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ISSUES

THE EUROPEAN CHEMICAL INDUSTRY IN 1932



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FOREWORD

Recovery of world conditions is intimately associated with recovery in foreign trade. Because of this fact and because the chemical industry is a basic industry, a review of the chemical situation in Europe is particularly appropriate at this time.

European countries account for two thirds of the world's export trade in chemicals and allied products; their share of the world's imports, however, is somewhat smaller. Germany, England, and France, the "big three" in chemical matters, are the chief competitors of the United States in world markets. They account for approximately two thirds of all European chemical exports. In 1932 their combined exports of \$316,000,000 were 28 percent less than in 1931. Imports of these same three countries, however, were only \$169,000,000 in 1932, 34 percent below the 1931 figure.

Germany, although retaining its position as the world's largest chemical exporting country, recorded the largest loss in exports in 1932, and shipped to foreign countries only \$172,300,000 worth compared with \$244,000,000 worth in 1931. These figures compare with \$95,100,000 worth of chemicals and allied products exported by the United States, the second largest world exporter, in 1932, and \$130,600,000 worth shipped in 1931. Germany is less important in the import trade and falls considerably behind the United States, which country imports more chemicals than any other country in the world.

Belgium and the Netherlands are becoming important from a chemical producing and exporting standpoint and also because much of the goods shipped there is later sold elsewhere. In 1932 exports of chemicals and allied products from Belgium were valued at \$38,000,000 and from the Netherlands \$33,300,000.

The cartel movement has had great impetus during the past year, particularly in the dye and nitrogen fields, but the effect is not so far evident.

This bulletin reviews the chemical industries of 22 European countries and is published in lieu of separate bulletins on individual countries as has been the practice in other years. More complete information on practically all countries is available upon application to the Chemical Division.

FREDERICK M. FEIKER, *Director,*
Bureau of Foreign and Domestic Commerce.

APRIL 1933.

THE EUROPEAN CHEMICAL INDUSTRY IN 1932

ORDER OF ARRANGEMENT

Germany.
United Kingdom.
France.
Belgium.
Netherlands.
Switzerland.
Italy.
Norway.
Sweden.
Czechoslovakia.
Spain.

Poland.
Yugoslavia.
Austria.
Hungary.
Denmark.
Bulgaria.
Baltic Republics.
Greece.
Portugal.
Finland.
Rumania.

GENERAL REVIEW

C. C. Concannon, Chief, Chemical Division

Commerce and industry in the chemical and allied lines reached a low ebb during 1932, but the chemical industry in general continued to be in a somewhat better relative condition than most other industries. In preceding years, the countries of Europe individually had felt the effects of the depression, but during the past year practically all of them recognized that entirely new world conditions had developed and took steps toward reorganization to meet these conditions.

Most countries attempted to develop strong national sentiment for industrial self-sufficiency and tried to protect domestic manufacturing industries by imposing tariff barriers to prohibit imports of certain commodities or by applying import quotas in other instances. Drastic exchange regulations were also enforced because of depreciated currencies. World marketing agreements were consummated, and on every hand there was evidence of greatly increased control and regulation of industrial and commercial operations.

One of the notable features of 1932 was the extension of the influence of the German I.G. by its acquisition of strong chemical concerns in key countries. Another feature was confidence in financial circles indicated by the higher list prices of some chemical stocks at the end of 1932 than at the beginning.

Since only a few countries publish even incomplete statistics promptly after the close of the year, accurate data are not available until many months later. Preliminary statistics for the foreign chemical trade of the five largest chemical exporting countries of Europe, however, showed that the export trade held up better than imports and that Germany recorded the largest decline in exports, perhaps because the 1931 figure was so high.

The following table shows the relative positions of these five countries together with corresponding figures for the United States, in

1932 compared with 1931. Figures for the United Kingdom probably should be 10 percent higher, since only the major commodities are included in the official preliminary statistics.

CHEMICAL FOREIGN TRADE OF THE MAJOR EXPORTING COUNTRIES

[Thousands of dollars]

Country	Exports			Imports		
	1931	1932	Percent decline	1931	1932	Percent decline
Germany.....	244,000	172,300	30	78,500	52,500	33
United Kingdom ¹	94,000	74,100	21	105,300	58,600	44
France.....	98,500	69,900	29	73,000	58,200	21
Belgium.....	52,600	38,000	28	44,800	26,000	40
Netherlands.....	41,600	33,300	20	47,500	37,300	22
United States.....	130,600	95,100	27	118,200	72,000	40

¹ Figures should probably be 10 percent higher and are exclusive of the Irish Free State.

NOTE.—All figures are preliminary and subject to correction.

Total world exports of chemical products in both 1924 and 1931 approximated \$1,000,000,000, notwithstanding the decided decreases in prices of some of the most important crude chemical materials since 1924. These latter, have become less important, during the period, and the more highly finished chemicals have had a larger part. Substitution of synthetic nitrogen for natural Chilean nitrate and synthetic resins for lac and shellac are outstanding examples.

Germany has recovered its position as the world's largest exporter of chemicals and allied products and in 1931 supplied 24 percent of the total export trade of all countries of the world, the same percentage as in 1913. In 1924 Germany accounted for only 16 percent. Shares of all other large exporting countries have decreased, the United States having declined from 18 to 13, the United Kingdom from 17 to 10, and France from 15 to 9 percent, respectively.

Belgium, during the past few years, has been steadily increasing its production of chemicals by the erection of new plants especially for the manufacture of sodium carbonate, superphosphates, and ammonium sulphate. The Netherlands is the largest exporter of superphosphates, ammonium sulphate, linseed oil, certain chemical pigments, and quinine and its alkaloids.

Swiss chemicals—dyes, pharmaceuticals, and other synthetics—and Swedish matches are well known. Norway, a large manufacturer of electrochemicals, exports appreciable amounts of calcium carbide, calcium nitrate, and pyrites. Italy is prominent as a source of sulphur, essential oils, and citric and tartaric acids. Bulgaria, world's most important producer of rose oil, is illustrative of the fact that practically every country, even if agricultural, is an exporter of some chemical product.

Besides supplying the bulk of chemical exports, Europe is the largest importer. Its industrialization gives rise to a large consumption of industrial chemicals as well as the highly finished manufactured chemical products, paints and varnishes, medicinals, and preparations. Europe likewise consumes large quantities of fertilizers and fertilizer materials, which constitute the most important import group. In fact, in the fertilizer year 1931-32, Europe consumed two thirds of the world nitrogen consumption.

To cover each European country in detail in a report of this type would not be practical. Statistics for 1932 have not yet been released by the majority of countries. This bulletin, therefore, gives a brief review of the chemical industries in each of the European countries with the most recent statistics available.

To establish a general picture, foreign trade statistics for 1931 are used. Under the sections dealing with individual countries, however, there is presented whatever more recent information is available.

The following table includes these chemical groups and classes which are the same for all countries: All industrial chemicals, sulphur, pyrites, fertilizers and fertilizer materials, phosphate rock, pigments, paints, varnishes, gums, resins, naval stores, linseed oil, essential oils, explosives, matches, pyroxylin plastics, crude drugs, and medicinal and toilet preparations. Soaps of all kinds are excluded.

EUROPEAN FOREIGN TRADE IN CHEMICALS AND ALLIED PRODUCTS IN 1931

Countries	Exports	Imports	Countries	Exports	Imports
Germany ¹	\$244,100,000	\$78,500,000	Yugoslavia ¹	\$5,500,000	\$7,000,000
United Kingdom and Irish Free State.....	100,000,000	119,700,000	Austria ¹	4,800,000	12,300,000
France ¹	98,500,000	73,000,000	Hungary ¹	2,900,000	6,000,000
Belgium ¹	52,600,000	44,800,000	Denmark.....	2,400,000	18,000,000
Netherlands.....	41,600,000	47,500,000	Bulgaria ¹	2,200,000	3,000,000
Switzerland.....	29,000,000	21,000,000	Baltic States.....	1,400,000	7,300,000
Italy ¹	26,200,000	30,000,000	Greece ¹	1,100,000	4,700,000
Norway ²	23,400,000	9,200,000	Portugal.....	1,100,000	5,500,000
Sweden.....	13,200,000	26,000,000	Finland.....	1,000,000	9,300,000
Czechoslovakia ¹	12,000,000	20,200,000	Rumania ¹	1,000,000	6,000,000
Spain.....	12,000,000	28,600,000	Total.....	681,700,000	598,300,000
Poland.....	5,700,000	20,700,000			

¹ Compiled from preliminary figures and subject to correction.

² 1931 figures not yet available; those given are for years earlier.

GERMANY

Trade Commissioner William T. Daugherty, Berlin

Germany's chemical production in 1932 was estimated at 2,400,000,000 marks (\$570,000,000), 40 percent below the peak 1929 figure of 4,000,000,000 marks (\$952,000,000). Economic organizations and leaders in the German chemical industry stated that signs indicated a turn for the better and that they believed the bottom of the depression was reached late in 1932.

German chemical production proper embraces about 470 corporations and several hundred limited-liability companies, according to the Union for the Protection of Germany's Chemical Interests. About 150 of these enterprises, each capitalized at 1,000,000 marks or more, control two thirds of all capital invested in the German chemical industry, estimated at 3,500,000,000 marks (\$830,000,000).

The I.G. Farbenindustrie, or German dye trust, of Frankfort on the Main, controls one third of the total of German chemical capital. The 320 companies capitalized at less than 1,000,000 marks have a total nominal capital of but 80,000,000 marks as of December 31, 1931, according to the German Federal Statistical Office. The limited liability companies are reckoned to have a total capital of 600,000,000 marks.

The downward curve of profits did not improve in 1932. Expert calculations show profit-to-capital ratios in the case of the 150 mil-

lion-mark enterprises to have declined from the high average of 8.6 percent in 1928 to 4.8 percent in 1930, and to only 2 percent in 1931.

Among the group of million-mark companies the most prosperous branch was pharmaceuticals, wherein 13 of the larger enterprises with a combined capital of 42,300,000 marks showed profits of 2,000,000 marks in 1931, or a ratio of 4.6 percent against a high of 11.4 percent in 1929.

Five large corporations in miscellaneous chemical production with combined capital of 967,700,000 marks and 1931 profits of 40,600,000 marks registered a ratio of 4.2 percent, against a peak of 11.6 percent in 1928.

Profits in 1931 were 3.3 percent in explosives, 2.4 percent in mineral colors, 2.1 percent in heavy chemicals, 1.8 percent in plastics, 1.7 percent in cosmetics, and 1.6 percent in fertilizers.

Branches operating at a loss in 1931 included lacquers, tar products, glue and gelatine, and photographic chemicals.

Though the German chemical industry has introduced part-time labor in greater degree than the average of other industries, its number of employed increased in the fall months of 1932, contrary to the trend at that season in former years. On December 19, 1932, the I.G. announced additional employment of 4,000, and in February 1933 another 1,000 were hired. Since October 1932 the Krupp works has taken on 1,400, so that its personnel was increased to 37,000 by the end of the year.

According to Germany's official foreign trade figures, the favorable balance of chemical trade (excess of exports over imports) was 547,108,000 marks in 1932. This was a 48-percent decline from the 1929 peak of 1,053,555,000 marks.

The United States assumed fourth place in 1932 as a market for German chemical products, but nevertheless was still Germany's best customer outside of Europe. In 1929 the United States occupied first place.

The purchase of foreign exchange to finance imports was rigorously restricted in 1931 and 1932. Importers were permitted a monthly quota of foreign exchange for imports in proportion to their requirements in the year ended June 30, 1931. In September 1932, the quota-regulation period was extended to 3 months, and from January 1, 1933, it was extended to 6 months, an indication of the easing foreign exchange situation. The quota allocation is administered by the so-called "Devisenbewirtschaftungsstelle" of Berlin, responsible to the Federal Ministry of Economics.

In actual practice, the German importer is granted foreign exchange purchasing facilities to the extent of about 25 percent of the amount he spent abroad in the year preceding July 1, 1931. Considering the fall in prices and in volume of imports since then, he is able to finance about 50 percent of his actual present requirements.

The net result of this foreign exchange control by Germany was a decline since 1930 of 65 percent in value of imports of nine best sellers among the chemical products imported by Germany from the United States—benzol, gum rosin, phosphate rock, turpentine, sulphur, carbon black, crude borax, refined borax, and certain metal compounds. Imports of these nine commodities in 1932 approximated \$7,733,000.

Another phase of American participation in the German chemical market has been the growth of manufacture by license, independently or in community with German interests, of a range of quality American chemical commodities, including miscellaneous toiletries, medicinals, lacquers, polishes, synthetic ammonia, nitric acid, photographic chemicals, and formaldehyde condensation products. These enterprises, however, are confronted with the difficulty of removing their profits in dollars from the country. The Government, through the Reichsbank, has imposed a practical prohibition on exports of dollar credit so built up.

The past year was not marked by many mergers. The Lurgi-Gesellschaft fuer Waermetechnik m.b.H., of Frankfort on the Main, however, acquired the business of Allgemeine Vergasungs-Gesellschaft, of Berlin-Halensee. Deutsche Gold & Silber Scheideanstalt vorm, Roessler, of Frankfort on the Main, which paid a 9 percent dividend on 1931-32 operations, procured a majority interest in the lampblack works of August Wegelin A.G., of Kalscheuren, Cologne.

Increasing interest has been taken in the production of solvents by the German dye trust and the Deutsche Hydrierwerke A.G., of Rodleben. The Deutsche Hydrierwerke A.G., recently acquired by Henkel & Cie., produces butanol and acetone from molasses by fermentation.

Hydrierwerke H.Th. Boehme A.G., of Chemnitz, has been more intensively occupied with production of higher fatty alcohols and their sulphonates, increasingly important in household and toilet soap production and in the textile industry.

I.G. ACTIVITIES IN 1932

The I.G. continued its hydrogenation process for manufacturing synthetic gasoline at the rate of about 100,000 tons annually, though its supply of crude oil from the Burbach (potash) wells at Volkenrode was diminished as a result of fire at these wells early in 1932. The slack, however, was taken up by supplies from Hanover oil wells, and by hydrogenation of lignite tar produced at the Leuna works of the dye trust.

The I.G. reduced its common-stock capital from 960,000,000 to 685,000,000 marks in 1932. It held 160,650,000 marks of reserve shares against eventual merger transactions; it held 4,350,000 marks of unsold shares; it also bought in 110,000,000 marks of its own shares in 1930 and 1931. Its invested capital, including reserves and convertible obligations, aggregates 1,150,000,000 marks. The I.G. paid for 1931 a 7 percent dividend on its 685,000,000 mark capital from net profits of 44,515,000 marks for that year, increased by a carry-forward of 6,944,562 marks to a total dividend-paying fund of 51,459,582 marks, exclusive of 1,027,500 marks royalty and 2,482,082 marks carry-forward.

The latest available report by the I.G., for the third quarter of 1932, points to a turn for the better in its affairs, with an increase in dye-stuffs sales in September after summer stagnation. Likewise, third-quarter nitrogen fertilizer sales were 10 percent better than in 1931. Photographic chemicals was another item showing improvement, but heavy chemicals and pharmaceuticals decreased.

Referring to the 1931 panic caused by withdrawals of short-term credits in wholesale amounts, the I.G. stated that while its own plant operation was not directly disturbed thereby, as the company is liquid, the effect on customer markets was catastrophic.

German coal-tar dye exports in 1932 declined 32 percent in tonnage and 34 percent in value from 1929, and 33 and 24 percent, respectively, from 1931. Exports of coal-tar dyes were 29,141 tons, valued at 133,662,000 marks.

Exports of pharmaceuticals and medicinals of which the dye trust produced 20 to 30 percent, declined 18 percent in tonnage and 13 percent in value in 1932 compared with 1929 and 12 and 16 per cent, respectively, from 1931. Prepared-medicine exports in 1932 were valued at 67,574,000 marks and pharmaceuticals, 18,739,000 marks.

German exports of prepared medicines, although smaller in 1932 than in the preceding year, nevertheless have held up much better than those of the other major exporting countries and were double the 1913 figure. Prepared-medicine exports recorded a larger decline than unprepared pharmaceuticals, indicative of the growing tendency to ship in bulk for packaging abroad.

The international dyestuffs agreement between Germany, France, and Switzerland, initiated provisionally between Germany and France in 1927 and made more binding in 1929 with the admission of Switzerland, was extended in February 1932, to include England. This pact, while assuring each nation full independence of development, mainly minimizes competition in inter-trading and in export markets. By reason of its dominant position in the nitrogen industry, the I.G. is mainly affected by the inter-European nitrogen agreement concluded in July 1932.

INDUSTRIAL CHEMICALS

The 1932 production of sulphuric acid is estimated at 1,000,000 metric tons of monohydrate against a peak in 1929 of 1,700,000 tons. In 1930, 72 plants produced 1,468,100 tons of sulphuric acid from raw material, 70 percent of which was pyrites and 15 percent zinc blende, according to the German Federal Statistical Yearbook. In 1931, production amounted to 1,100,000 tons in 67 plants, 42 of which were of lead-chamber equipment and the rest contact; pyrites accounted for 83 percent of the raw material.

German superphosphate production consumes 20 percent of the total sulphuric acid production and ammonium sulphate production takes 40 percent. The great I.G. ammonium sulphate plants at Leuna and at Oppau do not consume sulphuric acid, but substitute gypsum in interaction with carbon dioxide. Another important substitution is at the Wintershall Kaiseroda plant, manufacturing half of the German total sodium sulphate, which refrigerates magnesium sulphate solution with solution of sodium chloride.

After an import duty of 15 marks per metric ton was imposed on superphosphate on September 26, 1932, production was stimulated but not enough to compensate for the low output early in 1932, nor to fill the gap from basic-slag shortage due to partial paralysis of the German iron and steel industry.

Calcined soda ash production in 1932 was estimated at 500,000 to 600,000 tons against a somewhat higher level in 1931 and a peak in 1929 of 700,000 tons. Seven or eight German producers constitute the Syndicate of German Soda Ash Manufacturers at Bernburg,

Anhalt, dominated by the Deutsche Solvay Werke at Bernburg with 70 percent of the total output. All operate the Solvay process. A typical 1932 price quotation was 9.54 marks per hundred kilos for large orders delivered anywhere in Germany. The freight haul for export from Bernburg to Hamburg was around 1.80 marks per hundred kilos.

Caustic-soda production was estimated at 125,000 tons in 1932, against 140,000 tons in 1929 and 125,000 tons in 1931, while the caustic potash output was 50,000 tons in each year. Caustic potash sales are effected by the Electro-Chemical Products Co., an I.G. company in Frankfort-on-the-Main. The same cartel is exclusive sales agent for potassium carbonate, production of which was 25,000 tons against a peak of 35,000 tons in 1929.

Salt cake and Glauber salt (sodium sulphate) production was estimated at 230,000 tons in 1932, compared with Sulphate Union sales of 300,000 tons in 1929. Exports of sodium sulphate reached a peak of 188,000 tons in 1930, of which 77,000 tons were shipped to the United States. In 1932, total German exports were 160,400 tons, with 34,600 tons to the United States.

Hydrochloric-acid production probably declined to 150,000 tons in 1932 from a peak of 250,000 tons. The process of oxidizing ammonia for production of nitric acid has completely displaced sodium bisulphate or niter in Germany.

The German potash industry produces magnesium compounds and bromine by-product. Production of magnesium sulphate declined to 66,000 tons from 155,000 tons in 1929 and 96,000 tons in 1931; magnesium chloride to 34,500 tons solid (48 per cent) and 26,000 tons liquid (35 per cent) from 49,000 tons solid and 74,000 tons liquid in 1929; bromine to 850 tons from a peak figure of 2,650 tons in 1930. (These estimates are of private origin, but are believed to be correct.) All these products are cartelized in the Deutsches Bittersalz Syndikat, Deutsches Chlormagnesium Syndikat, and Deutsches Brom Syndikat, all of Berlin. The latter is in agreement with the French potash producers, sharing exports on a 75-25 basis.

COAL-TAR PRODUCTS

Three-quarters of Germany's crude coal-tar production of 1,200,000 tons in 1931 was coke-oven tar, the rest being gas tar and small amounts of oil and water-gas tar. Total 1931 production was 32 percent (by volume) below 1929, with coke tar 36 percent less and gas tar 20 percent off. Estimated 1932 production of crude tar was less than 1,000,000 tons.

Except for a very small percentage applied directly to roofs, German tar is subjected to distillation. In 1931, consumption of crude tar by distilleries is reckoned at 1,000,000 to 1,100,000 tons, and in 1932 it was doubtless 10 percent less. Exports of tar have declined from 76,000 tons in 1930 to 43,000 tons in 1931 and 28,170 tons in 1932.

The latest available Federal Statistical Office figures of consumption and production of Germany's 121 coal-tar distillation plants are for 1930, when output declined 12 percent in volume and 22 percent in value from 1929 figures.

Most German pitch production is consumed locally as briquet binder, although a considerable tonnage is exported. Relatively

small quantities enter pitch coke, made by the Bergbau Lothringen A.G., of Dortmund. Consumption of pitch for briquet binder was 330,000 tons in 1931. Exports were 235,000 tons in 1931 and 129,816 tons in 1932.

Domestic consumption and exports in 1928-29 were considerably less than production, so stocks rose to 150,000 tons in 1929. Demand exceeded production in 1930-31, and stocks fell to 4,000 tons at the beginning of 1932.

Lothringen, inaugurating production of pitch coke in 1929, actually produced 12,150 tons of pitch coke in 1931, partly to relieve Ruhr overstocks of pitch and partly to free Germany from petroleum-coke imports.

Unlike the pitch market, there are large stocks of heavy oil on hand despite lowered production. In 1931 total production was probably not more than 320,000 tons, of which perhaps 175,000 tons was creosote oil. Exports of heavy coal-tar oils, the main tonnage being creosote oil, were 50,720 tons in 1932.

As numerous as are the coal-tar distillation plants, at least two thirds of this distillation activity is controlled by two major enterprises, Gesellschaft fuer Teerverwertung, of Duisburg-Meiderich, and Ruetgerswerke A.G., in Berlin.

Benzol production in connection with coke-plant operations was 291,500 tons reduced to refined product in 1930, according to latest official figures. Estimated production was 217,000 tons in 1931, and 182,000 tons in the first three quarters of 1932.

Legislation requiring the purchase of alcohol for mixture in motor fuel, while increasing the use of alcohol, has diminished the consumption of benzol, imports of which declined 40 percent from 138,900 tons in 1931 to 82,100 tons in 1932.

The latest decree, compelling the gasoline distributing companies to use alcohol to the amount of 10 percent of imports and local production, was effective October 1, 1932. Alcohol for mixture with motor fuel reached 1,170,000 hectoliters in the fiscal year ended September 30, 1932, against only 179,065 hectoliters in 1927-28.

The following table on alcohol was published by the Federal Alcohol Monopoly and the Federal Statistical Office:

GERMAN ALCOHOL STATISTICS

[In hectoliters]

Year ended Sept. 30	Production	Sales	Included in motor spirit	Carry-over stocks
1928.....	2,806,413	2,424,160	179,065	503,801
1929.....	3,243,117	2,611,353	277,217	887,474
1930.....	2,881,612	2,038,110	235,135	1,578,010
1931.....	2,569,077	2,023,377	508,519	1,992,211
1932.....	2,246,095	2,500,778	1,170,000	1,650,000

Fifteen factories, according to the statistical office, produce acetic acid, 3 being in wood acid, 7 in acetate salt acid, 3 in carbide, and 2 in other production.

GERMAN ACETIC ACID PRODUCTION

[Metric tons anhydrous]

Year	Taxed	Denatured	Undenatured
1927-28	3,985	6	23,239
1928-29	4,952	4	31,666
1929-30	4,337	25	23,686
1930-31	4,030	28	23,861

PAINTS AND VARNISH

Annual production of paints and varnish is valued at over 150,000,000 marks (\$36,000,000). According to estimates, production in 1932 declined about 25 percent.

FERTILIZERS

Germany, the leading producer of nitrogen, is also the leading consumer. Official consumption data for 1931-32 issued by the Prussian Ministry of Agriculture showed a decline of 9 percent for nitrogenous fertilizers, 13 percent for phosphoric, and 20 percent for potash from the levels of 1930-31, and 24 percent, 29 percent, and 29 percent, respectively, from 1928-29, the peak postwar year. Official consumption figures for the year ended June 30, 1932, were 325,000 metric tons of nitrogen, 393,000 tons of phosphoric acid, and 560,000 tons of potash.

Despite the great decrease in nitrogen and potash consumption in the last 3 years, their use in 1931-32 per unit of cultivated area, was still considerably above the pre-war level. This was true especially of nitrogen, which made remarkable gains.

In the case of nitrogen, German consumption in 1931-32 averaged 11.0 kilos (of nitrogen content) per hectare, compared with only 6.2 kilos in 1913-14, an increase of 77 percent. Potash consumption in 1931-32 averaged 19.0 kilos (of potash content) per hectare, against a peak of 26.6 kilos in 1928-29. Compared with 16.5 kilos in 1913-14, the 1931-32 figures is an increase of 15 percent and the peak 1928-29 figure is an increase of 61 percent.

In the case of phosphoric acid, unit consumption in 1931-32 was appreciably below pre-war levels, consumption having averaged 13.3 kilos (P_2O_5) per hectare compared with 18.7 kilos in 1913-14, a decline of 29 percent.

In 1913-14, for every 100 units of nitrogen, there were consumed 300 units of phosphoric acid and 254 of potash. With the greatly increased consumption of nitrogen and lessened use of phosphoric acid and lessened relative consumption of potash in 1931-32, for every 100 units of nitrogen consumed the ratio for other fertilizers was reduced to 121 for phosphoric acid and 171 for potash.

NITROGEN

The German nitrogen industry, with more than one fourth of the world capacity of 4,000,000 tons nitrogen content, fared worse in 1932 than in 1931, primarily because of declining exports. Exports of fertilizer nitrogen in 1932 were around 75,000 tons less than the year before.

Lacking accurate figures, it is estimated that the turnover of nitrogen by Germany in 1932 included a quantity of 300,000 tons (N) in domestic fertilizer consumption, another 100,000 tons exported, and 40,000 tons in technical salts, half of which were consumed at home and half exported. This gives a visible quantity of 440,000 tons (N), but actual sales may be discounted because part of this amount was covered by consumers' stocks already purchased. Corresponding figures in 1931 probably included 300,000 tons (N) in domestic fertilizer, 180,000 tons exported, and 40,000 tons of technical salts, a total of 520,000 tons.

The 1932 figures show a considerable decline from 1928, when Nitrogen Syndicate published statistics of nitrogen fertilizer sales were 667,300 tons (N). That figure excludes sales of technical nitrogen, which are estimated at 50,000 tons in 1928.

These figures include an average of 8,000 to 10,000 tons (N) in Chile salt-peter imports (preferred in sugar-beet fertilization). In the year ended June 30, 1932, Chile was granted an import contingent duty-free of 48,000 tons of salt-peter (8,000 tons N). The Chilean import contingent was not regranted during the current year, but there are enough stocks in warehouses to meet the demand.

The notable development in German nitrogen exports in 1932 was the shipment of around 160,000 tons of synthetic sodium nitrate made in I.G. plants, mostly on order of the French Comptoir de l'Azote. Large exports of synthetic sodium nitrate present a striking commentary on the breach that existed in the international market with Chile and Germany in open competition, after the collapse of the former convention in July 1931, until harmonious adjustment was effected by the latest European nitrogen pact resumption.

Latest official figures of German Nitrogen Syndicate sales follow:

GERMAN NITROGEN SYNDICATE SALES IN 1932

[Metric tons N]

Year	Ammonia	Nitrate	Cyanamide	Total
1928.....	338,300	239,100	89,900	667,300
1929.....	297,700	261,400	95,000	654,100
1930.....	201,300	246,200	108,700	556,200

Source: Statistical Yearbook, 1932.

Production at one third of capacity or less in 1932 was sold by the German Nitrogen Syndicate of Berlin, controlling about 98 percent of Germany's stocks. The I.G., with major Haber-Bosch synthesis plants at Merseburg and Oppau, and with the Mont Cenis plant no. 1 at Herne-Sodingen in Westphalia (closed down), controls over 70 percent of the potential output. Its total syndicate quota of 843,000 tons (N) annually includes 90,000 tons of Norwegian Norsk Hydro, with which it is in contract on the Haber-Bosch process as well as being 25 percent financially invested. Ammonia from the Merseburg and Oppau plants is further processed in I.G. plants at Hoechst, Wolfen, Bitterfeld, Piesteritz, and at Gerthe, Westphalia (Lothringen works).

In addition to the Mont Cenis Sodingen works, four coal-mining enterprises, all members of the nitrogen syndicate, manufacture synthetic ammonia, utilizing hydrogen from coke-oven gas. They are the Hibernia and Recklinghausen Cos. the Ruhr Chemie of Essen, and the Ewald Co.

Another, the Victor Co., belonging half to the Wintershall concern and half to Kloeckner, is partly independent of the nitrogen syndicate.

It is expected that the Waldenburg, Silesia, nitrogen works, which has been in financial difficulties, will resume operations shortly under new management.

Four cyanamide plants, though members of the German Nitrogen Syndicate, are not associated in the European nitrogen pact, cyanamide producers having previously cartelized. They are the Bavarian Nitrogen works at Trostberg and Piesteritz, the Knapsack Nitrogen works of the I.G., and the Waldshut, Baden, works of the Swiss Lonza Co.

By-product ammonium sulphate is dominated by associated coke plants in the German Ammonia Sales Union of Bochum; by gas plants in their cartel, with headquarters in Cologne, and by the Coke and Chemical Factories Co., headquarters in Berlin.

The German Nitrogen Syndicate domestic price schedule for the year 1932-33, announced July 30, 1932, retroactive to July 1, brought further price decreases from previous levels. The July 1932, price for nitrogen in ammonium sulphate of 0.66 mark a kilo was exactly half the 1913-14 average price of 1.32 marks.

Nitrogen exports, which in 1928 were 65 percent of domestic sales, fell in 1932 to 111,000 tons (N), or about 35 percent of the domestic sales. The following table shows exports of bulk fertilizer nitrogen by Germany in the last 5 years:

GERMAN EXPORTS OF NITROGEN FERTILIZER

[In metric tons]

Items	1928	1929	1930	1931	1932
Ammonium sulphate.....	837,300	728,800	463,700	664,900	286,500
Sodium nitrate.....	32,400	69,400	65,200	51,900	157,800
Calcium nitrate (urea).....	395,600	494,300	309,000	170,000	33,000
Cyanamide.....	400	1,300	6,300	400	60
Total.....	1,265,700	1,291,800	844,200	887,200	577,360
Nitrogen content.....	262,500	271,000	176,600	184,700	111,510

Exports of nitrogen fertilizer to the United States amounted to 146,700 tons in 1928, 92,000 tons in 1929, 80,000 tons in 1930, and 57,321 tons in 1931. In 1932 the trade fell off to 4,203 tons.

The following table shows the German plants producing nitrogen:

GERMAN NITROGEN INDUSTRY

Company and plant	Nitrogen products	Capacity (metric tons N)	1932 syndicate quota (metric tons N)
<i>I.G. Farbenindustrie A.G.:</i> Ammoniakwerk Merseburg (Haber-Bosch).	Liquid ammonia, ammonium sulphate, calcium nitrate, ammonium sulphate-nitrate, sodium nitrate.	650,000	9843,000
Werk Oppau (Haber-Bosch).	Ammonia (25-100 percent), ammonium sulphate, ammonium chloride, ammonium bicarbonate, urea nitric acid, sodium nitrate, ammonium nitrate, etc.	150,000	
I.G. plant of Hoechst Farbwerke.	Calcium nitrate, sodium nitrate, potassium nitrate.	150,000	
I.G. plant at Wolfen.....	Potassium nitrate.....	50,000	
I.G. plant at Bitterfeld....	Technical nitrogen as ammonium nitrate, nitric acid, sodium nitrate.	30,000-40,000	
I.G. part lease of plant at Piesteritz.	Nitrophoska and other phosphoric acid compound fertilizers.	200,000	
Chem. Werke Lothringen Gerthe, Westphalia.	Ammonium sulphate-nitrate, nitric acid, sodium nitrate, potash, ammonium nitrate.	25,000	
Former Gewerkschaft Mont Cenis (Gasverarbeitungs Ges.) Plant I.	Ammonium sulphate-nitrate (formerly).....	24,000	
Herne-Sodingen (Mont-Cenis Uhdé synthesis).	Ammonia, ammonium sulphate, and ammonium sulphate-nitrate.	55,000	
Bergwerks Ges. Hibernia Herne-Mont Cenis plant II at Wanne-Eickel (Shamrock Pit).	Ammonia, sulphate, nitric acid, ammonium, sulphate-nitrate, sodium nitrate.	28,000	
Bergwerks A.G. Recklinghausen at Scholven (Mont-Cenis process).	Primary ammonia nitrogen.....	40,000	160,000
Ruhr Chemie A.G. (Essen), plant at Oberhausen, Holten (Cassale process).	Ammonia, nitrate acid, ammonium chalk, ammonium nitrate chalk, ammonium sulphate nitrate, etc.	55,000	-----
Gewerkschaft Victor, at Rauxel (Wintershall-Kloekner) (Claudé process).	Ammonia, ammonium nitrate, ammonium sulphate-nitrate, nitric acid, ammonium chloride, potash, ammonium nitrate, sodium nitrate.	35,000	
Gewerkschaft Ewald, Herne Westphalia (Nitrogen Engineering Corporation process).	Ammonia, etc.....	22,500	22,500
Stickstoffwerke Waldenburg A.G. at Waldenburg, Silesia (Nitrogen Engineering Corporation process).	-----	22,500	22,500
Bayerische Stickstoffwerke A.G. plants at Trostberg (Bavaria) and Piesteritz.	Carbide, cyanamide, etc.....	90,000	87,000
A.G. fuer Stickstoffduenger	do.....	22,500	22,500
By-product:			
Deutsche Ammoniak Verkaufs-Vereinigung, Bochum.	Ammonium sulphate.....	123,000	92,000
Koks u. Chem. Fabriken A.G., Berlin (Oberkoks).			5,700
Wirtschaftliche Vereinigung deutscher Gaswerke (Gaskokssyndikat Cologne).			7,200

¹ Includes 90,000 tons Norsk Hydro; with further influence on "Lothringen" and "Gaveg," this quota is increased.

² Total product, not nitrogen content.

³ These Ruhr synthetic plants belong to Ammonia Sales Union of Bochum, in turn member of nitrogen syndicate.

POTASH

Sales of some 850,000 tons of pure potash (K²O) in 1932 were 12 percent below the 1931 figure of 964,000 tons and 40 percent below peak sales of 1,421,000 tons in 1928.

The Federal statistical office, reporting on 1931 production of potash and rock salt, states that 54 works were engaged in 1931 compared

with 62 in 1930. Of the number active in 1931, 43 produced potash and by-products, while the other 11 produced rock salt. The number of unionized employees was 15,920 in 1931 against 22,196 in 1930. Although figures are not available, it may be concluded that fewer works were in operation in 1932.

The output of potash, according to the statistical office, was 8,050,000 metric tons (1,080,000 tons K_2O) in 1931 against 11,960,000 tons in 1930. Exports were 38 percent of total sales in 1930 and about 33 percent in 1931.

Wintershall A.G. of Berlin-Cassel, capital 185,000,000 marks, controlling 41 percent of German potash production, concentrated its potash output in 1932 at three refineries at Kaiserroda, Glueckauf-Sondershausen, and Heiligenroda mines. They operated at about 50 percent of capacity during the year, with by-product yields of sodium sulphate, magnesium sulphate, and magnesium chloride, bromine, etc., somewhat better. Wintershall expanded its interests in domestic oil prospecting and refining in 1932.

With the Kloeckner concern, Wintershall is interested in synthetic ammonia production at the Gewerkschaft Victor plant at Rauxel, which, while making its own salts, supplies Wintershall's Sondershausen plant with synthetic ammonia for oxidation to nitric acid for production of potassium nitrate. These plants were busy in 1932.

The second most important German potash-producing consolidation is the so-called Salzdettfurth concern, connecting Kaliwerke Salzdettfurth A.G., Kaliwerke-Aschersleben, and Cons. Alkaliwerke Westeregeln. Salzdettfurth, capital 28,000,000 marks, controls about half the stock capital of Aschersleben, which is 24,000,000 marks, and Westeregeln, which is 22,000,000 marks. The latter, in turn, owns about a fourth of Salzdettfurth. The combination controls about 27 percent of German potash production.

Salzdettfurth acquired in 1932 a very small quota, 0.67 percent, of the Mansfeld concern, which previously had been transferred to Burbach. Salzdettfurth owns the two mines with the highest potash content—27 to 30 percent K_2O .

Overproduction forced Aschersleben to shut down its master refinery temporarily in 1932. Among other things, a special line of potassium sulphate is produced there. This production was transferred for the time to its Hattorf refinery, the second largest German producer of magnesium sulphate after the Kaiserroda works of the Wintershall concern.

Production was also curtailed at the Westeregeln refinery because of depressed market demand. This refinery is distinguished by its electrochemical production of chlorates, caustic potash, caustic soda, and by-product chlorine. Westeregeln sulphate production was shifted temporarily to works of Gewerkschaft Rossleben.

Burbach Kaliwerke A.G., the third producer, reorganized its capital structure in 1932 to 20,000,000 marks. Burbach found oil beneath its Volkenrode potash deposits in 1931 and contracted to supply it to the I.G.'s Leunawerke for hydrogenation to synthetic gasoline.

Germany exported 461,005 metric tons of potash salts up to 42 percent K_2O in 1932 against 540,878 tons in 1931. Exports to the United States declined further in 1932, to 108,298 tons from 139,315 tons in 1931. Exports of muriate, potassium sulphate, and potash sulphate magnesia were 222,756 tons in 1932 against 355,277 tons in

1931. Exports to the United States were 68,250 and 150,352 tons, respectively.

PHOSPHATES

Federal Statistical Office figures show a declining trend in German production of superphosphate and basic slag, which may be assumed to have continued in 1932. The imposition of a duty of 1.50 marks per 100 kilos on superphosphate, effective September 26, 1932, reacted to stimulate domestic production.

In 1913, production of superphosphate amounted to 1,863,000 metric tons and of basic slag to 2,280,000 tons. Production of superphosphate during 1932 occurred in 34 out of a former total of 70 plants, the largest operators being Guano Werke A.G., Hamburg; A.G. der chemischen Produkten-Fabriken Pommernsdorf Milch, Stettin; Kali-Chemie A.G., Berlin; and Chemische Fabrik Kalk G.m.b.H., Cologne.

Domestic prices for superphosphate 18 percent delivered inland were 5.96 marks per 100 kilos in 1932 against 6.12 marks in 1913.

Germany has imported superphosphate in excess of exports since 1929. The 1932 duty is calculated to reverse this situation. Chief sources of supply are the Netherlands and Belgium. The United States has about one third of the phosphate rock market. Imports of basic slag originate in France, Luxemburg, Belgium, and the Saar, European centers of iron and steel production.

The following table shows production and foreign trade of phosphates:

GERMAN PRODUCTION AND FOREIGN TRADE IN PHOSPHATES

[In metric tons]

Year	Production		Imports			Exports	
	Super-phosphate	Basic slag	Super-phosphate	Basic slag	Phosphate rock	Super-phosphate	Basic slag
1927.....	739,000	1,742,000	89,290	1,036,400	910,100	80,700	237,500
1928.....	792,000	1,639,000	113,500	1,160,600	794,200	96,900	436,100
1929.....	843,000	1,886,000	116,300	1,115,800	909,600	145,700	240,900
1930.....	865,000	1,313,000	109,400	1,158,600	834,400	75,000	295,100
1931.....	509,000	875,000	134,200	1,104,200	616,400	51,300	173,100
1932.....	(1)	(1)	137,600	795,800	407,900	29,600	50,400

¹ Not available.

PARTICIPATION OF UNITED STATES IN GERMAN CHEMICAL TRADE

Despite foreign-exchange purchase restrictions, not all imports of chemicals from the United States declined in 1932. German purchases of crude borax from the United States in 1932 exceeded 1931 and even 1929 high levels, amounting to 29,270 tons in 1932, against 16,460 tons in 1931, and 20,720 tons in 1929.

American naval stores were imported at about the 1931 level, even though below 1929. The 1932 imports of gum rosin from the United States of 41,600 tons compares with 36,200 tons in 1931. Turpentine receipts in 1932 from the United States were 10,460 tons compared with 11,600 tons in 1931.

Carbon black sales also held fairly well in 1932, with 5,550 tons compared with 5,660 tons in 1931 and 5,770 tons in 1929.

Losses were sustained in the cases of imports from the United States of phosphate rock, benzol, refined borax, and sulphur.

High tariff, financing, and transport costs discouraged direct importation of American chemical specialties, and there was a marked tendency to pack, prepare, or manufacture them in Germany under license. This was especially true of cosmetics, toilet preparations, medicinals, insecticides, lacquers, polishes, photographic chemicals, and some industrial chemicals.

UNITED KINGDOM

Trade Commissioner Roger R. Townsend, London

The British chemical industry has emerged from the third year of world-wide trade depression in a relatively satisfactory position, and is making every effort to consolidate the advantages gained during 1932 as a result of the depreciation of sterling, the adoption of a protective tariff policy, and the preferences obtained in the Empire markets following the Ottawa Conference.

The year was one of consolidation rather than expansion in the industry, with manufacturers devoting their attention largely to the perfection of existing products and processes, while their sales efforts were directed primarily toward supplanting foreign products in the domestic and Empire markets. Research work was not neglected, but it is possible that financial considerations forced most companies to curtail their activities in this direction, with a consequent slowing down in the development of new products and processes.

Value of exports of wholly or mainly manufactured chemicals, drugs, and dyes and colors in 1932 showed an increase of about 2 percent over 1931, while total British exports decreased 6½ percent. Imports of such chemicals and allied products were over 30 percent less than in 1931, compared with a decrease of less than 20 percent for all imports into the United Kingdom. Reexports of chemicals were less than half of the 1931 figure, while total reexports decreased only about 20 percent.

While detailed figures showing the direction of this oversea trade are not yet available, it seems probable that British chemical manufacturers have maintained their relative position against competition in foreign markets, and that any decreased sales in such markets due to general trade conditions have been offset by increased sales in Empire markets at the expense of foreign competitors. Similarly, it may be reasonably assumed that the large decrease in imports of chemical manufactures is indicative of increased domestic sales at the expense of foreign products, which have been faced with the triple barrier of depreciated sterling, new tariffs, and the "Buy British" movement.

PRODUCTION AND EMPLOYMENT

The official index of production compiled by the Board of Trade, with 1924 as a basis, shows that in the first half of 1932 the chemical industry considerably improved its position relative to the average for all manufacturing industries, but fell off again in the last half of the year. The chemical index for the whole year was 97.7 compared with 95.2 for 1931, while the general index rose from 96.7 for 1931

to 97.0 for 1932. In the first half of 1932 the chemical index at 102 was well above the figure of 95.2 for the corresponding period of 1931, but in the second half the index fell to 93.3 compared with 95.0 in the same period of 1931.

Unemployment in the chemical industry decreased by more than 10 percent during 1932, while in British industry as a whole the figures show a small increase. The number of insured workers in the chemical industry is about 99,000, of which 16,020 were unemployed at the end of 1932 compared with 18,091 at the end of the previous year. The proportion of unemployed in all British industries increased during 1932 from 20.9 percent to 21.7 percent, while in the chemical industry it fell from 18.3 to 16.2 percent. The employment situation also improved during the year in the allied industries, such as explosives, paints and varnish, oil, glue, and soap.

Very little construction took place in the chemical industry in 1932. Only two new plants were completed during the year; one a new copper sulphate plant by the Mond Nickel Co., said to be the largest in the world, and the other a new pharmaceutical factory, reported to be the most up-to-date factory of its kind.

At least three "dry-ice" plants are operating and distributing solid carbon dioxide. Imperial Chemical Industries (Ltd.), employs the Carba process, and Solvent Products (Ltd.), utilizes the Esselinger process, purifying the carbon dioxide obtained from molasses fermenters.

Gelatin was manufactured for the first time in England by Chemical and Metallurgical Corp. (Ltd.), and commercial production of citric acid by fermentation methods was inaugurated by two concerns, Messrs. Rowntree and Messrs. J. & E. Sturge.

Several foreign chemical firms opened new factories to manufacture some of the fine chemical products, such as Coty's new factory for production in England of its toilet preparations.

FOREIGN TRADE

Owing to the causes already mentioned which operated in 1932 to lower imports and to promote exports, the trend of foreign trade in chemical products was just the reverse of 1931. Under the general heading of articles wholly or mainly manufactured the official trade returns show that exports of chemicals, drugs, dyes, and colors amounted to £17,377,524 in 1932, an increase of £359,685 over 1931 exports, and that imports were £9,578,482 in 1932, £4,263,188 less than in 1931. Both exports and imports were considerably below the 1930 figures. Another £3,750,000 of miscellaneous chemical products, coal tar, pitch, basic slag, superphosphates, guano, explosives, and polishes, were exported in 1932. Imports of miscellaneous chemical products not included in the above-mentioned figures amounted to £7,134,000. Most important of these miscellaneous imports were phosphate rock, sulphur, pyrites, argols, essential oils, gums and resins, matches, and perfumery and toilet preparations.

In comparing these totals for the past three years it should be remembered that they are computed in pounds sterling and that if they were to be converted into gold or dollar values for comparison with the chemical trade of other countries in these years the 1931 and 1932 figures would be relatively very much lower owing to the depreciated value of British currency. In 1930 Great Britain was still on

the gold standard and the pound was worth its par of \$4.86. The gold standard was suspended on September 21, 1931, and the depreciation of the pound in the remainder of that year brought its average value for the year down to about \$4.53. In 1932 the dollar exchange value of the pound varied between a high of \$3.83 in April and a low of \$3.14 at the end of November, with the average for the year working out at about \$3.50.

The decline in imports of the chemical group was widespread, and only a few items showed increases. Acetic anhydride, crude glycerin, potassium nitrate, and intermediate coal-tar products showed small increases. Of the crude materials the following items improved in quantities imported in 1932 over 1931; phosphate rock from 258,700 to 358,000 tons; sulphur, from 61,800 to 70,500 tons; pyrites, from 268,300 to 297,500 tons; and argols and other crude tartrates from 8,400 to 11,800 tons.

Imports of perfumery, cosmetics, and toilet requisites, grouped together in the British trade returns as a single item and not included in the above-mentioned figures, were valued at £263,200 in 1932, only about 30 percent of the 1931 total. The decline is probably due mostly to the increased use of British-made products rather than to any substantial falling off in British consumption. A number of American, French, and German firms which formerly exported merchandise of this nature to the British market have found it necessary or advisable to arrange for manufacture in Great Britain as an alternative to losing the market entirely. In many cases the tariff, the depreciation of sterling, and the "Buy British" campaign made it difficult for imported products to compete with British-made goods.

Of the 37 items separately classified under exports of chemicals, drugs, dyes, and colors, increases over the 1931 values were recorded in 24 cases and decreases in 13. In 11 of the 24 increases the 1932 total was also higher than the figure for 1930. Exports of ammonium sulphate were, as usual, greater than for any other single product and were valued at £2,022,953. This was a decrease of about £560,000 on the 1931 total and was less than half of the 1930 figure, with smaller shipments to China and Japan accounting for most of the decrease. The total quantity exported in 1932, however, amounted to 419,870 tons, which was some 18,000 tons greater than in 1931. In all of the other items in which decreases were recorded the amounts involved were comparatively small.

Exports of most coal-tar products showed substantial increases, especially tar and creosote oils, which were £110,000 higher at £382,600. Exports of both crude and distilled glycerin were higher than in 1931 by about £75,000, with a total value of £311,850.

Caustic soda was another important export well above the previous year, with a total of £1,246,519 (1,578,300 hundredweight), an increase of nearly £200,000 (371,400 hundredweight). The largest proportionate increase of importance was in zinc oxide with a total of £206,568 (10,600 tons), which was more than double the 1931 figure.

PRICES

Prices of chemical products on the basis of sterling quotations were generally much steadier during 1932 than in the previous two years when the trend was almost constantly downward. The fact that world prices, especially in gold standard countries, continued to fall

was offset by the depreciation in the gold value of sterling and by the addition of customs duties to the price of imported products. Especially in products sold at retail, such as toilet and medicinal preparations, there have been very few successful attempts to raise prices to the consumer. Only in the case of a few imported products for which no British-made substitutes are available has any increased retail price been maintained. It is primarily for this reason that many exporters from gold standard countries, such as the United States, France, and Germany, have been compelled to arrange for the manufacture of their products in Great Britain.

As an indication of the general trend of chemical prices, for which no index is compiled, a table published in the *Oil and Colour Trades Journal* shows the prices of 48 representative industrial chemicals at the end of 1932, compared with earlier periods. A comparison with the prices prevailing at the end of 1931 shows 16 decreases, 15 increases, and 17 cases in which there was no change. A similar table of 50 representative pharmaceutical chemicals published in the *Chemist and Druggist* shows 14 decreases, 25 increases, and 11 cases of no change. The greater proportion of increases in this list is probably due to the fact that more products in this group are not obtainable from domestic sources and have to be imported at gold prices, which have declined less than sterling has depreciated.

TARIFFS

Practically all imported chemical products are now subject to customs duties, which range from 10 to 33½ percent ad valorem. The general tariff act imposing a 10 percent duty on nearly all imports into the United Kingdom, except certain specified foodstuffs and raw materials, came into effect on March 1, 1932. Additional duties on specified products were imposed later in the year on the recommendation of the import duties advisory committee. A total duty of 20 percent is now in force on a list of some 25 different chemicals and on paints, varnishes, lacquers, etc. Toilet preparations and cosmetics are subject to a 30 percent duty, and six different chemical products come under a 33½ percent duty. These new duties imposed during 1932 do not apply to such products as are already dutiable under previous acts, such as the 33½ percent duty on synthetic organic chemicals, except those specifically exempted because they cannot be supplied by British manufacturers. These, however, are subject to the general tariff rate of 10 percent ad valorem.

DYESTUFFS

For the third year in succession the operation of the dyestuffs import regulation act of 1920 has been temporarily prolonged for a further period of 1 year, and will accordingly remain in force during 1933 on the same basis as in 1932. The Government has stated that the import duties advisory committee will be asked to inquire into the whole circumstances of the dye industry and make its recommendations as to the course to be followed after the present year's extension of the dyestuffs act has expired.

Details of the production of dyestuffs in 1932 are not yet available, but the recent report of the Dyestuffs Industry Development Committee stated that preliminary data indicated an increase of about 25 percent from the 1931 figure of 47,980,794 pounds. This report

also mentioned the fact that the greater part of the dyestuffs industry in Great Britain was now under the control of Imperial Chemical Industries (Ltd.), but that there are some 13 other firms whose contribution to the output is very valuable in the manufacture of special products which are not otherwise available from British sources.

The main object of the agreement among British, German, French, and Swiss producers was reported to be to stabilize their share of the world trade in dyestuffs. The committee was also informed that the agreement does not comprise any selling-price arrangements. With regard to price fluctuations of British dyestuffs, the report estimated that prices in England of individual dyestuffs has been raised on the average by about 22½ percent during 1932.

Imports of dyestuffs and intermediates in 1932 showed a considerable decline from the 1931 figures, both in value and in quantity. In 1932, 4,807,488 pounds valued at £977,331 were imported, as compared with 6,265,168 pounds valued at £1,279,109 in 1931. Exports in 1932 showed a small increase in value and a small decrease in quantity. Their value was £1,039,087 compared with £1,016,238 in 1931, while the quantities were 13,104,448 pounds in 1932 compared with 13,134,464 pounds in 1931.

IMPERIAL CHEMICAL INDUSTRIES (LTD.)

By far the most important factor in British chemical activity is Imperial Chemical Industries (Ltd.), and the progress of its affairs is therefore fairly indicative of the industry as a whole. Its chairman, Sir Harry McGowan, issued a number of optimistic statements during the past year in connection with the progress of his own company and of the chemical industry generally. At the annual meeting last April he anticipated trading results for the year at least as good as in 1931, and said the first quarter's operations of his company indicated the probability of an actual improvement. This optimistic forecast appears to be confirmed by the fact that the company declared an interim dividend on the ordinary shares of 2½ percent in September as compared with a corresponding dividend of only 1½ percent in the previous year. The total dividend paid for 1931 was 4½ percent, compared with 6 percent for 1930 and 8 percent for each of the preceding three years. The final dividend for 1932 was 3½ percent, bringing the total for the year up to the 1930 level of 6 percent. During the past year the price of the company's £1 ordinary shares has ranged between 10s. 9d. and 25s. 9d.

Among the products in which the company is believed to have obtained increased business in 1932 are fertilizers and soda ash, dyestuffs and textile chemicals, and certain new specialities such as "Drikold" and benzyl cellulose. In a recent article Sir Harry McGowan summed up the progress of the British chemical industry during 1932 with the comment that it had gained a little ground in oversea markets and undoubtedly strengthened its position in the home market.

FRANCE

Assistant Trade Commissioner Earle C. Taylor, Paris

The French chemical industry continued to feel the effects of the economic and business depression during 1932, although this industry suffered less than many other French industries.

The decline marked in 1931 continued during the early part of 1932, but from September on several branches of the chemical industry showed changes for the better. At the end of the year this industry was maintaining about the same degree of activity as at the close of 1931.

Chief difficulties confronting the French chemical industry continued to be the closing of foreign markets and the prohibition placed on exports of gold in many customer nations.

The set-up of the French chemical industry showed little change in 1932. There were no major bankruptcies although many small chemical houses, both industrial and commercial, are reported to have closed down for lack of business. This naturally increased unemployment in the chemical industries, as did the reduction in the working personnel of some of the larger concerns.

The stocks of entirely chemical concerns such as Kuhlmann, Air Liquide, and Bozel-Maletra were listed higher at the end of the year than at the beginning, which may be due in part to the fact that the 1931 share values had dropped too low.

INDUSTRIAL CHEMICALS

Sulphuric acid production in 1932 continued at about the same level as in 1931, largely because of the protection afforded to French manufacturers by placing a quota on imports. At one time Belgian competition was feared. Belgian sulphuric acid is largely a by-product of zinc, while in France it is obtained principally from pyrites.

The shutting down of coke ovens, the sharp drop in sales of superphosphate, and the reduced ammonium sulphate production all contributed to lower the outlets for sulphuric acid. On the other hand, the rayon, textile, and petroleum industries somewhat increased their consumption.

Hydrochloric-acid consumption continued to decline, particularly in the gelatin and metallurgical industries. Principal outlets for nitric acid, consumption of which did not decline, were in the manufacture of explosives and in production of nitrogenous fertilizers.

Sales of sodium sulphate and sodium carbonate dropped off still further because of the unsatisfactory situation of the glass industry. Such alkalies as caustic soda, caustic potash, silicates, and rosin enjoyed their usual outlets in the soap industry. Bleaching chemicals benefited by the improvement in the textile industry, although total sales were probably about 10 percent under 1931.

The year ended with a fair amount of activity in the market for sodium sulphide, sodium bichromate and hyposulphite, alums, and similar tanning chemicals. French tanneries continued to record unsatisfactory returns during the early part of 1932, but during the last half a distinct betterment occurred in the leather industry.

The explosives branch seems to have continued on an almost normal basis, even with the situation in the mines of northern France far from satisfactory.

Production of synthetic methanol continued on the reduced schedules of 1931 with prices remaining about the same. Output of ethyl alcohol, however, continued under conditions satisfactory to the producers.

Conditions affecting the French glue industry were not good in 1932. The quota system was long in making its effects felt, and the

drop in prices in some foreign countries permitted foreign products to flood the French market. Imports from Russia in particular had a depressing effect on domestic prices. Exports of glues and gelatins diminished considerably. The fall in sterling practically closed the English market for gelatins. Stocks were reported to be equivalent to 10-month production.

COAL-TAR PRODUCTS

Consumption of coal tar in France in 1932 increased about 35,000 tons over 1931, bringing the total consumption, including the Saar, up to 860,000 tons, less exports of approximately 15,000 tons. There was a decline in domestic production of about 20,000 tons, and in the Saar of about 23,000 tons, and a sharp increase of 90,000 tons in imports, the greater part of which were of American origin. Because of the drop in French production and the shortage of stocks in England, Germany, and Belgium, France's customary sources of supply, the United States exporters of coal tar were able to make substantial sales to France.

At present it seems probable that the domestic production of coal tar will decrease further in 1933, but consumption will also probably be less. Budget difficulties of the French Government may bring about a curtailment of the funds for building roads. There is considerable agitation to replace coal tar used in road construction in part by asphalt of domestic origin.

Toward the end of September, the change for the better in the textile industries reacted favorably on sales of dyestuffs, which during the early part of the year had been unsatisfactory.

PAINTS AND VARNISHES

Lithopone, zinc oxide, and similar pigments, paints, and varnishes suffered severely from the sharp drop in building toward the end of the year.

In addition to the decreased consumption in the building trades, the French colonies, which have always been fairly large consumers of paints, reduced their purchases considerably. Particularly was this true of Indo-China and French West Africa, the North African colonies having felt the depression less severely.

Raw materials for the manufacture of varnishes, such as synthetic resins, solvents, acetates, etc., after a sharp reduction in consumption and a price drop during the first part of the year, picked up somewhat toward the end, attributable to the fact that automobile manufacturers had found themselves with depleted stocks of varnishes.

FERTILIZERS

The situation in the French superphosphate industry was unsatisfactory, but in nitrogen was better. Superphosphate manufacturers, already suffering from subnormal consumption and increasing foreign competition in 1931, were worse off in 1932. For the fertilizer year ended June 30, 1932, French consumption of superphosphates amounted to approximately 1,400,000 tons compared with 2,100,000 tons in normal years. The difficulties of the domestic industry were attributed to the lower purchasing power of the farmers and to the continued increase in imports.

Imports, chiefly from Belgium and the Netherlands, increased considerably during 1932 over preceding years. These imports were shipped to and consumed principally in the north of France. Production costs in both Belgium and the Netherlands are considerably under those in France, and it was therefore possible to offer the imported superphosphate at low prices. The French superphosphate industry is not protected by either tariffs or quota restrictions.

The French nitrogen industry, protected by a rigid system of import licenses, did not suffer unduly from the depression. The 1932 spring season was reported as good, although sales after that period did not hold up. Most recent reports were that farmers' purchases of all types of fertilizers have fallen off sharply.

The large stocks of nitrogenous fertilizers at the beginning of 1932, particularly ammonium sulphate, caused a reduction in production in most sections. Prices were somewhat lower than at the beginning of the year, but in February, 1933, were still high as compared with prices of similar fertilizers in the surrounding countries. Estimated consumption for 1932 was only slightly less than in 1931.

French production of ammonium sulphate and calcium nitrate is sufficient for domestic consumption. Several installations for the manufacture of ammonium sulphate, completed after the depression set in, have never produced a ton of fertilizer.

The only nitrogenous fertilizer imported is sodium nitrate, subject to an import license. The United States played an increasingly important role as a source of these imports. Total imports during 1932 amounted to 304,213 tons, of which the United States furnished 79,605 tons compared to 21,659 tons in 1931.

While no figures are available on compound fertilizers, it is thought there was no great change in the market in 1932. Sales of compound fertilizers have never reached very large proportions. In the fertilizer year 1931-32, the production of "Ammonitre" by the Toulouse nitrogen plant reached 12,000 tons, an increase over 1931. The Government plant hopes to increase sales to 40,000 tons in 1932-33.

Production of the Alsatian potash mines showed a considerable decrease from 1931—due to the sharp falling off in exports, since domestic sales actually increased 4 percent. This increase in domestic sales is attributed to the continued and well-directed sales methods of the Société Commercial des Potasses d'Alsace. It is possible, however, that although sales are slightly larger, the actual consumption may not have changed, as many of the smaller dealers are said to have stocks on hand.

TOILET AND MEDICINAL PREPARATIONS

The toilet preparations industry, products of which are important export items and considered as luxuries in practically all countries, was severely affected in 1932. Exports of around \$7,900,000 were about half the 1932 figure. Medicinal preparations, however, held up better than most other branches of industry; nor did exports decline as much, \$9,900,000 having been shipped abroad in 1932.

BELGIUM

Assistant Commercial Attaché Leigh W. Hunt, Brussels

The Belgian chemical industry grew rapidly from the close of the World War to 1930. Its greatest contribution has been development of the ammonia soda ash process (so-called "Solvay process") for the

manufacture of sodium carbonate. It was estimated that at one time about 96 percent of the total world production of sodium carbonate was made by the Solvay process. Belgium is also one of the important producers of white lead, zinc white, and lithopone.

As was true with the other major chemical producing countries, Belgium's exports of chemicals and allied products, valued at \$38,000,000 in 1932, showed a much smaller decline from 1931, 28 percent than did imports of \$26,000,000, which dropped 40 percent.

Because of the lack of raw material, the Belgian output of sodium carbonate is limited to about 80,000 tons annually, not enough for the relatively large consumption; imports of this product come from the Solvay plants in France. The principal consumer of soda, the glass industry, was working at only 50 percent capacity during 1932, and consequently production and imports of both sodium sulphate and sodium carbonate dropped considerably. Imports of sodium carbonate declined from 68,800 tons in 1931 to 51,200 tons in 1932, and exports from 3,560 to 2,700 tons. Figures for sodium sulphate and bisulphate were; imports, 23,550 tons in 1931 and 16,200 tons in 1932; and exports, 30,000 and 44,100 tons. Larger amounts were shipped to both the United States and Sweden in 1932, which accounted for the 32 percent increase in total exports.

Production of sulphuric acid in 1932 amounted to 550,000 tons, a decline of 25,000 tons from the 1931 figure, in spite of the fact that stocks of sulphuric acid was estimated to have declined approximately 50,000 tons during the year. The maintenance of consumption is explained by the continued heavy output of superphosphates and sodium sulphate.

No figures are available on the production of pigments, paints, and varnishes. Belgium has an annual capacity of approximately 9,000 tons of white lead, and a former normal annual consumption estimated at 4,500 tons. In the last 5 years consumption has declined to about 2,500 tons. Until 1932, when they were only 3,100 tons, exports had remained in the neighborhood of 4,000 tons.

Five firms produce lithopone, although the Société des Industries Chimiques de Wilsele is the outstanding producer. Capacity approximates 16,000 tons. Belgian lithopone is of good quality and competes well on foreign markets. About 80 percent of the output is exported. Exports of 9,700 tons in 1932, although below the 1930 and 1931 figures, exceeded 1928 and 1929 totals.

Manufacture of zinc white is carried on by only one firm, the Vieille Montagne Zinc Co. Output has amounted to 16,500 tons in normal years, but dropped to 12,500 tons in 1931. The greater part of production is exported. In 1932, only 6,800 tons were shipped to foreign countries, compared with 10,500 tons in 1931 and 13,600 tons in 1929.

The year 1932 was relatively satisfactory with regard to demand for coal tar and its byproducts, and prices were strong. The coke industry produced 150,000 tons of crude coal tar, 55,000 tons of pitch, 40,000 tons of creosote, 4,500 tons of crude naphthaline, and 25,000 tons of benzol. In addition, gas plants produce some 40,000 tons of coal tar annually and extract the byproducts.

The year 1932 was a poor one for fertilizers. A comparison of prices of chemical fertilizers at the beginning of 1932 and at the end of the year indicates that 12 types of fertilizers declined in price and

five increased. Among the increases were cyanamide, superphosphate, and slag.

The superphosphate market was relatively satisfactory in 1932. In addition to the slight price increase, Belgian consumption advanced from slightly over 100,000 tons in 1931 to about 150,000 tons in 1932. Production also gained to over 350,000 tons, compared to 300,000 tons in 1931.

Imports of Chilean nitrate in 1932 were insignificant (11,000 tons), but over 100,000 tons were in stock in Belgium at the end of 1931, and demand was met by drawing on those stocks.

Keen competition rendered the sulphate of ammonia market extremely unprofitable. Prices were at a low ebb throughout the year, and in spite of active sales campaigns, sales amounted to only 162,500 tons about the same as in 1931, out of a production of 255,000 tons. The 1931 production was 237,000 tons.

The yield of by-product basic slag dropped to less than 1,200,000 tons during 1932. Restricted production and good demand caused a favorable price trend.

Estimated production of cyanamide was 9,000 tons, ammonium nitrate 12,500 tons, and calcium nitrate 10,000 tons in 1932, about the same as in 1931.

A list of plants engaged in the synthetic production of nitrogen follows:

BELGIAN PLANTS PRODUCING SYNTHETIC NITROGEN

Company	Capital (francs)	Process employed	Annual capacity (tons N)
Société Belge de l'Azote.....	125,000,000	Claudé.....	35,000
Union Chimique Belge.....	192,000,000	Casale.....	25,000
Ammoniaque Synthétique et Dérivés.....	30,000,000	Fausser.....	25,000
Etablissements Kuhlmann.....	30,000,000	N. E. C.....	16,000
Société Carbochimique.....	150,000,000	Casale.....	40,000
Centrale du Centre pour la Fabrication de l'Ammoniaque Synthétique.....	115,000,000	Fausser.....	160,000
Fabrication des Engrais Azotés.....	80,000,000	Casale.....	15,000
Produits Chimiques du Marly.....	150,000,000	Claude.....	25,000
Engrais et Produits Chimiques de la Meuse.....	60,000,000	N. E. C.....	9,000

¹ This plant is not yet completed.

Nearly two thirds of Belgian output of matches is exported. Consumption of matches in 1932 was the highest since 1927 and amounted to 23,665,000,000, compared with 20,829,000,000 in 1931 and 20,685,000,000 in 1927. Production, however, declined from the high of 73,693,000,000 in 1929 to 50,563,000,000 in 1932. Exports, likewise fell to 27,513,000,000 in 1932.

Exports of linseed oil to the United Kingdom in 1932 were more than double those in 1931, which largely accounted for the advance in total exports from 10,300 tons to 15,800 tons in 1932. Shipments to the United Kingdom in 1932 were 9,370 tons, valued at 17,558,000 francs.

THE NETHERLANDS

The Netherlands occupies a unique position in the world chemical trade, largely by virtue of its key geographical location and natural facilities in relation to the great European chemical producing and consuming area. Its chemical trade is largely one of transshipment

in many commodity lines. However, the country produces and exports a few products such as superphosphates (of which it is the world's largest exporter), ammonium sulphate, linseed oil, pigments, and quinine and other alkaloids, and imports cinchona bark, fertilizer materials, and certain industrial chemicals for its own consumption.

Perhaps the outstanding general commercial development during the year was the country's departure from its traditional policy of free trade by imposing import quotas on a variety of commodities. The enforcement of artificial price levels for some products and the granting of Government relief for agriculture and certain industries was continued during 1932, but it has become increasingly evident that no extensive exploitation of the domestic market can compensate for the losses on foreign markets.

Imports of chemicals and allied products in 1932 totaled 92,546,000 florins (\$37,300,000) compared to 118,053,000 florins (\$47,500,000) in 1931, while exports were 82,580,000 florins (\$33,300,000) and 103,496,000 florins (\$41,600,000), respectively. Although in 1932 all imports into the Netherlands fell 31 percent and exports 36 percent from 1931, chemical trade fared better. Chemical imports, which accounted for 7 percent of all imports, dropped 22 percent and chemical exports, which accounted for 10 percent of all shipments, declined 20 percent.

Total trade in chemicals and allied products in 1931 and 1932 follows:

NETHERLAND FOREIGN CHEMICAL TRADE

[Thousands of florins]

Items	Imports		Exports	
	1931	1932	1931	1932
Fertilizer materials.....	39,348	28,304	32,601	32,774
Industrial chemicals.....	32,565	27,071	19,417	16,132
Drugs, gums, waxes, and balsams.....	15,470	12,671	15,803	10,401
Coal-tar products.....	9,636	8,624	7,585	7,226
Paints, varnishes, and pigments.....	8,366	5,575	12,583	7,132
Naval stores and linseed oil.....	2,570	2,096	13,529	7,064
Matches, explosives, plastics, etc.....	4,410	3,749	1,535	1,361
Medicinals and toilet preparations.....	5,688	4,456	943	490
Total.....	118,053	92,546	103,496	82,580

In normal years the Netherlands uses more artificial plant food per acre than any other country, consuming each year over 1,000,000 metric tons. The manufacture of fertilizer materials for the domestic and export trades constitutes an important industry. Despite the lack of domestic supplies of phosphate and sulphur, the Netherlands is the leading world exporter of superphosphates and since 1930 has occupied a very important position in ammonium sulphate export trade. The three synthetic nitrogen plants, the first of which went into operation in 1930, had during 1932 an estimated capacity of 122,000 metric tons of nitrogen, while the normal home consumption is only 65,000 tons. A plant at Lutterade, which has an annual capacity of 225,000 tons of ammonium sulphate, completed in March 1932, an installation with an annual productive capacity of 47,000 tons of ammonium nitrate, 12,000 tons of ammonium sulphate nitrate, and 2,000 tons of sodium nitrate by-product. The plant has

storage capacity of 40,000 tons of ammonium sulphate and facilities for loading at the rate of 100 tons an hour.

In addition to the domestic output there were imported 1,049,729 tons of fertilizer materials during 1932 compared to 1,123,372 tons in 1931. The 1932 import tonnage consisted mainly of 310,795 tons of phosphate rock, chiefly from Algeria and Tunisia; 261,167 tons of basic slag, principally from Belgium; and 140,035 tons of ammonium sulphate, from Germany and Belgium. France, Chili, Poland, and Norway were other important sources of fertilizer materials. During 1932 the continued unfavorable agricultural situation and the growth of the domestic nitrogen industry reduced imports of sodium nitrate, calcium nitrate, and other nitrogen carriers very sharply.

Exports of 936,780 tons of fertilizer materials in 1932 were well above the 780,395 tons shipped in 1931. The shipments consisted mainly of superphosphates, which increased from 399,456 tons in 1931 to 409,895 tons in 1932, and ammonium sulphate, which jumped from 254,685 tons to 377,022 tons in 1932. The bulk of the latter, 187,907 tons, went to the United States. A notable increase was in the shipment of 23,147 tons of sodium nitrate in 1932, mostly to Egypt, compared with only 1,236 tons the previous year.

In the field of industrial chemicals both imports and exports showed a marked drop. Increases were registered in this group in imports of iron pyrites totaling 353,887 tons in 1932 compared to 322,306 tons in 1931, with more than half coming from Spain. The new fertilizer plant at Lutterade is producing approximately one-third of its sulphuric acid requirements from Spanish pyrites. Sulphuric acid was also imported in 1932, chiefly from Belgium, to the extent of 87,419 tons, but this commodity is also an important export to Germany, Belgium, and France, increasing to 61,279 tons last year. Imports of soda ash increased in 1932 to 48,878 tons, and imports of caustic soda rose to 15,822 tons, both coming chiefly from France. Potash lye, sulphur, carbon bisulphide, silicates, ammonium chloride, and refined glycerine were other imports to show increases. Dextrin, among the more important exports, jumped from 22,203 tons in 1931 to 24,896 tons in 1932, and sodium ferrocyanide from 576 tons to 1,825 tons. Ethyl ether, sulphur, caustic soda, Glauber's salt, and nitric acid also were exported in larger amounts.

During 1932 a potential market for water softeners was noted. Although hardness of water averages 10 degrees in some districts the water-softener market is still undeveloped.

The Netherlands is an important factor in the trade in cinchona bark, quinine, and quinine salts. During 1932 its imports of cinchona bark, almost all of which came from the Netherland East Indies, dropped to 5,442 tons compared to 6,703 tons in 1931, while its exports, chiefly to Germany, France, and the United States, were 2,351 tons and 3,371 tons, respectively.

Exports of quinine sulphate and other quinine alkaloids of 372 tons during 1932 had a widespread distribution but were far below the 579 tons shipped in 1931. Imports of "other alkaloids" totaled 1,490 tons in 1932 and 1,727 in 1931, with exports of the same group being 563 tons and 680 tons.

The Netherlands is important as a transhipper of coal-tar products and also has a fair domestic output. In addition to several coke batteries there are some 200 gas plants supplying about 75,000 tons

of coal tar to the 5 or 6 largest distillers. During 1932 the output of pitch was 55,000 tons compared to 49,000 in the previous year, most of this being used in the manufacture of briquettes. Domestic production is supplemented by imports, increased purchases being necessary during 1932 to supply domestic requirements, with the figure rising to 69,664 tons from 65,026 tons in 1931. Import prices increased in 1932 about 33 percent, domestic market prices 25 percent, and export prices 37 percent. Exports of 23,200 tons in 1932 were 200 tons below the 1931 shipments.

Trade estimates of Dutch creosote production place the annual output at about 35,000 metric tons, mostly of wood-preservative grade. Imports of creosote dropped to 1,190 tons in 1932 from 6,962 tons the previous year, while exports dropped to 12,545 tons from 15,719 tons.

Dyes were one of the largest items in the Netherland trade in coal-tar products. Imports dropped to 1,959 tons from 2,339 tons in 1931, but exports showed a slight improvement to 1,359 tons compared to 1,207 tons in 1931. Germany supplied 1,451 tons of the 1932 imports, Switzerland, France, and Great Britain supplying relatively small amounts. The market for American dyes is said to be good where terms of European competitors can be met.

The Netherland paint and varnish industry supplies the bulk of the domestic demand and also exports to all parts of the world, although during the past few years these shipments have fallen sharply. Recent statistics show that there were some 123 paint and varnish manufacturers, 10 of which employed over 1,000 of the 1,961 employees in the industry. Exports were 2,612 tons of prepared paints in 1932, a decrease from 3,369 tons in 1931. Principal customers were the Netherland East Indies, the United States, the Union of South Africa, British India, Belgium, and Ceylon. In 1932, 1,228 tons of varnishes were exported, compared with 2,352 tons in 1931; it went to Belgium, the Netherland East Indies, United States, Great Britain, Sweden, and Turkey. Locally manufactured nitrocellulose lacquers compete in price and quality with imported brands, the 210 tons imported in 1932 coming from Germany, the United States, and Great Britain. Dark colors are preferred.

Among the more important pigments imported are zinc oxide, zinc white, litharge, ocher, lead white, lithopone, and ultramarine, with Germany by far the principal supplier. Among the principal exports are ultramarine, lead white, and litharge, with the United States, Netherland East Indies, Great Britain, Belgium, Sweden, and Germany the most important destinations.

Linseed oil is one of the most important Dutch chemical exports, amounting to 73,226 tons in 1931, and 57,166 tons in 1932, the bulk going to Great Britain and Germany.

Trade in naval stores declined somewhat in 1932. Turpentine prices climbed until April 1932, but by the end of the year had declined considerably. Buyers do not anticipate higher prices in 1933, but as soon as lower prices are offered may decide to contract for future deliveries. American turpentine continued to dominate the market in 1932. Stocks at Rotterdam on January 1, 1933, aggregated 1,665 barrels, compared to 3,914 barrels a year earlier. Lower quotations stimulated the sale of American rosin during 1932.

Imports of toilet preparations showed a considerable drop during 1932, as did those of medicinals. Shaving soaps and creams are manufactured locally, but certain foreign brands are popular. Lotions, face powders, face creams, cosmetics, and other toilet preparations are mostly imported.

SWITZERLAND

The chemical industry is of considerable importance to the economic welfare of Switzerland. Large-scale production is concentrated in coal-tar dyes, medicinal preparations, sodium nitrate, calcium carbide, and a few other industrial chemicals. These commodities form the bulk of Swiss chemical exports. Imports consist mainly of the raw materials necessary to large manufacture of industrial chemicals, which the country does not have.

Swiss foreign trade in chemicals and allied products in 1932 held up better than that of its competitors, with both exports and imports having declined 22 per cent in value from 1931.

Dyes accounted for half the total exports of \$22,400,000 in 1932, and medicinal and pharmaceutical preparations for 21 per cent. Imports of chemicals and allied products were valued at \$16,200,000.

Annual production of Swiss coal-tar dyes is valued at about 100,000,000 Swiss francs (\$19,300,000). Exports of indigo decreased from 1,500 tons valued at \$700,000 in 1931 to 560 tons valued at \$300,000 in 1932. Exports of aniline and other coal-tar dyes dropped from 6,900 tons valued at \$13,000,000 in 1931, to 5,000 tons valued at \$10,700,000 in 1932.

Although the steadily expanding gas industry offers a very important source of supply for crude tar, Switzerland is still dependent to a certain extent on foreign sources. Imports in 1932 of coal-tar derivatives and materials for the manufacture of dyes were 6,900 tons worth 2,300,000 francs and of aniline and aniline compounds 680 tons valued at 2,300,000 francs.

Swiss dye manufactures were reported to have operated only 4 days a week during 1932, in order to keep their personnel occupied as much as possible. Although exports to Germany and the United States were reported to have increased somewhat during the summer, at the end of the year the situation was reported to be less satisfactory.

Difficulties with which the pharmaceutical industry had to contend assumed greater proportion in 1932, although sales of special preparations were not much below those of the preceding year. Because of increased import duties and quotas by most customers for Swiss pharmaceutical exports, many of the products were partly manufactured or prepared in the importing countries. The financial results of the pharmaceutical industry were unfavorable, owing to the lower selling prices. Exports of medicinal and pharmaceutical preparations declined 15 per cent from 1931 and were valued at nearly \$5,000,000.

Increased duties abroad and other import restrictions, together with extremely keen competition, seriously handicapped the exports of carbide and cyanamide. Production was greatly reduced in the various Swiss branch factories; electric power from the hydroelectric power plants in the Canton of Valais could not be used fully. Exports of calcium carbide declined from 8,675 tons (2,100,000 francs) to 7,100 tons (1,700,000 francs).

It is too early for financial reports of the leading Swiss chemical firms, but Lonza Usines Electrique et Chimiques S.A., the electrochemical concern, announced a net loss for the 1931-32 fiscal year of 3,371,000 francs, compared with a profit of 2,762,000 francs in 1930-31.

More favorable results, however, were reached by the Fabrique de Produits Chimiques Ci-Devant Sandoz. Notwithstanding adverse conditions in export markets, on which this concern depends almost entirely, a normal volume of business was realized and manufacture held at capacity in 1931. This concern diminished its gross profit in 1931, however, to 6,748,000 francs, 18 per cent less than in 1930. The net profit in 1931 was about 2,247,000 francs.

According to the report for 1931 of the Internationale Gesellschaft fur Chemische Unternehmungen, A. G. Basel, known as I. G. Chemie, and the largest holding company in Basel, net profits for the year amounted to 9,441,000 francs.

ITALY

Trade Commissioner Elizabeth Humes, Rome

Italy, one of the major chemical producing countries, is likewise an importer and exporter of many chemical commodities. The country is a major source of sulphur, citric and tartaric acids, and bergamot, citrus, and other essential oils.

The Italian chemical industry was no exception to the general rule of diminished industrial activity and shrinking markets during 1932. The decline in both output and sales was less severe, nevertheless, than the drop which occurred in 1931 as compared with 1930. In fact, several industries, including dyestuffs, glue, and compressed gases, reported a more satisfactory year and the possibility of a sustained volume of production if not an actual increase.

The branches which supply chemical products for agriculture and those affected by peculiarly unfavorable world market conditions, such as the citric and tartaric acid, essential oils, and tanning extracts, were those that felt the crisis most acutely.

Irregularity in demand and slowness in collections characterized the domestic market.

Although dividends paid early in 1932 on 1931 earnings of chemical companies were curtailed, only a very few of the larger chemical concerns passed dividends. At the close of 1932 the capital investment in 926 Italian chemical companies with limited liability totaled 2,678,873,000 lire (\$137,694,000) compared with 3,012,739,000 lire (\$157,566,000) invested in 889 companies at the end of 1930, according to figures compiled by the Italian Association of Stock Companies.

A drop of 11 percent in capitalization occurred in the industry. An unusually heavy withdrawal of capital took place in 1931, attributed chiefly to the insolvency of the important Italgas group of Turin with its numerous subsidiary chemical companies. Many of these concerns, manufacturing intermediates, dyestuffs, copper sulphate, fine chemicals, pharmaceuticals, etc., have since been reorganized with new capital and under new management.

During 1932 the industry sought to consolidate the position gained in former years rather than reach out in new developments. The last important venture into new lines was the erection and operation of large plants for the production of alumina and potash fertilizers

near Rome by the Societa Prodotti Chimici Napoli in 1931. Owing to an unfortunate combination of factors, these plants suspended operations during 1932.

In 1931 the A.C.N.A., the most important dye-manufacturing concern belonging to the insolvent Italgas group, was reorganized, with fresh capital contributed in part by the Montecatini and in part by the German I.G. in proportions to allow the control to be retained by the Italian interests.

Some progress was made during 1931 and 1932 in the development of solvents and plasticizers for pyroxylin lacquers by the Distillerie Italiane and certain Montecatini subsidiaries, but no new plants of importance were put in operation in 1932 with the exception of a plant for the manufacture of phosphorus under the control of the State Match Monopoly.

Several branches of the chemical industry, notably citric acid and citrus oils, found themselves faced with conditions of such gravity as to seriously threaten their future. Growing competition from fermentation citric acid combined with the general decline in world consumption radically reversed the situation of Italian citric acid manufacturers, who up to a few years ago held practically a world monopoly. Toward the end of the year the C.I.F.A.C., the central citric acid sales bureau, was dissolved and free marketing resumed.

The situation of all Sicilian essential-oil producers was far from satisfactory, while that of bergamot-oil producers selling through the Bergamot Oil Consortium became so serious as to necessitate State intervention in October 1932, to dissolve the Consortium and take over stocks of bergamot oil before the oil of the new season came on the market.

An event of primary importance in 1932 was the discontinuance of the Sicilian Sulphur Consortium at the request of its members. In spite of laborious negotiations covering a period of weeks, it has not yet been possible to form a national consortium to include producers on the mainland, principally the Montecatini, as well as Sicilian producers.

In spite of conditions, 1932 was no worse, but in many respects was better, than 1931 in the Italian chemical industry. Italian manufacturers look toward the future without undue alarm. The stability of the national currency and the repeated assurances of the Government of its intention to maintain the lira at its present stabilized level are a source of security to the manufacturer in calculating his costs and profit margins.

The law enacted during the past year making the erection of new plants subject to State permit, in order to control so-called uneconomic competition, assures the chemical manufacturer of protection from upstart, improvised producers seeking to take advantage of markets created by legitimate industrialists with the expenditure of time and money in long research and experiments.

The fact that the State will not allow key chemical industries to perish, but will intervene at critical times, has been proven over the past two years in the case of dyestuffs, boric acid, sulphur, bergamot oil, bromine, phosphorus, iodine, and other industries.

State aid in the dyestuffs industry took the form of assistance in obtaining banking support at the time of the reorganization of the A.C.N.A. in 1931. In the case of boric acid an important direct sub-

aid of 1,000,000 lire annually over a period of 15 years was granted the Societa Boracifera di Larderello. Remission of taxes, favorable leases, and assurance of purchase at a fixed price for the finished product were accorded the nascent bromine, iodine, and phosphorus industries. The State appropriated 4,000,000 lire annually over a period of 6 years to cover the liquidation of accumulated sulphur stocks last July, and in October provided 5,000,000 lire to withdraw a stock of 350,000 pounds of bergamot oil from the market.

CARTELS AND CONSORTIUMS

In line with the policy of the Fascist regime of furthering centralization and coordinated action in the industrial and commercial life of the nation, the cartel movement has made further progress during the past two years.

In its domestic expression cartelization usually is the grouping of manufacturers in a branch of industry into a central consortium which may have one or several functions, including price fixing, allocation of production quotas, concerted buying of raw materials, and unified selling on the domestic and/or world markets. These consortiums may be voluntary or obligatory.

According to a law enacted in 1931, an obligatory consortium may be forced by the Government to embrace all producers in a given industry when petitioned by a group of manufacturers representing 70 percent of production in that industry. In these consortiums the industry finds a convenient instrument for realizing cartel agreements both at home and abroad.

The most important groupings in the chemical industry through consortiums and market agreements have been in the branches of sulphur dyes, citric acid, tartaric acid, matches, electrolytic caustic soda, hydrogen peroxide, sodium sulphide, formic acid, acetic acid, citrate of lime, calcium carbide, carbon disulphide, tanning extracts, alcohol, idoine, copper sulphate, white lead and lead carbonate, zinc white, dynamite, cyanamide, hydroquinone. During 1932 the Sulphur Consortium, the Citric Acid Sales Comptoir (C.I.F.A.C.), and the Bergamot Oil Consortium were dissolved.

The Italian chemical industry is a party to various international agreements and cartels, including dyestuffs, nitrogen, calcium carbide, tanning extracts, tartaric acid, acetic acid, acetone, formic acid, sodium sulphide, hydroquinone, white lead, and glue.

SULPHUR AND PYRITES

Italy has abundant deposits of both pyrites and sulphur, important export commodities. The Italian output of iron and copper pyrites was unofficially estimated at 657,850 tons in 1931, as compared with 717,270 tons in 1930. No estimate for 1932 is yet available. The Montecatini mines represent about 75 percent of the total yield of pyrites, principal use of which is in the production of sulphuric acid. Practically the entire Italian output of sulphuric acid is obtained from roasting pyrites, and only a very small proportion from processing sulphur.

Owing to the high cost of the land haul from Italian pyrite mines to certain of the sulphuric acid plants and the relatively lower cost of

ocean freight, imported pyrites arriving by sea can be laid down at some plants cheaper than the domestic pyrites, and there is, therefore, a steady importation. On the other hand, the Montecatini likewise ships pyrites abroad to Balkan and other Mediterranean customers.

A radical change has taken place in the Italian sulphur situation within the past 5 years. Prior to the World War, Sicilian production represented 90 percent, the mainland not more than 10 percent, of the total. Since 1925 the mainland deposits, chiefly Montecatini, have been increasingly developed until in 1932 production on the Continent accounted for about 30 percent of the total, as illustrated by the following figures:

SULPHUR PRODUCTION IN ITALY

[In tons]

Year	Sicily	Mainland	Total	Year	Sicily	Mainland	Total
1913.....	347,588	38,721	386,309	1930.....	251,408	99,153	350,561
1924.....	248,330	46,569	294,899	1931.....	248,085	99,715	347,800
1929.....	241,762	82,075	323,835	1932 ¹	250,000	110,000	360,000

¹ Estimated.

Until July 1932, Sicilian sulphur was marketed through the Sicilian Sulphur Consortium. The growing production on the mainland, not bound by the agreement, proved an increasingly disturbing element in the world sulphur situation until July 1932, when the Italian Government dissolved the consortium at the request of the members, arrangement being made for the liquidation of the stock of 200,000 tons held by the consortium over a period of 6 years. Since last summer numerous attempts have been made to form a national consortium to include both Sicilian and mainland producers and renew the world marketing agreement.

Foreign trade in pyrites and sulphur follows:

ITALIAN FOREIGN TRADE IN PYRITES AND SULPHUR

[In tons]

Items	1929	1930	1931	January-October 1932
Pyrites:				
Imports.....	185,224	209,859	104,443	74,932
Exports.....	230,617	245,473	249,330	213,585
Sulphur:				
Imports.....	35	61	-----	5
Exports.....	221,836	253,853	240,533	219,205

Production of sulphuric acid in Italy hinges largely on the demand for superphosphates. Consumption of this fertilizer having declined sharply in the past 2 years, production of sulphuric acid registered a corresponding drop, as shown by the following production figures:

ITALIAN PRODUCTION OF SULPHURIC, HYDROCHLORIC, AND NITRIC ACID

[In tons]

Items	1932	1931	1930	1929
Sulphuric acid:				
50° to 52° B _é	1 700, 000	1 850, 000	1, 147, 057	1, 133, 710
66° B _é	(?)	1 88, 683	79, 153	95, 075
Fuming, 22 to 25 percent free SO ₂	(?)	1 31, 700	18, 308	20, 210
Fuming, 60 percent free SO ₂	(?)		1, 375	1, 416
Hydrochloric acid.....	(?)	34, 500	39, 550	40, 770
Nitric acid ²		60, 000	74, 963	39, 360

¹ Estimated.² Not available; estimated to be about equal to 1931.³ In terms of 36° B_é.

In 1931, 6,550 tons of hydrochloric acid were obtained by synthesis. Production of concentrated nitric acid continued to increase during 1932, and imports of this acid, while greater than in 1931, were still well below figures of previous years. Domestic production is not yet sufficient to free Italian consumption of the necessity of importing.

ALKALIS AND DERIVATIVES

The domestic market for sodium sulphate and bisulphate weakened during 1932, owing to reduced consumption of these salts by the glass and rayon industries. Domestic production likewise declined, and the lessened consumption was supplied in part by imports from Russia. Production of Glauber's salt in 1931 was estimated at 18,000 tons; sodium bisulphate at 2,700 tons.

Italian consumption of soda ash is supplied exclusively by the Rosignano plant of the Italian Solvay Company. Production of soda ash is estimated at 181,200 tons in 1931, compared with 181,400 tons in 1930 and 199,760 tons in 1929. Output in 1932 is believed to have been somewhat less than 1931.

Production of caustic soda in 1931 was larger than in 1930 and amounted to 67,400 tons of fused and 50,000 tons in solution. Imports are negligible, and Solvay soda supplies 60 percent of the domestic consumption.

One of the chief problems confronting manufacturers of electrolytic caustic soda is the profitable utilization of the chlorine obtained as a byproduct. Chlorine production capacity of Italian electrolytic plants was estimated at approximately 30,000 tons annually. Estimated 1931 and 1932 production was between 18,000 and 19,000 tons. The amount utilized as liquid chlorine is 800 to 1,000 tons. Chlorine is just beginning to be used for purifying water.

The principal chemicals manufactured in Italy from chlorine are bleaching powders (calcium and sodium hypochlorite), synthetic hydrochloric acid, insecticides and fungicides, chlorine intermediates for dyestuffs, chlorinated chemical cellulose, and chlorinated solvents. Production of bleaching powders is on the decrease, but this is offset by the development of other chlorinated products. Two companies, however, have perfected a super-bleach with a high chlorine content.

The Caffaro has had considerable success with its copper oxychloride base, which is sold in competition with copper sulphate. About 6,500 tons were produced in 1931.

A.C.N.A. has developed a series of chlorine intermediates for the dyestuffs industry and solvents including chlorobenzol, tetrachloroethane, pentachloroethane, and S-chloroethane, triethylene, and carbon tetrachloride. Production of triethylene has become one of the principal outlets for chlorine. An estimated 4,000 tons of chlorine are utilized annually in its production, although 1932 consumption was estimated at 3,000 tons. Exports of triethylene in the first 10 months of 1932 were 1,548 tons.

To some extent, carbon tetrachloride and triethylene have displaced carbon disulphide as a solvent and in the extraction of fats, particularly olive oil. In addition to its use in the preparation of carbon tetrachloride, carbon disulphide is consumed in large quantities in the manufacture of rayon. Production of carbon disulphide is estimated at 13,500 tons in both 1931 and 1932, compared with 13,763 tons in 1929.

Phosgene gas for the account of the Government is manufactured by one of the caustic soda manufacturers, the Cellulosa-Cloro-Soda at Naples.

Plans are in preparation for the erection of a plant for the manufacture of cellulose from straw by the Pomilio chlorine process.

Production of sodium sulphide declined from 4,300 tons in 1930 to approximately 2,500 tons in 1931, with a further decrease in 1932. The decrease is attributed in part to a falling off in consumption by the textile and tanning industries, and in part to competition from low-priced imported sodium sulphide from Russia.

The Soc. Boracifera di Larderello utilizes natural steam jets to produce electric power which is carried to near-by cities. In addition to the power, the Soc. Boracifera produces boric acid and borax from condensation of the steam, which is rich in chemicals. Production figures are not available later than 1930, but in that year 3,322 tons of borax, 4,706 tons of crude boric acid, and 1,382 tons of refined boric acid were made. Borax was exported for the first time by the Soc. Boracifera in 1927. In the first 10 months of 1932, 1,255 tons of borax, 348 tons of crude boric acid, and 871 tons of refined boric acid were exported.

In addition to boric acid, the company also recovers carbon dioxide, ammonia, and smaller amounts of hydrogen, methane, and other gases from the steam jets. The carbon dioxide is utilized in the manufacture of dry ice, while the company plans to produce ammonia salts. In February 1932, a subsidy of 1,000,000 lire annually was granted to the Soc. Boracifera, over a period of 15 years.

Copper sulphate is the most widely used fungicide. The Montecatini controls about 70 percent of Italian production of copper sulphate, which totaled 78,271 tons in 1931 compared with 70,393 tons in 1930. Production for the first 10 months of 1932 showed a further increase of 23 percent over 1931. Copper sulphate is both exported and imported, chiefly from Great Britain. Imports for the first 10 months of 1932 were 7,462 tons, and exports were 1,327 tons. Copper sulphate has been marketed since 1929 through a central sales bureau which fixes prices.

Both fumigation and plant sprays are extensively used in the Italian orchards. One of the first successful sprays with a petroleum base to be used in Italy was an American product. Petroleum sprays are manufactured now domestically, but the market continues to absorb

the imported products also. Plant sprays with a pyrethrum extract base have proved too expensive for extensive agricultural use on the Italian market.

Fumigation is obligatory in the citrus orchards and until two years ago was done solely with sodium cyanide of German origin. American calcium cyanide is now being used extensively and is gaining in preference.

National sources of bromine and iodine during the past three years have been developed to a point where imports have been eliminated. Both these young industries have received tariff protection and official assistance in the form of leases of Government property on easy terms, assurance of a monopolistic market, etc.

Bromine is extracted from sea brine in the State Salt Works at Santa Margherita di Savoia by a chlorine process. Production in 1931 was estimated at 34 tons, compared with 22 tons in 1929 and 20 tons in 1930. Output in 1932 was probably in excess of 1931. The entire output is taken by the A.C.N.A. for use in dye manufacture and by the Government for military gases.

Iodine was first extracted from the brine of the State mineral springs at Salsomaggiore by the chlorine process on an industrial scale in 1925. Production increased to 18 tons of crude iodine in 1930 and an estimated 22.6 tons in 1931. Plant capacity is about 200 kilos of crude iodine in 24 hours, and during 1932 the daily output averaged around 100 kilos of crude, 50 kilos of bi-sublimated, and 30 kilos of iodides.

Small amounts of crude iodine are also extracted from brines at Monticelli Bagni, near Parma, and Bertinoro, near Forli. In accordance with existing law, however, the minor outputs are bought in by the R. T. Salsomaggiore. Only two other firms are authorized to manufacture bi-sublimated iodine and iodides, namely, Carlo Erba and Schiapparelli. The bi-sublimated iodine and salts are all marketed through a central sales bureau known as the Centrale Iodio Italiano.

Synthetic camphor was first manufactured in Italy by the Soc. Marengo at Spinetta Marengo in 1925. Present annual plant capacity is about 1,600 tons. Production is estimated at 600 tons in both 1932 and 1931, as compared with 345 tons in 1930. About half of the production is exported. The United States is a good customer, 93 tons of synthetic camphor having been exported to the United States from Italy during the first 10 months of 1932. Owing to some difficulties over prices, the Marengo sold no camphor to the United States in 1931, but last year the company was able to recapture its American trade.

Italian production of ethyl alcohol (calculated in terms of absolute alcohol) amounted to 420,102 hectoliters in 1931-32, of which three fourths was made from sugar-beet waste. There are now 4 plants for the production of alcohol—3 at Pontelagoscuro, near Ferrara, and 1 at Padova. The combined capacity of these plants is 610 hectoliters in 24 hours.

Synthetic methanol now accounts for over 95 percent of the total production of methanol, which reached 8,351 hectoliters in 1931-32, compared with 3,867 hectoliters in 1930-31 and 7,127 hectoliters in 1929-30. Three plants produce synthetic methanol, the Soc. Terni at Nera Montoro, capacity 20 tons daily, S.I.R.I. at Terni, capacity

10 tons, and Soc. Metanolo e Derivati at Coghinas, Sardinia, capacity 10 tons.

The growth of the pyroxylin lacquer, acetate rayon, and synthetic resin industries in Italy brought in its wake the production of solvents used by these industries. Production of acetic acid during 1931-32 totaled 7,027 tons, as compared with 6,741 tons in 1930-31 and 3,219 tons in 1929-30. The bulk is obtained synthetically.

In 1928 and 1929 it was believed that the pyroxylin lacquer industry was to take a greater and more rapid development than proved to be the case, and production of butyl alcohol was expanded beyond consumptive needs. As a result, a stock accumulated. Production fell from the peak point of 600 tons in 1929 to only 180 tons in 1930 and was brought up again to 300 tons in 1931, when stocks had been worked off; 1932 production is estimated at 400 tons.

Production of acetone rose from 520 tons in 1930 to an estimated 900 tons in 1931 and slightly more in 1932.

The Italian industry now produces a complete series of solvents, including ethyl, methyl, butyl, and amyl acetate, amyl alcohol, butyl phthalate, butyl stearate, isobutyl alcohol, and such plasticisers as triphenyl and tricresyl phosphate. All these products are made by the Distillerie Italiane group, which also prepares a high-grade nitrocellulose for the manufacture of pyroxylin lacquers. In spite of the development of domestic production, imported solvents and plasticizers still find a ready market, and the United States holds an important share of this trade.

TARTARIC ACID

The tartaric-acid industry has felt the world crisis severely. Two factors which tended to lower prices and reduce consumption were the low price of citric acid and cut-price competition from Spanish tartaric acid. Of the 5 Italian plants, 1 was closed and the remaining 4 worked on reduced schedules. Production of tartaric acid is estimated at 4,000 tons in 1931, compared with 5,640 tons in 1929. Production of cream of tartar was 1,400 tons in 1931 and 1,700 tons in 1929. Production of both these products underwent a further decline in 1932. Exports of tartaric acid and cream of tartar reflect the difficult world market situation and registered marked declines. The following table shows exports of tartaric materials, tartaric acid, etc.

ITALIAN EXPORTS OF ARGOLS, TARTARIC ACID, ETC.

[In tons]

Items	January- November, 1932	1931	1930	1929
Argols.....	7,578	8,696	7,077	7,921
Wine lees.....	933	1,015	219	897
Tartaric acid.....	1,512	2,371	3,613	4,110
Cream of tartar.....	610	1,053	914	1,553

CITRIC ACID

Since the development of citric acid production by the fermentation process, the situation of the Sicilian citric-acid industry has become increasingly difficult. Conditions react on both producers of citrate

of lime and manufacturers of citric acid. Citrate of lime is marketed exclusively through the Camera Agrumaria at Messina. The demand for it has declined so markedly in the past 2 years and the price that the Camera has been able to realize has been so low as to compensate producers inadequately. Only 1,676 tons were delivered to the Camera in the citrus year 1931-32, compared with 8,983 tons in 1929-30. Sales during 1931-32 were only 765 tons.

The carry-over at the end of November 1932, old stocks plus the unsold surplus of 1931-32, totaled about 8,245 tons. Exports during the first 11 months of 1932 were only 539 tons, compared with 1,351 tons during the corresponding period of 1931. It is reported that the Camera has contracted for deliveries of about 2,000 tons of citrate over the current year, a relatively small sale in view of the accumulated stock. The whole future of the Camera and the marketing of citrate of lime is in the balance, and various interests are asking that the Camera be dissolved. This will probably not take place, but it is probable that the Camera may undergo a complete reorganization.

Official figures on citric acid production are not available later than 1930, when 2,827 tons were produced, compared with 3,704 tons in 1929. Production in 1931 has been estimated at approximately 2,100 tons, with a further decline in 1932. Exports of citric acid declined from 2,804 tons in 1929 to 1,821 tons in 1931 and 1,418 tons the first 11 months of 1932. Since 1928 Italian citric acid has been marketed through a central sales bureau, the C.I.F.A.C., which disposed of the output of the two Italian producers, the Arenella and the Sada-Bosurgi. Late in 1932 Sada-Bosurgi withdrew from the C.I.F.A.C., and sales are now on a competitive basis.

In view of the unfavorable conditions in world citric-acid markets, Italian producers are looking to develop other branches of the citrus by-products industry. Production of pectin on an industrial scale is reported from both Messina and Palermo, and the Sada-Bosurgi is said to be developing the conservation of fresh fruit juices on the Matzka process.

ESSENTIAL OILS

The world market for citrus oils has declined steadily in both demand and prices. Shipments of lemon oil from Sicily during 1931-32 were about 30 percent below those of 1930-31. Production of lemon oil is said to have been from 55 to 60 percent below the 1930-31 figure. In spite of the lower production, the carry-over of lemon oil as of December 1, 1932, was rather large, owing to the heavy carry-over as of December 1, 1931, and the reduced 1931-32 shipments. The carry-over on December 1, 1932, is estimated at 340,000 kilos. Owing to the relatively high price of lemons as compared with that of the oil and the difficulty of realizing any sales of citrate of lime, it is reported that production of lemon oil during the 1932-33 season will be below normal.

A new process for the extraction of lemon oil by machine is being further developed. It is being worked on a relatively large scale by two firms in Messina. The quality is said to be fully comparable to that of the best sponge oil, with a slightly darker color.

The experiment in monopolistic marketing of bergamot oil through the Bergamot Consortium proved a failure and the consortium was dissolved, the stock of 190,000 kilos of oil owned by the consortium

having been taken over by the Government to be withheld from the market. The 1933 production is estimated at about the same figure as the old stock, and, therefore, a supply in excess of the demand is foreseen.

No figures on production of orange and mandarin oils are available. This season's output of sweet orange oil will be about normal. There are practically no stocks of bitter orange oil carried over and a normal production is anticipated, whereas an abundant output of mandarin is expected.

In addition to citrus oils, Italy produces, among other essential oils peppermint, lavender, clove, and flower oils. Production of peppermint oil in 1932 was estimated at 13,000 to 14,000 kilos, and oil of lavender 3,000 kilos. Promoted by the experimental station of Reggio Calabria, the cultivation of flowers for the production of floral essences, particularly jasmine, is progressing. Italian oils are less expensive than French.

The following table shows exports of citrus and other essential oils:

ITALIAN EXPORTS OF CITRUS AND OTHER ESSENTIAL OILS

[In kilos]

Items	1932	1931	1930	1929
Lemon oil.....	321,345	617,617	799,885	555,330
Bergamot oil.....	62,311	169,393	258,270	188,122
Orange oil.....	63,898	114,122	166,020	146,206
Mandarin oil.....	3,499	5,873	8,503	6,271
Peppermint oil.....	21,279	15,519	8,669	15,113
Other essential oils.....	21,392	16,280	11,815	15,034

COAL-TAR PRODUCTS

Italian production of coal tar is more than sufficient for industrial needs. Imports of crude coal-tar products, however, are considerable, and during the first 10 months of 1932 amounted to 3,406 tons of crude benzol, toluol, and zylol, 290 tons of crude phenol, and 1,022 tons of crude naphthalene.

Domestic production of intermediates, estimated at 5,500 tons in 1931, supplied about 90 percent of the needs of the dyestuffs industry. With the completion of the plant for the production of phthalic anhydride at Cengio, the series of intermediates is complete and the industry practically independent except in the case of certain specialty dyes.

Early in 1931, the A.C.N.A., the principal Italian manufacturer of intermediates and dyestuffs, was reorganized and taken over by the Montecatini and the I.G. It is reported that 51 percent of the new capital subscribed is held by the Montecatini, 49 percent by the I.G. A considerable financial contribution was made by the Government. Although the exact amount of the subsidy and its form is not known, it is probably a long-term loan arranged from the Banca d'Italia on advantageous terms. At the same time the Montecatini acquired from the I.G. an important share in the Soc. Chimica Lombarda A.E. Bianchi & Co. Shortly after the reorganization the Italian dye industry entered the European Dye Cartel.

Production of dyestuffs declined from 7,400 tons in 1929 to 5,400 tons in 1931. About 40 percent consisted of sulphur dyes. Domestic

production supplied 85 percent of consumption in 1931. Imports average between 1,550 and 1,600 tons annually, the greater part being supplied by Germany, Switzerland, and France, but American dyes have captured a small share of the trade. Dyes are no longer received on reparations account, but a stock of some 100 tons of reparation dyes still exists, which will be liquidated during the first half of 1933.

PIGMENTS, PAINTS, AND VARNISHES

Italy has an important output of mineral-earth pigments such as ochers, siennas, and verona, output of which approximated 9,900 tons in 1931. The principal chemical pigments produced in Italy in 1931 were white lead 2,500 tons, zinc white 5,000 tons, titanium white 1,300 tons, lithopone 2,615 tons, red lead and litharge 4,000 tons, and English red 850 tons. White lead and lithopone are exported in considerable quantities, and red lead and zinc white are imported.

Imports of bone, carbon, and lampblacks, exclusively from the United States, amounted to 2,376 tons in the first 10 months of 1932, compared with 1,348 tons in 1931 and 1,816 tons in 1930.

Production of paints and varnishes was estimated at 20,500 tons in 1931, and about 15,000 tons in 1932. Domestic production of pyroxylin lacquers was estimated at 500 tons in both 1931 and 1932. During 1932 a new type of lacquer containing glyptal resins, known as Dulux, which is both a brushing and a spraying lacquer, was put on the market. Imports of lacquers are from 250 to 350 tons annually.

CRUDE DRUGS, MEDICINAL AND TOILET PREPARATIONS

Italy is an important source of various crude drugs and botanicals, among which are sumac, licorice root, manna, scilla, psyllium seed, and saffron, some of which grow wild and some of which are cultivated. Production figures are not available until a recently ordered survey by the Government is completed. The following export figures give an idea of the importance of the trade:

EXPORTS OF CRUDE DRUGS AND BOTANICALS

[In tons]

Items	January-October, 1932	1931	1930	1929
Licorice root.....	523	1,286	1,337	868
Manna.....	107	140	131	138
Sumac:				
Ground.....	5,271	6,708	7,680	8,977
Not ground.....	2,335	4,104	5,274	3,975
Unspecified botanicals.....	1,384	2,258	2,688	2,599

The Italian industry for the preparation of medicinal and pharmaceutical specialties underwent a severe drop in sales both at home and abroad during 1931 and 1932. Domestic consumption declined some 20 percent from 1930, while exports fell 40 to 50 percent. This market contraction, together with the increasing stringency of regulations governing import permits, restricted the sales of American medicinal specialties.

Estimated sales of cosmetics and toilet preparations declined 30 percent in 1932 from 1931. As a result, the domestic industry succeeded in persuading the authorities to withdraw the conventional

rate of duty and return to the general duty on toilet preparations—equivalent to a 100 percent increase in the duty. French toilet preparations and cosmetics were restricted by the quota system. American preparations were growing steadily in popularity until the tariff increase, but their sales probably will not increase until it is reduced.

FERTILIZERS

Both production and consumption of phosphate fertilizers continued to decline heavily in 1931 and 1932. Imports of phosphate rock during the first 10 months of 1932 were 20 percent below the same period of 1931 and almost 60 percent under 1930. Production of superphosphates during the first 10 months of 1932 declined 24 percent, while total 1931 production of 802,000 tons was 41 percent below 1930.

In contrast to phosphate fertilizers, the use of nitrogenous fertilizers gained. Present productive capacity of the Italian nitrogenous fertilizer industry (in terms of nitrogen) may be estimated at approximately 81,000 tons, distributed as follows: calcium cyanamide, 27,500 tons; synthetic ammonia, 50,000 tons; and by-product ammonium sulphate, 3,500 tons. Total nitrogen consumption, including imported sodium nitrate, may have been about 62,000 tons in 1932, compared with 60,000 tons in 1929 and 55,250 tons in 1930. Total synthetic ammonia plant capacity is 262 tons per 24 hours, equivalent to 210 tons of nitrogen.

In order to afford protection to the nitrogen industry and encourage the use of synthetic nitrogenous fertilizers, the import duties on nitric acid, calcium cyanamide, and all nitrogenous fertilizers were greatly increased in July 1931. At the same time, an annual import quota of sodium nitrate was provided for, to be fixed twice a year in accordance with the needs of agriculture. As a result, imports of calcium nitrate have ceased, imports of sodium nitrate declined to less than half the previous figure, and those of other nitrogenous fertilizers, including ammonium sulphate and cyanamide, have become negligible. A considerable export trade in ammonium sulphate is registered. Total estimated production of nitrogenous fertilizers in 1931 was 264,960 tons, 10 per cent greater than in 1929. Production figures for 1932 are not available, but it is stated that the output of cyanamide, ammonium sulphate, and ammonium nitrate decreased somewhat compared with 1931, whereas calcium nitrate increased markedly and that of bi-ammonium phosphate doubled.

With the exception of relatively unimportant amounts of ground leucite, which are applied directly to the soil, and vinasse cinder from the residuum of beet-sugar molasses, Italy possesses no supplies of potash. Experiments have been made on an industrial scale in obtaining potash salts from leucite, and an important plant was erected in 1930 for this purpose. The plants are not operating at present, and other industrial experiments along this line have been abandoned.

Attempts have been made to extract potassium salts from sea brine in Government salt works in the Italian colonies, but none of these has been developed on an industrial scale.

A decrease in the consumption of imported sodium nitrate, part of which came from the United States, and an increase in use of calcium

nitrate is evident in the following table of consumption of fertilizers in Italy:

CONSUMPTION OF FERTILIZERS IN ITALY

[In tons]

Items	1929-30	1930-31	1931-32
Phosphate fertilizers:			
Ground phosphate rock.....	8, 935	3, 230	3, 215
Superphosphates.....	1, 524, 948	1, 047, 836	882, 005
Basic slag.....	71, 206	50, 285	46, 882
Nitrogenous fertilizers:			
Calcium cyanamide.....	97, 011	76, 196	83, 774
Ammonium sulphate.....	112, 206	104, 669	114, 349
Ammonium nitrate.....	21, 816	14, 894	18, 209
Ammonium sulphate-nitrate.....	2, 755	864	735
Calcium nitrate.....	44, 302	28, 114	51, 281
Sodium nitrate.....	74, 592	64, 000	50, 708
Bi-ammonium phosphate.....		1, 594	5, 587
Potash fertilizers:			
Potash salts.....	51, 537	24, 608	21, 697
Vinasse cinder.....	5, 797	2, 943	6, 383
Ground leucite.....	2, 031	921	786

FOREIGN TRADE

In point of value Italian foreign trade in chemicals reached its highest mark in 1929. Since then the value of both the import and export trade has declined steadily. In respect to tonnage, the 1930 volume of chemical imports exceeded the 1929 figure, chiefly because of increased imports of light tar oils and coal-tar crudes after the cessation of reparations deliveries. The following table shows Italy's total foreign trade in chemicals and allied products and the share of the United States from 1929 to October 1932:

ITALIAN FOREIGN TRADE IN CHEMICALS AND ALLIED PRODUCTS

Year	Tonnage		Value			
	Total	United States	Thousand lire		Thousand dollars	
			Total	United States	Total	United States
IMPORTS						
1929.....	1, 472, 839	90, 890	953, 908	61, 096	49, 890	3, 195
1930.....	1, 573, 219	119, 506	854, 768	60, 113	44, 700	3, 144
1931.....	894, 148	70, 205	578, 700	36, 956	30, 150	1, 925
January-October 1932.....	620, 620	47, 467	361, 077	26, 291	18, 560	1, 351
EXPORTS						
1929.....	610, 507	11, 022	738, 125	67, 651	38, 600	3, 538
1930.....	645, 149	10, 037	609, 083	52, 691	31, 543	2, 766
1931.....	645, 107	9, 571	503, 289	28, 673	27, 200	1, 494
January-October 1932.....	600, 053	5, 915	315, 312	15, 849	16, 207	815

Germany, France, the United States, and Great Britain are the chief suppliers of chemicals and allied products to Italy. Practically the only chemical items whose imports did not register declines in volume were light tar oils and coal-tar crudes, linseed oil, lampblack, lithopone, and crude drugs. The increase in imports of light tar oils and coal-tar crudes offset the amounts formerly received on reparations account. The most notable losses in volume of imports of chemicals took place in the items of phosphate rock, superphosphates, basic

slag, Chilean nitrate, ammonium sulphate, nitric acid, caustic potash, copper sulphate, drugs, medicines, and toilet preparations.

Italy's principal exports are sulphur, fertilizers, citrus oils, tartaric and citric acids, boric acid, crude drugs and botanicals, argols, mineral earth pigments, and prepared medicines. Great Britain is Italy's best market, followed by France and Germany. Argentina, Brazil, the Balkan countries, Egypt, and India are also good customers. In 1931 Soviet Russia took important quantities of chemicals, notably sulphur, coal-tar intermediates, citric acid, argols, fertilizers, essential oils, paints and varnishes, and camphor, but during 1932 the value of Russian chemical purchases dropped to about one tenth of the 1931 sales.

Through 1931 the volume of exports of sulphur, coal tar, ammonium sulphate, triethylene, phosphates, argols, boric acid, borax, white lead, and citrus and peppermint oils showed noteworthy gains, which were continued during 1932 in the case of the first four items. Sales abroad of boric acid and borax, citrus oils, and pigments lost ground in 1932. Tartaric acid, citric acid, citrate of lime, copper sulphate, mineral earth pigments, and medicinal specialties have declined steadily since 1929.

NORWAY

Commercial Attaché Marquard H. Lund, Oslo

Norway, not a large industrial country and with a relatively small population, nevertheless is one of the important chemical-producing countries of the world, principally because of its development of the electrochemical branch, in which the production of nitrates is outstanding. Norway's exports of chemicals and allied products are nearly double its imports.

The prominence of the chemical industry in the economic structure of Norway is indicated by the accomplishment of the Norsk Hydro-Elektrisk Kvaestofaktielskab, the largest single commercial enterprise of the country. This company has practically built the towns of Notodden and Rjukan.

The important electrochemical branch operated at curtailed capacity throughout 1932. A comparison with 1931 is not of much value because in that year most plants were closed for months due to a lockout, but the loss of markets is strikingly shown if statistics for 1930 are considered. This loss is due partly to a general shrinkage in world requirements, and to some extent to the construction of competitive plants in other countries which formerly purchased Norwegian electrochemical products.

Synthetic nitrate production was expanded in 1929, and in quantity exceeds that of all other chemical products. The Norwegian producer of nitrate (Norsk Hydro) had concentrated for many years on calcium nitrate. In recent years the line has been extended and the following products are marketed:

Calcium nitrate (Norgesalpeter), 13 percent N, 26 percent Ca.

Compound white nitrates of lime and ammonia (Kalksalpeter), 15.5 percent N, 28 percent CaO.

Calnitro (Kalkammonsalpeter), 20.5 percent N, 20 percent CaO.

Sodium nitrate, 97 percent NaNO₃.

Ammonium nitrate 99.9 percent NH₄NO₃.

Nitric acid, 98 to 99 percent NHO₃.

Liquid ammonia.

Sodium nitrate is gaining in popularity, and production increased somewhat in 1932. The requirements of soda ash, which have been imported, are now to be produced locally in a new plant being built by Norsk Hydro, with an annual capacity of 18,000 tons. The use of sea water as a raw material for soda ash manufacture has been investigated. If practical, such a process would be of considerable economic importance, but evidently it is only in the experimental stage.

With the exception of sodium nitrate, exports of which rose from 28,000 tons in 1930 to 63,560 tons in 1932, other nitrates declined to the following figures in 1932: calcium nitrate 312,000 tons, cyanamide 24,200, calcium carbide 22,700, ammonium nitrate 1,900, and nitric acid 2,800 tons.

Production of elemental sulphur from pyrites reached commercial proportions in 1932, a total of 60,000 tons being reported, the greater part of which was exported to Sweden and Finland. Several new ovens for roasting pyrites were installed during the year, for chemical pulp manufacture by that method rather than by burning sulphur.

Other chemical industries marked time during 1932. There was some increase in the exports of a few specialties, notably cod-liver oil and kelp.

Factories catering to the domestic market, such as paint and toiletries, benefited from the additional 20 percent surtax on imported products and were able to extend their market somewhat. In this they were aided by the semiofficial campaign to give preference to Norwegian-made products.

Industrial chemicals, chiefly alkalis, for use as raw material are important import commodities. With the exception of the increase in imports of soda ash to 63,200 tons in 1932, due to the greater production of sodium nitrate, and of bleaching powder which advanced to 3,200 tons, other commodities were received in smaller amounts. Receipts of sulphur decreased to 11,300 tons.

Imports of rosin during 1932 amounted to 3,200 tons of which France furnished a considerable share. During the latter part of the year, however, the price relation between gum rosin and wood rosin gave American producers some advantage, and part of the lost business was recovered.

Some interest was expressed recently in American aniline dyes. At present the bulk of the business is being done with Germany, although other European countries participate to some extent. Imports average 300 to 400 tons a year.

Paint imports are being gradually replaced by domestic products, although total 1932 receipts will probably aggregate 5,000 tons. Domestic manufacturers claim that no import of paint is necessary, but specialties of proven quality still find a market.

SWEDEN

Commercial Attaché T. O. Klath, Stockholm

Sweden, another chemical producing country, both imports and exports chemicals and allied products. Sweden continues to be the world factor in the match trade. It formerly controlled 80 percent of world production, but the present position is not known. In addition to matches, the country is an important factor in the production of superphosphates, explosives, cyanamide, calcium carbide, and some pigments and paints.

While the foreign financial structure of the match industry was changed, the activities of the Swedish Match Co. at its Swedish plants have not changed materially. Exports of safety matches were 19,478 tons in 1932 compared with 31,177 tons in 1931; exports of other kinds of matches were 3,006 tons and 3,971 tons, respectively. The decline in exports, and consequently production, is largely due to the ability of foreign factories within tariff barriers to keep Swedish-made matches out of some of their former markets.

The result of extensive research work regarding a method of making sugar from wood was delivered recently to the Swedish Government Forest Commission. It is estimated that if developed into an industry about 1,000,000 tons of wood sugar could be produced annually in Sweden. Of this quantity, 200,000 tons would be used by the alcohol industry, 140,000 used by the fodder industry, and 660,000 tons exported to such countries as England and Denmark where refining into ordinary sugar might be commercially profitable.

The superphosphate industry was subject to a centralization during the latter part of 1931 whereby the entire industry is now under one management. This was done to overcome difficulties encountered in the sale of the output on the domestic market and in order to meet competition from abroad. One of the factories belonging to the cartel was closed, and production was cut considerably.

The United Superphosphate Companies, Landskrona, capitalized at 12,240,000 crowns, now operates factories in Landskrona, Limhamn, Gothenburg, Stockholm, and Malmö, the latter two only leased.

Swedish imports of superphosphate amounted to 7,463 tons in 1932, compared with 20,267 tons in 1931. Exports, chiefly to the Baltic States, were 31,468 tons compared with 16,450 tons in 1931. Present domestic consumption is estimated at 180,000 tons.

Stockholms Superfosfatfabriks Aktiebolag, Stockholm, one of the members of the superphosphate combine, recently requested the Swedish Government to regulate production of ammonium sulphate and to facilitate its sale in the domestic market. Imports of ammonium sulphate advanced to 21,638 tons in 1932 from 3,060 tons in 1931. The steady increase in imports of this product, chiefly from Germany, offers strong competition to Swedish producers of ammonium sulphate.

Imports of sodium nitrate decreased from 26,776 tons in 1931 to 18,888 tons in 1932. The Swedish fertilizer industry hopes for improved conditions in the spring of 1933. The Swedish grain crop in 1932 was unusually good, and this may have a favorable effect on purchases by farmers for the coming season.

Ore at the Boliden mines in northern Sweden, producing copper, gold, and silver, contains large quantities of arsenic; it is estimated that these mines could supply the world's entire present consumption of this mineral. Annual production of white arsenic is estimated at 55,000 metric tons, but only a very small portion can be sold. The white arsenic is stored at the mines, and the company is now endeavoring to develop new uses for it. Tests have been conducted to ascertain the feasibility of impregnating lumber with arsenic. Another use which may prove economical is mixing cement with arsenic to make water-resistant concrete. Steps are being taken to construct modern facilities for producing refined arsenic.

The calcium carbide industry appears to be suffering from economic conditions. Production is reported to have decreased considerably more than exports, which declined from 8,801 tons in 1931 to 7,436 tons in 1932.

Swedish production of sulphite ethyl alcohol derived from sulphite waste liquor at the woodpulp mills amounted to 9,784,452 kilos in 1932 compared with 12,281,427 kilos in 1931. The decline was largely due to the strike in the wood-pulp industry for several months in the early part of 1932. This alcohol is used for motor fuel in combination with gasoline ("Lättbentyl"), in the production of alcoholic beverages and for industrial purposes. A recent proposal to the Swedish Riksdag was that the mixing of sulphite alcohol and gasoline be made compulsory.

Large quantities of sulphur, chiefly for use in the sulphite woodpulp industry, continued to be imported, although purchases from the United States, formerly the chief supplier, dropped considerably. Italian sulphur and sulphur from the Orkla mines in northern Norway were quoted at prices about 20 percent below those of American producers. The Orkla mines, partially controlled by Swedish interests, produce sulphur from pyrites; present capacity is 65,000 to 70,000 tons of 99.7 percent sulphur. Imports of sulphur were 59,822 tons in 1932, compared with 60,324 tons in 1931.

It is reported that an investigation is now being conducted by Swedish woodpulp mills to ascertain the possibility of utilizing the liquid rosin derived as a by-product in sulphite woodpulp plants in the distillation of rosin. If successful, an important Swedish rosin production may result and have an effect on imports of American rosin. Large quantities of rosin are used in the Swedish paper industry. Imports in 1932 were 7,075 tons, an increase over 1931, when 6,584 tons were received.

Drastic new legislation regulating the sale of prepared medicines and pharmaceutical specialties has been proposed. It is doubtful, however, that the proposed regulations will be enacted. As proposed, all specialties and original packages sold by apothecaries must be registered before marketed. For the testing, control, etc., of such preparations a very high registration fee is suggested.

On February 1, 1932, the Government imposed increased import duties on many so-called luxury goods, which particularly affected toilet preparations. Imports of perfumes, cosmetics, etc., decreased from 114,813 kilos in 1931 to 53,485 kilos in 1932. Imports of powder, rouges, etc., have decreased from 65,052 to 27,583 kilos.

Although the duty on essential oils also was increased, the decline in imports was not noticeable, since the entire requirement must be imported. The duty on toilet preparations containing alcohol was increased from 3 to 5 crowns per kilo. This was recently counteracted, however, by the increased tax on alcohol to be paid by Swedish manufacturers of such preparations, who now pay a tax of 60 percent of the value of the product plus 1.60 crowns per liter. In effect, this means that the Swedish industry is now heavier taxed than imported preparations.

CZECHOSLOVAKIA

Commercial Attaché Don C. Bliss, Prague

The Czechoslovak chemical industry is one of the oldest in the world, dating its origin to the sixteenth century, although still comparatively small. Alkalies, acids, wood distillates, coal-tar products, pharmaceuticals, paints, and lacquers are all made in Czechoslovakia. In 1931 imports of chemicals and allied products were valued at \$20,200,000, exports at \$12,000,000, and sales of domestic products at \$21,800,000.

Developments in the chemical industry and trade of Czechoslovakia in 1932 were mainly the results of the declining activity of consuming industries and a strong movement toward industrial self-sufficiency. Estimates based on the statistics of the first 11 months of 1932 indicate that exports of chemicals and allied products were well maintained at \$11,000,000, while imports were cut to \$16,400,000 and inland sales of domestic products declined to about \$16,500,000.

Economic developments in 1932 were dominated by a strong nationalistic movement, especially in agricultural products. This trend was reflected in exchange regulations and restrictions, used to create additional protection for agricultural and industrial products.

Imports of heavy chemicals which entered Czechoslovakia by international agreements, although the country is self-sufficient in its production, were shut out by embargoes or reduced to nominal quantities only.

The whole structure of the chemical export trade was changed in 1932. Czechoslovakia's neighbors and customers for heavy chemicals were fostering economic nationalism by introducing exchange regulations, import permits, quotas, and/or compensation imports. The result was a sharp drop in exports of many heavy chemicals, ranging from 30 to almost 100 percent. Exports of fine chemicals, on the other hand, surpassed in 11 months the total value of 1931 exports of about \$3,000,000.

The stock-exchange values of the securities of the 10 largest Czechoslovak chemical companies increased 10 percent during 1932, although certain other industrial stocks showed enormous drops.

The average decline in the consumption of Czechoslovak fertilizers in 1932 as compared with 1931 was 6 percent, while the decline in potash sales averaged 21 percent. Sales of superphosphate and cyanamide were well maintained, but basic slag consumption was reduced by about 17 percent owing to a sharp drop in domestic steel production. The Czechoslovak superphosphate cartel "Fosfacid", which expired December 31, 1932, was renewed for another three years.

The sharp cut of 56 percent in Chile saltpeter sales was caused by Government restrictions which, however, did not have the desired effect of increasing sales of nitrogenous fertilizers of domestic origin. Small quantities of United States sodium nitrate were sold for the first time in Czechoslovakia. Imports of Chile saltpeter, which were 95,000 tons in 1929, dropped to 16,000 tons in 1930, however, 1929 shipments were in part for use the following spring, while it is understood that no shipments were made in 1930 for the 1931 spring season. Imports were only 5,900 tons in 1931 and 7,216 tons in the first 11 months of 1932.

The requirement of an import permit for calcium nitrate prevented imports in 1932. The Czechoslovak Nitrogen Works, which had

been making calcium nitrate and a calcium nitrate-ammonium sulphate mixture, was forced to close down for several months for lack of orders.

In 1928 Czechoslovakia imported in excess of 3,800 tons of sulphuric acid. By increasing the output in 1929 to about 300,000 tons of 50° acid, imports dropped to only 885 tons. With the shrinking production of superphosphate and ammonium sulphate, 1930 showed for the first time a net export of 8,282 tons. Exports in 1931 were 4,700 tons, with Germany the main country of destination, and in the first 11 months of 1932 exports were 3,684 tons.

Exports of hydrochloric acid dropped about 26 percent to 492 tons the first 11 months of 1932. On the other hand, imports of muriate of potash were cut more than half and exports (mainly obtained from the residual waste of alcohol and sugar industries), which were 1,100 tons in 1931, will probably reach 1,300 tons in 1932, with Japan, and the United States as leading customers.

In 1929 Czechoslovakia produced about 5,000 tons of nitric acid and imported 3,000 tons. In 1932, it was estimated, 6,500 tons of nitric acid were produced, of which 1,500 tons were exported; there were practically no imports.

Exports of acetic acid and of acetate of lime dropped 30 per cent in 1932 from 1931. Tartaric acid is not produced in Czechoslovakia, and imports declined 20 percent in 1932.

Production of fermented citric acid from sugar-beet molasses, which was started by the Joh. David Starck Co. in 1930, has gradually increased until now the country is an exporter of this acid instead of an importer. During the first 11 months of 1932, 381 tons were exported compared with 370 tons in the entire year of 1931 and 21 tons in 1930.

Although the Nestomitzer Solvay-Werke has an average production of 90,000 tons of soda ash, annual imports have exceeded 18,000 tons until 1931 when only 2,900 tons were received. In the first 11 months of 1932 less than 50 tons were imported.

Caustic soda, made by the Aussiger Verein and the Nestomitzer Solvay Werke, brought imports down from 2,270 tons in 1924 to 555 tons in 1929. Imports from Russia raised the figure to 1,330 tons in 1931. By refusal of import permits, imports were reduced to 14 tons for the first 11 months of 1932.

Net exports of wood distillates from Czechoslovakia have declined markedly since 1929. Figures for the first 11 months of 1932 were: Calcium acetate 2,609 tons, methanol 1,626 tons, acetone 562 tons, and concentrated acetic acid 473 tons.

Estimates place the 1932 consumption of impregnated wood at 160,000 cubic meters of ties and 40,000 cubic meters of telegraph poles. All the ties are impregnated under pressure with tar oil or with tar oil and zinc chloride mixture. Total capacity of the 12 wood-preserving plants is between 400,000 and 500,000 cubic meters. Consumers of heavy coal-tar oil for wood preserving are united in the "Prodimp" sales cartel of the United Wood Preserving Works (Ltd.). Members of the cartel are: Böhmisch-Mährische Holzimprägnierwerke A.G. (5 plants); "Konsea" A.G. Holzimprägnierwerke & Chemische Fabriken; Julius Rutgers Kom. Ges.; Böhmerwälder Holzimprägnierwerke; Hrdlicka Holzimprägnierwerke; and A. Formandl. There are two outsiders, Jos. Dacho, Ceske Velenice, and

a plant controlled by the Czechoslovak Ministry of Public Works, established early in 1932, operating on a mercury chloride process.

Reduced industrial activities brought production of coke down from 2,046,000 tons in 1931 to an estimated 1,270,000 tons in 1932. By-product recovery was correspondingly lower.

The coke and gas plants, primarily in the Moravsk Ostrava district, produced 68,000 tons of coal tar in 1932. Net imports during the first 11 months were 1,025 tons. Czechoslovak production of dyes is estimated at 1,500 to 2,000 tons. Imports of 2,389 tons and exports of 168 tons in the first 11 months of 1932 were about 30 percent less than in 1931.

Alcohol production, a Government monopoly, amounted to 529,534 hectoliters in the year ended August 31, 1932. The alcohol monopoly also administers the production of "Dynalkol", a 50-30-20 mixture of alcohol, benzol, and gasoline. According to official statistics, 62,218 hectoliters of alcohol were used in the manufacture of "Dynalkol" in 1930-31 and 74,931 hectoliters in 1931-32.

The situation changed radically when, by a special law, compulsory mixing of gasoline with alcohol was introduced September 1, 1932. In accordance with this law, motor fuel must contain 19 percent ethyl alcohol and 1 percent methanol. As a consequence, alcohol sales in the following months jumped more than 100 percent above the levels of the corresponding months of 1931.

Alcohol production quota for the year 1933 was fixed at 970,000 hectoliters, an increase of 62 percent above the 9-year average.

Along with the increase in alcohol production went a compulsory nationalization of Czechoslovak industrial distilleries, wherein industrial distilleries are refused the new and higher quotas unless evidence is submitted to show that controlling interests are in Czechoslovak hands.

Production of lacquers averaged 3,000 tons annually; 1932 production was estimated at 2,000 tons. With the exception of a few special high-grade lacquers, all the usual kinds are made locally. A high duty and import restrictions on lacquers and solvents serve to reduce imports. Imports in 1931 were 262 tons (\$418,000), of which 154 tons were from Germany and 49 tons from the United States. In the first 11 months of 1932 imports were 105 tons (\$227,000). Pyroxylin lacquers have increased steadily, and almost every paint and varnish manufacturer is producing a line of spray lacquers.

During 1932 the production of white lead was begun by a Prague manufacturer of red lead and litharge, while a number of other manufacturers increased their range of chrome colors.

The pharmaceutical industry increased its quantity output in 1932. The German I.G. acquired a majority of shares of the Chemosan-Helco A.G. of Opava, a modern though small pharmaceutical factory. It is reported that a number of I.G. pharmaceuticals will be made or at least packed there in 1933 for the Czechoslovak market in addition to the aspirin which is already being produced. Domestic insulin (Norgine) was brought on the market at prices about half of the British or Danish product. Domestic calcium gluconate also was introduced.

Merck, of Darmstadt, branched out in Czechoslovakia for the manufacture of its "Komprettin" and Biersdorf, of Hamburg, for leucoplast and cold cream.

Other new products produced for the first time in 1932 were commercial sodium nitrite and potassium nitrite, by the Synthesia Co. of

Semtin (owned by the Czechoslovak Nitrogen Works); iodine salts, potassium and sodium iodide, by the Oderberger Chemische Werke; ethylene trichloride by Aussiger Verein; and two new insecticides, "Chlorochema" and preparations against weevils. Two new companies were formed in 1932 for the manufacture of these insecticides—Chlorochema by the Aussiger Verein, and Schuldes, Brno.

In the general meeting of July 23, 1932, of Aussiger Verein, two mergers were approved, with the Falkenauer Kohlenbergbau A.G. and with the Silleiner Kunstdünger and Chemische Industrie A.G. Zilina. The mergers were more or less a formality, since Aussig was already holding majority control in the case of Sillein. The first-named company supplied the Falkenauer carbide and cyanamide plant of the Aussiger Verein with electric power.

SPAIN

Assistant Trade Commissioner Alma H. Cramer, Madrid

From the chemical viewpoint, Spain is of interest as a small competitor in European markets of American naval stores, as a source of supply of pyrites, certain crude drugs, essential oils, and mineral earth pigments, and as a growing market for most chemical products.

Exports of chemicals and allied products from the United States to Spain in 1931 were the greatest in the past decade. In 1932 exports of \$1,800,000 kept up better than to most other world markets and were above the average year. Nevertheless, the United States buys more chemicals from Spain than it ships there.

Imports from all countries into Spain of chemicals and allied products in 1931 amounted to \$28,600,000 and exports to \$12,000,000. During the first 11 months of 1932 losses were made in the trade with imports aggregating \$22,000,000 and exports \$9,700,000.

Since the dissolution of the Rosin Consortium in 1931, the naval stores industry has been in the hands of individuals or groups of individuals who are forest owners or rosin producers. La Cooperativa Resinera, which consists of a number of individual producers, the most important of which is the Union Resinera, however, was formed to facilitate the production and sale of naval stores. A number of other producers, the most important being the Compañía de Productos Resinosas, are not allied with the group. Estimated 1932 production of turpentine was 9,000 metric tons, and of rosin 33,000 tons. Exports for the first 11 months of 1932 were 5,552 tons of turpentine and 14,159 tons of rosin, vegetable tar, and pitch, shipped principally to Great Britain, Germany, Italy, and Belgium.

Spain is well adapted to the production of paints and varnishes inasmuch as important quantities of naval stores and mineral-earth pigments are produced there. In 1930, the last year in which statistics are available, 1,753 tons of white lead, 914 tons of red lead, and 17,923 tons of ochers and iron oxides were produced.

It was estimated that in normal times from 50 to 75 percent of the consumption of paints was furnished by domestic producers, but since the fall in the value of the peseta, this percentage has increased. Calomines and other cold-water paints are made by practically every paint manufacturer in Spain. Ordinarily about 75 percent of the consumption of nitrocellulose lacquers is supplied by imports. The Second National Congress of Paints and Allied Products was held in Barcelona in July, 1932.

Spain is the largest source of pyrites, production of which in 1931 amounted to 2,593,933 metric tons. Exports in 1931 were 1,397,000 tons of iron pyrites and 511,000 tons of copper pyrites, and during the first 11 months of 1932 were 1,139,000 and 330,000 tons, respectively. Other European countries were the principal purchasers.

Recent figures on production of industrial chemicals are not available but appreciable amounts of sulphuric, nitric, and hydrochloric acids, soda ash, caustic soda, calcium carbide, chloride of lime, copper sulphate, potassium chloride, and ammonium sulphate are made. Among principal imports are alums, salicylic and benzoic acids, calcium chloride, mineral salts, and chloride of lime. Only a few items are exported, among which are cream of tartar, potash, caustic soda, tartaric acid, calcium tartrate, and sodium chlorate.

Spain produces an appreciable proportion of the fertilizers required for its agriculture. The entire demand for potassium is furnished by Spanish production, while domestic manufacture of superphosphate is almost exactly equivalent to domestic needs. Natural phosphates are imported, however, there being no large domestic production.

Domestic ammonium sulphate supplies less than 10 percent of the needs, while all other nitrogenous fertilizers are entirely imported.

Figures covering consumption of fertilizers during the past 2 years are not available, but consumption is said to be on the increase. Production of superphosphates amounted to 999,667 tons in 1930. Production of ammonium sulphate in the same year amounted to 18,194 tons; imports increased from 241,500 tons in 1930 to 264,850 tons in 1931, and 392,785 tons in January–November 1932. Production of potassium chloride amounted to 51,815 tons in 1930.

Fertilizers account for over one half of the total value of chemical imports. The trade in fertilizers both ways showed marked gains in 1932 over preceding years. Potash exports rose from 24,780 tons in 1929 to 25,649 tons in 1931 and 71,317 tons in 11 months of 1932. Superphosphates imports declined from 53,600 tons in 1929 to 127 tons in the January–November 1932 period, while exports have advanced from 28 tons in 1929 to 2,337 tons in 1932 period. Slag is the only other fertilizer exported.

Imports of fertilizers into Spain for the last four years were:

IMPORTS OF FERTILIZERS INTO SPAIN

[In metric tons]

Items	1929	1930	1931	Jan.–Nov. 1932
Total fertilizers.....	1,081,569	943,484	868,597	1,029,578
Potash fertilizers, total.....	19,172	13,785	8,311	7,279
Germany.....	14,649	10,422	6,705	4,751
Sodium nitrate, commercial.....	173,188	46,833	103,603	66,267
Synthetic calcium, ammonium and sodium nitrates, and other synthetic nitrogen compounds, total.....	20,380	20,881	36,972	54,653
Germany.....	12,140	8,783	4,045	5,283
United States.....			8,219	15,068
Calcium cyanamide, total.....	1,774	3,159	1,981	1,486
Norway.....	1,632	2,644	3	889
Ammonium sulphate, total.....	241,175	241,606	264,850	392,785
Germany.....	55,088	26,422	22,815	70,471
Netherlands.....	5,184	8,348	59,798	67,179
United Kingdom.....	120,621	181,041	117,530	170,136
United States.....			14,324	
Superphosphates and phosphate fertilizers.....	53,809	27,524	3,568	127
Slag.....	10,156	7,123	2,962	3,403
Phosphate rock, total.....	562,115	582,703	448,330	503,588
United States.....	74,177	78,266	75,220	60,000

Essential oils distilled in Spain are spike lavender, rosemary, thyme, sage, eucalyptus, origanum, pennyroyal, geranium, orange, and lemon. No statistics relative to the production of these oils in 1932 are available, but it was reported that production of orange, lemon, mandarin, and geranium oils was less than in former years.

Estimates of production of orange oil for the 1931-32 season vary from 5 to 10 tons, and it is stated that many manufacturers have stopped producing entirely and that those producing have limited their output. Output of spike lavender oil was considered normal, while that of rosemary was somewhat larger, there being a good demand for both. Production of thyme was normal but the demand was less than in former years. Production of eucalyptus oil was smaller, and sales are said to be 50 percent under average due to the diminished sales in England, Spain's best market.

Both importers and producers of biologicals and pharmaceuticals in Spain were concerned with the decree of December 3, 1931, requiring that three samples be taken of each lot of serums, vaccines, etc., and submitted to the Institute of Pharmacobiology for testing, the results of which must be known before sale could be effected. The regulation applied to both domestic and foreign products. During the past year the regulations were not strictly enforced, and it is now believed that they will be enforced with the understanding that samples will be taken only from the first shipment, subsequent shipments being exempt so long as they may be identified as being a part of the same lot as the first shipment.

Spanish production of prepared medicines including serums and vaccines approximate \$4,000,000. Imports during the January-November 1932 period were \$1,700,000, about 16 percent less than in 1931. Exports fell about 50 percent.

Imports of pharmaceuticals are largely of French, German, and British origin, with some products coming from Switzerland, Italy, and the United States. The United States continues to supply a large percentage of serums and vaccines, but imports from the United States have had a gradual decrease whereas imports from France, while considerably less than those of the United States, have been maintained.

Spain is an important producer of toilet preparations and makes high-quality soaps, face powders, perfumes, toilet waters, and dentifrices. No statistics are available as to domestic production, but during the past decade output has increased greatly.

Certain foreign products continue to have a good market, but because of the fall in value of the peseta and the resultant higher cost of foreign preparations, imports have fallen off since 1930. Soaps from England and face powders, rouge, lipsticks, colognes, and perfumes from well-known French houses continue to find favor with the Spanish woman, while the United States has found a market for certain brands of dentifrices, face creams, and manicure preparations.

There is a tendency for foreign producers to manufacture wholly or in part in plants established locally. Such raw materials as are available are purchased at home and only those not produced in Spain are imported. The balance of trade in these preparations is favorable to Spain, although exports have fallen off more than imports.

Along with the decreased production of crude coal-tar products in 1932, imports have increased. Imports of benzol, toluol, xylol, and

other benzols were about three times the 1931 figure and amounted to 1,581 tons, and of creosote also three times as much, being 1,100 tons, for the first 11 months of 1932. Some intermediates are made in Spain, but the larger part are imported.

Spanish production is said to control the entire demand for sulphur dyes, direct acid, and chrome colors. Three companies manufacture dyestuffs, Fabricacion Nacional de Colorantes y Explosivos, the most important, linked with the I.G. through its selling agent, the Union Quimica y Lluich; Preckler y Alemany, connected with the Swiss group; and Cardoner y Cia., a small independent company.

The most important entity manufacturing explosives is the Union Española de Explosivos, S.A., head offices in Bilbao. It reported that sales of industrial explosives in 1930 decreased some 15 to 18 percent, attributable to restricted demand for Spanish metals and consequent decrease in mining operations as well as to the decreased public works.

POLAND

Commercial Attaché Clayton Lane, Warsaw

The chemical branch is one of the most important of Polish industry. Poland has one of the highest rural density-of-population figures in Europe. Although it is now an industrial country, agriculture is still very important, and consequently fertilizers form the most important part of the chemical industry.

The chemical industry and trade of Poland concluded the year 1932 with considerable losses.

Imports of chemicals and allied products into Poland in 1932 showed a drop in value similar to that which occurred in 1931. The aggregate quantity imported in 1932 was 177,800 tons, valued at 106,900,000 zlotys (\$12,000,000), a decline of 17 percent in volume and 42 percent in value from 1931. Among the groups most affected were inorganic crude materials, semimanufactured products, and miscellaneous chemicals, the other groups showing negligible changes. While the bulk of the decline is directly attributable to import restrictions and embargoes, a large part may be ascribed to sluggish demand.

Chiefly as a result of continued trade restrictions in other countries, total exports in 1932 declined to 202,000 tons, valued at 35,423,000 zlotys (\$4,000,000) from 227,300 tons, valued at 50,610,000 zlotys (\$5,700,000) in 1931. As in the case of imports, the latter figure is indicative of the downward trend in prices in foreign markets. The principal declines in export volume were in sulphuric acid, coal-tar derivatives, sodium compounds, and superphosphates, and other artificial fertilizers.

Two foreign chemical concerns with strong financial backing, the Polsko-Belgijskie Zaklady Chemiczne, Sp. Ake., commonly known as "Polchem", at Torun, and Belgijska Sp. Akc., Zaklady Przemyslowe "Boryszew" at Boryslaw, started operations. The first is a superphosphate plant, and the second manufactures pharmaceuticals.

Contrary to the general trend, pharmaceuticals showed continued progress. During 1932 this branch succeeded in securing almost complete independence in salicylic preparations, notably methyl salicylate and aceto salicylic acid. It is reported that German predominance in the supply of aspirin tablets has been completely replaced by a similar product "Motopirine" manufactured by the Warsaw firm "Motor." This achievement has been supplemented

by the establishment of two additional manufacturing units, the "Asmidar" and L. Nasierowski, both of Warsaw, producing prepared medicines on the basis of French licenses. The pharmaceutical branch represented the only encouraging feature of the 1932 chemical industry and trade.

Although the sale of certain pharmaceuticals, notably prepared medicines, was featured by considerable irregularities and showed a net decline of some 35 percent toward the end of the year, gains secured with other lines, particularly compounds and organo-therapeutic preparations, more than offset the loss. Moreover, the production of additional medicinals and preparations contributed to offset the otherwise depleted volume.

According to the Pharmaceutical Union, large firms have experienced capital stringency and often have been forced to reduce their manufacturing schedules, while small manufacturers, chiefly drug stores producing one or two products, are said to have obtained satisfactory profits. Total production of pharmaceuticals and medicinals in 1932 were estimated at 820 metric tons.

Other new chemical projects started in 1932 were as follows: The Tomaszow rayon factory started production of Blaubers salt and anhydrous sodium sulphate; the firm "Kabel" of Krakow is reported to be the first Polish manufacturer of synthetic resins and the firm Roman Maj of Poznana the first producer of iron pigments; Polchem is setting up a special department for the manufacture of carbon disulphide. In addition to these, the Polish Union reported the following as having been placed in production in 1932: Ferro-chrome, artificial corundum, carborundum, ferro-manganese-silicon, ferro-phosphorus ethylene trichloride, and cocaine.

Although the general trend in cosmetics showed a slight improvement during 1932, the manufacturer was unable to profit, chiefly because of the exceedingly high price paid for the principal raw material, alcohol. As a result, foreign products penetrated the Polish market in increasing quantities and acquired a competitive position in spite of the high duties. This situation prompted 140 local manufacturers and 7,000 wholesale and retail dealers to lodge a strong protest with the Government, demanding a reduction of alcohol prices to 1925 levels, that is, 2 zlotys for alcohol used in perfume production and 1.05 zlotys for alcohol used in manufacture of toilet soap. The petition is under consideration.

In the meantime the ranks of cosmetic manufacturers are being gradually reduced, and the majority are operating only on a part-time schedule. Production volume has shown marked irregularities, with a definite downward movement largely in sympathy with the somnolent trend in sales, which established a record low in 1932. The following figures show the production decline:

POLISH PRODUCTION OF COSMETICS, ETC.

[In kilos]

Commodities	1929	1930	1931	1932
Toilet soap.....	2,500,000	2,500,000	2,000,000	1,600,000
Dentifrice.....	200,000	300,000	150,000	140,000
Cosmetics.....	150,000	200,000	150,000	120,000
Products with alcohol base.....	760,000	660,000	350,000	290,000

FERTILIZERS

In view of the increasing difficulties in agriculture, the superphosphate industry could not improve. As a result of the presence of accumulated stocks from previous years aggregating some 110,000 metric tons, it was necessary to shut down all factories engaged in the production of superphosphates, following a short period of operation in the beginning of 1932. In consequence the domestic demand for this commodity, which amounted only to some 80,000 metric tons, was wholly covered from stocks on hand. Since no exports of superphosphates were effected in 1932, chiefly on account of foreign import restrictions and unusually acute competition, there still existed a balance of about 30,000 metric tons to be disposed of in the spring season of 1933. It is probable that most superphosphate factories will remain closed at least until then.

There were no changes in the market price of superphosphates, chiefly because the reductions effected in 1930 and 1931 established a price which is approximately the manufacturers' cost. According to a statement obtained from the Superphosphate Union, the year 1933 will perhaps necessitate the liquidation of several factories, primarily those with antiquated equipment. This contingency is rendered all the more probable by the anticipated competition of the new factory "Polchem", which may prove to be ruinous to all members of the union should the superphosphate authorities be obliged to reject the conditions on which "Polchem" proposes to join it.

The general trend in the potassium trade was the same as in superphosphates. Average consumption at the beginning of the year amounted to only 23 percent of the quantity consumed in 1928-29. It increased, however, in the autumn, following a considerable reduction of prices, first by 10 and later by 15 percent. It is reported in this connection that the superphosphate and nitrate industries reduced fertilizer prices at the beginning of the depression period and that prices for potassium salts remained firm throughout 1931 and the first part of 1932. This reduction was effected after it became known that the Polish potassium industry had joined the Kalisyndicat.

Polish exports of potassium salts declined heavily before the "Tesp"-Kalisyndicat agreement was concluded, but increased considerably thereafter and aggregated 59,994 metric tons, valued at 4,469,000 zlotys in 1932 as compared with 68,879 metric tons, valued at 5,480,000 zlotys, exported in 1931. Domestic production was further reduced in view of the accumulated stocks and contracted domestic demand. According to available statistics, domestic consumption of potassium salts and foreign trade for the last 5 years were as follows:

POLISH CONSUMPTION OF POTASSIUM SALTS
(In metric tons)

Year	From Kalusz			From Stebnik		Total	
	Kainite	Sylvinite	K ₂ O	Kainite	K ₂ O	Kainite and sylvinite	K ₂ O
1928.....	23,780	12,857	34,650	125,820	12,620	292,397	47,272
1929.....	24,000	92,000	25,000	100,000	10,000	221,000	35,000
1930.....	3,100	98,187	22,014	96,668	9,704	197,995	31,718
1931.....	802	45,492	10,296	54,021	5,402	100,315	15,668
1932.....	1,726	35,199	9,742	44,582	4,458	81,507	14,200

POLISH FOREIGN TRADE IN POTASSIUM SALTS

[In metric tons]

Year	Imports	Exports	Year	Imports	Exports
1928.....	91, 117	27, 178	1931.....	3, 805	68, 879
1929.....	110, 230	13, 184	1932.....	47	50, 904
1930.....	22, 245	15, 379			

In accordance with the agreement between German and Polish potash producers approved in March 1932, the Polish organization "Tesp" (Society for the Exploitation of Potassium Salts) is entitled to serve the Polish market exclusively and to export 4 percent of its aggregate production. Moreover, independent of the agreement, negotiations are in progress to secure a loan of at least 1,000,000 zlotys to be used as an operation fund by "Tesp." The contract further stipulates that should the value of potassium salts produced by "Tesp" be insufficient to cover domestic demand, the balance will be supplied by the Kalisyndicat. The same terms apply to refined concentrates, which, it is generally assumed, will enter the Polish market in larger volume than heretofore, since the potassium salts concentrated by "Tesp" are of lower grade. The exclusive clause pertaining to the domestic market will therefore probably be, in practice, restricted to crudes and the small quantity of 3,000 tons of concentrates.

Many farmers reverted to the antiquated practice of applying manure instead of artificial fertilizers. Those who continued to utilize nitrates demanded extensive credits, which the manufacturers have refused in most cases because of the many defaults in payment by even the most reliable farmers. Another deterrent in the use of fertilizers during 1932 was the general psychology of the farmer, greatly discouraged by the low prices for his products. Many farms and estates drastically reduced production, in view of the fact that the expenses connected with production generally exceeded actual receipts. Both consumption and production of nitrogenous fertilizers declined in spite of the 39 percent price reduction effected since 1927-28. Consumption of fixed nitrogen went from 38,300 tons in 1929-30 to 23,300 tons in 1930-31, and 19,500 tons in 1931-32. Imports of Chile saltpeter were reduced to 89 tons in 1932 from 668 tons in 1931 and 29,500 tons in 1930.

INDUSTRIAL CHEMICALS

Owing to the accumulation of large quantities of sulphuric acid from previous years, which manufacturers sought unsuccessfully to place in foreign markets, production was drastically curtailed in 1932. Out of a total of 11 factories producing sulphuric acid, only 7 remained in operation, with only 3 of them conducting an uninterrupted production schedule. The well-known firm Kijewski, Szoltze & Ska, established 100 years ago, suspended its sulphuric acid production for over 7 months. Most factories operated on a part-time schedule and during only a fraction of the year, according to the Sulphuric Acid Union.

Reduction in production of sulphuric acid was caused by the lack of demand from the fertilizer branch, as well as from industry. Total

production declined from 388,000 tons of 50° Be. in 1929 to 308,200 tons in 1930, 199,800 in 1931, and 151,100 in 1932. Exports declined 13 percent from 19,000 tons in 1931 to 16,500 tons in 1932.

Limitations on the sale of sodium compounds which obtained in previous years continued to operate in 1932, but the volume obtained was regarded by manufacturers as satisfactory in view of the slack demand. Sales of ammonia process soda, according to the Solvay Union, were 41,500 tons in 1932, production 50,100 tons, and exports 5,700 tons.

Sales of caustic soda opened strong early in the year because of stock exhaustion, but toward the close of the year the trend continued sluggish and total sales for the year were 11,400 tons compared with 12,210 tons in 1931. Exports declined approximately 50 percent.

Output of coal-tar products was considerably reduced as compared with preceding years, owing to a decrease in the production of the coke works. There was, however, a recovery in the sales of certain products. Demand from domestic and foreign sources for prepared pitches and tars showed a marked increase. Demand for road pitches and impregnating oils, on the other hand was far from satisfactory. Sales of further refined products, including pure naphthaline, phenol, and anthracene, were satisfactory, and there was a good demand for motor benzol and benzol for the chemical industry.

Partly as a result of increasing demand but chiefly because of the request of the Polish Government, the Fabryka Kabli (Cable Manufacturing Plant) of Krakow started the production of a phenol-formaldehyde type of synthetic resin. Present domestic requirements are said to aggregate 150 to 200 metric tons annually, but it is intimated that this amount will increase rapidly because of its proposed use for insulation, automobile accessories, and other purposes for which the Government will place considerable orders. Imports will be eliminated gradually.

YUGOSLAVIA

Assistant Trade Commissioner Edward G. Eichelberger, Belgrade

As a producer of sulphuric acid, copper sulphate, soda ash, wood distillates, calcium cyanamide, superphosphates, and other heavy chemicals in amounts larger than domestic consumption, and as a large grower of pyrethrum flowers and other natural chemical materials, Yugoslavia was more an exporter than an importer of chemicals and allied products until 1930. In that year imports of chemicals and allied products attained a value of around \$7,000,000 and exports only \$5,500,000.

Throughout 1932 the Yugoslav chemical industry was faced with a continuance of the decline in export demand. Fertilizer stocks, particularly superphosphates, accumulated at the plants, and the farmer could not be induced to take them even on liberal terms. Retrenchments were necessary in nearly all branches of the heavy chemical industry. Other chemical products, notably essential oils, had to forego justifiable expansion and rationalization because of the lack of adequate financing.

Yugoslavia's chemical industry has been largely dependent upon foreign markets for its success. This industry was inherited from Austria-Hungary, and hence not entirely adjusted to the totally different requirements of agricultural Yugoslavia.

Yugoslavia is buying from its own factories almost no fertilizers, only about 17 percent of the alkali output, very little from the wood-chemical industries, and seems to be taking what can be produced only in copper sulphate. Unless export sales can be at least maintained, therefore, a considerable part of the Yugoslav industry faces serious difficulties, since the domestic market cannot be counted upon for some years to consume any real part of the capacity production.

Cheapness and availability make superphosphate Yugoslavia's most popular fertilizer. Normal annual consumption is about 60,000 tons, but consumption in 1932 was estimated at only 7,500 tons. The largest producers have ceased their output, and stocks on hand are believed to be sufficient to cover 3 years' demand. Capacity production is 170,000 tons. Almost no export shipments were made in 1932.

Such imports of potash as are being made are very much reduced in quantity. Potash is generally applied as admixtures with other fertilizers. Actually the only buying of fertilizers is by the farmers' cooperatives.

Also dependent upon export, the two electrochemical enterprises, "La Dalmatienne" (Société Française des Forces Hydroélectriques de la Dalmatie) and the Bosansko Dioničko Društvo za Elektrinu (Bosnian Electrical A.G.), are running on much lowered levels of production of calcium cyanamide, carbide, chloride of lime, and ferrosilicon. Another plant for manufacture of calcium cyanamide at Ruse, belonging to the Tvornica za Dusik D.D., with an annual capacity of 20,000 tons, has been closed.

The alkali plants of the Jugoslavenska Solvay Tvornica D.D. are operating at less than two-thirds capacity, while lowered output also characterizes the wood-chemical industry. Plans for the erection of an aluminum plant, in connection with the electrochemical resources, to work the large domestic bauxite deposits, have had to be laid aside.

If it should appear that, at some later date, any further development of manufacture of electrochemicals would be desirable, a further exploitation of the enormous reserve of water power for electro-chemical purposes may be undertaken.

The wood-chemical industries, which held down operations throughout 1932, were not so hard hit as certain other branches of the chemical field. Exports dropped heavily, especially calcium acetate, acetic acid, acetone, methanol, and formaldehyde.

A considerable growth in the paint industry took place in 1932, with nearly all of the concerns, most of which are branches of German or French companies, having done satisfactory business. The domestic industry suffers real competition only in the higher grades of paints and lacquers. Six large plants turn out mineral earth pigments, oil paints, and lacquers, the largest having a capacity of 900 tons of lacquer, 400 tons of varnish, and 1,800 tons of other paints. The domestic industry is still unable to cover local demand.

As with all imported lines, the cosmetics trade dropped severely, due not only to the exchange situation but also to restricted purchasing power and the effect of new luxury taxes.

Medicines and drugs held up fairly well for established lines, but in the face of the above situation, any new line was extremely difficult to introduce.

One of the best known Yugoslav products, Dalmatian pyrethrum (*pyrethrum cinerariaefolium*), seems to be regaining its former position on the world market, chiefly because of the methods adopted by the Yugoslav Government to regulate production, gathering, sorting, packing, and shipment to meet Japanese competition. Dalmatian pyrethrum is now offered on the market in one standard grade. Local authorities predict a steady rise in export sales, especially to the United States.

Lack of capital retarded the development of the Yugoslav essential oil and crude drug industries. Various essential oils are distilled in more or less primitive plants owned by the cooperatives, and exports of these oils are considerable. Rosemary oil, annual production of which is about 8,000 kilos, is well known. Numerous crude drugs and aromatic plants, outstanding of which are belladonna, linden blossoms, and pine needles, are grown in the Dalmatian mountains. From the south of the country comes Macedonian opium, camomile, anise, stramonium, hellebore, juniper, and a number of other products. With the necessary capital and proper mechanical and technical equipment, a strong development of Yugoslavia's medicinal and aromatic plants industry might be expected.

AUSTRIA

Assistant Commercial Attaché D. F. Spencer, Vienna

The Austrian chemical industry, almost entirely a post-war development, can now supply practically the entire domestic consumption of most heavy chemicals, wood chemicals, superphosphates, and ammonium sulphate. It is likewise in a position to furnish part of the demand for many other chemical products but suffers keen competition from Germany and other European countries, especially in the coal-tar dye, pharmaceutical, and toilet preparations branches. Imports of chemicals and allied products exceeded \$12,000,000 and exports \$4,500,000 in 1931.

The Austrian chemical industry and trade suffered decreases in 1932. A number of manufacturers, notably of sulphuric acid, superphosphates, ammonium sulphate, and several mineral acids, curtailed production. Although imports have somewhat decreased, partly as a consequence of the foreign exchange control and prevailing import restrictions, the Austrian industry has gained little thereby because domestic demand has likewise decreased.

An outstanding event was the fact that the majority of the Chemosan Union & Fritz Petzold A.G. shares was purchased by the Anilinchemie A.G., a subsidiary of the German I.G. The Chemosan Union is the most important concern in the pharmaceutical branch.

Discovery of natural gas and mineral oil at Zistersdorf, near Vienna, was another interesting development.

The Austrian chemical industry, according to compilations made in 1930, the latest report available, consisted of 598 plants employing 16,682 workers. Most of the plants, however, employ less than 20. These plants consist of 123 establishments with 1,874 workmen manufacturing candles, soap, and cosmetics, 122 lacquer and varnish factories with 1,573 employees, 28 gas plants with 3,893 workmen, 6 match factories with 746 workmen, and 319 other chemical works with 8,596 employees.

Since 1930 a number of plants have been closed. The capacity of the industry is much greater than its present domestic demand.

Production of sulphuric acid declined to an estimated output in 1931 of 40,000 metric tons (capacity is 73,000 tons). Estimated production of superphosphates in 1931 was 35,000 tons against a capacity of 90,000 tons, and of ammonium sulphate of 6,410 tons, capacity 7,000.

Nitric and hydrochloric acids, sodium sulphate, aluminum sulphate, copper sulphate, alum, tartaric acid, and potassium ferrocyanide are made in modern plants in amounts sufficient to permit considerable quantities to be exported. Production of chrome alum and nitric acid have been discontinued temporarily. Production of ammonium chloride and ammonium carbonate covers domestic demand, and small amounts are exported.

Liquid chlorine, chlorinated lime, and trichloroethylene are also manufactured in sufficient quantities to cover local demand. As a result of the manufacture of sodium hydroxide, imports continue to decrease; stocks are relatively large.

Production of ammonia soda, crystal soda, and potassium chlorate exceeds domestic requirements, while sodium chlorate must be imported. Calcium chloride is both exported and imported. Production of calcium carbide by far exceeds domestic demand, but exports have been declining. Electrolytic production of hydrogen peroxide is largely for export. Manufacturers of sodium silicate are unable to work at capacity and exports, mainly to the Succession States and the Balkans, have been declining.

Smaller chemical plants make, among other products, zinc sulphate, magnesium sulphate, acetic acid, formic acid, boric acid, and borax. These chemicals are sold chiefly locally, since the high cost of raw materials does not permit manufacture for exportation.

Liquefied gases, carbon dioxide and ammonia, and condensed gases, hydrogen, oxygen, nitrogen, and acetylene, are manufactured in sufficient quantities.

An old-established plant covers the domestic demand for wood-chemicals, such as acetic acid, methanol, acetone, solvents, and formaldehyde.

Tar, benzol, solvent, naphtha, naphthalene, and similar products are made in larger quantities than can be absorbed domestically, so some is exported. In 1931, 32,970 tons of tar were made, compared with 34,170 metric tons in 1930.

Imports of low-priced glues from Czechoslovakia and Germany adversely affected Austrian manufacturers, who exported a part of their production at unprofitable prices.

For the past four years manufacturers of fertilizers have suffered under the farmers' crisis as well as from German competition. Consumption of fertilizers decreased by as much as 40 percent in 1930, in which year sales of superphosphates amounted to 26,000 tons compared with 46,000 tons in 1929.

Austrian manufacturers of dyes seriously suffer from foreign competition, and imports have increased even in 1931 and in 1932. For the first 10 months of 1932, imports of coal-tar dyes amounted to 1,500,000 pounds valued at \$1,000,000.

Considerable progress has been made in the production of mineral earth pigments. Lacquers and varnishes are made by a number of

old-established and well-equipped plants. Exports of these products are of some importance, although they have declined considerably in the past few years.

The naval-stores industry is fairly well developed, and production of turpentine and rosin covers about 75 percent of consumption.

Manufacture of pyroxylin plastics, artificial horn, and synthetic resin felt the foreign competition, and production of synthetic resin in particular was curtailed.

Production of matches exceeds local consumption by about 20 percent. Exports have declined considerably. In 1931, domestic sales of matches totaled 67,698 cases containing 5,000 boxes each compared with 66,496 cases sold in 1930.

Consumption of explosives dropped considerably on account of decreased activities of the mining industry. Exports have shown a marked falling off since 1929.

Manufacturers of alcohol, which are united in the "Spirituszelle," supply most of the demand for alcohol for beverages, industrial purposes, and fuel and are doing a moderate export business.

Sulphuric ether, acetic ether, alcohol absolute, and collodion are also made in Austria.

The pharmaceutical industry suffers from overwhelming German competition, but nevertheless has succeeded in selling a number of articles both at home and abroad. The photographic chemical industry has shown a favorable development.

Some of the adverse factors which have affected the heavy-chemical industry during the past three years are heavy competition in the nitrogen industry, decreasing consumption of fertilizers, discontinuation of manufacture of rayon for a greater part of this period (the plant was operating from February to September 1932 and then resumed operation in December 1932), the large decrease in the output of iron ore, suspension of operations in the copper mine at Mitterberg, Salzburg, and of the lead mine in Carinthia, as well as restricted activities of the metal-working, paper, and textile industries.

Manufacturers of chemicals complain of the import restrictions through foreign exchange control and other regulations in foreign countries which were important markets for their exports.

Austria represents only a small outlet for American chemicals, partly because of local production and partly because of competition from Germany, Czechoslovakia, and other European countries.

In former years sulphur from Louisiana and Texas found a good market in Austria, but now almost all is imported from Italy. Out of a total importation of 4,610 tons during the first 10 months of 1932, only 7 tons came from the United States and 4,462 tons from Italy.

The bulk of Austrian imports of borax, however, comes from the United States, while American cosmetics account for nearly 10 percent of the total imports of that line. American exports to Austria continue to be adversely affected by the foreign exchange regulations, and prospects for immediate promotion of sales are not very promising.

HUNGARY

Trade Commissioner Charles R. Hersum, Budapest

Primarily an agricultural country, Hungary nevertheless has shown a marked tendency toward industrialization. During the 5-year period 1924-29, the chemical industry doubled itself to a total pro-

THE EUROPEAN CHEMICAL INDUSTRY IN 1932

duction of \$35,500,000. In 1931 the value was around \$30,000,000, including some industrial chemicals, particularly sulphuric acid, copper sulphate, and calcium carbide; fertilizers, especially superphosphates; chemical pigments; essential oils; and medicinal and toilet preparations. Imports were \$6,000,000 and exports \$2,900,000.

The prolonged economic depression and the consequent drop in the purchasing power of the public, lack of individual, corporate, and governmental construction and improvements, increased taxation, and foreign exchange and trade restrictions the world over weighed heavily on the activities of the Hungarian chemical industry as a whole. Foreign outlets were partly or entirely lost in 1932, and to offset this loss domestic manufacture of several new products was introduced.

Among the chemical factories established in 1931 were Acetic Chemical Works, Ltd., manufacturers of methanol and acetic acid, Alkaloida Chemical Works, Ltd., manufacturers of opium, morphine, and similar products; Industrial Varnish Works, Ltd., for varnish, Lithopone Chemical Works, Ltd., for lithopone, Hungarian Ammonia Works, Ltd., for liquid ammonia, Vajda & Rona, insecticides, and Pet Nitrogen Works, Ltd., fertilizers, nitric acid, and similar products.

In addition to these new factories, nine considerably enlarged their capacity, and 36 started the manufacture of new products. Only four factories liquidated, and five closed.

In the chemical field, the fertilizer industry suffered more than other branches. Unsold stocks of artificial fertilizer was estimated at 3,000 carloads. Domestic consumption for the first half of 1932 amounted to only 800 carloads, compared to 16,000 in 1929. Production of sulphuric acid dropped from 7,000 carloads to 800. Under these conditions the outlook for the newly constructed fertilizer works at Pet, for nitrogen fixation, is not encouraging.

Consumption of agricultural insecticides, powders, and sprays has fallen by 75 percent to 700,000 pengos for 1932. Output of the alcohol industry fell to 240,000 hectoliters, partly due to the decline in the consumption of mixed motor fuel (Motalko).

Chemical factories supplying the building industry worked at reduced capacity. Lack of road building was mostly responsible for the decline of 40 percent in production of asphalt, tar, and tar products. Output of the paint and varnish industries declined 25 percent, and of explosives 20 percent.

Companies making washing soap worked at only 25 percent capacity, and total output was valued at about \$1,600,000. Consumption of toilet soaps, cosmetics, candles, matches, photographic paper, and cleansers declined by 30 to 50 percent, with the outlook for 1933 for a greater decline.

On the other hand, factories producing chemicals for the textile, leather, fur, and paper industries were in a comparatively favorable position. The Municipal Gas Co. of Budapest started the erection of a benzol plant with an annual capacity of 200 carloads.

Production of animal biologics, one of the more-important branches of the chemical industry, increased 5 percent. Animal biologics account for about half of the average annual production of pharmaceutical and medicinal preparations, valued at \$14,000,000.

Foreign trade was handicapped in 1932. All import and export operations are subject to the approval of the National Bank of

Hungary. In order to do business in Hungary, it is necessary, first to obtain an import permit from the National Bank, and secondly, to sell against the pengo, which must be left in Hungary, except in rare cases when foreign exchange is granted for some special purpose.

On December 1, 1932, a somewhat modified scheme was put into operation under the auspices of the Hungarian Ministry of Agriculture for the exchange of foreign moneys received by Hungarian exporters and required by importers. Importers will have to pay a certain premium over the rates pegged at gold parity, the plus to be turned over to the exporters of Hungarian products. It remains to be seen to what extent this new system will stimulate exports and what additional foreign exchange will thereby become available for imports. One of the consequences of the new system will be the cessation of the privilege of self-compensation accorded to several firms, among them chemical manufacturers, which permitted the import of raw materials for foreign exchange derived from their own exports.

DENMARK

Assistant Trade Commissioner Paul H. Pearson, Copenhagen

Denmark, relatively unimportant as a chemical-producing country, nevertheless had an output of chemicals and allied products in excess of \$105,000,000 in 1931, imports of \$18,000,000, and exports of \$2,400,000. Predominantly an agricultural country, nearly one-third of its imports were fertilizers. Rennet, the leading export, accounted for about one sixth of the total.

Chief fertilizers imported were calcium nitrate, superphosphates, potash, ammonium sulphate, phosphate rock, and Nitrophoska. Danish agriculture felt the full effect of the current depression throughout 1931, with the result that consumption dropped about a third under that of 1930. The fact that foreign purchases of superphosphate were made notwithstanding a domestic plant capacity of almost 400,000 tons is perhaps due to the fact that Danish cooperatives are very large buyers who deemed it advisable to purchase from Germany and the Netherlands. In all probability, however, Danish producers will increase their share of the market in the future.

The four plants controlled by the sole Danish producer of superphosphate, A/S Dansk Svovlsyre og Superphosphatfabrik, worked at about 50 percent of capacity during 1931. At the close of the year 2 of the plants were working at half capacity, 1 at 75 percent, while the fourth had closed.

The reduced activity of the superphosphate industry was reflected in a lower importation of phosphate rock in 1931, amounting to 126,300 tons, of which the United States supplied about 18 percent. Imports in 1932 declined about 30 percent.

Consumption of phosphate, was supplemented slightly by imports of 5,500 tons of basic slag originating in the steel mills of Germany, the Netherlands, and Belgium.

Practically devoid of a domestic nitrate industry except for a production of 1,000 tons of gas-plant ammonia, Denmark in 1931 imported 130,900 tons of calcium nitrate, ammonium sulphate, sodium nitrate, and cyanamide. Larger amounts of these fertilizers were imported during the first 10 months of 1932. Shipments of American nitrogen have not been great.

THE EUROPEAN CHEMICAL INDUSTRY IN 1932

Germany supplied 70 percent of the total 1931 imports of 44, tons of potash. During the early part of 1932 drillings for salt were made in the vicinity of Sønderborg in Jutland with the plan to erect a potash and fertilizer plant. All work is held up, however, for the time being.

Paints and varnishes are both produced and imported. Denmark produced about 11,000 tons of paints and paint products in 1931 in its 23 plants, an output slightly greater than in 1930 since the leading customers are the trades which have suffered the least from the general depression. Painters were generally well occupied, and the only noticeable retrenchment was in ship repairing. Consumption of varnish and lacquers continued to increase in 1932. Small amounts of Danish enamels and lacquers are sold in Spain, Portugal, Switzerland, Netherlands, the Baltic States, and Italy.

In 1932 Sadolin & Holmblad (Ltd.), Copenhagen, the leading local manufacturer of paints and paint products and the largest in Scandinavia, completed a number of extensions and improvements of its works, one of which was the erection of a laboratory. The company also built an experimental factory, where at present aniline and other coal-tar dyes are made for their own use. For many years the company has made all the aniline it uses in its dry-color plant.

Imports include chemical pigments and the higher-priced oil paints, lacquers, and varnishes.

The Danish vegetable-oil industry produced 3,200 tons of linseed oil in 1931 against 2,400 tons in 1930, continuing the steady climb toward the high production of postwar days. An additional 800 tons were imported, chiefly from the Netherlands, for consumption in the soap industry.

Two manufacturers are estimated to supply about 80 percent of the demand for laminated synthetic resins.

Leading foreign markets for Danish production of rennet, which amounted to 1,000 tons in 1931, were Sweden, France, the United States, Brazil, Argentina, Finland, and Spain.

Production of matches at the two interlocking Copenhagen enterprises associated with foreign companies, making up the domestic industry, aggregated 2,300 tons (\$700,000) in 1931. Restrictions and duty increases in foreign markets as well as increased competition reduced exports considerably, but concentrated and intensified efforts in the domestic market increased local sales materially and resulted in considerably lower imports.

A leading feature of the 1931 Danish pharmaceutical production of \$1,750,000 was the manufacture of glandular preparations and of such medicinal specialties as insulin, sanocrysin, and liver and iron preparations. Germany, England, France, and the United States are the leading sources of supply for imports of around \$700,000. A Danish proclamation of September 1932, effective January 1, 1933, regulates the composition, marking, and sale of imported and domestic medicinal specialties.

Production of industrial chemicals was small, being confined chiefly to such establishments as the Superphosphate Co., which makes its own sulphuric acid, and soap plants, which make soda crystals.

After the establishment in January 1932 of an exchange control board and the subsequent regulation that no manufactured goods

could be imported without special import permit, import permits were especially difficult to obtain for many finished chemical products such as insecticides, paints, pigments, varnishes, lacquers, pharmaceuticals, and toilet preparations. This circumstance encouraged the domestic manufacture or mixing of a number of products, especially toilet preparations, although in some cases even this was impossible owing to failure to obtain the necessary import permit for raw materials. A new law passed in December 1932 specifies the goods subject to import control in 1933. Generally speaking, Danish importers will be assured of no less than 45 percent of the value of their imports in 1931 in crowns unless circumstances make such importation undesirable.

BULGARIA

Bulgaria, primarily agricultural, differs from other countries in being first and foremost a nation of small landholders able to live to a great extent on the products of their own lands. Local industries exist and have received considerable legislative assistance, among which is the chemical industry with a production of around \$3,000,000 annually. Imports of chemicals approximate another \$3,000,000, and exports \$2,000,000.

Bulgaria's chief contribution so far as the world's chemical supplies is rose oil, of which it is the largest producer. Rose culture has been one of the staple industries of Bulgaria, and the main source of revenue in many communities. Rose oil ranks fourth in value among the country's exports.

Owing to an unfavorable trend on the world market resulting from unused stocks abroad and the use of synthetics, local distillers were unable to dispose entirely of their 1931 production of rose oil. In spite of this unfavorable situation, acreage and production of rose flowers in 1932 were larger than in 1931, but the output of oil was lower.

Production of rose oil in 1932 was 1,500 kilos, according to the Bulgarian Agricultural Bank. Of this total, 1,200 kilos was made at the State-controlled cooperative distilleries and 300 kilos by the cultivators themselves. These figures agree with unofficial figures which, however, also give an additional 500 kilos as made by other distillers.

In order to safeguard the interests of rose cultivators, the Government arranged for distillation of roses from the 1932 crop under the control of the Agricultural Bank of Bulgaria. A minimum price was fixed at 7 leva for each kilo of red rose flowers or for 2 kilos of white flowers.

Practically the entire production is exported, with France, United States, Great Britain, Germany, and Switzerland the leading buyers.

In 1930 there were listed 117 concerns in the chemical industry of sufficient importance to receive industrial privileges. Of these concerns, 89 were companies and 28 individuals. Total capital invested approximated \$3,000,000; employees numbered 2,031. Soap and rubber products as well as explosives, matches, paints, and industrial chemicals are embraced in this estimate.

BALTIC REPUBLICS

The Baltic Republics, while predominantly agricultural, have been slowly developing industrially. All three of the Baltic States—Latvia, Lithuania, and Estonia—had favorable trade balances during

THE EUROPEAN CHEMICAL INDUSTRY IN 1932

1932, Latvia for the first time in its history. So far as chemical trade is concerned, these countries are not of great importance, their combined imports in 1931 having reached about \$7,300,000 and exports \$1,400,000. The United States does not play a very important role in this market although it is probable that more American goods are sold there than appear in the rather meager statistics available.

LATVIA

Assistant Trade Commissioner Everett B. Ansley, Riga

Crude and semimanufactured chemical imports into Latvia declined approximately 45 percent and the quantity of prepared chemical products about 25 percent from 1931. Superphosphate is the most important chemical imported. The total artificial fertilizer imports, including superphosphate, basic slag, and sodium nitrate, showed the greatest decline in 1932, imports having amounted to only 25 percent of the quantity imported in 1931.

Local production of artificial fertilizer, primarily superphosphate, during 1932 amounted to about 44,500 tons, compared with 40,000 tons in 1931. Annual consumption of superphosphate has been estimated at 50,000 metric tons. As imports in 1932 were negligible, the difference between production and consumption is accounted for by the fact that fairly large stocks were held over from preceding years. Superphosphate exports are negligible.

During the first 10 months of 1932, superphosphate imports amounted to only 332 tons compared with 13,273 tons during the corresponding period of 1931. Basic-slag imports dropped from 22,907 tons to 4,226, and sodium nitrate from 4,784 to 2,304 tons during the same periods. Imports of crude ammonium sulphate, potassium salts, and Nitrophoska declined approximately 50 percent in 1932 from 1931.

Slight increases in production are believed to have taken place in 1932 for most of the general run of chemicals made in relatively small amounts. The Latvian Government has done everything in its power to protect and encourage all local industries. Production of chemicals and related products in 1931 was valued at \$43,00,000.

Imports comprise the usual line of chemicals imported into any country, and only two major changes have taken place recently. Ethyl-alcohol imports, formerly from Estonia, have declined to almost nothing. Since 1930, domestic production of ethyl alcohol has been sufficient to meet the demand. Increase in imports of coloring material for butter and cheese is accounted for by the increase in domestic production and exports of these foodstuffs. Practically all the coloring material is shipped from Denmark.

LITHUANIA

American Consulate, Kaunas

The chief chemical importance of Lithuania is as an outlet for phosphate rock consumed in the one factory making superphosphate, the Union Chemical Factory at Memel. This factory also produces a very small quantity of sulphuric acid. Total production of superphosphate in 1932 was estimated at \$600,000, compared with \$800,000 in 1931. Imports of phosphate rock in 1931 totaled 21,165 tons compared with 28,386 tons in 1930. A small amount originated in the

United States. Nearly 48,000 tons of superphosphate were also imported in 1931. In 1932, about 20 percent less entered the country.

Total imports of all fertilizers into Lithuania aggregated \$1,046,000 (89,400 tons) in 1931, and \$580,900 (52,700 tons) in the first 9 months of 1932. Second in importance to superphosphate is basic slag, followed by sodium nitrate, potash salts, and ammonium sulphate.

Estimated output of alcohol, a Government monopoly, in 1932 was valued at \$4,000,000. The Government is dependent to a considerable extent on the revenue derived from excises. Only a part of this is sold for medicinal and industrial purposes. Denatured alcohol is used to some extent as an antifreeze mixture and for heating purposes.

The match industry, with an estimated output in 1932 of \$400,000, is rather important. Production of matches decreased from 45,900,000 boxes in 1931 to 40,200,000 boxes in the first 11 months of 1932. This industry is the largest consumer of sulphur, having taken practically all of the 17,500 tons imported in 1931.

Although the majority of the drugs and pharmaceutical products, cleaning compounds, and insecticides used in Lithuania are imported, a small industry protected by a high tariff has grown up during the past decade. About 12 factories made \$50,000,000 worth of perfumes, cosmetics, and toilet preparations in 1932, with the same amount imported.

Owing to the establishment of several new enterprises recently in Lithuania, an increase in certain chemicals used in these factories should occur. The Swedish Match Company constructed a paper factory, operation of which is expected to start this spring.

A new glue factory with a potential capacity of 1,500 tons annually of bone and refuse from slaughtering has been established. A sugar-beet factory likewise was opened in 1931.

ESTONIA

Statements regarding Latvia and Lithuania apply to Estonia. Match production is probably the most important chemical industry. Production and exports of matches have been declining.

The leading industries of Estonia, employing about 15 percent of the population are textiles, paper and wood pulp, lumber and wood-working, metal, foodstuffs and beverages, oil shale, and cement. Gross value of industrial production by concerns of more than 20 workers was \$27,200,000 in 1930. Chemicals imported in 1931 were valued at \$1,400,000.

There is also a small toiletries industry, producing exclusively for the domestic market. Importation of competing foreign products in 1932 was almost excluded by the various import control measures, and production was maintained at about the 1931 level.

In 1932, a wood distillation plant resumed operation after having been closed during 1931.

GREECE

Commercial Attaché K. L. Rankin, Athens

Greece is not an industrialized country, yet during the past 10 years there has been considerable commercial development. Production of chemicals and allied products approximated \$4,650,000 in 1930 and \$3,750,000 in 1931. Output in 1932 was reported as somewhat greater than in 1931. Fertilizers and naval stores are the most

important chemicals produced. Imports were \$4,700,000 and exports in 1931, \$1,100,000.

Exchange restrictions, the depreciation of the Greek currency, and the import quotas in effect since May 15, 1932, rendered imports of chemicals more difficult in 1932, and a considerable decline was noted during the first 10 months of 1932 compared with the same period of 1931. The import quota system seriously affected imports of toilet preparations, which were cut by about 80 percent compared with 1931, and other chemicals to a lesser extent. Prepared medicines for which a sales permit in Greece has been or may be obtained are not affected by import quotas.

The export trade in chemicals and allied products was favorably influenced by the heavy depreciation of the drachma. Rosin exports increased, and only in the case of pyrites did export show important quantity decreases in the first nine months of 1932 compared with corresponding period of 1931; value declines were more marked.

Despite the fact that many of the raw materials used by domestic chemical industry are imported from foreign countries, most branches were established as a result of the availability of certain prime materials within Greece.

The fertilizer industry is the most important in value of products, invested capital, quality of output, and equipment. It is represented by one enterprise, the Hellenic Chemical Products and Fertilizers Corporation, which operates several mines and is the largest industrial establishment in Greece, located at Piraeus. In addition to fertilizers, production of which declined from 78,200 tons (valued at \$1,400,000) in 1930 to 48,700 tons (worth \$1,000,000) in 1931, the company manufactured about \$400,000 worth of sulphuric acid, nitric acid, hydrochloric acid, nitrosulphuric acid, sodium bisulphate, sodium sulphate, and iron sulphate. Iron pyrites and common salt are obtained locally, but all other crude materials, amounting to around 45,000 tons, are imported from foreign countries, chiefly Germany and Belgium.

The naval stores industry includes 28 factories with 140 employees, and an invested capital of nearly \$500,000. About 12,000 tons of crude gum are obtained from Greek pines, from which around 7,300 tons of gum rosin and 1,920 tons of spirits of turpentine are distilled. Some 2,000 tons of gum residue from the rosin-flavored Greek wine (retsina) is used also in the production of naval stores.

The Hellenic Powder and Cartridge Manufacturing Corporation, the most important factor in the explosives industry, operates two factories. Twelve smaller plants with a total of 70 employees likewise are engaged in the manufacture of explosives. Smokeless powder, black gunpowder, blasting powder, dynamite, and other explosives are made, total production of which increased from 1,200 tons (\$400,000) in 1930 to 1,500 tons (\$385,000) in 1931. Most of the materials, acetone, glycerine, salts, and sulphur, are imported from Germany and the United Kingdom.

With the exception of a factory operated by the Dyestuffs Manufacturing Co. of Piraeus, located at Phaleron, the other chemical factories are small, with little capital, primitive equipment, and small staffs. The factory owned by the Dyestuffs Manufacturing Co. produces \$200,000 worth of dyes and \$100,000 of pharmaceuticals and medicines a year. Small amounts of carbon dioxide, ammonia,

and miscellaneous items are likewise made by the company. Quinine preparations, tonics, and laxatives also are manufactured on a small scale by various minor establishments.

Toilet preparations, including Eau de Cologne, hair tonics, perfumes, creams, powders, and dentifrices, are produced by small plants to some extent. The production of Eau de Cologne is estimated at \$400,000 and that of other toiletries at about \$250,000.

About 8 years ago a factory was erected in Athens to manufacture all kinds of toilet preparations, but its products met with little demand from the population who are accustomed to the imported brands. The factory's activities have been confined in recent years to Eau de Cologne, perfumes, and toilet soap.

Among the chemical consuming industries, soap holds first place. Manufacture of soap is based on the large output of olive oil. In making green laundry soap, olive kernel oil is used, while olive oil of high acidity and olive oil residue are used for white soap. Chemicals used are caustic soda and sodium carbonate, imported mainly from Belgium, Russia, and England.

Germany, France, Belgium, and United Kingdom are the principal countries of origin for industrial chemicals; France and Germany for pharmaceuticals and prepared medicines; the Netherlands for quinine; Germany, France, Belgium, and the United Kingdom for dyes, paints, lacquers, and varnishes; and the United States and France for toilet preparations.

Remarkable progress has been recorded in the sale of American toiletries in Greece. American dentifrices and face creams occupy a leading position in the market despite higher prices, and American cosmetics and shaving preparations are also popular.

Some progress has been noted in the sale of American prepared medicines, although Germany and France have been extending liberal terms and discounts in order to maintain their lead in this market.

PORTUGAL

Assistant Trade Commissioner Fred E. Huhlein, Lisbon

Portugal is an importer of industrial chemicals for use in its textile and glass industries, of fertilizers and insecticides, of medicines, and of paints and varnishes, and a small exporter of naval stores, pyrites, crude drugs, and other natural products. Imports in 1931 were valued at \$5,500,000, somewhat less than the average of the past 2 or 3 years; exports were one fifth as much.

The chemical-consuming industries of Portugal in 1932 appear to have been in about as good a position as in 1931, and production of chemicals held up fairly well.

Textile industries, large consumers of caustic soda, sodium sulphide, calcium chlorate, and coal-tar dyes, operated at near capacity during the entire year. Demand for cheap shoes resulted in a fairly satisfactory year for domestic tanneries, which consumed the usual quantities of sodium sulphide and various bleaching and tanning chemicals.

The match industry, which uses important quantities of antimony sulphide and potassium chlorate, had produced 5,500,000,000 sticks to September 30, 1932, as compared to 8,000,000,000 during the year 1931. The glass industries' output of fine crystal fell off considerably, with consequent effect upon chemicals consumed, but increases were

registered in production of small bottles, 5-liter glass demijohns, and window glass, with comparatively no change in output of standard wine bottles, household glassware, and glassware for electric fixtures.

Production of iron pyrites declined from 399,119 tons in 1930 to 287,118 tons in 1931, and 202,931 tons for the first 9 months of 1932, while output of calcopyrites, which totaled 1,104 tons in 1930 and declined to 90 tons in 1931, was negligible in 1932. Output of sulphuric acid and copper sulphate showed losses, but, on the other hand, that of soap probably set a record.

Retail sales of soda ash, sulphuric acid, and lixiviation chemicals were normal. Owing to the absence of trade-marked cleaning compounds, these chemicals in general use for household purposes are sold in bulk. The demand for soda ash is exceptionally heavy.

Chemical fertilizer production was 193,517 metric tons in 1930, 190,250 tons in 1931, and 137,811 tons the first 9 months of 1932. The Government's campaign among the farmers is resulting in an increased demand for fertilizers, and with reasonably satisfactory crops this trade should expand. Nearly all fertilizer produced is superphosphate. Certain compound fertilizers, however, are mixed from imported ingredients by the four large Lisbon companies engaged in the trade.

Sulphur is used for a variety of purposes, among which are the fertilizer industries, agricultural chemicals, fireworks and glassware factories, and sugar refineries. There is no production of sulphur as such, although the country has pyrites deposits containing varying amounts of sulphur. All pyrites not exported are used in the production of sulphuric acid and copper sulphate. Plants are maintained at Barreiro and at Gaia for pulverizing and packing sulphur. Imports of sulphur continued to come largely from Italy and were 8,202 tons for the first 11 months of 1932.

While there is a growing need for the use of scientifically prepared sprays, farmers continue to depend principally on dusting sulphur and copper sulphur solutions, and soda ash, against mildew. Lime is used extensively as a ground insecticide. The use of sprays with a nicotine ingredient would appear advisable.

The market for imported fly sprays and household insecticides, imports of which were 40,184 kilos in 1931, showed a decided slump due to the number of preparations now being manufactured in Portugal. Some half-dozen brands of fly sprays are now being made from powdered pyrethrum, kerosene, and gas oil.

Prepared medicines are being used in larger amounts, partly because of a reported lack of confidence in the accurate filling of prescriptions by local pharmacies. An increasing number of remedies are being manufactured in the country.

The paint market was reported as not seriously affected by the depression, and manufacturers of ready-mixed paints and varnishes reported a good year with satisfactory sales. The bulk of the mineral earth pigments are imported from Belgium and Germany.

In view of the larger number of pine trees exploited in 1932, production of crude gum will probably attain 12,000 to 13,000 metric tons. Several new and modern steam-process distilleries were opened during the year, and while most of the distilleries use the old direct-fire process of distilling, much of the turpentine produced is of a comparatively high grade. Efforts are being made to improve methods and

processes so that the product will compare favorably with American and French output.

Exports of turpentine from January to October 1932, were 2,376 metric tons, and of rosin 10,342 tons, nearly double the amounts exported in 1931. The majority of the shipments were to British, German, Belgian, and Netherland ports. In view of the present demand in those markets, and the fact that the season is now over with but small stocks on hand, probably there will be no stocks to carry over into the 1933 season.

FINLAND

Finland does not possess a highly diversified industrial structure nor a wealth of natural mineral resources and is compelled, therefore, to rely largely on importations for its chemical supplies. It is the most densely wooded country in Europe, and the forests are the basis of the nation's leading industrial branches. Although not especially well suited to agriculture because of the thin soil, the rigorous climate, and unfavorable physical features, nevertheless, about 65 percent of Finland's population depend on agriculture for a living.

Sulphur is of outstanding importance to Finnish industry for use in the manufacture of chemical paper pulp. Finland imports between 50,000 and 60,000 tons of sulphur annually, the United States supplying generally about 50 percent. While quantities of copper pyrites are mined at the State-owned Outokumpo Copper Mines, the sulphur contained in this ore has been converted directly into sulphuric acid, of which only negligible quantities have been used outside of the chemical fertilizer industry.

Sulphuric acid is made in Finland by one factory, the State's sulphuric acid factory at Willmanstrand, most of the output being used by the State's superphosphate factory at Kotka. Production in 1929 amounted to 19,000 metric tons and the quantity used by the superphosphate factory was 15,746 tons. Imports of sulphuric acid in 1930 amounted to 212,051 kilos valued at \$11,000, Germany supplying 154,887 kilos valued at \$7,000.

Production of superphosphate in Finland was inaugurated in 1932 at the State plant at Kotka. The plant employs foreign phosphate rock and sulphuric acid produced from domestic material. The 1932 consumption of superphosphates in Finland has been estimated at 45,000 metric tons, with domestic production accounting for about 39,000 tons. Consumption apparently exceeded that of the 3 preceding years but was considerably below the maximum of almost 80,000 tons reached in 1926.

Most of the alcohol, an important percentage of the paints and varnishes, and a growing proportion of the essences and druggists' chemical sundries and preparations used in Finland are manufactured in the country itself; however, local production is inadequate to meet the total demand.

Detailed statistics are not available giving total imports of chemicals and allied products into Finland. The following import figures, however, excluding rosin, linseed oil, tar, and asphalt, may serve for general comparative purposes:

IMPORTS OF CHEMICALS AND RELATED PRODUCTS INTO FINLAND

Items	1931	1932
Ethers, alcohol, essential oils, and cosmetics.....	\$203,000	\$135,000
Colors and dyes.....	1,049,000	801,000
Explosives, firearms and materials, fuses, and fireworks.....	131,000	107,000
Chemicals and drugs.....	4,156,000	3,729,000
Fertilizers.....	1,891,000	1,110,000
Total.....	7,430,000	5,882,000

RUMANIA

Trade Commissioner Kenneth M. Hill, Bucharest

Rumania is relatively unimportant as a chemical-producing country, but considering its population of 18,000,000 and its developing industries, it is important as a consumer of chemicals. Imports of chemicals and allied products approximated \$6,000,000 in 1931, and exports \$1,000,000. No 1932 figures are available, but estimates place imports at slightly less than 1931.

The country, preeminently agricultural, is also rich in minerals, among which petroleum is the principal product. Rumania is at present the fifth largest oil-producing country in the world, and its refining industry is highly developed. Other chemical-consuming industries are the textile, tanning, paper, soap, and glass industries.

There were 175 factories which produced \$12,600,000 worth of chemicals and allied products, including soap, in 1931. Cosmetics and perfumes were produced to the amount of nearly \$1,000,000 in 17 factories in 1931; imports amounted to about \$250,000, and exports were negligible. Leading French and German toiletry concerns, such as Coty, Piver, Lubin, Legrain, D'Orsay, Roger Gallet, Mignot Boucher, Beiersdorf, Leo, Oja, and Elida, manufacture products destined for the Rumanian market domestically. Other foreign concerns which have no local factories import their goods in bulk and their distributors or representatives mix the ingredients and pack them locally. Several well-known American cosmetic lines are packed in Rumania in this manner. A distinct characteristic of the Rumanian market for toilet preparations is the decided preference for foreign brands.

Amyl acetate, anethol, butyl butyrate, ethyl valerate, and ethyl anthranilate are the chief synthetic perfume materials produced in Rumania, annual production of which is 120 tons. Considerable quantities of perfume materials are likewise imported in bulk.

Eleven concerns manufacture about \$550,000 worth of prepared medicines, a relatively small amount considering Rumania's large population. Principal medicines are headache and influenza remedies, cough sirups, and tonics. Chemicals used in the preparation of these medicines are imported. Practically all pharmaceutical preparations sold are imported primarily from Germany, France, and Switzerland.

A branch of the Solvay Co. of Brussels, with two factories, both situated in Transylvania, manufactures caustic soda, sodium carbonate, and soda ash. Several smaller concerns make sodium sulphate. Total production of alkalis in 1931 was caustic soda 9,410

tons, sodium carbonate 17,756 tons, and sodium sulphate 741 tons. The output practically satisfies domestic demand.

In 1931 six sulphuric acid factories produced 40,284 tons, which covered internal demand and left an export of 677 tons, sent chiefly to Bulgaria. The acid is made from pyrites, and the principal consumers are the large petroleum refineries.

Carbide and cyanamide are made in Rumania by the nitrogen factory of Dicosanmartin in Transylvania, Rumania's largest chemical plant, with an annual capacity of 30,000 tons of calcium cyanamide, 25,000 tons of carbide, 6,000 tons of lime, 6,000 tons of calcium chloride, 500 tons of potassium chlorate, 300 tons of ammonia, and 30,000 cubic meters of oxygen. Only 25 to 30 percent of the total capacity is being produced at present.

The use of chemical fertilizers is small. Two factories, Marasesti of Brasov and Phoenix of Satul Mare, make superphosphates. According to estimates, consumption of superphosphates was 15,000 tons in 1929, 12,700 tons in 1930, and 3,000 tons in 1931. These factories likewise produced bone and horn meal, for shipment to Poland, Czechoslovakia, and Italy.

Output of four wood distillation plants in 1931 was 6,889 tons of calcium acetate, 2,000 tons of methanol, 932 tons of acetic acid, and 488 tons of acetone. In the same year, 4,786 tons of calcium acetate, 1,517 tons of ethanol, and 275 tons of acetone were shipped abroad, primarily to Germany, Austria, and Hungary. All the acetic acid made was consumed within the country.

The Rumanian paint and varnish industry has expanded considerably since the war. Some 41 factories made around \$1,500,000 worth of these products. The bulk of the production consists of ready-mixed paint, which satisfies the entire domestic demand. Domestic production of lacquers, enamels, and spirit varnishes does not entirely fill the demand and the finer grades are mostly of foreign origin. Pigments used in their manufacture are practically all of foreign origin, approximately 75 percent coming from Germany, Austria, and Italy. Linseed oil is principally imported from the Netherlands. Turpentine and rosin comes from Greece and France, and the higher grades indirectly from the United States.

In spite of the fact that Rumania consumes mostly German and French chemical products, several American products are rather well known, especially soap and toilet preparations, aniline dyes, high-grade lacquers, rosin, turpentine, and drugs and pharmaceuticals. In addition to the products imported directly from the United States, considerable quantities are purchased through France and Germany, so that the share of the United States is much larger than is shown by official returns.