

CHEMICAL INDUSTRY AND TRADE OF FRANCE¹

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One result of the war has been the growth of a keen desire on the part of French manufacturers to achieve independence of the German chemical industry. Along certain limited lines the French had made good progress before hostilities began, but probably in no country was German dominance in the markets for chemicals so pronounced as it was in France, and it is common knowledge that in no other country to-day is the desire to be free of German dominance in any line so freely expressed as it is there.

The war struck directly at the French chemical industry, as many of the factories were in the Nord and Nord-Est districts. The effect of the loss of these factories on the chemical industry can be judged from the following figures for the whole country:

	Number of Chemical Establishments	Number of Workmen
Before the war.....	1,583	78,892
End of August 1914.....	894	35,470
End of August 1917.....	1,410	93,667

In brief, the number of factories and workmen engaged in manufacturing chemicals was reduced by half as a result of the German invasion, but within three years the number of workmen so engaged was about 19 per cent greater than normal.

The chief effort, of course, was directed to organizing chemical plants for the production of munitions and medicinal supplies for the army, and to direct this effort there was organized the "Office des produits chimiques et pharmaceutiques," under Professor Bethal, the success of which has been demonstrated by actual results. The obstacles faced by the French at the outset can be appreciated if we consider what our own plight would have been if half our chemical industries had been taken from us within a week or so of our entrance into the war.

As in other countries, there is now a desire to utilize to the full in peace times the productive capacity created during the war, but, as in other countries, there is a growing realization that similar development along exactly similar lines occurred in other countries, and that much of the capacity so recently developed will have to be adapted to other products or allowed to stand idle. It is understood that this condition points to spirited competition from the greatest industrial nations, including England, the United States, and Germany, and that the way to chemical independence will be a difficult and trying one.

The chief development during the war occurred in the production of heavy chemicals, statistics of which are shown in the following table:

¹ Facts and figures in this article are based upon publications of the French government, upon the semi-official "French Year Book," upon the German "Gluckauf," and upon published material issued by the United States Bureau of Foreign and Domestic Commerce.

	1913 Production Metric Tons	1919 Productive Capacity Metric Tons
Sulfuric acid, 58°.....	1,160,000	2,500,000
Sulfuric acid, 66°.....	58,000	1,200,000
Oleum.....	6,000	300,000
Nitric acid.....	20,000	360,000
Sodium salts.....	625,000	800,000
Liquid chlorine.....	300	90,000
Bromine.....		500
Calcium carbide.....	32,000	200,000
Cyanamide.....	7,500	300,000
Ammonium salts.....	75,000	200,000
Nitrate of lime.....		250,000
Natural phosphates.....	2,700,000	3,000,000
Superphosphates.....	1,965,000	2,500,000
Phosphorus.....	300	3,600

The foregoing figures do not cover the newly acquired capacity for producing potash, which is discussed in the section devoted to Alsace-Lorraine. The increased capacity for producing nitrogen products, so noticeable in these statistics, is referred to under the heading "Fertilizers," and further comment will be found under the heading "Heavy Chemicals."

Before the war France exported something like \$30,000,000 worth of chemicals, but the export trade has been slow in recovering. On the other hand, the import trade was brisk for a considerable period after the war, as stocks of certain essentials needed replenishing. During the last year French exports in general have increased, and it is presumed that chemicals have benefited along with other lines.

ALSACE-LORRAINE

By the return of Alsace-Lorraine, France has come into possession of a district rich in agriculture, mineral resources, and manufacturing industries. Of these the most important in the building up of a greater chemical industry are the minerals, the production of which under German control in 1913 was as follows (according to the "Gluckauf"):

MINERALS	Number of Establish- ments	Production Metric Tons
Iron ore.....	48	21,135,554
Coal.....	4	3,795,932
Table salt.....	8	76,672
Potash salts (crude).....	17	355,341
Petroleum.....	6	49,584
Asphaltum (crude).....	1	6,354

The acquisition of the iron-ore resources of Lorraine will make it possible for France to produce 40,000,000 tons of ore annually, and place her a good second after the United States in this respect. Before the war she was third, between Germany and England. The loss of these deposits is a very serious matter for Germany, as she formerly depended upon them for three-fourths of the ore she needed. The manufacture of iron and steel in the Lorraine district is very highly developed.

In 1913 France consumed 63,000,000 tons of coal, of which 23,000,000 tons were imported. The bulk of the domestic supply came from mines in the Nord and Pas-de-Calais regions which were destroyed or damaged during the war. The production of the Lorraine mines was approximately 4,000,000 tons under German control, and the production of the mines in that portion

of the Saare basin to be held by France until the plebiscite 15 years hence was 12,000,000 tons. The acquisition of this total of 16,000,000 tons will not make France independent of other coal-producing countries, especially not until the Nord and Pas-de-Calais mines have been repaired, but French engineers believe that the annexed fields can be developed to a point that will insure eventual independence. The future will depend upon French initiative and organization.

The potash resources of the annexed territory are estimated at from one and a half to two billion tons of raw salt (say, 300,000 tons of K_2O), and it is considered possible that within a few years the annual production will amount to 4,000,000 tons. The present output is far from that, although it is nearly four times what it was under German control. For the last eight years the amount of crude salts mined has been as follows:

Year	Metric Tons
1913.....	355,341
1914.....	325,886
1915.....	114,358
1916.....	204,474
1917.....	320,131
1918.....	333,499
1919.....	592,000
1920.....	1,200,000 ¹

¹ Average daily production for August multiplied by 300.

Alsatian potash production before the war was admittedly low, and the explanation generally offered is that the mines were all new and that the output was limited by the Kali-Syndicat to prevent overproduction. During the war, production fell off for a number of reasons. One mine was bombed, and others suffered from neglect and flooding. It is said that some of the mines farthest from the front were badly operated in an effort to speed up production.

Not all the damage done during the war has been repaired, but it is evident that the mines in operation are producing more effectively than they did under German control. For the present they can be divided into two groups, those under control of the Sequestration Office and those independent of that official organization. There is considerable agitation for removing all the mines from such control. Daily production of all mines in August was 4000 tons of crude salts, while the capacity was put at 8500 tons (7000 tons for the mines under sequestration and 1500 tons for the others). It is calculated that with all the mines in operation the production four years hence should reach 14,000 tons a day. Perhaps a third of the present production is going to the United States.

HEAVY CHEMICALS

France has been able to supply its own needs for many of the heavy chemicals, as the table of imports will prove. Before the war sulfuric acid was produced to the extent of more than 1,000,000 tons, nitric acid to the extent of about 20,000 tons, and hydrochloric acid to the extent of some 130,000 tons. Comparatively small quantities were imported and exported. The war about doubled the capacity for producing sulfuric acid, and the output of nitric and hydrochloric acids was also greatly stimulated, so that after the armistice there was an excess for export

with but few buyers, as a number of other countries were in the same predicament. Soda products were also manufactured to a sufficient extent to meet domestic demands before the war, with a surplus for export, and doubtless the same will be true as to potash products as soon as the chemical industry has grown up to the possibilities of the newly acquired Alsatian resources.

FERTILIZERS

The war has opened the way to complete independence for French agriculture so far as foreign fertilizers are concerned. The need of nitric acid in the manufacture of munitions led to a great development of the nitrogen industry, just as it did in many other countries, and efforts are now being concentrated on keeping these new plants in operation on such products as cyanamide and calcium nitrate. Cyanamide is now manufactured to the extent of more than 100,000 tons annually, as contrasted with 7500 tons before the war, and French authorities have high hopes of getting along without the 300,000 tons of sodium nitrate formerly brought from Chile, although they appreciate the fact that other countries have ambitions along the same line, especially Germany with its Haber process.

The acquisition of Alsace-Lorraine assures independence of the Kali-Syndicat, and some export business in addition.

The production of superphosphates now amounts to nearly 2,000,000 tons a year, which is sufficient to meet the domestic demand. This industry operates on phosphates from Morocco and Algeria.

COAL-TAR DYES

France is one of the half-dozen countries (*i. e.*, France, England, Switzerland, Italy, Japan, and the United States) avowedly seeking to establish dyestuff industries that will make them independent of the German manufacturers who formerly dominated the world markets. In some respects the obstacles she has to overcome are more serious than those confronting the United States and England. The home market is not extensive (imports of German dyes did not exceed \$3,000,000 before the war), and it requires less in the way of staples and much more in the way of specialties, since the product of the silk, wool, and cotton industries consists largely of the most highly finished fabrics. And the fact that so many other countries are in the dye-making business will make it difficult to find markets abroad for French dyes. On the other hand, the value of a dye industry to the national defense is more generally recognized and conceded than in some other countries, notably the United States, and the government has already armed itself with the power to regulate the importation of German dyes. (See the section headed "Government Assistance.")

Authoritative figures on the present production of artificial dyes are apparently not to be had and no attempt will be made in this article to estimate the output, but it is certain that no success comparable to that of the American industry has been attained

up to this time; in fact, American dyes and dyestuffs have been marketed in France in fairly large quantities.

PERFUMERY AND COSMETICS

Among the highly finished luxury goods for which France is famous are included perfumery and cosmetics, by which are meant perfumes, essential oils, scented soaps, grease paints, beauty creams, etc. The production of these articles totaled in value some \$30,000,000 before the war, and they were exported to all corners of the earth. This was an industry naturally hit very hard by the war, but just as naturally it made a very quick recovery as soon as the armistice was signed and the period of luxury-buying set in. It is the only important French chemical industry that fared better in the export trade in 1919 than in 1913.

For some time before the war the French manufacturers of natural perfumes were somewhat worried by the competition from German artificial scents, but the French themselves are now manufacturing these synthetic perfumes on an increasing scale, coincident with the production of artificial dyes, and it seems logical to assume that the long-established supremacy in the natural products will assure the success of the new industry. Not only have the new artificial scents been favorably received, but considerable success has been attained in blending the natural and artificial products.

OILS AND SOAP

Marseille was a commanding figure in the vegetable-oil and soap business before the war, the product of its crushers amounting to some 1000 tons a day, while the output of soap reached a very high figure. Oil-bearing materials were brought to this port from points in the Mediterranean and especially from the Indian Ocean and the Far East by way of the Suez Canal, and considerable quantities of more or less crude oils were brought in for refining. The total value of the products of the oil industries was \$86,000,000, of which Marseille was credited with \$70,000,000, Nice with \$10,000,000, and Bordeaux with less than \$3,000,000.

The war interfered greatly with the importation of oil-bearing materials, and a fat famine lasted until long after the armistice. Even in 1919 the imports of oil-bearing materials were less than half what they were in 1913. Peanuts, the principal raw material crushed at Marseille, were imported to the extent of nearly 500,000 tons in 1913, but in 1919 the total quantity was only 225,000 tons. The falling off in receipts of linseed and copra, the next most important materials, is equally striking. Imports of oils in 1919 were much greater than in 1913, whereas the exports dropped from about 58,000 tons to less than 8,000. Eventually Marseille will recover much of its former business, but the development of the oil industries in England and the United States, to say nothing of the tendency to crush near the source of supply of the raw materials, are factors that are receiving serious consideration in France.

The production of common soap was affected by the

scarcity of fats during the war and is slow to return to normal. Exports, which totaled nearly 78,000,000 lbs. in 1913, were 43 per cent below that figure in 1919. In striking contrast to the decline in sales of common soap is the increase in exports of scented soap from a little over 3,000,000 lbs. in 1913 to nearly 7,000,000 lbs. in 1919.

GOVERNMENT ASSISTANCE

Protection by the government is a most important factor in the development of a self-contained and independent chemical industry in any country, or of any branch of the chemical industry, and the chances of ultimate success in the numerous countries that have announced their intention of going their own way since the war started can be appraised with some measure of accuracy by a study of the steps taken to restrain outside competition, especially German, until the home industry can establish itself on a sound basis.

In France, as in the United States, England, Italy, and Japan, there have been more or less wholehearted and intelligent efforts to foster a number of chemical industries (coal-tar dyestuffs and medicinals in particular) in the hope of ending the former German monopoly, and the French government has to date placed its reliance on high tariffs plus control of German imports. There was a tariff on intermediates and finished dyestuffs before the war, but it was unscientific in that the duty on the finished dyes was much higher than that on the intermediates and was the same for an intermediate that required little finishing as for one that required a great deal of manufacturing to finish. The result was that the Germans established finishing plants in France and defeated both the revenue and protective objects of the tariff.

The new tariff is frankly protective and the rates are not only higher but so adjusted that intermediates requiring little labor to finish are only slightly lower than the finished dyes, thus making it unlikely that foreign manufacturers will be tempted to establish mere "assembling" plants in France.

As against Swiss, British, and American competition the tariff is at present the only protection afforded the French dye-maker, and there is a disposition to complain of the extent to which non-German foreign dyes have entered the market. Against dyes of German origin there is a licensing provision in addition to the tariff, although the reparation allotments come in free of duty. The decree upon which the French licensing program is based may be continued indefinitely, differing in that respect from our own war-time power to license imports. In brief, the French dye-maker is apparently assured of adequate protection against the German dye industry, and thus better prepared for eventualities than our own manufacturers.

THE MARKET FOR IMPORTED CHEMICALS

A study of the following compilation from official French statistics shows how the war has affected the French market for foreign chemicals, and incidentally reveals the fact that the United States did not figure prominently in the pre-war trade. Statistics are not available to show the origin of 1919 imports.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS:			
Acetate of copper, crude.....	440	660	
Acetate of lead.....	452,160	393,750	504,200
Germany.....	354,940		
United States.....		171,960	
Acetone.....	4,441,210	788,810	420,640
Germany.....	2,709,040		
United Kingdom.....	845,910	3,090	
United States.....	107,810	767,870	
Acids:			
Acetic.....	5,510	6,170	358,690
Arsenious.....	653,670	429,900	1,570,570
Boric.....	147,490	57,760	280,650
Carbonic, liquid.....	268,740	34,170	881,630
Citric, crystallized.....	63,270	210,320	137,570
Citric, liquid.....	250,440	272,930	60,410
Formic.....	141,320	42,990	65,700
Gallie, crystallized.....	14,550	12,790	25,350
Hydrochloric.....	6,399,800	2,544,130	3,054,950
Hydrofluoric.....	34,390		5,730
Hydrofluosilicic.....	4,850		
Lactic.....	561,520	195,550	160,060
Nitric.....	1,822,560	403,220	87,520
Oleic, of animal origin.....	5,851,730	336,430	3,776,520
Belgium.....	4,786,450		
Spain.....		118,170	
United States.....		87,080	
Oxalic.....	1,878,340	500,670	731,710
Germany.....	1,303,590		
United Kingdom.....	447,760	178,790	
United States.....		18,960	
Phosphoric.....	125,660	95,680	115,080
Stearic.....	2,661,420	4,594,210	5,867,600
Belgium.....	1,276,920		
Netherlands.....	1,214,750	302,470	
United Kingdom.....	13,890	2,114,010	
United States.....	3,750	1,619,960	
Sulfuric.....	21,827,300	139,634,170	2,926,640
Belgium.....	14,559,100		
Germany.....	6,894,070		
Italy.....		63,757,680	
United States.....		6,697,200	
Tannic.....	\$114,984	\$100,736	\$245,496
Germany.....	\$105,139		
United States.....		\$26,896	
Tartaric.....	1,105,180	671,970	330,030
Germany.....	624,350		
Italy.....	373,460	653,890	
Alcohol, amyl.....	32,630	3,530	150,130
Alum, ammonia or potash.....	246,920	1,855,190	2,626,810
Aluminium:			
Chloride.....	3,530	880	6,830
Hydrate.....	728,410	7,500	12,130
Oxide, anhydrous.....	5,730	220	2,430
Sulfate.....	337,970	183,420	6,090,270
Ammonia.....	614,650	303,350	2,047,430
Ammonium:			
Sulfate, refined.....	479,500	8,928,060	2,973,590
United Kingdom.....	457,020	8,878,450	
Salts, other, crude.....	118,830	37,071,170	14,332,250
Salts, other, refined.....	1,896,190	53,247,580	4,853,480
Germany.....	229,060		
Norway.....	934,540	30,368,230	
United Kingdom.....	513,680	1,661,180	
Antimony oxides.....	203,050	246,250	422,630
Germany.....	67,240		
United Kingdom.....	130,950	236,770	
United States.....	2,200	9,480	
Arsenic sulfide.....	536,820	660	106,040
Ashes, vegetable, and lye of.....	616,850	333,560	
Ashes, beet-root.....	7,929,950	436,290	262,350
Barium dioxide.....	412,700	218,700	809,540
Bromides.....	20,720	156,530	17,640
Bromine, liquid.....	169,750	1,980	222,890
Germany.....	169,750		
United States.....		1,980	
Calcium:			
Borate.....	6,291,710		2,308,240
Carbide.....	8,157,680	35,594,500	35,208,480
Chloride.....	24,910	6,250,320	11,083,520
Sulfide and bisulfide.....	50,050	12,790	91,930
Chemicals, n. e. s.:			
With alcoholic base:			
Taxed by weight.....	132,060	26,230	36,160
Taxed by value.....	\$55,071	\$295,498	\$312,853
Other:			
Taxed by weight.....	30,860	198,420	558,870
Taxed by value.....	\$2,438,390	\$3,200,490	\$5,887,272
Chlorine, liquefied.....	572,320	7,425,830	164,910
Chloroform.....	440	77,600	46,740
United Kingdom.....	440	72,750	
United States.....		4,850	
Citrate of calcium.....	1,978,630	2,113,130	1,097,900
Italy.....	1,974,880	2,080,500	
Cobalt:			
Oxide, pure.....	5,730	440	25,570
Zaffer, siliceous oxide, vitrified			
oxides, smalt, and azure.....	245,150	57,540	660
Salts, n. e. s.....	2,650	4,190	3,090
Cocaine, crude.....	2,430	3,970	3,970
Germany.....	2,430		
Copper:			
Oxide.....	191,140	24,470	76,500
Sulfate.....	41,856,550	40,630,300	38,811,090
Belgium.....	1,287,270		
United Kingdom.....	40,373,730	39,666,450	
United States.....		908,300	
Ether, acetic and sulfuric.....	47,840	44,970	116,180
Fluorides.....	168,880		3,530

¹ See also Fertilizers.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS (Continued):			
Formaldehyde.....	909,400	1,406,990	755,750
Germany.....	680,780		
United States.....		1,089,960	
Formates.....	3,090	880	
Glycerol.....	1,045,870	108,250	1,303,810
Netherlands.....	367,950	31,970	
United Kingdom.....	252,210		
United States.....		74,740	
Iodides and iodoform.....	220	2,650	440
Iodine, crude or refined.....	50,050	139,330	74,520
United Kingdom.....		46,740	
United States.....	50,050		
Iron:			
Lactate.....	1,320	220	880
Oxide.....	3,232,600	675,270	1,363,120
Sulfate.....	6,685,670		561,520
Sulfate of iron and copper.....	13,230		2,200
Lactates, n. e. s.....	28,880	440	1,100
Lactarine (casein).....	55,340	12,350	29,320
Lead:			
Carbonate.....	8,463,240	6,827,350	10,325,130
Belgium.....	5,712,340		
Germany.....	1,296,080		
United States.....		1,330,050	
Chromate.....	98,990	108,250	38,360
Oxide.....	1,765,230	1,204,830	6,568,230
Belgium.....	505,740		
Germany.....	1,113,540		
Salts, n. e. s.....	324,080	724,000	506,400
Magnesia, calcined.....	76,500	261,690	248,900
Magnesium:			
Carbonate.....	1,330,480	3,208,830	4,035,340
Italy.....	753,750	324,900	
United States.....	294,320	1,895,750	
Chloride.....	6,149,960	1,676,170	1,283,310
Germany.....	6,092,640		
United States.....		133,160	
Sulfate.....	8,110,500	1,639,350	2,458,370
Germany.....	7,810,020		
British India.....		1,003,320	
Mercuric sulfide:			
In lumps, natural or artificial.....			1,760
Pulverized (vermillion).....	51,590	15,870	13,230
Germany.....	37,700		
United States.....		4,630	
Methanol.....	5,002,500	3,752,270	1,870,180
Canada.....	1,715,630		
Germany.....	2,026,710		
United States.....	306,000	2,570,810	
Milk sugar (lactose).....	33,290	355,380	288,810
Nicotine salts.....	46,960	3,300	440
Germany.....	22,490		
United States.....	12,130		
Phosphorus:			
Red.....			
White.....		40,780	323,860
Potassium:			
Acetate.....	440		
Arsenate.....	19,840		
Chlorate.....	7,720	15,457,490	5,070
Carbonate and crude potash.....	16,256,220	716,560	1,800,960
Belgium.....	1,328,720		
Germany.....	11,105,900	6,610	
Russia.....	2,750,240		
Chromate of potassium and			
sodium.....	6,438,980	8,197,000	8,056,790
Germany.....	3,581,370		
United Kingdom.....	2,421,310	6,797,070	
Nitrate.....	157,410	6,605,050	6,149,570
Oxalate.....	108,470	11,900	32,630
Permanganate.....	506,840	143,080	63,050
Germany.....	459,220		
Switzerland.....	11,900	81,570	
Prussiate.....	45,420	37,480	41,670
Sulfite, bisulfite.....	288,140	30,640	50,040
Pyrolignites of:			
Calcium.....	395,510	1,740,330	892,870
Iron.....	15,650	12,350	220
Lead.....	22,710		
Quinine, sulfate, and other salts.....	880	2,420	68,780
Silver salts.....	1,100		
Sodium:			
Acetate.....	486,780	12,120	18,300
Arsenate.....	18,740	23,150	345,020
Bicarbonate.....	338,190	5,825,930	2,144,660
Carbonate:			
Crude.....	2,474,250	79,590	3,839,570
Refined.....	135,800	87,740	12,143,940
Chlorates of sodium, barium,			
etc.....	11,020	47,377,780	2,908,120
Hydroxide (caustic soda).....	1,177,930	30,084,050	3,397,760
United Kingdom.....	1,123,700	1,060,640	
United States.....		28,961,240	
Hyposulfite.....	97,000	131,400	368,170
Silicate of sodium and potas-			
sium.....	505,740	168,210	397,270
Sulfate.....	212,520	2,870	1,104,960
Sulfite, bisulfite.....	1,032,640	328,270	1,686,540
Tetraborate (borax):			
Crude.....	29,862,200	14,297,860	8,779,030
Chile.....	16,526,130	1,102,970	
United States.....		8,465,530	
Refined or semi-refined.....	195,990	46,960	2,201,310
Salts, n. e. s.....	12,140	670,420	10,169,040
Tartrates:			
Cream of tartar.....	30,860	96,340	37,040
Crude tartar.....	3,122,850	1,954,840	603,630
Crystals of tartar.....	251,100	44,750	14,990

¹ See also Fertilizers.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS (Concluded):			
Tartrates (Concluded):			
Wine lees.....	21,578,850	11,062,350	9,000,370
Other.....	71,210	6,390	145,730
Thorium and cerium salts.....	3,530		440
Tin:			
Chlorides.....	2,030,450	1,760,610	297,620
Germany.....	1,853,850		
United States.....	171,740	1,751,790	
Oxide.....	103,620	17,860	25,570
Uranium oxide.....	102,290	4,190	8,820
Belgium.....	9,040		
Germany.....	91,490		
United Kingdom.....	1,100	4,190	
Zinc:			
Oxide.....	12,888,760	6,420,960	14,955,940
Germany.....	4,146,190		
Netherlands.....	4,515,460	2,060,220	
United States.....	3,864,670	1,662,730	
Sulfate.....	421,080	141,980	285,940
Sulfide.....	219,800		59,740
COAL-TAR PRODUCTS:			
Products obtained directly by distillation of coal tar.....	190,097,800	137,628,840	65,206,100
Belgium.....	36,267,880		
Germany.....	84,665,000		
Spain.....	1,080,480	2,794,140	
United Kingdom.....	65,167,540	114,600,460	
United States.....	1,653,890	19,702,710	
Products derived from products obtained by distillation of coal tar.....	8,422,240	6,598,650	11,383,130
Germany.....	7,790,620		
Switzerland.....	237,220	862,670	
United Kingdom.....	150,350	1,388,030	
United States.....		4,335,390	
Dyes derived from coal tar:			
Alizarin, artificial.....	771,170		71,650
Germany.....	762,570		
United Kingdom.....	8,600		
Picric acid.....	660	8,215,300	21,389,250
Germany.....	660		
United States.....		7,988,230	
Other dyes.....	3,847,250	1,078,280	5,453,570
Germany.....	3,263,250		
Switzerland.....	410,280	802,920	
United Kingdom.....	87,080	170,200	
United States.....		44,530	
DYEING AND TANNING MATERIALS:			
Extracts of woods, barks, nuts, and berries used for dyeing:			
Black or violet extracts.....	271,390	533,960	5,409,040
British America.....		349,210	
United States.....	173,720	169,320	
Garancine.....	440	2,200	220
United States.....		2,200	
Indigo, natural.....	88,180	336,200	144,620
British India.....	76,280	9,920	144,620
Orchil, prepared:			
Dried.....	15,430	660	1,760
Moist, in paste.....	220	440	
Red or yellow extracts.....	48,060	74,080	1,487,240
Extracts of woods, barks, nuts, and berries used for tanning:			
Chestnut and other.....	2,190,730	381,620	3,140,480
British India.....	867,740	197,980	
United States.....		105,820	
Nutgalls and sumac.....	774,040	241,180	754,420
Switzerland.....	601,200	189,380	
Quebracho.....	11,101,810	6,508,480	65,100,070
Argentina.....	7,952,950	6,507,380	
Germany.....	783,960		
EXPLOSIVES:			
Dynamite.....		430,120	71,870
Spain.....		390,220	
Fireworks.....	20,280	6,610	15,210
Gunpowder.....		13,654,550	139,550
United States.....		12,668,860	
FERTILIZERS:			
	Metric Tons	Metric Tons	Metric Tons
Ammonium sulfate, crude.....	20,696	19,121	20,709
Belgium.....	4,110		
Germany.....	8,237		
United Kingdom.....	8,123	19,121	
Calcium nitrate and cyanamide.....	10,010	7,986	6,389
Norway.....	9,378	1	
Sweden.....	232		
Switzerland.....	400	7,985	
Fertilizers, chemical, n. e. s.....	223,217	7,100	5,055
Belgium.....	28,860		
Germany.....	157,107		
United Kingdom.....	31,709	4,395	
United States.....		106	
Potash:			
Muriate (chloride).....	46,138	357	1,048
Germany.....	43,704		
Italy.....		304	
Sulfate.....	14,520	28	0.1
Germany.....	13,088		
Tunis.....		27	
Slag, basic.....	(1)	828	1,498
Sodium nitrate.....	322,115	540,700	156,169
Chile.....	322,014	540,694	118,255
Superphosphate.....	100,822	4,122	12,956
Belgium.....	83,983		
Tunis.....		3,100	
United Kingdom.....	6,130	1	
MEDICINAL PREPARATIONS:			
Distilled waters:	Gallons	Gallons	Gallons
Alcoholic.....	132	53	264

¹ Included under "Fertilizers, chemical, n. e. s.," in 1913.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Pounds	1916 Pounds	1919 Pounds
MEDICINAL PREPNS. (Concluded):			
Distilled waters (Concluded):			
Nonalcoholic.....	52,030	27,120	142,860
Other, taxed by weight.....	152,780	341,060	127,650
United Kingdom.....	76,940	61,950	
United States.....	21,380	80,690	
Other, taxed by value.....	\$8,472	\$18,690	\$36,091
OILS, FIXED VEGETABLE:			
Castor and pulghere.....	459,660	2,557,140	13,687,620
Belgium.....	27,780		
United Kingdom.....	430,120	2,266,130	
United States.....		123,460	
Coconut, touloucouana, illipe, palm nut.....	7,821,120	3,123,730	21,484,050
Belgium.....	968,710		
Germany.....	4,922,260		
United Kingdom.....	1,726,220	2,581,170	
Colza.....	59,520	6,166,990	3,509,760
Japan.....		1,757,300	
United Kingdom.....	28,880	2,933,030	
Corn:			
For manufacture of soap.....	93,260	88,400	106,920
Other.....	19,180	41,450	440
Cottonseed:			
For manufacture of soap or edible fats.....	10,446,600	9,359,720	5,850,560
United Kingdom.....	2,983,260	1,745,840	
United States.....	7,347,790	6,710,210	3,453,790
Other.....	9,087,890	4,938,790	4,535,790
United Kingdom.....	3,622,860	611,780	
United States.....	5,449,380	4,188,560	3,049,770
Linseed.....	4,671,820	25,040,540	5,017,060
China.....	1,269,420	638,020	
United Kingdom.....	1,732,170	24,311,260	
Mustard.....			3,530
Olive.....	31,927,120	50,870,110	121,606,300
Algeria.....	2,173,760	15,444,260	
Greece.....	2,320,800	115,080	
Italy.....	2,738,800	1,052,480	
Spain.....	2,403,260	18,601,500	68,140,470
Tunis.....	21,604,420	15,302,060	51,073,170
Palm.....	34,729,820	70,437,460	52,273,140
China.....	2,761,950	2,718,960	
West Africa, British.....	1,327,840	28,814,630	
West Africa, French.....	29,553,840	35,970,610	
Peanut:			
For manufacture of soap or edible fats.....	39,240	4,209,160	4,485,300
China.....		1,076,080	
Japan.....		2,192,940	
Other.....	28,440	2,521,427	3,144,230
Japan.....		1,538,830	
United Kingdom.....		363,100	
Rape.....	15,430	8,160	4,630
Sesame:			
For manufacture of soap or edible fats.....	11,020	302,910	
Other.....	73,410	45,190	9,260
Soy-bean:			
For manufacture of soap.....	401,460	939,390	1,722,250
Other.....	14,550	800,940	6,751,880
Other oils.....	145,280	117,250	268,080
OILS, VOLATILE:			
Rose.....	3,750	231	3,375
Bulgaria.....	2,147	22	
Germany.....	337		
Switzerland.....		97	
Rose geranium and ylang-ylang.....	179,776	206,553	52,651
Algeria.....	61,488	105,919	
Réunion.....	92,987	94,351	
Other.....	1,308,880	1,462,320	2,418,910
British India.....	119,930	148,150	
Germany.....	154,980		
Indo-China.....	269,400	185,630	
Italy.....	184,300	258,600	
United Kingdom.....	88,630	223,770	
PAINTS, PIGMENTS, VARNISHES:			
Blacks:			
For engraving.....	5,950		53,130
Ivory.....	11,240	9,700	115,080
Lampblack, Spanish black.....	2,411,630	1,858,500	2,698,680
United States.....	1,589,750	1,574,980	
Mineral, in lumps.....	219,800		35,490
Mineral, ground.....	840,400	660	276,680
Blue, Prussian.....	222,890	190,700	243,170
Carmines:			
Common.....	660		220
Fine.....	880		660
Colors:			
Ground in oil.....	216,050	1,372,380	5,145,370
In paste.....	25,790		2,650
Other.....	\$173,683	\$87,056	\$280,622
Green, mountain, Brunswick, and other greens resulting from a mixture of chromate of lead and Prussian blue.....	208,780	35,490	37,260
Green, Schweinfurth, mits green, mountain blue and green ashes.....	24,690	1,980	15,210
Lithopone.....	14,909,860	10,868,130	16,310,900
Belgium.....	1,385,390		
Germany.....	9,867,890	10,140	
Netherlands.....	3,062,660	3,581,410	
United States.....		304,240	
Ultramarine.....	237,660	99,870	572,100
Varnishes:			
Spirit.....	69,890	16,090	8,160
Turpentine, oil, or mixed.....	3,771,670	1,806,690	3,943,850
Germany.....	403,450		
United Kingdom.....	2,519,220	910,950	
United States.....	543,440	622,800	
Zinc yellow, or chromate of zinc.....	35,050	21,600	2,200

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS (Concluded)

	1913 Pounds	1916 Pounds	1919 Pounds
PERFUMERY AND COSMETICS:			
Alcoholic, gal.	6,973	819	2,140
Nonalcoholic, lbs.	266,760	169,310	157,410
Oils, fixed, scented.	408	99	86
Synthetic perfumes.	254,190	108,030	459,440
Germany.	178,570		
Switzerland.	48,500	68,560	
Toilet soap:			
Transparent.	69,890	40,570	169,760
United Kingdom.	46,740	37,700	
United States.		2,830	
Other, scented.	3,044,580	826,290	1,521,630
United Kingdom.	2,880,340	760,590	
United States.	65,040	64,370	
MISCELLANEOUS PRODUCTS:			
Albumin.	724,000	1,312,850	785,500
China.	287,260	721,350	
United Kingdom.	339,510	520,070	
Blacking.	42,110	9,470	10,360
Candles:			
Tallow.		220	405,650
Wax and other.	100,090	3,632,340	2,057,350
Italy.	35,940	874,130	
United Kingdom.	24,910	2,693,830	
United States.		33,730	
Dextrin.	497,800	140,650	2,688,760
Gelatin, in powder, sheets, etc.	523,820	285,940	176,590
Italy.		118,390	
Switzerland.	23,150	124,340	
Germany.	386,690		
Glucose.		7,396,290	28,026,040
United States.		4,809,820	
Glue.	4,152,400	997,160	1,874,810
Germany.	1,222,020		
Switzerland.	199,520	690,270	
United Kingdom.	1,195,570	135,360	
Inks:			
Drawing, in tablets.	2,870	220	11,020
Writing or printing.	391,540	191,580	197,090
Germany.	143,960		
United Kingdom.	144,180	144,180	
United States.	14,770	14,990	
Isinglass.	171,300	172,400	255,740
United Kingdom.	82,890	77,380	
United States.	43,650	61,070	
Paper and pulp:	Metric Tons	Metric Tons	Metric Tons
Pulp, mechanical.	259,449	213,209	161,168
Germany.	6,396		
Canada.	4,504	41,731	
Norway.	115,923	118,232	
Russia.	15,380		
Sweden.	116,342	725	
Pulp, chemical.	205,500	149,502	106,704
Austria-Hungary.	26,536		
Germany.	42,716		
Norway.	31,830	36,252	
Sweden.	88,803	107,293	
Switzerland.	4,606	4,636	
United States.	2,711	844	
Paper, fancy.	Pounds	Pounds	Pounds
Germany.	1,480,400	4,025,200	2,104,970
United Kingdom.	942,030		
United States.	177,690	899,930	
Paper, other.	29,110,270	1,550,950	
Germany.	7,900,260		
Norway.	724,880	79,138,230	
Sweden.	3,149,300	95,147,530	
United Kingdom.	14,833,800	16,457,500	
United States.		11,399,220	
Resin oil.	152,560	6,830	54,230
Soap, common.	3,863,820	17,272,330	36,474,600
United Kingdom.	996,490	14,294,110	
United States.	1,808,010	2,591,530	
Sugar (expressed in terms of refined).	Metric Tons	Metric Tons	Metric Tons
Pounds.	108,062	543,126	568,867
Pounds.	Pounds	Pounds	Pounds
Tar.	9,279,480	4,718,330	6,816,030
Russia.	2,291,040	916,460	
United Kingdom.	1,651,700	1,562,640	
United States.		291,230	
Turpentine, resins, rosin, pitch, resin lumps, and other resinous products.	1,965,200	665,360	1,794,780
Turpentine, spirits of.	222,670	574,970	591,060

THE EXPORT TRADE

The details of the falling off in French exports of chemicals in 1919 as compared with 1913 are shown in the following table, which is based upon official French statistics:

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS:			
Acetate of copper:			
Crude.	1,655,230	267,420	105,380
Russia.	1,572,780	106,700	
United States.	15,210		
Refined, powdered.	721,350	2,870	27,340
Crystallized.	203,270	67,680	40,790
Acetate of lead.	52,470	32,850	91,710

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS (Continued):			
Acetone.	12,350	31,300	58,640
Acids:			
Acetic.	395,730	105,600	397,270
Arsenious.	2,472,700	397,490	17,420
Boric.	4,749,190	3,483,960	630,740
Belgium.	1,072,100		
Spain.	190,260	233,910	
United Kingdom.	2,284,870	2,856,090	
Carbonic, liquid.	655,210	541,670	357,150
Citric, crystallized.	886,840	410,060	243,610
Germany.	248,240		
United Kingdom.	98,550	63,930	
United States.		44,970	
Citric, liquid.	57,540	245,370	69,890
Formic.	4,850	734,140	234,790
Gallic, crystallized.	440	220	45,640
Hydrochloric.	3,921,360	2,052,720	745,600
Hydrofluoric.	41,010	22,490	56,440
Hydrofluosilicic.	3,310	3,090	1,320
Lactic.	13,010	6,610	14,990
Nitric.	4,701,570	2,274,070	1,078,720
Belgium.	4,289,970		
Italy.		1,749,590	
Switzerland.	31,080	464,510	
Oleic, of animal origin.	5,338,490	1,155,220	468,480
Belgium.	1,888,920		
Italy.	1,481,950	191,800	
Switzerland.	288,140	945,120	
Oxalic.	101,850	3,530	7,270
Phosphoric.	39,020	71,430	17,420
Stearic.	2,838,890	501,770	379,200
Algeria.	330,910	344,360	
Italy.	993,400	16,530	
Switzerland.	21,160	128,970	
United States.	161,820	7,280	
Sulfuric.	9,146,530	3,272,100	8,668,570
Tannic.	305,560	24,690	65,920
Tartaric.	2,677,730	1,813,300	1,345,040
Algeria.	376,550	246,920	
Germany.	223,990		
Spain.	208,560	250,440	
Switzerland.	587,530	115,300	
United Kingdom.	73,630	337,710	
United States.	40,780	10,800	
Alcohol, amyl.	408,740	289,460	22,710
Belgium.	386,690		
United States.		192,460	
Alum of ammonia or potash.	488,540	329,810	274,920
Aluminium:			
Chloride.	1,980	440	2,200
Hydrate.		401,020	1,496,060
Oxide, anhydrous.	16,498,710	13,813,060	13,309,750
Norway.		13,728,620	
Switzerland.	13,139,750		
Sulfate.	541,900	4,373,090	547,850
Argentina.	104,940	1,732,170	
Italy.	154,320	1,461,660	
Spain.	100,970	495,600	
Ammonia.	278,220	2,037,510	186,510
Ammonium:			
Sulfate, refined.	892,650	26,245,370	314,380
Algeria.	628,100	197,750	
Belgium.	6,830	916,460	
Free zones.	39,680	25,016,290	
Salts, other, crude.	472,890	286,820	74,520
Salts, other, refined.	171,520	95,460	255,080
Antimony oxides.	2,788,180	509,710	516,760
Germany.	849,220		
United Kingdom.	103,400	92,810	
United States.	1,477,100	332,900	
Arsenic sulfide.	27,120	249,780	13,230
United Kingdom.	6,170	226,860	
United States.		11,240	
Ashes, vegetable, and lye of.	306,220		6,830
Ashes, beet root.	3,497,630	160,940	1,050,280
Barium dioxide.	1,364,880	36,820	440
Italy.	484,800		
United Kingdom.	568,130	3,750	
Bromides.	6,170	16,750	50,490
Bromine, liquid.	880	16,310	113,980
Calcium:			
Borate.	180,560		31,750
Carbide.	14,924,620	3,261,740	4,156,150
Algeria.	10,626,930	1,325,420	
Morocco.	1,316,600	329,150	
Chloride.	25,043,380	464,070	2,480,860
Belgium.	6,942,130		
Spain.	7,105,270	10,580	
United Kingdom.	2,400,390		
United States.	2,057,130		
Sulfite and bisulfite.	29,100	51,370	17,420
Chemicals, n. e. s.:			
With alcoholic base.	153,880	171,520	274,250
United Kingdom.	112,430		
Other.	26,153,850	21,788,720	18,118,020
Algeria.	2,505,110	1,195,660	
Belgium.	10,046,230	72,970	
Germany.	2,462,340		
United Kingdom.	1,132,730	5,274,340	
United States.	425,710	2,879,680	
Chlorine, liquefied.	1,540	440	4,190
Chloroform.	13,230	13,450	70,110
Citrate of calcium.	3,310		
Cobalt:			
Oxide, pure.	20,940	660	2,200
Zaffer, siliceous oxide, vitrified oxides, smalt and azure.	5,950	2,420	1,320
Salts, n. e. s.	440	2,650	2,650

¹ See also Fertilizers.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS (Continued):			
Cocaine, crude.....	220	.....	.....
Copper:			
Oxide.....	57,980	16,760	1,105,620
Sulfate.....	10,305,500	9,347,600	3,812,890
Algeria.....	6,981,800	5,437,040	.....
United Kingdom.....	1,141,770	2,673,550	.....
Ether, acetic and sulfuric.....	182,540	47,400	113,980
Fluorides.....	12,790	27,340	23,590
Formaldehyde.....	47,840	64,150	61,950
Formates.....	.....	97,660	12,570
Glycerol.....	16,778,040	8,273,070	3,714,790
Belgium.....	728,400	.....	.....
Italy.....	668,660	1,399,270	.....
United Kingdom.....	3,129,910	6,743,500	.....
United States.....	8,313,180	9,480	.....
Iodides and iodoform.....	52,470	20,720	31,300
Iodine, crude or refined.....	8,600	9,260	4,190
Iron:			
Lactate.....	.....	220	1,980
Oxide.....	385,370	1,032,640	220,680
Sulfate.....	3,674,880	1,310,650	631,620
Sulfate of iron and copper.....	2,430	220	9,480
Lactates, n. e. s.....	.....	1,100	6,170
Lactarine (casein).....	14,582,250	7,376,450	4,546,810
Germany.....	6,721,670	.....	.....
United Kingdom.....	2,263,040	3,422,020	.....
United States.....	3,917,170	2,040,620	.....
Lead:			
Carbonate.....	683,870	557,550	135,360
Chromate.....	10,140	13,000	63,710
Oxide.....	1,152,350	897,940	772,940
Salts, n. e. s.....	12,130	5,070	369,940
Magnesia, calcined.....	97,440	31,750	23,590
Magnesium:			
Carbonate.....	20,060	39,460	83,330
Chloride.....	110,890	22,050	13,230
Sulfate.....	406,750	176,370	121,250
Mercuric sulfide:			
In lumps, natural or artificial.....	.....	.....	440
Pulverized (vermillion).....	24,030	2,650	3,530
Methanol.....	215,390	47,840	722,460
Milk sugar (lactose).....	198,200	20,280	38,140
Nicotine salts.....	1,100	4,410	377,210
Phosphorus:			
Red.....	568,570	160,720	143,080
Japan.....	311,070	52,030	.....
Russia.....	.....	49,600	.....
Switzerland.....	67,240	22,270	.....
White.....	162,040	135,360	105,380
Potassium: ¹			
Acetate.....	8,380	880	440
Arsenate.....	35,050	21,160	7,720
Carbonate and crude potash.....	7,984,100	233,250	765,440
Belgium.....	4,196,720	.....	382,280
United Kingdom.....	3,021,650	4,630	880
Chlorate.....	2,037,510	4,173,350	1,742,750
British India.....	622,140	.....	.....
Italy.....	128,310	283,960	.....
Russia.....	24,690	3,358,960	.....
Chromate of potassium and sodium.....	24,470	350,310	1,043,010
Nitrate.....	1,561,090	39,460	101,850
Oxalate.....	7,720	5,730	440
Permanganate.....	36,820	41,450	8,160
Prussiate.....	1,207,250	445,330	242,290
Sulfate and bisulfite.....	186,730	29,760	17,420
Pyrolignites of:			
Calcium.....	695,120	132,940	855,390
Iron.....	588,630	53,350	42,550
Lead.....	34,180	71,210	36,380
Quinine, sulfate and other salts.....	40,790	24,470	12,130
Salts of thorium, cerium, etc.....	36,820	21,660	37,260
Silver salts.....	21,830	4,410	15,650
Sodium:			
Acetate.....	84,000	421,080	284,840
Arsenate.....	29,760	51,150	39,460
Bicarbonate.....	3,987,940	592,820	1,847,910
Carbonate (soda, natural or artificial):			
Crude.....	898,820	10,055,500	11,027,300
Algeria.....	582,680	29,100	.....
Italy.....	37,040	4,054,740	.....
Norway.....	.....	5,342,460	.....
Refined, not containing more than 38 per cent of pure carbonate.....	7,125,550	6,566,030	7,550,390
Refined, other.....	174,398,200	49,686,450	127,701,200
Algeria.....	3,656,140	5,734,880	.....
Belgium.....	96,006,010	132,720	.....
Netherlands.....	30,238,380	.....	.....
Switzerland.....	18,645,370	41,310,880	.....
Chlorates of sodium, barium, etc.....	1,787,950	44,588,700	8,054,810
Italy.....	284,840	1,801,180	.....
Russia.....	506,180	54,230	.....
Hydroxide (caustic soda).....	29,622,850	4,609,200	18,781,400
Belgium.....	14,977,100	.....	.....
Netherlands.....	6,277,660	.....	.....
Switzerland.....	5,887,660	2,976,020	.....
Tunis.....	144,840	584,220	.....
Hyposulfite.....	213,850	691,590	532,410
Silicates of sodium and potassium.....	653,230	2,427,950	1,017,880
Sulfate.....	53,302,700	38,957,440	10,947,930
Belgium.....	23,658,460	.....	.....
Brazil.....	.....	2,739,460	.....
Italy.....	19,364,520	34,268,430	.....

¹ See also Fertilizers.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Pounds	1916 Pounds	1919 Pounds
CHEMICALS (Concluded):			
Sodium (Concluded):			
Sulfate and bisulfite.....	234,130	331,790	302,030
Tetraborate (borax):			
Crude.....	1,964,760	326,500	551,160
Refined or semi-refined.....	9,378,460	2,154,800	1,633,190
Belgium.....	3,802,310	.....	.....
Netherlands.....	3,287,530	.....	.....
Switzerland.....	.....	855,390	.....
United Kingdom.....	1,577,180	1,033,080	.....
Salts, n. e. s.....	4,791,520	4,390,060	39,693,780
Tartrates:			
Cream of tartar.....	8,745,290	4,500,960	1,874,370
Australia.....	3,651,290	1,311,090	.....
United Kingdom.....	4,174,230	2,978,880	1,335,120
Crude tartar.....	18,681,310	8,250,800	11,516,950
United Kingdom.....	2,512,830	1,934,550	.....
United States.....	10,973,730	6,263,110	.....
Crystals of tartar.....	1,320	440	660
Wine lees.....	3,952,670	1,318,360	432,550
Other.....	5,730	24,250	449,740
Tin:			
Chlorides.....	79,150	48,940	342,600
Oxide.....	182,540	.....	100,970
Uranium oxide.....	4,630	17,860	4,850
Zinc:			
Oxide.....	7,899,160	5,069,090	3,508,000
Russia.....	1,180,790	232,150	.....
Spain.....	380,520	322,310	.....
United Kingdom.....	1,336,440	2,183,020	.....
United States.....	689,820	1,207,250	.....
Sulfate.....	17,860	67,680	49,380
Sulfide.....	4,630	.....	4,410
COAL-TAR PRODUCTS:			
Products obtained directly by distillation of coal tar.....	17,407,250	1,449,980	5,247,490
Products derived from products obtained by distillation of coal tar.....	663,810	678,580	3,703,100
Switzerland.....	236,120	579,150	.....
Dyes derived from coal tar:			
Alizarin, artificial.....	.....	.....	1,760
Picric acid.....	13,000	228,180	17,640
United Kingdom.....	.....	227,520	.....
Other dyes.....	916,900	134,480	536,380
United Kingdom.....	40,340	39,680	.....
United States.....	15,870	220	.....
Indo-China.....	580,040	25,570	.....
DYEING AND TANNING MATERIALS:			
Extracts of woods, barks, nuts, and berries used for dyeing:			
Black or violet.....	8,833,700	2,224,020	994,280
China.....	893,310	324,740	.....
Germany.....	2,652,600	.....	.....
United Kingdom.....	1,158,090	714,960	239,420
United States.....	90,610	65,260	.....
Garancine.....	1,100	4,410	440
Indigo, natural.....	71,210	55,120	408,740
Indigo pastil, indigo bluing.....	164,020	64,370	30,200
Orchil, prepared:			
Dried.....	28,000	148,810	11,460
Moist, in paste.....	25,350	142,640	49,160
Red or yellow.....	5,279,850	4,644,260	1,769,210
Italy.....	.....	1,349,450	.....
Spain.....	163,580	566,370	.....
United Kingdom.....	1,589,310	1,692,930	527,780
United States.....	332,900	186,290	.....
Extracts of woods, barks, nuts, and berries used for tanning:			
Chestnut and other.....	207,113,030	29,200,440	35,761,620
Belgium.....	30,011,080	.....	.....
Germany.....	37,854,690	.....	.....
Indo-China.....	253,530	793,440	.....
United Kingdom.....	97,079,440	26,012,780	.....
Nuttgalls and sumac.....	118,830	.....	3,090
Quebracho.....	18,754,500	471,790	26,273,150
Belgium.....	2,184,480	.....	.....
United Kingdom.....	5,958,430	.....	.....
Algeria.....	30,420	270,510	.....
EXPLOSIVES:			
Dynamite.....	1,455,270	12,994,710	366,190
Algeria.....	724,660	470,910	.....
Russia.....	.....	12,105,800	.....
Fireworks.....	430,780	71,430	86,640
Gunpowder.....	3,107,410	23,142,800	322,310
Algeria.....	1,525,380	517,870	.....
Italy.....	220,020	16,901,080	.....
Russia.....	.....	4,465,460	.....
FERTILIZERS:			
Ammonium sulfate, crude.....	Metric Tons	Metric Tons	Metric Tons
Algeria.....	1,036	1,328	203
Calcium nitrate and cyanamide.....	839	5,511	11
Fertilizers, chemical, n. e. s.....	403,296	3,078	135,194
Algeria.....	7,929	2,571	.....
Belgium.....	135,790	.....	.....
Germany.....	219,805	.....	.....
Italy.....	22,982	20	.....
United States.....	1,000	.....	.....
Potash:			
Muriate (chloride).....	127	17	3,000
Sulfate.....	730	144	40
Slag, basic.....	(1)	4,101	45,358
Sodium nitrate (Chile saltpeter).....	5,268	11,792	538
Superphosphate.....	145,226	12,363	6,209
Algeria.....	9,692	526	.....
Belgium.....	30,212	176	.....
Italy.....	20,974	530	.....
Portugal.....	11,815	1,550	.....
Spain.....	57,389	5,151	.....
Switzerland.....	5,524	1,538	.....

¹ Included under "Fertilizers, chemical, n. e. s.," in 1913.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS (Continued)

	1913 Gallons	1916 Gallons	1919 Gallons
MEDICINAL PREPARATIONS:			
Distilled waters:			
Alcoholic.....	97,798	33,154	40,472
Belgium.....	14,028		
Senegal.....	52,783	4,993	
	Pounds	Pounds	Pounds
Nonalcoholic.....	1,369,950	1,110,690	789,250
Argentina.....	155,200	181,000	
United States.....	517,640	311,290	
Other compounds.....	13,786,160	9,708,270	21,645,860
Argentina.....	2,270,760	1,471,800	3,102,560
Brazil.....	1,877,450	1,235,250	2,659,880
Cuba.....	1,083,570	1,653,250	
Mexico.....	1,065,050		
Spain.....	239,640	432,770	
United Kingdom.....	765,440	327,160	953,060
United States.....	479,280	359,570	
OILS, FIXED VEGETABLE:			
Castor and pulghere.....	7,177,370	1,148,730	1,162,060
Rumania.....		158,730	
Russia.....		168,430	
United Kingdom.....	1,035,290		
Coconut, touloucouna, illipe, palm nut.....	21,643,440	11,436,700	925,500
Italy.....	2,676,190	1,740,350	
Switzerland.....	3,819,290	4,678,210	
United Kingdom.....	3,046,570	487,880	
United States.....	6,794,200	2,373,270	
Colza.....	4,041,290	1,251,790	550,050
United Kingdom.....	582,460		
United States.....	897,060	653,670	
Cottonseed.....	2,035,750	275,140	89,290
Linseed.....	5,783,380	6,043,970	2,321,250
Algeria.....	1,514,360	640,000	
Switzerland.....	177,470	3,461,260	
Tunis.....	445,550	352,740	
Mustard.....		220	
Niger.....	9,040		
Olive.....	13,027,330	4,347,960	5,388,760
Belgium.....	2,672,880	119,710	
United Kingdom.....	1,270,740	335,760	
United States.....	2,292,800	762,780	
Palm.....	2,429,490	6,310,950	223,330
Italy.....	763,680	2,790,170	
Switzerland.....	420,200	1,040,140	
United Kingdom.....	414,910	87,300	
United States.....		1,869,740	
Peanut.....	53,427,920	25,860,880	4,399,760
Algeria.....	18,511,990	7,603,960	
Italy.....	6,799,940	150,800	
Switzerland.....	4,769,920	9,265,370	
United Kingdom.....	4,356,770	1,531,990	
United States.....	5,269,710	1,977,110	
Pepperyseed:			
Black.....	968,930	27,340	6,170
White.....	437,180	321,870	3,090
Rape.....	69,670		
Sesame.....	12,019,380	4,518,380	610,460
Algeria.....	5,117,590	1,826,530	
Bulgaria.....	495,160		
Switzerland.....	3,695,170	1,801,190	
United States.....	255,080	49,600	
Soy-bean.....	18,080		34,610
Other oils.....	4,347,070	709,890	729,730
Switzerland.....	906,100	129,630	
United Kingdom.....	247,140	135,140	
United States.....	83,110	103,840	
OILS, VOLATILE:			
Rose.....	3,627	12,965	4,083
Belgium.....	985		
Switzerland.....	1,389		
United States.....	474	3,693	
Rose geranium and ylang-ylang.....	14,284	133,294	28,263
Germany.....	2,765		
Spain.....	3,457	3,580	
Switzerland.....	2,381	18,667	
United States.....	84	61,600	
Other.....	1,923,310	1,124,800	1,643,100
Germany.....	302,690		
United Kingdom.....	645,290	229,500	
United States.....	502,430	255,520	
PAINTS, PIGMENTS, VARNISHES:			
Blacks:			
For engraving.....		440	3,090
Ivory.....	13,230	9,260	61,730
Lampblack.....	1,855,850	558,650	418,660
Belgium.....	433,650		
Germany.....	806,230		
Italy.....	206,570	192,680	
Mineral, in lumps.....	279,330	65,260	5,950
Mineral, ground.....	301,150	195,110	115,960
Blue, Prussian.....	220,240	178,350	206,130
Japan.....	23,370		
Tunis.....	37,260	5,730	
United States.....		27,780	
United Kingdom.....	13,890	48,500	
Carmines:			
Common.....	660	22,930	18,300
Fine.....	5,950	14,990	24,030
British India.....	4,850		
Colors:			
Ground in oil.....	7,768,870	3,160,550	3,146,220
Algeria.....	924,180	470,460	
Belgium.....	1,174,180		
United Kingdom.....	492,790	110,230	
United States.....	84,230	24,030	
In paste.....	794,760	419,100	284,620
Other.....	1,489,220	733,480	714,300
Green, mountain, Brunswick, and greens resulting from a mixture of chromate of lead and Prussian blue.....	49,160	8,380	42,550

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS (Concluded)

	1913 Pounds	1916 Pounds	1919 Pounds
PAINTS, ETC. (Concluded):			
Green, Schweinfurth, mitis green, mountain blue and green ashes.....	74,960	59,300	8,600
Lithopone.....	225,750	36,160	64,150
Ultramarine.....	3,784,670	3,182,590	2,735,050
Algeria.....	496,040	345,020	
Egypt.....	767,210	677,920	
United Kingdom.....	176,370	324,520	
United States.....		31,330	
Varnishes:			
Spirit.....	238,980	106,700	124,340
Turpentine, oil, or mixed.....	3,402,610	1,782,430	2,575,880
Belgium.....	686,300		
Italy.....	629,420	393,080	
Spain.....	249,560	283,960	
United Kingdom.....	326,940	110,230	
Zinc yellow, or chromate of zinc.....	1,100	3,310	3,970
PERFUMERY AND COSMETICS:			
Alcoholic.....	Gallons	Gallons	Gallons
Argentina.....	448,376	345,703	421,627
Belgium.....	69,979	47,710	
Belgium.....	35,504		
United Kingdom.....	56,849	34,423	
United States.....	32,467	48,952	
	Pounds	Pounds	Pounds
Nonalcoholic.....	5,333,860	5,394,930	6,045,300
Argentina.....	286,160	369,270	
Brazil.....	112,440	235,890	
Belgium.....	615,970		
United Kingdom.....	1,510,600	1,132,070	
United States.....	884,050	1,630,320	
Oils, fixed, scented.....	31,182	4,528	9,127
Synthetic perfumes.....	32,410	170,420	297,400
United Kingdom.....	7,500	41,890	
United States.....	3,310	84,440	
Toilet soap:			
Transparent.....	98,550	52,470	55,780
United States.....	20,940	5,070	
Other, scented.....	3,072,800	2,065,070	6,944,340
Algeria.....	251,770	568,570	
British India.....	23,370	172,620	
Indo-China.....	816,150	160,060	
United Kingdom.....	393,080	140,880	
United States.....	309,310	55,120	
MISCELLANEOUS PRODUCTS:			
Albumin.....	364,200	400,580	306,660
Germany.....	162,700		
United States.....	42,990		
Switzerland.....	18,960	352,740	
Blackening.....	1,691,600	2,251,140	1,636,710
Belgium.....	238,980	58,860	
Italy.....	235,010	1,005,090	
United States.....	26,010	22,270	
Candles:			
Tallow.....	188,720	168,650	109,350
Wax and other.....	6,772,160	5,651,770	5,358,330
Algeria.....	5,707,540	4,947,830	4,035,340
Madagascar.....	252,210	93,920	
Dextrin.....	306,220	253,750	123,460
Gelatin, in powder, sheets, etc.....	1,016,330	542,340	1,228,410
United Kingdom.....	624,130	231,050	
United States.....	118,830	43,210	
Glucose.....	347,450	230,600	173,720
Glue.....	16,605,000	5,560,060	7,107,920
Belgium.....	3,836,700		1,569,690
Germany.....	955,700		
United Kingdom.....	6,454,250	3,373,510	996,930
United States.....	912,270	241,400	
Inks:			
Drawing, in tablets.....	2,420	5,070	17,860
Writing or printing.....	4,376,610	2,644,890	2,623,060
Belgium.....	538,810	23,150	
Brazil.....	308,200	261,470	
Italy.....	321,430	309,970	
United Kingdom.....	756,190	379,200	
Isinglass.....	260,370	404,550	577,830
United Kingdom.....	3,300	74,520	
United States.....	19,840	139,330	
Paper and pulp:	Metric Tons	Metric Tons	Metric Tons
Pulp, mechanical.....	59	6	15
Pulp, chemical.....	594	117	25
	Pounds	Pounds	Pounds
Paper, fancy.....	3,924,230	1,533,100	1,546,540
United Kingdom.....	1,345,040	483,690	
United States.....	76,940	87,080	
Paper, other.....	90,756,590	66,659,840	43,470,300
Algeria.....	29,489,690	23,613,710	
Egypt.....	7,637,910	771,400	
United Kingdom.....	9,288,510	5,724,740	
United States.....	6,675,150	10,813,670	
Resin oil.....	58,420	128,090	65,480
Soap, common.....	77,568,530	53,463,410	44,304,090
Algeria.....	28,784,210	28,175,200	
Italy.....	8,830,390	4,567,100	
Switzerland.....	3,340,220	2,626,810	
Tunis.....	3,913,420	2,718,300	
United Kingdom.....	4,042,610	1,227,750	
United States.....	1,546,760	771,180	
	Metric Tons	Metric Tons	Metric Tons
Sugar (expressed in terms of re- fined).....	199,115	94,486	78,851
Tar.....	Pounds	Pounds	Pounds
Turpentine, resins, rosin, pitch, resin lumps and other indig- enous resinous products.....	1,153,900	454,590	384,260
Switzerland.....	90,159,570	67,470,700	114,201,640
United Kingdom.....	1,149,710	8,685,420	
United States.....	19,707,340	3,113,900	
Turpentine, spirits of.....	21,525,270	6,065,800	14,959,240
Italy.....	3,653,060	1,301,610	
Switzerland.....	3,244,760	2,091,970	