan Falls.
Military gases and respirator charcoal made by Stormont Chemicals Limited, Cornwall, Ont.

Synthetic rubber made by Polymer Corporation Limited, Sarnia, Ont.

Penicillin made by Merck & Co. Ltd. and Ayerst McKenna and Harrison Ltd. at Montreal, and by Connaught Laboratories Limited at Toronto.

1945-46—Monochlorobenzene and chloroform made by Canadian Industries Limited at Shawinigan Falls.

Phosphorus sesquisulphide made by Electric Reduction Company of Canada Limited at Buckingham.

Monochloroacetic acid, crotonic acid, and chloral made by Shawinigan Chemicals Limited at Shawinigan Falls.

D.D.T., quinoline, nitrobenzene, acetanilide and phenolthiazine made by Naugatuck Chemicals at Elmira.

Aluminum sulphate made by Aluminum Company of Canada Ltd. at Arvida and by Nichols Chemical Company Limited, at Valleyfield.

Polystyrene resins made by Dow Chemical Company of Canada Ltd. at Sarnia and by Monsanto (Canada) Limited at Montreal.

(e) PRINCIPAL MANUFACTURERS OF CHEMICALS IN CANADA

Name and Head Office Address	Principal Chemicals Made
Heavy Chemicals Industry	
Alberta Nitrogen Products Ltd., Box 370, Calgary, Alta.	Anhydrous ammonia; ammonium nitrate; nitric acid (own use).
Blachford, H. L., Limited, 977 Aqueduct St., Montreal, Que.	Metallic stearates; calcium resinate; zinc resinate; lead oleate; sodium oleate; zinc laurate; rubber chemicals; synthetic waxes.
Brunner, Mond Canada, Limited, Canadian Bank of Commerce Bldg., Toronto, Ont.	Calcium chloride; soda ash.
Canadian Industries Limited, 1135 Beaver Hall Hill, Montreal, Que.	Hydrochloric acid; sulphuric acid; nitric acid; ammonium chloride; sodium silicate; sodium sulphate (salt cake); sodium sulphate (Glauber's salt); anhydrous sodium sulphite; sodium metabisulphite; sodium thiosulphate; liquid sulphur dioxide; zinc chloride; liquid chlorine; caustic soda; sodium hypochlorite; anhydrous hydrogen chloride; anhydrous ammonia; aqua ammonia; chloride of lime; ferric chloride; sulphur monochloride; ammonium hydroxide; liquid hydrogen peroxide, perchlorethylene; trichlorethylene; calcium magnesium chloride; zinc ammonium chloride; monochlorobenzene; chloroform; chlorine gas; liquid sulphur dioxide, nitroglycerine; sodium azide.
Church & Dwight, Limited, 2715 Reading St., Montreal, Que.	Sal soda.
Consolidated Mining & Smelting Company of Canada, Limited, The Trail, B.C.	Anhydrous ammonia; ammonium nitrate; hydrofluosilicic acid; sulphuric acid (own use); ammonium sulphate; ammonium phosphate; nitric acid (own use); hydrogen (own use); phosphoric acid (own use).
Cornwall Chemicals Limited, 1135 Beaver Hall Hill, Montreal, Que.	Carbon bisulphide
Electric Reduction Co. of Canada Ltd., Buckingham, Que.	Phosphoric acid; acid calcium phosphate; phosphorus pentoxide; ammonium perchlorate; barium chlorate; calcium phosphide; ferrophosphorus; amorphous phosphorus; yellow phosphorus; potassium chlorate; potassium

Name and Head Office Address	Principal Chemicals Made
Heavy Chemicals—Continued	
Electric Reduction Co. of Canada Ltd.—*Concluded*	perchlorate; sodium acid phosphate; sodium chlorate; monosodium phosphate; disodium phosphate; trisodium phosphate; tetrasodium pyrophosphate; phosphorus sesquisulphide.
Hardesty, W. C., Co. of Canada Limited, 521 Front St. E., Toronto, Ont.	Hydrogenated stearic acid; hydrogenated tallow fatty acids; tallow fatty acids; cocoanut fatty acids; mixed fatty acids; glycerine; hydrogenated fish oils.
National Silicates Limited, P.O. Box 69, New Toronto, Ont.	Sodium silicate; sodium metasilicate.
Naugatuck Chemicals, Division of Dominion Rubber Co. Ltd., 550 Papineau Ave., Montreal, Que.	Aniline; monomethylaniline; diphenylamine; acetanilide; phenothiazine; rubber accelerators and specialties; nitrobenzene; oil of mirbane; quinoline; D.D.T.
Nichols Chemical Company, Limited, The Sun Life Building, Montreal, Que.	Hydrochloric acid; sulphuric acid; nitric acid; sodium bisulphate (nitre cake); anhydrous ammonia; aluminum sulphate.
North American Cyanamid Limited, Niagara Falls, Ont.	Calcium cyanamide; calcium cyanide; sodium silicate.
Nuodex Products of Canada, Limited, 34 Industrial St., Leaside, Ont.	Lead naphthenate; cobalt naphthenate; manganese naphthenate; zinc naphthenate; copper naphthenate; calcium naphthenate.
Shawinigan Chemicals Limited, Power Building, Montreal, Que.	Acetic anhydride; acetone; acetylene black; glacial acetic acid; butyl acetate; calcium carbide; dibutyl phthalate; ethyl acetate; paraldehyde; pentasol acetate; vinyl acetate; polyvinyl acetate resins; butyl alcohol; cerium croton aldehyde; paraldehyde; butyraldehyde; ethylidene diacetate; acetaldehyde; crotonic acid; chloral; monochloroacetic acid; crotonic esters.
Zinc Oxide Company of Canada Ltd., 6894 Notre Dame St. E., Montreal, Que.	Zinc oxide.
Watts Chemical Co., 355 Weston Rd. S., Toronto, Ont.	Zinc oxide; zinc dust.

Name and Head Office Address	Principal Chemicals Made
Heavy Chemicals—Concluded	
Welland Chemical Works Ltd., Niagara Falls, Ont.	Nitric acid; sulphuric acid; anhydrous ammonia; ammonium nitrate; nitroguanidine; dicyandiamide; guanidine nitrate.
Compressed Gases Industry	
B.C. Welding Sales & Equipment Co. Ltd., Armstrong, B.C.	Hydrogen; oxygen.
Canadian Liquid Air Co. Limited, 1111 Beaver Hall Hill, Montreal, Que.	Acetylene; nitrogen; oxygen.
Dominion Oxygen Co. Ltd., Canada Life Bldg., Toronto, Ont.	Hydrogen; nitrogen; oxygen.
Liquid Carbonic Canadian Corporation Limited, 2120 Cabot St., Montreal, Que.	Carbon dioxide (solid and in cylinders).
Oxygen Co. of Canada, Ltd., St. James St. W., Montreal, Que.	Nitrous oxide.
People's Gas Supply Co. Ltd., 2–10 Mill St., Ottawa, Ont.	Acetylene.
Prest-O-Lite Co. of Canada, Ltd., Canada Life Bldg., Toronto, Ont.	Acetylene.
Wall Chemicals Canadian Corporation, Limited, 2120 Cabot St., Montreal, Que.	Acetylene; oxygen.
Fine Chemicals Industry	
Merck & Co. Ltd., 412 St. Sulpice St., Montreal, Que.	Fine chemicals; vitamins; sulpha drugs; penicillin.
Mallinckrodt Chemical Works of Canada Limited, 378 St. Paul St. W., Montreal, Que.	Fine chemicals.

Name and Head Office Address	Principal Chemicals Made
Primary Plastics Industry	
Canadian Plastics Limited, 1850 St. Antoine St., Montreal, Que.	Casein resins.
Canadian Resins & Chemicals, Limited. 107 Craig St. W., Montreal, Que.	Polyvinyl resins
Carbide & Carbon Chemicals, Ltd. 340 University Ave., Toronto, Ont.	Phenolic resins.
Canadian General Electric Company, Ltd. 212 King St. W., Toronto, Ont.	Glyptal resins.
Dow Chemical Company of Canada Ltd., Sarnia, Ont.	Polystyrene resins.
Monsanto (Canada) Limited, Montreal, Que.	Polystyrene resins.
Universal Button Fastening & Button Co. Ltd., Windsor, Ont.	Casein resins.
Non-ferrous Smelting and Refining Industry	
Aluminum Company of Canada, Limited, 1700 Sun Life Building, Montreal, Que.	Aluminum fluoride; synthetic cryolite; sulphuric acid; aluminum sulphate; alumina hydrate; calcined alumina.
Canadian Copper Refiners Limited, Montreal East, Que.	Selenium dioxide; selenium salts; copper sulphate.
Deloro Smelting & Refining Company, Limited, Deloro, Ont.	Arsenious oxide (white arsenic); cobalt oxide; amorphous cobalt sulphate.
International Nickel Company of Canada, Limited.	Nickel salts.

Name and Head Office Address	Principal Chemicals Made
Coke and Gas Industry	
Algoma Steel Corporation, Limited, Sault Ste. Marie, Ont.	Ammonium sulphate; benzol; toluol; xylol; naphthalene; crude coal tar.
Dominion Steel & Coal Corporation Ltd., Sydney, N.S.	Ammonium sulphate; benzol; toluol; xylol; sulphuric acid; crude coal tar.
Hamilton By-Product Coke Ovens, Ltd., 82-84 King St., E., Hamilton, Ont.	Ammonium sulphate; benzol; toluol; xylol; naphthalene; crude coal tar.
Montreal Coke & Manufacturing Company, 435 St. Patrick St., Ville La Salle, Que.	Ammonium sulphate; benzol; toluol; xylol; crude coal tar.
Steel Company of Canada, Limited, The, Hamilton, Ont.	Ammonium sulphate; benzol; toluol; xylol; crude coal tar.
Soaps Industry	
Colgate-Palmolive-Peet Company Limited 64 Natalie St., Toronto, Ont.	Refined glycerine.
Lever Brothers Limited, 299 Eastern Ave., Toronto, Ont.	Refined glycerine; hydrogen (own use); oxygen.
Procter and Gamble Co. of Canada Ltd., Hamilton, Ont.	Refined glycerine; hydrogen (own use); oxygen.
Sodium Sulphate Industry	
Horseshoe Lake Mining Company, Limited, Ormiston, Sask.	Natural sodium sulphate.
Natural Sodium Products Limited, Bishopric, Sask.	Natural sodium sulphate.
Midwest Chemicals Limited, Palo, Sask.	Natural sodium sulphate.
Sybouts Sodium Sulphate Co., Gladmar, Sask.	Natural sodium sulphate.

Name and Head Office Address	Principal Chemicals Made
Distilled Liquors Industry	
British Columbia Distillery Co. Ltd., 105 Braid St., New Westminster, B.C.	Ethyl Alcohol, fusel oil.
Calvert Distillers (Canada) Limited, Amherstburg, Ont.	Ethyl alcohol; fusel oil.
Canadian Industrial Alcohol Co., Limited, Corbyville, Ont.	Ethyl alcohol; fusel oil; absolute alcohol.
Canadian Schenley Limited, 630 Sherbrooke St. W., Montreal, Que.	Ethyl alcohol; fusel oil.
Commercial Alcohols Limited, 3176 Notre Dame St. E., Montreal, Que.	Magnesium, carbonate; ethyl alcohol; fusel oil.
Distillers Corporation Limited, 1430 Peel St., Montreal, Que.	Ethyl alcohol; fusel oil.
Gilbey, W. & A., Limited, 120-18th St., New Toronto, Ont.	Ethyl alcohol; fusel oil.
Gooderham & Worts, Limited, 2 Trinity St., Toronto, Ont.	Ethyl alcohol; fusel oil; absolute alcohol.
Melchers Distilleries Limited, 437 James St. W., Montreal, Que.	Ethyl alcohol; fusel oil.
Montreal Products Company Limited, 1410 Montmorency St., Montreal, Que.	Ethyl alcohol; fusel oil.
Montmorency Distillery, Inc., 309 Boulevard Charest, Que.	Ethyl alcohol; fusel oil.
Ontario Paper Co. Limited, Thorold, Ont.	Ethyl alcohol; fusel oil; methyl alcohol.
Seagram, Joseph E., & Sons, Limited, Waterloo, Ont.	Ethyl alcohol; fusel oil.

Name and Head Office Address	Principal Chemicals Made
Distilled Liquors Industry —Concluded	
United Distillers Limited, 8900 Shaughnessy St., Vancouver, B.C.	Ethyl alcohol; fusel oil.
Walker, Hiram, & Sons, Limited, Walkerville, Ont.	Ethyl alcohol; fusel oil.
Hardwood Distillation Industry	
Canadian Industrial Alcohol Company, Limited, Corbyville, Ont.	Grey acetate of lime; refined methyl hydrate; acetone.
Standard Chemical Co. Ltd., 67 Yonge St., Toronto, Ont.	Grey acetate of lime; refined methyl hydrate.
Miscellaneous	
Canadian Hanson & Van Winkle Co. Ltd., 2-4 Silver Ave., Toronto, Ont.	Electroplaters' chemicals.
Carter White Lead Co. of Canada Ltd., The 1295 Delorimier Ave., Montreal, Que.	White Lead; red lead; litharge.
Dominion Tar & Chemical Company Limited, The 2240 Sun Life Bldg., Montreal, Que.	Phenol; ortho-cresol; meta para cresol; cresol; xylenols; cresylic acid; phthalic anhydride; dibutyl phthalate; crude naphthalene; coal tar acids; refined tar; pitch; creosote oils.
Lawrason, S. F., & Co., Limited, 639 Nelson St., London, Ont.	Oleic acid; stearic acid; cottonseed and other fatty acids; crude glycerine.
McArthur, Irwin, Limited, 7 Bates Road, Outremont, Que.	White lead; dry colours.
Northern Pigment Company, Limited, New Toronto, Ont.	Synthetic iron oxides.
Polymer Corporation Limited, Sarnia, Ont.	Buna-S rubber; butyl rubber; ethylbenzene; styrene; cumene.

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Name and Head Office Address	Principal Chemicals Made
Miscellaneous—Concluded	
Sherwin-Williams Co. of Canada Limited, 2875 Centre St., Montreal, Que.	Dehydrated castor oil; dry colours; Paris green; sodium arsenite.
Smith, Howard, Chemicals Limited, 407 McGill St., Montreal, Que.	Vanillin.
Woburn Chemicals Limited, Beechwood Ave., Toronto, Ont.	Fatty acids; dehydrated castor oil.